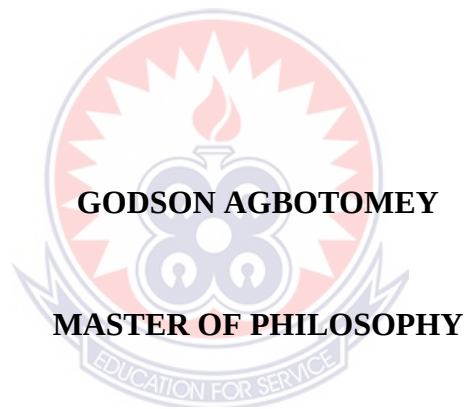


UNIVERSITY OF EDUCATION, WINNEBA

**Junior High School science teachers' views and practices of inclusive education
in the Shama District**



UNIVERSITY OF EDUCATION, WINNEBA

**JUNIOR HIGH SCHOOL SCIENCE TEACHERS' VIEWS AND PRACTICES
OF INCLUSIVE EDUCATION IN THE SHAMA DISTRICT**



**A thesis in the Department of Basic Education,
School of Education and Life-long Learning,
Submitted to the School of Graduate Studies, in partial fulfilment
of the requirements for the award of the degree of
Master of Philosophy
(Basic Education)
in the University of Education, Winneba**

OCTOBER, 2024

DECLARATION

Student's Declaration

I, Godson Agbotomey, declare that this Thesis, except quotations and references contained in published works which have all been identified and duly acknowledged, is entirely my own original work and it has not been submitted, either in part or whole, for another degree elsewhere.

Signature:

Date:

Supervisor's Declaration

I, hereby declare that the preparation and presentation of this work were supervised in accordance with the guidelines for supervision of the Thesis as laid down by the University of Education, Winneba.

Name of Supervisor: Prof. Sakina Acquah (PhD)

Signature:

Date:

Co-supervisor: Mr. Nixon Saba Adzifome

Signature:.....

Date:

DEDICATION

To my mother, Grace Tordzro.



ACKNOWLEDGEMENT

I wish to thank the Almighty God for His Grace and Mercy towards me throughout this work.

I would like to express my heartfelt gratitude to my supervisor, Prof. Sakina Acquah (PhD), HOD and a Lecturer at the Department of Basic Education of the University of Education, Winneba for her invaluable guidance, support, and mentorship throughout my research journey. Her expertise, encouragement, and constructive feedback have been instrumental in shaping my research and helping me reach this milestone despite her busy schedules. I am deeply grateful for the time and effort she invested in me. May the Almighty God guide, guard, and protect her always.

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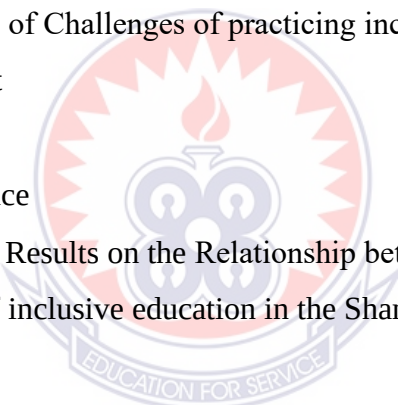
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ABSTRACT

The study examined the views and practices of inclusive education among JHS science teachers in the Shama District of the Western Region. The study had four research questions based on which a descriptive survey design was chosen. Eighty-eight (88) JHS science teachers were sampled using the census frame and stratified sampling technique. Multistage sampling technique was employed to select teachers for the study. Specifically, a census frame was used to include all the JHS science teachers during the questionnaire administration while stratified simple random sampling technique was used to select twelve (12) teachers for lesson observation. Data were collected with an observation checklist and a questionnaire. Descriptive statistics, such as frequencies, percentages, means, and standard deviations were used to analyse the data for the first three questions, while Pearson correlation was used to test the hypothesis. Several findings emerged from the study. First, the study found that teachers had mixed views about inclusive education; they saw its benefits but noted concerns like limited curriculum support and resources. Secondly, the teachers engaged in inclusive practices, such as reading non-verbal cues, monitoring learners with special needs, using varied teaching methods, and organising mixed-ability groups. However, they also faced challenges, including a lack of special education teachers, low parental support, limited resources, difficulty adapting materials, infrequent training, and large class sizes. Lastly, there was a weak but positive correlation between teachers' views and practices of inclusive education. The study concluded that while JHS science teachers in the Shama District understand inclusive education, they struggled with implementation of it. It recommended that the Shama District Education Directorate increase workshops on inclusive curriculum education and provide essential classroom materials to support teachers in gaining a better understanding of the inclusive education policy in Ghana and how to implement it in their science lessons.

CHAPTER ONE

INTRODUCTION

1.0 Overview

This chapter presents the introduction to the study. It includes the background, statement of the problem, research objectives, research questions, significance, delimitation, limitation and the organisation of the study.

1.1 Background to the Study

The teaching and learning of science in schools is very important for all education systems in the world. The impact of science is felt in all spheres of life making the subject crucial for the survival of humanity, present and future (Foxley, 2020). Echoing these sentiments, Fitzgerald et al. (2019) argue that science education should engage learners in inquiry-based activities, enabling them to develop a profound understanding and aptitude for scientific inquiry, ultimately fostering scientific literacy. The viewpoints of these authors underscore the significance of science education in society. In view of this, the subject has become the backbone of every technologically and economically developed country. To Issaka (2020), the inclusion of science as a compulsory subject in Ghana's pre-tertiary education curriculum further affirms the importance the country attaches to science education. Mohammed and Amponsah (2021) highlight science educators' desire to enhance learners' scientific literacy skills through the subject. Asano et al. (2021), in reinforcing the importance of the subject, suggested that science and technology play a key role in addressing the challenges of our ever-changing society. To this effect, science has become a core and compulsory subject in basic education in most African countries, including Ghana, as stated by Quansah et al. (2019).

Therefore, to produce more experts in the science and technology generation in the future, science education must be accessible and equitable for everyone (Ishak & Iksan, 2015). This reinforces the idea of inclusive education in science education. Agbenyega et al. (2023) cited in UNESCO (2017) views inclusive education as an educational process focused on removing barriers to the participation of all students and increasing every student's learning outcome. The concept of inclusion in education originated from the 1994 World Conference on Special Needs Education held in Salamanca, Spain (Ainscow, 2020). Initially, inclusive education was broadly defined as a means for schools to cater to all children, especially those identified as having special educational needs (UNESCO, 2017). However, in 2019, UNESCO refined the definition of inclusion to encompass the idea of ensuring equal access to high-quality learning opportunities for all learners (Ainscow, 2020). UNESCO (2017) further elaborated on this concept, explaining that inclusion involves reaching all individuals and addressing the needs of all students studying in schools. This means that any school system that seeks the participation of children with special needs in learning alongside their peers in regular schools is deemed as an inclusive education. Their ultimate goal is that through this, all children will have their needs met without discrimination in accessing quality education.

In Ghana, Darko (2015) highlights that the Education Strategic Plan (2010-2020) mandates the Ministry of Education to ensure the provision of equal and high-quality education for all learners, including those with physical and mental impairments, orphans, and students who are slower or faster learners. The plan emphasizes the inclusion of these learners, whenever possible, within the mainstream formal system. Only when necessary, should they be placed in special units or schools, in line with Article 25 (1) of the 1992 Constitution of the Republic of Ghana, which

guarantees equal educational opportunities and facilities for all learners. Sarpong and Kusi (2019) reported that Ghana has implemented various initiatives, including free and compulsory education, the Capitation Grant, the abolition of school fees, nutrition and school feeding programs, and the establishment of pilot inclusive schools across the country. This initiative ushered the nation into IE project in some districts at the start of the 2003/04 academic year. It started with 35 schools in 3 of the 10 regions of Ghana and progressed tremendously to 3022 inclusive schools in 48 of the 216 districts in Ghana (Deku & Vanderpuye, 2017). These pilot schools have been established in three regions: Central, Greater Accra, and Eastern Region.

Despite this initiative, Teo (2020) found that teachers are being confronted with the challenge to teach in increasingly diverse classrooms comprising a range of student learning needs including dyslexia, autism spectrum disorders, and attention deficiency. In Ghana, some researchers (Singal, et al., 2015; Asamoah et al., 2018) have indicated that there appears to be a gap between policy intent and practice as some Ghanaian traditions have produced firmly established practices with negative views about persons with disability, which have made inclusive education difficult to practice in the Ghanaian classroom. Asamoah et al. (2018) found that Ghanaian teachers generally find it difficult to meet the needs of students with severe disabilities in the general classroom. Similarly, Hsieh and Hsieh (2012) found that teachers think these students with severe disabilities in the general classroom would impede the goals of inclusive education by lowering academic standards. Opoku et al. (2017) also found that implementation has been a bit slower than expected, considering the resources that have been committed into the program, and duration of the program. In fact, enrolment of children with disabilities in mainstream schools within the period declined (Ministry of Education, 2018).

Teachers are the key resources and the most important determinant of quality education (Deku & Vanderpuye, 2017). In view of this, Hunter-Johnson and Newton (2014) suggest that the successful implementation of inclusive policies is greatly dependent upon the educators' acceptance of them. Mprah et al. (2023) argued that a major concern about the success of inclusive education in Ghana depends on the quality of teachers, which is reflected in their views and practice toward the program. Mprah and his colleagues were of the view that the success of any new educational programme, such as inclusive education, is highly dependent on the quality of teachers available. Well trained teachers in inclusive education are likely to have positive views and attitude required to create an enabling environment for children diverse needs to reach their full potentials (Garbutt, 2018). A positive attitude towards inclusive education, for example, is an indication of teachers' willingness to allow children with disabilities in their classrooms. Generally, it has been observed by the researcher that despite the apparent benefits of inclusive education, teachers generally have been concerned about the program.

Corroborating these challenges, several studies in Ghana (Ahiavi and Thomas, 2021; Boakye-Akomeah, 2015; Mprah et al., 2023; Nketsia and Saloviita, 2013) have reported mixed findings about teachers' views and practices of inclusive education. For instance, the study by Nketsia and Saloviita (2013) conducted in three colleges of education in Ghana revealed that although most of the teachers were introduced to the concept of inclusive education, just a few were prepared to teach children with special education needs. The teachers appeared to prefer inclusive educational strategies that were easier to apply. Another study by Mprah et al. (2023) found that JHS teachers in the East Mamprusi Municipality had little knowledge of inclusive education. It also revealed that classroom teachers were not adequately prepared towards the

implementation of inclusive education. In contrast, a study by Boakye-Akomeah (2015) found that inclusive JHS teachers in the Cape Coast Metropolis had knowledge and skills necessary to handle pupils with disabilities in inclusive settings, while adopting varied strategies to suit learners and were using alternative assessment strategies in assessing pupils in the classroom. They were also prepared to collaborate with other professionals to enhance inclusive education in the Metropolis. Similarly, Ahiavi and Thomas (2021) conducted a study in the Awutu Senya East Municipal and found that majority of the teachers viewed inclusive education as sound or good educational practice. The teachers believed inclusion would improve the academic abilities of students with disabilities, and so teachers were willing to tolerate or cope with special needs students placed in their classrooms. Availability of resources and other support services required to make inclusion workable, were however, inadequate. The study found out that teachers had not been adequately trained for inclusion and that there was the need for additional in-service courses to prepare them to implement it.

Amidst these challenges associated with the practice of inclusive education as well as the absence of such a study conducted within the Shama District, teachers' views of inclusive education, which influence their practices, must be evaluated in an effort to improve any deficiencies in the implementation of the inclusive education policy in the Shama District of the Western Region of Ghana.

1.2 Statement of the Problem

UNICEF in collaboration with the Government of Ghana has developed guidelines, including the disability Act, for an Inclusive Education Policy implementation to strengthen the education system and practice to realize the Sustainable Development Goal (SDG) 4. (Ministry of Education, 2015). The Shama

District, as one of the districts in Ghana, is characterized by its diverse population, including learners with different learning needs and abilities integrated into the mainstream education system (Shama District Assembly Report, 2023).

The Shama District, located in the Western Region of Ghana, characterized by its diverse population, including learners with different learning needs and abilities. As such, resource teachers have been assigned to various schools to assist the regular classroom teachers with managing the learning of learners with special educational needs. However, the researcher observed that some JHS teachers in the District do not give much attention to learners with special educational needs. Also, during cluster-based PLC meetings, teachers raised concerns about the challenges these learners face in understanding their lessons. Also, the researchers' personal conversation with some of these resource teachers revealed that teachers in the general classroom have difficulties in adapting the general curriculum to suite the learning needs of special need children. The researcher also observed that some teachers in his school turn to use assessment practices that alienate special need children. As a result of these practices in the general education, some of the special need children feel uncomfortable and thus, turn to be truant and finally, drop out of school.

A similar observation was shared by Mngo and Mngo (2018) that providing inclusive education has been a challenge as many countries have failed to provide quality inclusive education in their schools. The inability to establish effective inclusive schools has not been unexpected, because the policy of inclusion can only be effective if general education teachers embrace it and if schools have enough resources such as self-contained classroom, resource rooms, trained teachers and paraprofessionals needed to provide vital support to learners with diverse background (Mngo & Mngo, 2018). Other challenges reported included inadequate supply of

qualified teachers for the implementation of inclusive education in many countries, especially those in low-and-middle-income countries, such as Ghana (Global Campaign for Education and Education International, 2012; International Disability and Development Consortium, 2013).

In Ghana, the implementation of inclusive education is impeded by several challenges. Among these, Boakye-Akomeah (2015) citing Hayford found that most general education classroom teachers in Ghana have limited knowledge in identifying special need children. Regular classroom teachers usually express concerns about inclusive education. The author found that one of the concerns is that they lack the specialized training required to teach academic, social or adaptive behaviours to learners with diverse background. Ahiavi and Thomas (2021) also argued that key challenges that confront inclusive education delivery, some of which include huge number of teachers not trained in special needs education, inadequate specialized teaching and learning materials, and high teacher-pupil ratio of one teacher per class of about 80 pupils that remain in many basic schools. These challenges have led to the collapse of most pilot inclusive schools in Ghana. For instance, a report by the Awutu Senya District Directorate of Education (Second Annual Report, 2011), revealed that the District was experiencing increasing school enrolment of pupils, including those with disabilities. The report highlighted however, that some pilot inclusive schools established to accommodate the increasing population of children with disabilities had suffered various challenges leading to their collapse. Some of the challenges highlighted include teachers' ability and wiliness to handle the learners with diverse background.

Teachers' views on the inclusive education can have negative consequences on their instructional practices. A more positive view of teachers towards students

with special needs leads to a successful implementation of inclusive education in the mainstream classroom (Mngo & Mngo, 2018). If teachers have a negative attitude towards the implementation of inclusive education it can have damaging effects on the learning process and environment (Fine-Davis & Faas, 2014). Consequently, many experts have suggested that the success of inclusion depends on knowledge (Aldabas, 2020), instructional skills (Winter et al., 2021), and the attitudes and beliefs of general education teachers (Miyauchi, 2020) toward the inclusion of learners with special needs.

Considering how teachers views impede the implementation of the policy, literature abounds on the views and practice of inclusive education. However, the majority of studies that have targeted science teachers were conducted in non-Ghanaian settings (Padillo et al., 2024 in Malaysia; Teo, 2020 in Singapore; Phillips, 2021 in Finland; Almalky & Alwahbi, 2023; Paseka & Schwab, 2020 in Germany).

The few studies conducted in Ghana rather focused on general implementation of inclusive education (Mprah et al., 2023; Opoku-Nkoom & Ackah-Jnr, 2023; Ahiavi & Thomas, 2021; Vanderpuye et al., 2020; Deku & Vanderpuye, 2017). These studies failed to explore how inclusivity is specifically perceived and practiced by science teachers. Also, the Shama context seem missing from the previous studies. For instance, Vanderpuye et al. (2020) focused on teachers' attitude and resource need in the Cape Coast Metropolis. Deku and Vanderpuye (2017) focused on identified inclusive teachers' perspectives on the curriculum, the physical environment and their preparation for the inclusive education programme in the Cape Coast Metropolis. Mprah et al., (2023) conducted a qualitative study on views and attitude of inclusive education among teachers in the East Mamprusi Municipality. Ahiavi and Thomas (2021) investigated teachers' opinions about implementation of inclusion of children

with special education needs in regular schools in the Awutu Senya East Municipality of the Central Region, Ghana. In addition, Opoku-Nkoom and Ackah-Jnr (2023) investigated inclusive culture, environment and practices support the implementation of inclusive education in Ghanaian primary schools.

In the Shama District, studies on inclusive education are rather limited. For instance, Ahiamenyo and Mochiah (2022) conducted a similar study based on teachers' perspective of assessment policies and practices towards inclusive education in Ghana. The study was a quantitative study conducted in a special school and regular schools in the Shama District and the findings indicated that though teachers were positive about the importance of educational assessment towards the practice of inclusive education in Ghana, yet they had limited knowledge of its assessment practices and policies in Ghana.

Several gaps were identified with this study conducted in the Shama District. First, the study focused only on assessment at the expense of teachers' views and instructional practices. Again, the study used only five schools; 4 regular and a single special school, which cannot be enough justification to generalize its findings to all basic schools within the Shama District. Again, the nuance perspective of science teachers, responsible for training scientific and technological inclined citizens, were not the focus of the study.

In the Shama District, though the researcher has observed challenges with the practices of inclusive education, it is not known whether science teachers, as key actors in inclusive science education, have favorable opinion or otherwise, towards the inclusive programme as it is being implemented. As implementers of the policy, there is the need for a study to glean information from the teachers on what their views are

about their practice of inclusive education programmes. It is against this background that it is necessary to explore the views and practices of inclusive education among JHS science teachers in the Shama District.

1.3 Purpose of the Study

The purpose of the study was to examine Junior High School (JHS) science teachers' views and practice of inclusive education in the Shama District of the Western Region of Ghana.

1.4 Research Objectives

Specifically, the study sought to;

1. Find out the views of JHS science teachers about inclusive education in the Shama District.
2. Examine JHS science teachers' practice of inclusive education in the Shama District.
3. Identify the challenges JHS science teachers face in the practice of inclusive education in the Shama District.
4. Determine the relationship between views and practice of inclusive education among JHS Science teachers in the Shama District.

1.5 Research Questions

1. What are the views of JHS science teachers about inclusive education in the Shama District?
2. How do JHS science teachers practice inclusive education in the Shama District?
3. What challenges do JHS science teachers face in the practice of inclusive education in the Shama District?

4. What is the relationship between the views and practice of inclusive education among JHS science teachers in the Shama District?

1.6 Research Hypothesis

HO₁: There is no statistically significant relationship between the views and practice of inclusive education among JHS science teachers in the Shama District.

HA: There is a statistically significant relationship between the views and practice of inclusive education among JHS science teachers in the Shama District.

1.7 Significance of the Study

The study's findings would be beneficial and valuable to teachers, learners, Shama District Education Directorate as well as future researchers.

This study is important because it provides valuable insight into how Junior High School (JHS) science teachers in the Shama District view inclusive education. Understanding teachers' views is crucial because their attitudes and beliefs often influence how they teach and support all learners, including those with special educational needs. The findings will help education authorities and policymakers know whether teachers have a positive or negative outlook on inclusive education and what might need to change to improve their mind-sets.

In addition, the study assessed how teachers actually apply inclusive practices in their science classrooms. This is significant because knowing what teachers do in practice helps identify whether inclusive education is being implemented as intended. It also sheds light on whether teaching methods, lesson delivery, classroom organization, and student support are truly inclusive. This information can guide teacher training programs and in-service professional development.

The study also explores the challenges science teachers face when trying to include all learners in their classrooms. This is important because recognizing these challenges, such as lack of teaching materials, large class sizes, or limited training, can help education stakeholders provide the right support systems. This will draw their attention to the challenges they face, helping them to identify areas where they need further training and support. This can lead to more effective professional development programs and better teaching practices in the District. By understanding the difficulties teachers encounter, school administrators and district directors can develop strategies to address these barriers and make inclusive education more effective.

Again, the study examines the relationship between teachers' views and their actual classroom practices. This is important because it can show whether positive attitudes toward inclusive education lead to better implementation. If a strong link is found, it means that changing teachers' views could improve how they teach inclusively. On the other hand, if the relationship is weak, it may suggest the need for more practical support, regardless of their beliefs. This knowledge will be useful for education planners and policymakers in designing holistic interventions that target both mind-set and practice.

The findings would offer the Shama District Education Directorate actionable data to inform policies and interventions. The Directorate can use the results to design workshops on inclusive education programs, provide resources, and offer training that enhances teachers' ability to handle diverse classrooms effectively.

It would also contribute to the body of knowledge on inclusive education, particularly in the context of science education at the JHS level in Ghana. It will fill a gap in the literature by exploring the specific challenges and views of teachers in the

Shama District, adding localized insights to global discussions on inclusive education. Lastly, future researchers can build on the findings to explore other areas of inclusive education, such as the impact of teacher training programs or parental involvement in inclusive education practices.

1.8 Delimitation

The scope of this study was restricted to Junior High School (JHS) science teachers in the Shama District of the Western Region of Ghana. It focuses specifically on their views, practices, and challenges related to the implementation of inclusive education. The study does not cover teachers of other subjects or those teaching at the primary or senior high school levels. Additionally, the study is limited to inclusive education within the context of science teaching and does not examine inclusive practices in other academic disciplines. The study further concentrates on the relationship between teachers' views and their actual classroom practices, and therefore does not explore student outcomes or parental involvement. These boundaries were set to ensure a more focused and manageable investigation within the available time and resources.

1.9 Limitations

While this study provides valuable insights into Junior High School (JHS) science teachers' views, practices, and challenges in implementing inclusive education in the Shama District, it is important to acknowledge certain limitations. First, the study relied primarily on quantitative data collected through structured questionnaires and observation checklists. Although these tools are effective for collecting measurable data, they may not capture the deeper explanations, personal experiences, and contextual factors that influence teachers' attitudes and classroom practices. Secondly, the study was limited to only JHS science teachers in one district. This restricts the generalizability of the findings to other subject areas, districts, or educational levels.

Also, the study did not include the perspectives of learners, school heads, or parents, whose insights could have enriched the understanding of inclusive education in practice.

1.10 Operational Definition of Terms

JHS Science Teacher- teachers handling science as a subject from basic 7 to 9 in the Shama District of the time of the study.

Inclusive Education (IE) - an approach that values diversity and promotes the participation of all learners, regardless of their abilities, backgrounds, or needs in a supportive and welcoming learning environment. It aims to provide equal opportunities for all learners to learn, grow, and succeed together.

Views of Inclusive Education - the beliefs towards creating learning environment that value diversity for all learners to learn and succeed.

1.11 Organisation of the Study

The research was organized into five chapters. Chapter one of the study deals with the introduction of the study, including aspects like the background to the study, the statement of the problem, the purpose of the study, objectives of the study, research questions and hypothesis, the significance of the study, delimitations and operational definition of terms. Chapter two deals with the review of relevant literature on science education and inclusivity. The third chapter describes the research methods in terms of

the research paradigm, approach, design, the study area, the population, the sample, and the sampling techniques used. It also included a description of the data collection instruments, reliability and validity issues, data collection procedures, methods used to analyze the data and how ethical issues were considered. Chapter four provides the results as well as the discussion of the results of the data collected for the study. The last chapter, five, provides a summary of the study, and the findings, draws conclusions, and offers recommendations.



CHAPTER TWO

REVIEW OF RELATED LITERATURE

2.0 Overview

The chapter gives a review of current and relevant literature on teachers' views and practices of inclusive education. To achieve this goal, the researcher reviewed books, journals, and papers and conducted a web-based search for academic materials. The empirical review critically examined the research already conducted on the subject while attempts were been made to discuss the relevance of the two theories: CAST (2018) Universal Design for Learning (UDL) and UN (2015) Sustainable Development Goals 4. This is followed by a conceptual review, conceptual framework, empirical evidence and finally a summary of the literature review.

2.1 Theoretical Framework

This research is guided by two key theories: UN (2015) Sustainable Development Goals 4 and CAST (2018) Universal Design for Learning (UDL) as follows:

2.1.1 Universal Design for Learning (UDL)

This study is grounded in the Universal Design for Learning (UDL) framework, which serves as a suitable theoretical lens for understanding how inclusive education can be effectively implemented in science classrooms at the Junior High School (JHS) level. UDL is a research-based educational framework that aims to improve and optimize teaching and learning for all people based on scientific insights into how humans learn (CAST, 2018). The Universal Design for Learning (UDL) is an educational framework developed to address the diverse learning needs of learners by promoting flexibility in teaching methods, assessment, and classroom environments.

The concept of UDL originated from the field of architecture, where universal design was used to ensure that buildings and physical environments were accessible to all individuals, including those with disabilities (Mace, 1998). This idea was adapted into education by the Centre for Applied Special Technology (CAST) in the 1990s, with David H. Rose and his colleagues playing a key role in its development (Rose & Meyer, 2002).

The Universal Design for Learning (UDL) framework is built on three core principles, each aligned with a distinct brain network involved in the learning process (CAST, 2018). The first principle, Multiple Means of Representation, relates to the recognition network, or the “what” of learning. It emphasizes presenting information in diverse formats to meet the different ways learners view and make sense of content. For instance, science teachers may use visual diagrams, hands-on experiments, digital simulations, and oral explanations to support understanding (Rose & Dalton, 2009). The second principle, Multiple Means of Engagement, is associated with the affective network, or the “why” of learning. This principle focuses on motivating learners by offering choices, encouraging collaboration, connecting content to learners’ interests, and creating emotionally supportive learning environments that sustain engagement and effort (Meyer, Rose, & Gordon, 2014). The third principle, Multiple Means of Action and Expression, ties to the strategic network, or the “how” of learning. It encourages providing learners with varied options to express what they know, including oral presentations, written tasks, drawings, dramatizations, or technology-based outputs. This approach accommodates diverse learning styles and supports learners who may experience motor, language, or executive function difficulties (CAST, 2018).

In practice, UDL entails proactive and intentional curriculum design that anticipates learner variability rather than reacting to it after the fact. Teachers adopting

UDL are encouraged to develop clear and flexible learning goals, use a variety of instructional materials, conduct continuous formative assessments, apply adaptable teaching methods and tools, and support learner autonomy (Rose & Meyer, 2002). These elements create inclusive classroom environments where every learner, regardless of ability, can access, engage with, and succeed in learning.

The adoption of UDL as the theoretical framework is justified by the inclusive nature of the study, which focuses on the diverse needs of learners in mainstream JHS science classrooms. UDL promotes proactive curriculum planning that anticipates learner variability rather than retrofitting instruction to accommodate learners with special needs. This makes it especially relevant in the context of Ghana's inclusive education policy, which encourages the integration of all learners including those with disabilities into regular classrooms.

By applying the UDL framework, this study examines whether and how JHS science teachers in the Shama District plan and deliver lessons that provide access and participation opportunities for all learners. It also explores how teachers' views and practices align with the UDL principles, and whether the challenges they face stem from a lack of resources, knowledge, or systemic support to implement inclusive strategies effectively. The framework is particularly useful because it moves beyond mere physical access to education and addresses cognitive, emotional, and social access. It allows for an analysis of not just what teachers do, but how and why they make instructional decisions that affect learner inclusion. Thus, UDL provides both a conceptual and practical structure for understanding inclusive education in science teaching, making it an appropriate and comprehensive theoretical lens for this study.

2.1.2 UN (2015) Sustainable Development Goals 4

The primary theoretical framework for this study was based on Sustainable Development Goal 4 (SDG 4), which was established in 2015 following the Millennium Development Goals (MDGs). SDG 4 emphasizes the need for inclusive and equitable quality education for all individuals (United Nations [UN], 2015). Specifically, Target 4.5 aims to eliminate gender disparities and ensure access to education for persons with disabilities, while Target 4.a focuses on improving educational facilities to be accessible and friendly for all children, including those with disabilities (UN, 2015; Naami & Mort, 2023).

In Ghana, the government has made notable progress in incorporating the SDGs into its national development strategies, reflecting its commitment to the “Ghana Beyond Aid” vision, which prioritizes long-term economic and social development (Republic of Ghana, 2019). This integration underscores the significance of inclusive education as a fundamental component of broader developmental goals, aiming to enhance educational access for all learners.

The emphasis on inclusive and equitable education in SDG 4 aligns seamlessly with the objectives of this study, which seeks to examine teachers’ views and practices regarding inclusive education. By framing the study within this global and national context, we can better understand how teachers in the Shama District are contributing to the realization of inclusive education in Ghana. Moreover, this framework allows the researcher to explore how local challenges faced by teachers in the Shama District relate to global commitments toward educational equality and inclusivity.

2.2 Conceptual Review

2.2.1 Conceptualizations of Inclusion Education

The concept of inclusive education originated at the 1994 World Conference on Special Needs Education in Salamanca, Spain (Ainscow, 2020). Initially, inclusive education was defined as a framework for schools to accommodate all children, especially those identified as having special educational needs (UNESCO, 1994). In 2019, UNESCO updated this definition to emphasize equal access to quality learning opportunities for everyone (Ainscow, 2020). They clarified that inclusion means reaching all individuals and addressing the needs of all students in educational settings (UNESCO, 2017). Ikhwanudin and Suryadi (2018) describe inclusive education as a system that allows children with special needs to learn alongside their peers in regular schools. Their goal is to provide as many children as possible with access to quality education, catering to individual learner needs without discrimination.

Inclusive education is often framed as “a systematic strategy to address students' various needs, increase active participation, and eliminate exclusion both within and outside educational contexts” (Billingsley & Bettini, 2019). This comprehensive definition goes beyond just disability issues to encompass effective teaching methods, student attendance, engagement, and academic performance. It advocates for the inclusion of all students, particularly those facing various challenges and at risk of marginalization (Ainscow, 2020). The Salamanca Declaration was produced in 1994 as a foundational document in understanding the implementation of inclusive education. The term inclusive education is the integration of a child with impairment into conventional classroom settings, where they study and participate alongside their non-disabled peers. Extensive study has shown that when an individual with impairment attends lessons with counter parts, they benefit (Florian, 2019). During the 2008

UNESCO conference held in Geneva, the crucial nature of inclusive education in tackling rising inequality, spatial division, and cultural fragmentation was emphasized. Furthermore, Ainscow et al. (2019) stressed the necessity for equality to be essential to fundamental decisions regarding policies, instead of being restricted to ancillary measures targeted at mitigating the repercussions of overarching policies that do not correspond with justice and preventative principles. Schooling for all and the elimination of boundaries to participation and learning are vital additives riding instructional reforms and aligning with broader rules along with poverty reduction, improved maternal and toddler fitness, gender equality promoting, environmental sustainability, and international collaboration.

In 2010, after meeting of a High-Level group on Education for All, a declaration was issued reaffirming the critical role of education in fostering equitable and peaceful societies as well as encouraging long-term economic and social growth (Eikeland & Ohna, 2022). It was suggested after the meeting that there should be emphasis placed on the importance of proof-primarily based, inclusive education regulations in accomplishing marginalized populations and meeting the instructional needs of all people, irrespective of age, country of origin, ethnicity, sex, disability, religion affiliation, social status, or other factors. The suggestions also emphasized the need to document and share satisfactory educational practices in all facets of exceptional education. Those covered trained teachers, pedagogy, applicable curriculum and resources, medium of instruction, optimal application of technology, and get admission to open instructional sources.

According to Rouse (2010), difficulties concerning the variety and accessibility of educational possibilities are not unique to third-world countries; signs of such challenges can also be seen in wealthy countries. According to Rouse (2010), even in

countries with well-established compulsory education systems, not all children have pleasant experiences or substantial effects from their time in school upon completion. Inclusion education may be characterised as all students' participation (guaranteeing equal opportunity to education) involvement (guaranteeing a meaningful educational experience according to the learners' view), and accomplishment (focused on educational engagement and results throughout all subjects). According to Mensah et al. (2022) Education that is inclusive is a never-ending process that attempts to provide a high-quality education while recognising diversity, responding to students and communities' different needs, abilities, traits, and learning expectations. Its overarching purpose is to eradicate all types of discrimination.

Children who have impairments are urged to respect their societal, and educational entitlements and to participate fully in class. Inclusion teaches students with disabilities skills that they may apply both inside the classroom and the outside world. educational institution that are completely inclusive are becoming increasingly rare, no difference between "general education" and "special education" programmes; but rather, the educational institution has been restructured so that all students may learn together (Kent & Giles, 2016). In general, the teacher's role as it relates to learners with learning disabilities needs has shifted drastically in recent years in Ghana. Previously, instructors were primarily supposed to identify extraordinary students in order to rate them in order to provide for special education, but recently they have regular education in accordance with the concepts of mainstreaming, standardization, and inclusiveness (Madani, 2019).

Inclusive education has been widely defined as a process intended to respond to students' diversity by increasing their participation and reducing exclusion within and from education (Nguyet & Ha, 2010). This definition considers inclusive education

beyond disability issues and includes quality teaching, the attendance, involvement and achievement of all students, especially those who, for different reasons, are excluded or at risk of being marginalized (Byrd & Alexander, 2020).

The Salamanca Statement on Principles, Policy and Practice in Special Needs Education (Salamanca Declaration) from 1994 is the cornerstone of understanding the practice of inclusive education. Inclusive education happens when children with and without disabilities participate and learn together in the same classes. Research showed that when a child with disability attends classes alongside with his/her peers who were not having any disability, it benefits the child with disability (UNESCO, 2017).

Boakye-Akomeah (2015) explained that for a long time, children with disabilities were educated in separate classes or in separate schools. This has made most people to be used to the idea that special education meant separate education. Educating the public on this issue has made it such that it is now known that when children are educated together, positive academic and social outcomes occur for all the children involved. It is also known that simply placing children with and without disabilities together does not produce positive outcomes. Inclusive education occurs when there is ongoing advocacy, planning, support and commitment.

Inclusive education is seen as a process that believes all children, including those with special educational needs and disabilities (SEND), can learn when education systems, schools, and teachers provide the right support. This approach aims to reduce educational inequality and unfairness, gaining significant attention both globally and in Ghana. Stubbs (2008, p. 18) emphasizes that "inclusive education is a statement of everyone's fundamental right to access education and not be excluded." This shift in educational ideology benefits not just the learners but also parents, teachers, school leaders, and the wider community (Ackah-Jnr, 2022; McLeskey et al., 2018). Research

shows that quality inclusive practices can lead to advantages for all learners, particularly those with learning and support needs (LwSEND), such as fostering friendships, enhancing peer support, and improving acceptance (Ackah-Jnr, 2016).

The fundamental principle of the inclusive school is that all children should learn together, wherever possible, regardless of any difficulties or differences they may have. Inclusive schools must recognize and respond to the diverse needs of their students, accommodating both different styles and rates of learning and ensuring quality education to all through appropriate curricula, organizational arrangements, teaching strategies, resource use and partnerships with their communities. There should be a continuum of support and services to match the continuum of special needs encountered in every school (Salamanca Framework for Action, 1994 as cited in Boakye-Akomeah, 2015).

Inclusive education is based on the principle that all children, including those with disabilities, have the right to learn in the same classroom as their peers without disabilities. This right is protected by the Individuals with Disabilities Education Act (IDEA), which emphasizes that children should be placed in the least restrictive environment suitable for their learning. This means they should not be isolated or taught separately unless absolutely necessary. With the right support and services, students with disabilities can participate in general education classrooms. As a result, many schools are now adopting inclusive practices, and studies have shown that this approach benefits not only students with special needs but also their peers (Jorgensen, 2018).

The introduction of inclusive education has brought significant changes to the roles of both general education teachers and Para educators. In traditional classrooms, general education teachers handled most teaching responsibilities, while students with disabilities were often taught separately or given minimal support. Today, Para

educators play a much larger role in the classroom. They not only assist the main teacher but also help students with disabilities by re-teaching lessons, providing one-on-one support, and helping with class activities. This shift means Para educators have greater responsibility and are vital to ensuring that students with special needs receive the help they need to succeed within the general classroom (López-Torrijo & Mengual-Andrés, 2015).

However, the concept of inclusive education does not have a single, fixed definition. It varies between schools and even among teachers. While some educators define inclusion as focusing mainly on students with disabilities, others view it more broadly. Inclusion can also involve addressing differences in students' backgrounds, such as gender, culture, language, socioeconomic status, and learning abilities. Ruwandi (2012) argues that inclusion should go beyond disability to embrace all forms of diversity in the classroom. This means that inclusion is not just about placing students in the same room but about understanding and meeting their unique learning needs.

Inclusive education, therefore, is a belief that every student belongs in a supportive and respectful learning environment. Ruwandi (2012) stresses that true inclusion means providing every learner with a sense of belonging and equal opportunity to participate in school life. This includes not only students with disabilities but also gifted learners (TAG), English learners (EL), and students from different cultural or family backgrounds. Inclusion encourages schools to embrace diversity and adapt teaching practices to support all students. Yet, not everyone agrees with this broad view of inclusion, and different opinions continue to shape how schools implement inclusive practices.

A major area of debate in inclusive education is whether students with special needs should be placed in the same classrooms as their peers or taught separately. Some

people believe that separating these students denies them equal rights and access to quality education. Others argue that students with more severe disabilities may require special environments where their unique needs can be addressed effectively. Additionally, inclusion is no longer only about special education; it also covers other groups like EL and TAG students. This shows that inclusion is not just a method but a belief system. It requires careful planning, shared responsibilities, enough resources, and the willingness of both mainstream and special schools to work together (Marin, 2014).

Successful inclusive education depends heavily on collaboration and resource-sharing between teachers, support staff, and school leaders. Ní Bhroin and King (2019) point out that teamwork and mutual respect are crucial in making inclusive practices effective. Each educator brings different expertise to the classroom, and when they work together, they create a learning environment where all students feel supported. Without this partnership and clear understanding of each person's role, inclusive education may not be successful.

Although inclusive education is becoming more common, challenges remain. In the past, many believed that students with special needs had lower abilities and did not belong in regular classrooms. Today, this view is changing. These students are now seen as capable of learning with their peers if they are given the right support. Still, many teachers feel unprepared to teach students with special needs, especially at the secondary level. Most secondary school teachers are trained in specific subjects and may not know how to adjust lessons for students with diverse learning needs (Sengupta et al., 2019). This lack of training makes it hard for them to implement inclusive teaching strategies effectively.

Importantly, inclusive education does not mean simply putting students with disabilities in the same classroom as everyone else. It also involves providing the necessary support systems, such as additional teachers, teaching materials, and individualized strategies, to help them succeed. Şahan (2021) emphasizes that for inclusive education to work well, all teachers must receive proper training. They need to know how to support students with special needs, how to work with Para educators, and how to create classrooms where every child can learn and participate fully.

This makes it imperative to examine how schools implement inclusive practices as it can help us understand both the benefits and challenges of inclusive education. It can also highlight the advantages that schools gain from adopting inclusive approaches. According to the 2010 Census, around 100,000 children in Ghana aged 6 to 14 had various disabilities, with over 16,000 of these children not attending school (Ghana Statistical Service, 2012). This number is likely an underestimate, as many children with special educational needs and disabilities (CwSEND) are not reported due to cultural and social stigma. These children often face teasing and discrimination, which restricts their access to education and social opportunities. In schools, those with learning and support needs (LwSEND) are at a high risk of being excluded. Globally, millions of these children are denied inclusive education, and during the COVID-19 pandemic, about 40% of low- and lower-middle-income countries were unable to support disadvantaged learners, worsening their exclusion from schools (UNESCO, 2020).

2.2.2 Inclusion Education in Ghana

People with disabilities make up about 15% of the world's population, with about 80% living in developing countries like Ghana (World Health Organization, 2018). According to the 2021 Ghana Population and Housing Census, people with

disabilities account for about 8% (2,098,138) of Ghana's total population of 30,832,019 (Ghana Statistical Service, 2012). However, other reports suggest that this number might be much higher, with the 2012 Human Rights Watch report estimating over 5 million people with disabilities in Ghana (United States Department of State, 2017). This figure aligns with the World Health Organization's estimate that 15–20% of every country's population has some form of disability (World Health Organization, 2018). The actual number of people with disabilities may be underestimated due to various challenges in collecting disability data, such as societal attitudes, differing definitions of disability, and stigma, which can lead individuals to conceal their disabilities. The number is likely to increase due to factors like chronic illnesses, injuries, and aging (Howard and Rhule, 2021; World Health Organization, 2021).

In 1994, UNESCO held a World Conference on Special Needs Education in Salamanca, Spain, which called for the education of students with disabilities within an inclusive education system (UNESCO, 1994). Ghana, committed to providing all children with the chance to exercise their rights through inclusive education, ratified several international agreements, including the United Nations Convention on the Rights of the Child (CRC) and the Convention on the Rights of Persons with Disabilities (CRPD). These agreements emphasize the need for measures to ensure that people with disabilities can access education and lifelong learning opportunities. The Sustainable Development Goal 4 aims to "ensure inclusive and equitable quality education and promote lifelong learning opportunities for all" (United Nations [UN], 2015).

Despite growing awareness and advocacy for including students with disabilities in regular classrooms, the situation in many developing countries, including Ghana, remains challenging (Adera and Asimeng-Boahene, 2011). Students with

disabilities often face barriers to accessing education, resulting in lower academic achievement compared to their peers without disabilities (World Health Organization, 2018). These barriers include negative attitudes, lack of proper teaching methods, institutional challenges, and physical accessibility issues (Nakua et al., 2017; Braun and Naami, 2021). The Government of Ghana has identified several factors hindering school attendance for people with disabilities, such as public misconceptions, physical barriers, inadequate assessment facilities, a rigid curriculum, and insufficient planning by regular teachers to accommodate special needs (Government of Ghana, 2015).

To address the challenges faced by students with disabilities in Ghana, various education stakeholders have worked hard to adopt inclusive education principles. In 2015, the country developed and adopted a policy on inclusive education to support the 1992 constitution, which recognizes education as a fundamental human right. The main aim of this Inclusive Education (IE) policy is to help schools identify children with different learning needs and implement suitable curricula to meet those needs (Ofori, 2018).

The policy defines inclusion broadly, focusing on ensuring access and learning for all children, especially those disadvantaged due to language, ethnicity, gender, geography, or economic background, as well as children with special needs, including disabilities. According to the policy (2015, p. 6), a child with special educational needs (SEN) includes those with disabilities like visual, hearing, mobility, or intellectual impairments. However, the policy also includes children who are struggling in school for various reasons that hinder their learning and development.

Darko (2015) posit that the Education Strategic Plan (2010-2020) mandates the Ministry of Education in Ghana to ensure the provision of equal and quality education

for all learners including those with physical and mental impairments, orphans, and those who are slow or fast learners, by including them, wherever possible, within the mainstream formal system or, only when considered necessary, within special units or schools buttressing Article 25 (1) of the 1992 Constitution of the Republic of Ghana, which require that all learners have equal right to equal educational opportunities and facilities. As such various initiatives such as the free, compulsory education, capitation Grant, abolition of school fees nutrition and school feeding programmes as well as the institution of pilot inclusive schools across the country have been instituted with the aim of fully realizing the goals of the inclusive education policy of the country. Pilot schools have been instituted in three regions: Central, Greater Accra and Eastern Region (Sarpong & Kusi, 2019).

According to Boakye-Akomeah (2015), inclusive education in Ghana, had begun since 1951–Accelerated Educational Plan and the 1961 Educational Act for free education which resulted in increases in basic enrolment. Then the Jomtien World Conference in Education of Education (1990) for all set the goal of Education for all. UNESCO alongside with other UN Agencies and NGOs worked towards the achievement of this goal together with the efforts made at the country level. For example, the 1992 Constitution had emphasized the Free Compulsory Universal Basic Education (FCUBE - 1995) which also increased access to basic schools. It has been observed that though FCUBE had provided access to a lot of children to attend school, this did not provide what it takes to run an effective inclusive education. Rather, access to special schools was possible for some and those integrated had no equal opportunity. Society or educational systems had not changed, the child was rather expected to change – to have hearing aid; the teacher or peer are not expected to learn to sign; the child has to pass the standardized test in class to be promoted or if he fails to he repeats or drops

out. Contributions of UNESCO Teacher Education Resource Pack of 1995/96 started with Education of Teacher of Training Colleges as Trainer of Trainers at Saltpond. Series of workshops were held in many parts of the country to impact quality teaching for all children of diverse abilities in regular schools (Afolabi, 2014).

In the 2015, the Ministry of Education in Ghana introduced a significant initiative known as the Inclusive Education Policy. This policy had the core purpose of this policy of bring about a transformation in how education was imparted and managed, ensuring it could cater to the unique requirements of every learner, regardless of their background or abilities (Ministry of Education, 2015). Again, Ghana's 2015 plan of action focuses on mainstreaming students with disabilities by 2015. As a result, certain schools have experimented with inclusive education until 2015, when it will be completely adopted throughout the country (Esp 2003-2019). The government intends to provide equitable educational opportunities at the pre-tertiary level for youths and children with special needs in order to encourage access and participation, quality, and inclusion (Mensah, 2020).

In Ghana, these students include various categories of persons with varied educational needs in Ghana include but not limited to persons with hearing impairment, persons with visual impairment, person with intellectual disability, persons with physical disability, person with deaf-blindness, children placed by natural catastrophes and social conflicts, nomadic children, children living in extreme social and economic deprivation, children for financial purpose, orphans, children with HIV/AIDS and children who are not living with their biological parents (Ministry of Education, 2015) Ataman (2019) adds that Inclusive education concerns the process of adaptation of individuals who need special education to education in normal schools. Inclusion education requires identifying the needs of individuals, differentiating the teaching

methods and making feedback (Özmen, 2019). This allows for the inclusion of individuals in society (Nunez, Rosares, 2021).

Ghana has embraced the global push for inclusive education and has initiated several programs to ensure its successful implementation. This shift began between 2003 and 2018, during which Ghana created multiple Educational Strategic Plans (2003, 2010, and 2018) to guide the new educational policy (Government of Ghana, 2015). Some schools started piloting this new approach, but the implementation has been slower than anticipated given the resources invested and the program's duration (Opoku et al., 2017). In fact, the enrolment of children with disabilities in mainstream schools actually decreased during this time (Ministry of Education, 2018). Various factors have contributed to the challenges faced in implementing inclusive education, with a significant issue being the quality of teachers. This is evident in their views and attitudes toward the program. Despite recognizing the benefits of inclusive education, many teachers have expressed concerns regarding the academic, social, and behavioral adjustments needed for children with disabilities and how these adjustments impact educational outcomes (Mitchell & Sutherland, 2020; Shogren et al., 2015).

Ghana's education policy encourages schools to recognize and address the different needs of students, adapt to various learning styles and paces, and provide quality education through suitable curricula, organization, teaching methods, and collaboration with the school community (Ministry of Education, 2016). The goal of inclusive education is to transform educational systems, create supportive environments, equip schools, and change how people view all learners. It is based on the idea that when children learn and play together, share resources, and enjoy each other's company, it helps build an inclusive society (Sapon-Shevin, 2007). Ghana's Sustainable Development Goals (SDGs) 4, 10, and 16 aim to create an inclusive society

by 2030, a vision echoed in the Salamanca Statement and Framework for Action, which states that inclusive regular schools are the best way to fight discrimination, foster welcoming communities, and achieve education for all (UNESCO, 1994). These documents, along with others like the Moscow Framework for Action (UNESCO, 2010), urge governments, including Ghana, to not only support inclusive schooling but also provide the necessary resources and make practical changes to promote the education and socialization of all students, enhancing their participation and contribution to society (Ackah-Jnr and Danso, 2019). While inclusive education is part of daily classroom life, various factors affect how well it is implemented. It's essential to identify supportive inclusive cultures (Booth and Ainscow, 2016), physical environments (Ackah-Jnr and Danso, 2019; Gyimah, 2021; Maciver et al., 2018), and inclusive practices (Agbenyega and Klibthong, 2022; McLeskey et al., 2018; Sharma et al., 2021) in schools.

Ghana's inclusive education policy aims to create a school system that meets the diverse needs of all learners, ensuring they have the best chances to succeed. A major part of this policy is the idea of Universal Design for Learning, which provides different ways for students to learn, express themselves, and stay engaged based on their interests (Fontdevila & Grek, 2020; Johnstone, Schuelka, & Swadek, 2020). The policy promotes child-friendly schools, meaning schools should focus on children's needs and be centered around them. The policy also highlights the need for a flexible curriculum that teaches all children fairly. It encourages early help for students who need it, active participation from everyone involved, and teamwork with NGOs, parents, and the government. Additionally, it emphasizes the importance of positive attitudes from teachers and the ongoing evaluation of how well students with disabilities are educated (Kassah, Kassah, & Agbota, 2012; Naami & Mort, 2023).

This policy recognizes that all children can learn, no matter their age, gender, ethnicity, language, or disabilities. It states that every child has the right to basic education and that the education system should adapt to their needs. The policy aims to build educational structures and methods that support all children, helping to create a more inclusive society (Leal Filho et al., 2019). Finally, the curriculum should consider each child's background, community resources, values, interests, and future goals. The policy stresses that teachers need training in teaching methods that work well for children with special needs. It focuses on three main ideas: setting appropriate learning goals, meeting diverse needs, and breaking down barriers to learning. It also requires a thorough assessment process for all students and encourages alternative assessment methods to support everyone's learning needs (Naami & Mort, 2023; Kassah, Kassah, & Agbota, 2012).

Ghana's Inclusive Education (IE) Policy is designed to build an educational system that is inclusive, equitable, and responsive to the diverse needs of all learners. The central goal of the policy is to provide equal learning opportunities and support for every child, regardless of background or ability (Ministry of Education [MoE], 2015). One of the key principles underpinning the policy is Universal Design for Learning (UDL), which promotes the use of varied instructional methods. Through UDL, learners are supported using multiple forms of content representation, means of expression, and opportunities for engagement and motivation, ensuring that instruction aligns with learners' interests and capabilities (CAST, 2011; MoE, 2015).

The policy also advocates for the creation of child-friendly schools, encouraging institutions to be both child-seeking and child-centered. This means schools should actively identify and support all children, particularly those at risk of exclusion, and prioritize the holistic well-being and learning needs of each child (UNICEF, 2009;

MoE, 2015). Furthermore, the IE policy calls for a flexible and inclusive curriculum, placing a duty on schools to teach all learners without discrimination, implement early intervention strategies, and promote active participation of children with special needs. It also encourages collaboration among stakeholders such as NGOs, government agencies, parents, and communities, while promoting positive attitudes, consistent monitoring and evaluation, and appropriate policies to support persons with disabilities (MoE, 2015).

The policy recognizes that all children have the capacity to learn, regardless of age, gender, ethnicity, language, or disability. It emphasizes that education must be accessible to all and that educational systems must be dynamic and adaptable to the evolving needs of learners (UNESCO, 2020; MoE, 2015). To this end, the policy supports the development of education structures, teaching methodologies, and support systems that are inclusive and enable the full participation of all learners. This reflects a broader commitment to building an inclusive society through education (Ainscow, 2020; MoE, 2015).

Additionally, Ghana's Inclusive Education Policy highlights the need for a functional curriculum that reflects learners' cultural contexts, family and community resources, values, goals, and future aspirations. It promotes teacher professional development, particularly in the use of child-centered and inclusive pedagogical strategies that accommodate diverse learning needs (Florian & Black-Hawkins, 2011; MoE, 2015). The curriculum is expected to follow three core principles: setting appropriate learning objectives, addressing diverse learning needs, and removing barriers that hinder learning for individuals or groups. To meet these expectations, the policy recommends a multi-disciplinary assessment process at all levels of the

educational system. Moreover, it encourages the adoption of alternative assessment approaches that are flexible and responsive to the varied needs of learners (MoE, 2015).

2.2.3 Benefits Inclusive Education

Inclusive education offers many social benefits for both students with and without special needs. For students without disabilities, learning in the same classroom with their peers who have special needs helps them to develop a better understanding of diversity. It teaches them how to respect, accept, and support others who are different from them. These students are more likely to show kindness, patience, and cooperation. They also become more tolerant and less fearful of disabilities, which reduces discrimination and prejudice. According to Hehir et al. (2016), regular interaction between children with and without special needs promotes a sense of unity and helps build a more inclusive society starting from the classroom.

Academically, inclusive education supports the learning progress of students with special needs. When these students are given the chance to learn alongside their peers in mainstream classrooms, they often show improvement in subjects like reading and mathematics. Hehir, Grindal, and Eidelman (2012) found that students with special needs who spend more time in inclusive classrooms perform better academically than those who are separated in special schools. Similarly, Dessemontet, Bless, and Morin (2012) observed that students in inclusive settings gained better literacy skills over time compared to those in segregated schools. These findings suggest that inclusive classrooms provide better academic opportunities through peer support and exposure to the general curriculum.

Socially, students with special needs also benefit greatly from inclusive education. Being part of mainstream classrooms allows them to build friendships,

interact more confidently with others, and feel a sense of belonging in their schools. These interactions help them improve their communication and social skills, which can extend beyond school into community life. Hehir et al. (2016) pointed out that inclusive settings help these students participate more actively in group activities and build stronger relationships. Moreover, de Graaf, van Hove, and Haveman (2013) found that inclusive environments positively influence the social and emotional development of students with special needs, making them feel valued and included.

It is evident that inclusive education helps create a learning environment where all students, regardless of their abilities, can thrive academically, socially, and emotionally. It prepares every child to live in a diverse society and promotes equality, mutual respect, and shared learning.

2.2.4 Teacher Views of Inclusive Education

Teachers' views play an important role in how successful inclusive education becomes in the classroom. Research has shown that teachers' feelings and opinions about inclusion are closely connected to how well it is implemented (Costello & Boyle, 2013). However, experience seems to affect these views over time. For example, some studies found that teachers with more years of teaching tend to feel less positive about inclusive education, especially after their first year in the classroom. Teachers often feel unprepared or unsupported, especially when they don't receive enough training or resources to help them manage inclusive classrooms. This lack of support can lead to frustration and negative attitudes towards including students with special needs (Khursheed et al., 2020).

In many cases, teachers say they are willing to support inclusion, but they worry about not having the skills or resources to do so effectively. When schools do not

provide the right teaching materials, facilities, or training, teachers may feel overwhelmed and discouraged. This can affect the learning experience of students with special needs and lead to their isolation or poor academic performance. Teachers with negative views may unintentionally limit these students' participation, making change in the classroom harder. For this reason, ongoing training, teamwork, and professional support are essential to helping teachers develop a more positive outlook towards inclusion (Khursheed et al., 2020).

Research on how teachers view inclusive education shows a range of different opinions. Many teachers understand the advantages of including all students, regardless of their abilities, in the classroom. However, some teachers still have conflicting or negative attitudes toward inclusion. For instance, some believe that students who need extra support should not be part of regular science classes. These teachers might feel that learning difficulties are often used as excuses for poor performance. In some cases, teachers are even unwilling to teach in inclusive classrooms or prefer that students who require additional support are not as visible or active in the classroom (Kahn & Lewis, 2014). This reflects a mindset where the focus is more on what students cannot do rather than what they can achieve with proper support.

On the other hand, many teachers are more open-minded and ready to embrace inclusive education. These teachers are willing to make changes to their teaching style and lessons to accommodate students with different needs. They understand that inclusion is not just about having all students in the same room but making sure that every student gets the support they need to succeed. They are ready to adapt their methods, whether that means giving more time for tasks, breaking lessons into smaller steps, or using different teaching materials to make learning more accessible (Azman

& Teo, 2019). These teachers recognize the potential of all students and are committed to helping everyone participate and succeed in the classroom.

However, even teachers who strongly believe in inclusion can sometimes face challenges. For example, some teachers who are committed to inclusion may hesitate to pass students who do not meet academic expectations, even if those students have tried hard. They might believe in the ability of all students to succeed but feel conflicted when students with additional needs do not perform well. This reveals a contradiction; on one hand, they want to give all students a chance to excel, but on the other hand, they may not want to lower academic standards. This shows how positive attitudes towards inclusion can sometimes create difficult situations, as teachers try to balance fairness with high expectations (Baguisa & Ang-Manaig, 2019).

The Inclusive Education Policy highlights the need to support all learners, but for teachers to successfully put this into practice, their training, experience, and views must be considered. Studies show that negative attitudes can stop inclusion from working well. Several school-level factors such as poor infrastructure, limited teaching materials, and a rigid curriculum can make it harder for teachers to include all learners. The way teachers view students with disabilities and how they value their needs is also very important. When teachers are well-trained and supported, they are more likely to help all students learn and feel included (Pérez-Jorge et al., 2021).

Interestingly, teachers at the basic level (like kindergarten and primary) often have more positive views about inclusion than secondary school teachers. This could be because primary schools usually use more child-centered teaching methods, while secondary schools tend to focus more on exams and results (Costello & Boyle, 2013). Teachers who feel confident and prepared to handle inclusion are more likely to support

it. This confidence usually comes from training and hands-on experience. However, not all researchers agree that training alone improves teachers' attitudes. For example, some teachers may have limited exposure to different types of disabilities, and their opinions may be based on stereotypes rather than real experience (Costello & Boyle, 2013).

There is also evidence that teamwork in schools helps teachers feel more supported in implementing inclusive practices. Teachers who work closely with colleagues, support staff, and special educators in planning lessons and solving problems generally express more positive views about inclusion (Stelitano et al., 2019). They value sharing ideas and seeing different points of view. On the other hand, teachers also mention some difficulties in teamwork, such as finding time to meet or a lack of commitment from other team members. These challenges can reduce the benefits of collaboration and lead to negative feelings.

When teachers show a positive attitude towards inclusion, it often influences how students respond in the classroom. A supportive teacher can help all students feel accepted, including those with special needs. This can create a better learning environment where everyone feels welcome and included (Yukselturk & Altioik, 2017). But when teachers express frustration or negativity, it can have the opposite effect, causing students with special needs to feel left out. That is why it is important to provide teachers with the right kind of training, support, and collaboration opportunities, so they can build the confidence and skills needed to make inclusive education work for all learners.

A study by Teo (2020) revealed that science teachers recognize the importance of creating supportive environments for students in inclusive classrooms. They understand that students with special educational needs benefit from peer support and

stable classroom conditions, both of which have been identified as critical for the success of these students (Hughes & McGinty, 2020). Additionally, science teachers acknowledge that one-on-one instruction is essential, as collaborative group work can sometimes present challenges for students with special needs. Although managing the social dynamics of group work is necessary, structured group activities can also offer academic benefits to these students (Spektor & Yifrach, 2019).

Science learning requires students to acquire both knowledge and skills. Science teachers believe that students with special needs need more time to develop science process skills and to grasp key science concepts (Pinnell et al., 2019). This is especially important when both matter and processes are involved in learning, as this combination can make science more complex and hinder conceptual change (Kahnn & Lewis, 2014). The teachers' perspective aligns with the idea that students with SEN may require extra time and support to engage fully with scientific content.

Among the items assessed, several showed that science teachers generally found it easier to agree with positive views of students with special needs. For example, they did not believe that students with special needs become frustrated more easily than their peers or face more difficulty in completing hands-on science activities. Additionally, they thought that students with special needs do not struggle more than other students when learning science and that these students perform equally well in assessments. Teachers also viewed students with special needs as being just as proactive in science lessons as their peers.

A positive view of inclusive education is crucial for teachers to effectively implement it in their classrooms. In inclusive settings, teachers undertake multiple roles that necessitate patience and understanding. Their responsibilities extend beyond

traditional teaching; they also involve training in mobility, self-care skills, and preparing teaching materials that cater to diverse learning styles and preferences (Haug, 2017).

Despite the importance of these roles, many teachers perceive themselves as lacking the necessary qualities due to inadequate training, which affects their understanding of inclusive practices (Florian, 2019). Numerous teachers express concerns that the inclusion of students with disabilities will detrimentally impact both teaching and learning outcomes, as well as overall classroom performance (Agbenyega & Deku, 2011). Some educators perceive that accepting children with disabilities in their classrooms could disrupt the curriculum and slow down instruction (Burch, 2019). Avramidis and Norwich (2002) found that many teachers felt unprepared for the demands of including students with disabilities, which they believed would require constant monitoring, the development of specialized materials, and effective behavior management.

As a result, Yoon-Suk Evans and David (2011) suggest that special schools may be perceived as more suitable environments for students with disabilities, as these settings are believed to provide better attention and support. In Ghana, similar views have been reported, with Yekple and Avoke (2006) noting that many teachers question their readiness to effectively teach children with disabilities. Consequently, some teachers believe that students with impairments should be placed in special schools, perceiving those in mainstream classrooms as "stupid" or "lazy" for struggling to keep up. Teachers often view the inclusion of students with disabilities as time-consuming, which they believe may hinder their ability to complete the syllabus (Agbenyega & Deku, 2011).

In 2017, Deku and Vanderpuye investigated teachers' perspectives regarding inclusive education in Ghana, several key views emerged. Most teachers felt that the curriculum used in inclusive schools was inappropriate. Additionally, a majority found the physical environment unsatisfactory. Many teachers did not consider themselves competent to teach in an inclusive education setting, and a large number also believed that their pre-service training had been inadequate. Finally, most teachers perceived the inclusive education programme as unsuccessful. The study revealed that, 75% of the teachers rated the inclusive programme as not successful. The teachers also viewed the curriculum as not appropriate. In the case of the physical environment, the teachers perceived it as not satisfactory. The findings from this study evoke the debate as to whether placement of children with disabilities in inclusive schools offer the best option in Ghana and cast doubt on the capacity of the inclusive schools surveyed in Ghana to meet the needs of students with disabilities. Indeed, providing appropriate curriculum, attractive physical environment with good facilities and well-trained teachers in inclusive education is an integral part of the process of meeting the needs of individuals in an inclusive setting.

In a study by Mprah et al. (2023), teachers in public basic schools in the East Mamprusi Municipal area of Ghana expressed largely negative views and attitudes towards the inclusion of children with disabilities in general education programs. Many teachers believed that integrating these children would create additional burdens, disrupt classroom dynamics, and negatively impact overall teaching and learning outcomes. They voiced concerns about the potential harm to the school's reputation, fearing that academic performance might decline due to the need to address diverse needs. Additionally, several teachers argued that inclusive education fails to adequately benefit children with disabilities, asserting that their unique requirements are better met

in specialized settings. Frustration was also evident regarding the government's push for inclusive education without providing sufficient resources for special schools, which some viewed as an undue burden on teachers. While a minority of teachers recognized potential benefits, such as reducing stigma and promoting socialization among children with disabilities, the prevailing sentiment was one of skepticism and concern about the effectiveness and feasibility of inclusive education in their current contexts.

A contrary finding was reported in a study by Ahiavi and Thomas (2021) on teachers' opinions regarding the inclusion of children with special education needs in regular schools in the Awutu Senya East Municipality, Ghana. The findings indicated a largely positive view towards inclusive education. When asked if inclusion would enhance the academic abilities of students with disabilities, 30 teachers (75%) agreed, while only 4 (10%) disagreed. Additionally, 30 teachers (75%) disagreed with the notion that inclusion would hinder the academic progress of non-disabled students, showing confidence that inclusive practices would not negatively affect their peers. A significant majority, 31 teachers (77.5%), believed it was essential for all Ghanaian children, including those with disabilities, to attend the same school. However, 8 teachers (20%) expressed reservations about this view, and a similar number felt that teachers might be unhappy in inclusive settings. Despite these concerns, 30 teachers (75%) still affirmed that inclusion could benefit the academic abilities of non-disabled students, highlighting their overall support for inclusive education as a worthwhile endeavour.

2.2.5 Teacher Practices of Inclusive Education

In inclusive classrooms, the practices of accommodation and modification are essential for adapting teaching methods to support all students. Accommodations allow

students to complete the same assignments or tests as their peers but with adjustments, such as extra time, different settings, changes in scheduling, or alternate ways to respond. These changes help students perform to the best of their abilities without altering what the assignment or test measures. On the other hand, modifications go a step further by adjusting the assignment or test itself, changing the standard or what the task is designed to measure (PACER Center, 2013). Both practices help teachers create a more accessible learning environment for students with diverse learning needs.

In science education, teachers' use a range of strategies aimed at supporting students with special educational needs (SEN). One notable practice is the planning of specific seating arrangements, which many teachers recognize as essential for enhancing accessibility and fostering a supportive learning environment (Teo, 2020). By thoughtfully arranging seating, teachers can facilitate better engagement and interaction among students.

Additionally, teachers employ diverse teaching approaches tailored to meet the varied needs of their students. This involves using a variety of instructional strategies to ensure that all learners are effectively engaged in the lesson (Villaneuva et al., 2012). Moreover, teachers closely monitor students' learning progress through informal assessments and observations, allowing them to adjust their teaching methods in real-time based on individual student needs. This responsiveness is crucial for identifying when additional support is necessary (Scruggs & Mastropieri, 2015).

Another significant practice is the use of nonverbal communication, such as paying attention to students' facial expressions and body language. These cues provide valuable insights into students' understanding and engagement, enabling teachers to intervene when students appear confused or disengaged (Zee et al., 2020). Furthermore,

teachers report putting extra effort into lesson planning to ensure that their lessons are accessible and relevant to all students. By developing materials that cater to diverse learning styles, they create a more inclusive classroom atmosphere (Parmar et al., 2015).

For instance, Mastropieri and Scruggs (1992) conducted a review of 66 articles focused on inclusive science teaching and found that 21 articles specifically discussed adaptations made to help students learn better. Thirteen of these studies used mnemonic strategies, which involve memory aids to help students recall information. Eight studies discussed making adaptations to the texts or other instructional materials to enhance understanding. In one study involving 19 students with mild learning needs, it was shown that using mnemonics significantly improved students' ability to learn and remember science content compared to more traditional teaching methods. Not only did the students show higher recall immediately after learning, but they also performed better on delayed-recall tests. Importantly, the students were able to develop their own mnemonic strategies and expressed a strong preference for this method over traditional instruction (Scruggs & Mastropieri, 1991).

Another study, which involved 213 Grade 8 students with mild learning needs, highlighted the benefits of collaborative, hands-on activities in science education. These activities not only helped students learn science content more effectively but also increased their enjoyment of learning (Scruggs & Mastropieri, 2015). In yet another study that compared different comprehension strategies, including text-structure-based methods, paragraph restatement, and traditional teaching, it was found that text-structure-based strategies significantly improved students' ability to recall important information compared to traditional methods. This effect was observed immediately after learning as well as in delayed tests. The text-structure-based approach also

outperformed the paragraph restatement strategy for recalling key information, although it did not have the same impact on recalling less important details.

These studies have demonstrated that certain teaching strategies, such as mnemonic techniques, collaborative activities, and text-structure-based reading strategies, can be highly effective in teaching science to students in inclusive classrooms. These approaches not only improve students' understanding and recall but also make the learning experience more enjoyable and engaging for them.

2.2.6 Teacher Challenges in Practicing Inclusive Education

Since Ghana introduced inclusive education, many difficulties have come up in trying to apply it properly in schools at all levels. Studies show that a major problem is that many teachers do not have the training or confidence to handle inclusive classrooms. They feel unprepared to teach students with disabilities effectively. This lack of skill and preparation among teachers is one of the biggest barriers to successful inclusion in Ghana. Several researchers have also pointed out that without proper teacher education and support, it becomes very hard to meet the needs of students with disabilities. Therefore, it is important to examine just how serious this issue is in the Ghanaian context.

This challenge is not unique to Ghana. Other countries are facing similar problems when it comes to implementing inclusive education. For example, in Portugal, a large number of teachers said that they did not have enough materials or resources to support students with special needs. In Cameroon, teachers reported dealing with stress, lack of training, and not enough support when trying to teach these students. This suggests that in many places, schools are not given enough financial or material support

from governments or education departments. However, the exact impact of lack of resources in Ghana's case still needs more detailed research.

In South Africa, the situation is quite similar. According to Bornman and Rose (2017), schools often don't have enough resources or support systems, and negative attitudes toward people with disabilities make things worse. Changing a school to be more inclusive costs money, things like wheelchair ramps, elevators, special devices like Braille machines, and teaching tools for students with different needs are expensive. Many school leaders are unwilling to take on these extra costs. Even in Gauteng, South Africa's richest province, school principals were not always supportive of students with disabilities, showing that the problem is widespread.

Another key difficulty is adjusting their teaching to meet the needs of all students. Teachers frequently express reluctance in providing differentiated materials or adjusting their grading criteria for students with special needs, largely because of a strong desire to uphold rigorous academic standards for the entire class (Defor, 2017). For instance, they may fear that offering simplified materials or extended time for assessments could create a view of unfairness among students or parents. This concern is compounded by the belief that modifying the curriculum too much could lower the overall expectations for achievement, diluting the quality of education offered (Teo, 2020).

According to Hunter-Johnson et al. (2014), another significant challenge teachers face when implementing inclusive education is the increased workload that comes with accommodating children with disabilities. Teachers are required to spend additional time planning lessons that cater to a wide range of abilities, often needing to modify materials and design activities that are accessible to all students. This

individualized support extends beyond lesson planning, as teachers must also allocate extra time during class to ensure students with disabilities receive the attention they need to engage with the content effectively. This increased demand on time and resources can make it difficult for teachers to meet the learning needs of the entire class. Balancing the needs of students with disabilities alongside those of their peers often creates a strain, as teachers attempt to ensure that everyone progresses academically without leaving anyone behind. The challenge is further compounded when teachers feel that the time spent on one group may take away from the attention given to the rest of the class, leading to concerns about overall learning outcomes.

For teachers to develop a positive attitude toward inclusive education, they must first receive the right education, training, and ongoing support. However, this can only happen if the government provides schools with the needed teaching materials, learning resources, and suitable infrastructure. When schools are equipped with the right facilities—such as ramps for physically challenged students, specialized learning tools, and resource rooms—it encourages and motivates teachers to teach children with disabilities more confidently (Kuyini, 2010).

Agbenyega (2007) also emphasized that having the right facilities and materials is necessary to create learning opportunities for children with disabilities. This support is part of ensuring that these learners are properly integrated into mainstream schools and that their learning needs are met (Sharma, 2015). In other words, inclusive education can only be successful if the school environment is structured in a way that supports all learners, including those with special needs.

According to the Ministry of Education (2015), the government of Ghana has committed to providing the needed infrastructure to support inclusive education. Kuyini

(2010) agrees with this view, stating that without these necessary facilities, the implementation of inclusive education will not be effective. Kuyini and Boitumelo (2011) further argue that when schools lack adequate infrastructure and learning materials, teachers tend to develop negative attitudes towards teaching children with disabilities. Some teachers may even feel that such children should not be in mainstream classrooms.

Additionally, when teachers don't have the tools or training to handle diverse learners, they are unable to teach them effectively. Kuyini and Boitumelo (2011) concluded that both the lack of resources and insufficient teacher training are major barriers to inclusive education. The Ghana Education Service (2004) also raised similar concerns. Their report identified inadequate facilities and resources as one of the biggest challenges to achieving inclusive education in Ghana. Without improvements in these areas, it would be difficult for schools to meet the goals of inclusive education and to achieve the broader aim of "Education for All" (GES, 2004).

Moreover, Alhassan (2014) highlighted the issue of overcrowded classrooms. Many schools in Ghana have 40 to 50 students in one class, making it nearly impossible for teachers to give individual attention—especially to learners with special needs. Large class sizes create stress for teachers and reduce the quality of teaching and learning for all students. Therefore, there is a need for the government to invest in more school infrastructure, including building more classrooms and reducing class sizes, to make inclusive education practical and manageable for teachers (Alhassan, 2014).

Balancing high expectations for all students with the need to give special support to those with disabilities is another challenge. Many teachers find it difficult to assess students with special needs fairly while also maintaining the same performance

standards for everyone (Chi et al., 2014). On one hand, educators strive to maintain a uniform academic standard that reflects the school's overall goals for achievement and fairness. On the other hand, students with disabilities often require additional support, such as modified assessments, extra time, or alternative instructional strategies, to meet their learning needs. Many teachers find themselves caught between these conflicting demands. This conflict leads to a situation where teachers may hesitate to implement necessary adjustments, such as differentiated assessments or modified instructional techniques, fearing it may create inconsistencies in evaluation. This tension can ultimately result in a lack of meaningful support for students with disabilities, as teachers find it difficult to balance fairness with flexibility. Without proper resources, training, and guidelines on how to equitably manage these competing priorities, teachers may inadvertently hinder the learning progress of both students with and without disabilities (Chi et al., 2014).

Teachers also worry that including students with disabilities may disrupt the flow of classroom activities and affect the learning of other students. Some fear that the presence of children with disabilities could lower academic performance and damage the school's reputation if test scores suffer (Mngo & Mngo, 2018). Some teachers fear that the inclusion of students with disabilities might lead to lower overall academic performance, especially if these students struggle to keep up with their peers. This concern is compounded by the fact that many schools are judged based on their students' test scores, which can affect their reputation within the community. Educators worry that if test scores decline due to the inclusion of students with diverse needs, it could tarnish the school's image and undermine its academic standing. As a result, these concerns contribute to a reluctance among some teachers to fully embrace inclusive

education, despite the potential benefits it offers for students with disabilities (Mngo & Mngo, 2018).

Wani and Ali (2015) found that many teachers feel frustrated by the inadequate resources and training available to support the implementation of inclusive education. Teachers often report that they lack the necessary tools, materials, and professional development opportunities to effectively teach students with disabilities in mainstream classrooms. This lack of preparation leaves them feeling overwhelmed and unprepared to address the diverse learning needs of their students. As a result, some teachers believe that children with disabilities would be better served in specialized schools, where they could receive instruction from staff who are specifically trained to meet their unique needs. In these specialized environments, students might have access to tailored teaching approaches, assistive technologies, and additional support that mainstream schools are not equipped to provide. This belief underscores the ongoing challenge of making inclusive education a reality in schools that lack the necessary infrastructure and training to support all learners effectively (Wani & Ali, 2015).

Another concern is that children with disabilities may face stigmatization or isolation in mainstream classrooms (Miller, 2015). Teachers worry that if proper strategies for integration are not implemented, students with disabilities might be marginalized by their peers or unintentionally excluded from classroom activities. This fear stems from the fact that inclusive education aims to promote equity and belonging, yet without effective support, it could result in the opposite effect—further alienating these students. The challenge, as Miller (2015) points out, lies in ensuring that inclusion is not just a physical presence in the classroom but a meaningful integration that allows all students to engage socially and academically. Teachers are aware of this risk but feel that without adequate training and resources, they may not be equipped to create

the inclusive environments necessary to prevent stigmatization and isolation, thus potentially undermining the very goals of inclusive education.

Limited interaction with students and parents also complicates the implementation of inclusive education. Teachers often face challenges in fully understanding each student's individual needs when communication with both the students and their parents is minimal. This lack of strong, two-way communication hinders teachers' ability to tailor their teaching methods effectively to accommodate students with diverse needs. Without a clear understanding of what each student requires, teachers may struggle to provide the appropriate support that would help all students succeed in the classroom (Davis & Florian, 2014).

In addition to communication challenges, many teachers report that they lack the necessary materials and specialized training required to implement inclusive education strategies successfully. The absence of adequate resources, such as adaptive learning tools or differentiated instructional materials, limits teachers' ability to cater to the varied learning needs within their classrooms. Furthermore, teachers often feel underprepared to handle the complexities of inclusive teaching, as their professional development may not have adequately covered how to address the diverse needs of students with disabilities (Cater & Kennedy, 2016).

Managing group work and social interactions within the classroom also poses difficulties for teachers striving to create an inclusive environment. Ensuring that all students, including those with special needs, benefit from collaborative learning experiences requires careful planning and facilitation. Teachers must balance the social dynamics within groups, making sure that students with disabilities are actively included and that their participation is meaningful. Without thoughtful preparation,

group work can inadvertently exclude or marginalize these students, preventing them from fully engaging in the learning process (Gillies & Ashman, 2016).

There are also cultural and social barriers to inclusive education. One major issue is the attitude of people in schools and in the wider community. If people hold negative beliefs about children with disabilities, such as thinking they can't learn or that they will disturb others — then it becomes harder for these children to be included in school. As Polat (2011) points out, changing people's thinking and mindset is a key step in making inclusive education work, especially in countries with fewer resources.

To make inclusion successful, there needs to be a positive attitude toward disabled children in both schools and society. Slee (2011) explains that people must understand and value inclusive education in order for it to be put into practice. Public education campaigns are needed to help people see the benefits of including children with disabilities in mainstream schools. If people are not aware of the importance of inclusive education, they may resist or reject it, making the process harder for everyone involved.

Families also play a big role in changing attitudes. According to Obeng-Asamoah (2016), when parents have a positive view of their children with disabilities, they are more willing to send them to school. However, some families may feel ashamed or fear judgment from others, especially in communities where disabilities are stigmatized. As a result, some parents hide their children at home instead of allowing them to go to school. This is why authorities need to reach out to such families, explain the value of education, and encourage them to enrol their children despite these social pressures. The Salamanca Statement (UNESCO, 1994) supports this idea by stressing

the importance of parental support in helping children with disabilities adjust both socially and academically.

Moreover, it is important that parents are allowed to be part of the decisions that affect their children's education. When parents feel involved and listened to, they are more likely to support their children's schooling. The Salamanca Statement urges governments to work together with parents and involve them in educational planning. If parents are left out, they may feel disconnected and be less likely to encourage school attendance, which could harm the progress of inclusive education.

When these changes happen, and when families truly accept and support their children with disabilities, the broader society begins to do the same. People see how these families treat their children and are encouraged to adopt the same positive attitudes. However, if families are ashamed or reject their disabled children, society is likely to follow that lead. As Gadagbui (2010) points out, education and awareness campaigns for families and the public are essential in helping to replace negative views with understanding and respect. This could also push governments to invest more in inclusive programs, facilities, and resources in schools.

Unfortunately, some families still believe that having disabled children in the same class as their own children affects academic performance negatively. As Slee (2011) and Ghana Education Service (2004) note, these parents sometimes move their children out of schools where inclusive education is being practiced. Such actions send a message that disabled children do not belong, which weakens efforts to build inclusive schools and communities. This mindset must be addressed through education and public engagement.

It is also important to think about how teachers behave towards them. Obeng-Asamoah (2016) believes that teachers can develop a good and supportive attitude toward children with special needs. However, if teachers are not given the right training—whether they are working in regular schools or special schools—it becomes difficult for them to know how to teach and care for these children. Without proper training, teachers may feel unprepared or even uncomfortable, which can lead to negative attitudes (Agbenyega, 2007).

Inclusive education gives children with disabilities a fair chance to study in regular schools, just like everyone else (Kuyini, 2010). For this to work well, teachers and school leaders must understand what inclusive education means. This can only happen if they are taught about inclusion during their time in Teacher Training Colleges (TTCs). Training helps teachers understand the value of inclusive education, gives them the right mindset, and equips them with the practical skills they need to work effectively with children who have disabilities (Agbenyega, 2007; Kuyini, 2010). They also need to learn different teaching methods that can help all children, including those with special needs, to learn better.

Teacher Training Colleges must train both new teachers and those already in the classroom on how to support inclusive practices. This is important because many teachers may not have the experience or skills to work with disabled children. Without such training, it becomes hard for teachers to manage teaching in a diverse classroom (Agbenyega, 2007). Teachers who don't understand how to include children with disabilities may also have a negative attitude toward them. But with the right training, they can learn to use good teaching strategies and methods to support every child, regardless of ability (Kuyini, 2010). According to Opoku, Agbenyega, Mprah,

McKenzie, and Badu (2017), teachers need training and support to learn different techniques and teaching styles to meet the needs of all learners.

When teachers are trained and supported well, more children, especially those with disabilities are able to go to school. This also gives parents the confidence to send their children to school, knowing they will be welcomed and supported (Banks & Banks, 2010). Kuyini and Boitumelo (2011) also point out that teachers play a key role in making inclusive education successful. That is why it is so important to help them develop positive attitudes and beliefs about teaching children with disabilities. Positive teacher attitudes lead to more effective inclusive education. However, not every teacher supports inclusion. Hodkinson (2010) noted that some teachers are unwilling to include children with challenging behaviors in regular schools and believe such children should be taught separately.

For inclusion to work, schools must not only support disabled children but also provide teachers with the resources and help they need (Hodkinson, 2010). Agbenyega (2007) found that when teachers are trained and get to work closely with children who have special needs, they start to feel more confident and develop a more positive attitude. However, in his research, some teachers still raised concerns. They said they needed help from school heads, education authorities, and special education experts to manage children with disabilities well. Even though teachers may receive training, they also need practical support in their schools. Some teachers also felt that having disabled children in the regular class might negatively affect the academic performance of the other students (Agbenyega, 2007). Still, it is important for teachers to understand that helping children develop themselves in all areas is just as important as academic results. When children grow personally and socially, it helps the whole country to progress.

From my own experience growing up and learning in Ghana, many students often studied only to pass exams, instead of learning to understand and grow. Teachers should be taught to help children learn for personal development and not just for test results. While passing exams is important, it is even more valuable when children also gain knowledge and skills they can use in real life. Teachers can support this kind of learning if they are trained to focus on the overall growth of each child. Apart from working on teacher attitudes and providing them with training, it would also be helpful to explore what kind of facilities or resources schools can provide to support the teachers. This support will make it easier for teachers to develop a positive attitude and teach children with special needs more effectively

This implies that for inclusive education to work, everyone, families, communities, schools, and government, must develop a positive attitude toward children with disabilities. This is not just about changing schools, but about changing hearts and minds. When the public, educators, and families all support inclusion, it becomes easier to implement. Positive attitudes lead to more opportunities, greater acceptance, and a better future for all children, regardless of ability

To make inclusive education work better, it's important that both teachers and parents understand the basic rights of all children. When people don't know enough about these rights, it becomes harder to create a supportive school culture or run effective programs that protect and promote students' well-being (McCarthy, 2012). Learning more about what teachers and parents currently know or feel about inclusion can help identify gaps. This kind of insight can lead to better training and awareness programs that change attitudes in a positive way.

One proven way to improve teacher attitudes towards inclusion is through strong support from school leadership and teamwork among staff. When schools provide a welcoming environment and ongoing professional development, teachers are more likely to support inclusive education (Salovita, 2019; Abiodulla & Khursheed, 2020). On the other hand, many teachers still lack proper training and resources, especially in special education. This has caused a serious shortage of skilled staff, making it difficult to fully support students with learning needs (Mngo & Mngo, 2018).

To overcome these challenges, schools need well-trained general and special education teachers, along with paraprofessionals. Having dedicated support rooms or trained staff in classrooms helps teachers identify student needs early, create Individualized Education Programs (IEPs), and provide targeted support that helps students do better academically (Pérez-Jorge et al., 2021)

Leadership also plays a major role. A principal who encourages collaboration and values inclusion can influence teachers' attitudes and the way they work (Young et al., 2017). When principals work closely with both teachers and support staff, they can help build a shared belief in the importance of inclusion. This kind of leadership helps teachers feel more motivated and committed to inclusive practices.

Teamwork between teachers and paraprofessionals is another powerful way to make inclusion successful. Studies show that when teachers and support staff communicate well and share responsibilities, students benefit greatly. In interviews and classroom observations, many teachers said that collaboration worked best when everyone knew each other's strengths, used clear but flexible roles, and maintained mutual respect (Devicci & Rouse, 2010). Simple actions like sharing teaching strategies, classroom management tips, and useful materials can make a big difference.

Parents also play a key role. Their involvement is especially important during IEP meetings, where plans are made for their child's learning and support. Teachers, parents, and administrators need to work together to make sure the child's needs are fully understood and addressed (Malone & Gallagher, 2009). In secondary schools, it's often harder to get parents involved, but schools can still encourage participation through clear communication, shared goals, and respecting the voice of the student (Francis et al., 2016).

Sometimes, parents and students may have different views or expectations from what the school system promotes (Tannenbaum et al., 2020). This can be managed through open discussions and building trust between school staff and families. Even students themselves have different attitudes toward inclusion. Research shows that students who are fluent in more than one language often show more acceptance of diversity (Devicci & Rouse, 2010). In most classrooms, students with intellectual disabilities receive group support from a paraprofessional rather than one-on-one help. That's why the presence of supportive staff in the general classroom is so important.

When teachers and paraprofessionals work closely, they create a more inclusive and respectful classroom environment. Factors like sharing resources, planning together, and respecting each other's ideas make this partnership strong. These teams work best when roles are flexible and focused on helping students rather than following rigid job descriptions (Devicci & Rouse, 2010). This approach not only improves teaching but also challenges outdated views on what inclusion should look like.

The benefits of collaboration can be summed up by Huxham and Vangen's theory of collaborative advantage, which highlights things like shared success, better coordination, more efficient use of resources, and moral responsibility to support every

learner (Devicci & Rouse, 2010). This theory matches what teachers say helps them succeed in inclusive classrooms, working together, sharing responsibilities, and staying focused on what's best for the students.

2.2.7 Influence of Teachers Views on Practices of Inclusive Education

Teachers' views significantly influence their practices regarding inclusive education. Research has consistently shown that teachers who possess positive attitudes and well-developed training in inclusive strategies are better equipped to support and manage students with diverse needs in inclusive settings (Opoku, 2016; Burch, 2019). These positive views are essential not only for the implementation of inclusive practices but also for creating a welcoming and supportive classroom environment for all students.

Kuyini et al. (2020) and You et al. (2019) highlight the importance of teachers' perspectives in shaping the outcomes of inclusive education. Their studies demonstrate that when teachers believe in the value of inclusion and feel competent to teach diverse learners, they are more likely to engage in practices that promote an inclusive environment. This sentiment is echoed by Krischler et al. (2019) and Moberg et al. (2020), who emphasize that teachers' attitudes toward students with special needs significantly impact the success of inclusive education initiatives. Negative views can lead to lower expectations for these students, which in turn can hinder their academic and social development.

Furthermore, research indicates that teachers often face challenges that affect their views of inclusive education. For instance, lack of training and resources can contribute to feelings of inadequacy and reluctance to fully embrace inclusive practices (Kassah et al., 2012; Naami & Mort, 2023). Teachers who are inadequately prepared

may be more likely to hold negative views regarding the effectiveness of inclusion, further perpetuating a cycle of exclusion (Leal Filho et al., 2019).

In addition to training, systemic factors significantly shape teachers' views of inclusive education. Policies that prioritize inclusive practices create a supportive environment, providing teachers with the frameworks, resources, and professional development they need to implement effective strategies (Fontdevila & Grek, 2020). When educational policies explicitly advocate for inclusion, they help build teachers' confidence and commitment. Conversely, if policies do not adequately address the needs of teachers and students, scepticism about the feasibility of inclusion can arise. Lack of resources, insufficient classroom support, and systemic issues like large class sizes can leave teachers feeling overwhelmed, leading them to favour traditional methods over inclusive practices (Johnstone et al., 2020). Additionally, a positive school culture and leadership that actively promote inclusive values can encourage collaboration and foster a more accepting attitude among staff. Thus, comprehensive policies that address these systemic factors are essential for cultivating a positive view of inclusive education and ensuring its successful implementation.

This suggests that teachers' view of inclusive education is a critical factor that influences their practices. Positive views can lead to effective implementation and a nurturing environment for all learners, while negative views can hinder the progress of inclusive initiatives. Continuous professional development, supportive policies, and adequate resources are essential in fostering positive views among teachers, ultimately enhancing the effectiveness of inclusive education (Naami & Mort, 2023).

2.3 Conceptual Framework

The purpose of the study was to examine JHS science teachers' views and practice of inclusive education in the Shama District of the Western Region of Ghana. The researcher therefore extracted key variables from this purpose and objectives formulated to craft a conceptual framework that explains the variables and their interactions with each other as shown on figure 1.

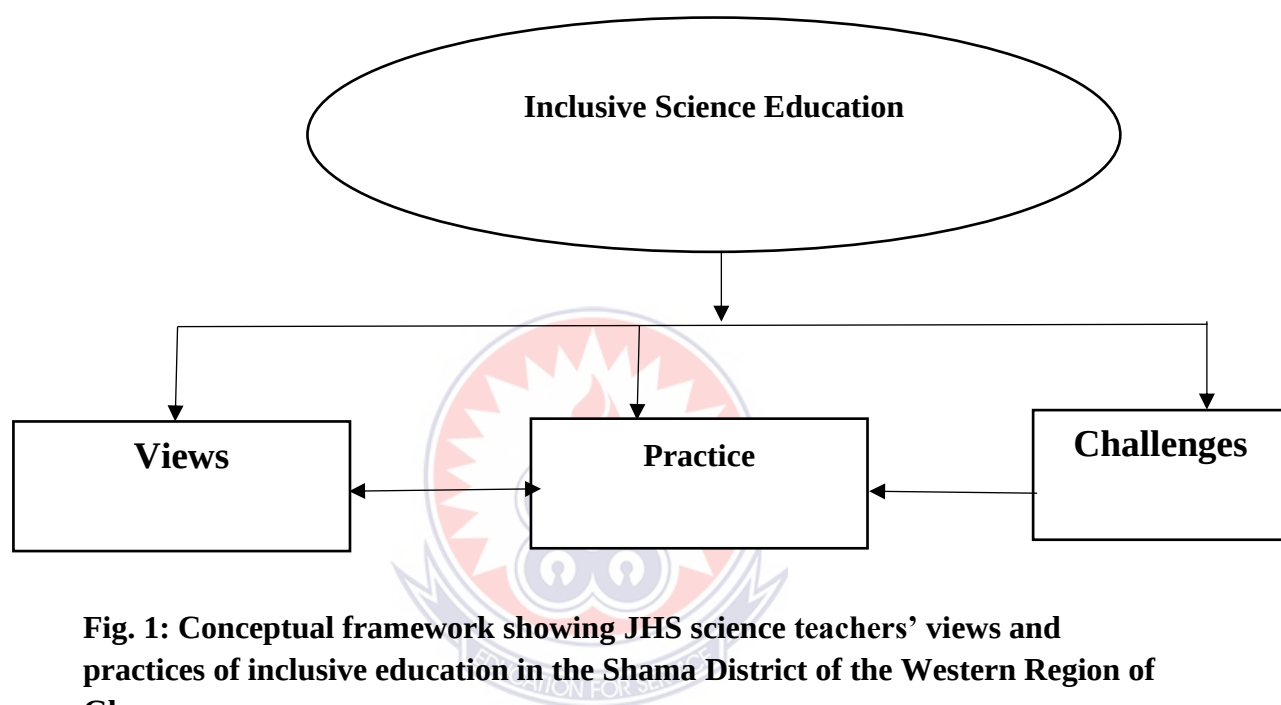


Fig. 1: Conceptual framework showing JHS science teachers' views and practices of inclusive education in the Shama District of the Western Region of Ghana.

Source: Researcher's Own Construct (2025)

Figure 1 shows four key variables and its relations. The first component is the teachers' views about inclusive education: This variable refers to the opinions that JHS science teachers in the Shama District have about the concept of inclusive education. Positive views, such as recognizing the benefits of inclusive practices for all students, can motivate teachers to adopt these methods in their classrooms. Conversely, negative views, such as doubts about the effectiveness of inclusion or concerns about their own preparedness, may hinder their willingness to engage in inclusive practices.

Also, there is practice of inclusive education: This variable examines the actual strategies and methods that science teachers employ to include students with diverse learning needs in their classrooms. Effective practice may include differentiated instruction, collaborative learning environments, and adaptive assessments. The study aims to assess how the teachers' views translate into practical approaches in their teaching.

Third, is the challenges faced by teachers: This variable identifies the obstacles that science teachers encounter while attempting to implement inclusive education. Challenges may include inadequate resources, lack of training, large class sizes, and insufficient support from school administration. Understanding these challenges is crucial as they can significantly impact both teachers' views and their practices.

Lastly, the double pointed arrow between view and strategies examines the relationship between teachers' view and their actual practice of inclusive education: This variable investigates the correlation between how teachers perceive inclusive education and how they practice it in the classroom. The hypothesis is that positive views lead to more effective inclusive practices, while negative views may result in reluctance or inability to implement such practices.

Figure 1 illustrates the relationship among four key variables: teachers' views on inclusive education, their practice of inclusive education, the challenges they face, and the link between view and practice. Teachers' views significantly influence their willingness to adopt inclusive strategies (Avoke, 2022; Agbenyega, 2023). Positive views, such as recognizing the value of inclusion for all learners, often promote the use of inclusive practices, while negative views can create resistance. The practice of inclusive education involves the actual teaching methods used to support diverse

learners, including differentiated instruction and collaborative learning (Tomlinson & Imbeau, 2023; Florian & Black-Hawkins, 2019). However, the successful implementation of these strategies is often hindered by challenges such as inadequate resources, limited training, and large class sizes (Senoo et al., 2024; Kuyini & Desai, 2022). These challenges can affect both teachers' views and their classroom practices. The double-pointed arrow between views and practice represents the dynamic relationship between what teachers believe and what they do in practice, suggesting that positive views are more likely to result in effective inclusive teaching, while negative views may limit implementation (Sharma & Sokal, 2016).

2.4 Empirical Evidence

This section of the review examines existing studies on the teachers' views and practices of inclusive education.

2.4.1 View of inclusive Education

Teachers' views on inclusive education play a critical role in its successful implementation. This section reviews studies that examine how teachers view inclusive education and their willingness to embrace inclusive practices.

For instance, Chitiyo, Brobbey, and Asare (2024) studied the views of 145 teachers from three regions in Ghana about inclusive education. They used a quantitative method, gathering data through questionnaires. The data were analysed using averages (mean), standard deviation, and correlations to see if there was a link between training and knowledge of inclusive practices. The results showed that teachers had a moderate understanding of inclusive education practices. Additionally, a small but positive connection was found between the level of training teachers received and their knowledge of inclusive education.

Poikola et al. (2024) conducted a review study focusing on students' views on inclusive education across 62 studies published between 2006 and 2022. These studies were mainly based in inclusive comprehensive schools and used both qualitative and quantitative methods, with interviews and questionnaires being the most common tools. The researchers also analyzed how the studies connected with international rights-based frameworks such as the UN Convention on the Rights of Persons with Disabilities (CRPD), the Convention on the Rights of the Child (CRC), and the Salamanca Statement. The findings were categorized into three main themes: attitudes toward inclusive education, academic inclusion, and social inclusion. These were further broken down to examine differences in views between students with and without special educational needs and disabilities (SEND) and to identify factors that support or hinder inclusion in schools. The review highlighted the importance of understanding students' voices in shaping inclusive practices.

Mprah et al. (2023) also conducted a qualitative study examining teachers' perceptions and attitudes towards including children with disabilities in mainstream classrooms in the East Mamprusi Municipality of Northeast Ghana. The research involved 40 respondents, including five headteachers and 35 classroom teachers, and utilized thematic analysis through in-depth interviews. Findings indicated that teachers had limited knowledge of inclusive education and felt unprepared for its implementation, often expressing negative perceptions and concerns about disrupting classroom dynamics. Although some recognized benefits, the overall sentiment leaned towards skepticism regarding the feasibility of inclusive education, emphasizing frustrations over insufficient resources to support inclusive initiatives.

In another qualitative study, Lavery et al. (2023) explored students' perspectives on inclusive education by engaging graduate students from a Canadian

university. Data were collected through a combination of surveys (13 students), follow-up interviews (6 students), and workshop feedback from 12 instructors. The researchers identified three central themes: persona, practice, and partnership. “Persona” referred to the personal attributes and inclusive behaviours of educators that made students feel welcomed and supported. “Practice” involved the design of the learning environment, including teaching strategies, materials, assessments, and the classroom atmosphere. “Partnership” emphasized the value of meaningful relationships among students, and between students and instructors or teaching assistants. The study concluded that inclusive education should go beyond basic accommodations and adopt a holistic approach that fosters a sense of belonging and emotional safety for all learners.

Ahiavi and Thomas (2021) investigated teachers’ opinions on the implementation of inclusive education for children with special education needs in regular schools within the Awutu Senya East Municipality of Central Region, Ghana. Utilizing a descriptive survey design, data were collected from 45 teachers through questionnaires. Analysis revealed that most teachers viewed inclusive education as beneficial and believed it could enhance the academic abilities of students with disabilities. However, they cited insufficient resources and support services as barriers to effective inclusion. These findings highlight the need for additional training and administrative support, leading to the recommendation that the Ministry of Education develop programs to enhance ongoing professional development for teachers.

Teo (2020) examined the views and practices of primary science teachers regarding inclusive education in Singapore's classrooms. Conducted through an online survey with Rasch analysis, the research involved 108 primary science teachers and assessed their views on students with special educational needs (SEN), self-efficacy in teaching these students, and inclusive teaching practices. The findings revealed that

teachers recognized the importance of creating supportive environments for students with SEN, noting that these students benefit from peer support and stable classroom conditions. While they held positive views about inclusion, many expressed feelings of inadequacy and a desire for more support from their schools. This highlights the need for professional development in inclusive teaching strategies, providing valuable insights into the perceptions of science teachers in an Asian context and offering a validated instrument for further research.

Vanderpuye et al. (2020) assessed teachers' views and how this impacted inclusive education in eight schools in Cape Coast. The study used a survey method and sampled 142 teachers. Results showed that most teachers had positive attitudes towards inclusive education and were able to identify the support and resources needed to help children with special needs. However, the link between their attitudes and the actual impact on students was found to be weak. This finding suggests that even though teachers are willing to help, they need more training, resources, and guidance to effectively translate their positive attitudes into real improvements in the classroom.

In another study, Butakor et al. (2018) surveyed 280 in-service teachers using the MATIES questionnaire, and discovered that male and older teachers tended to show more negative attitudes toward inclusive education, suggesting that attitudes vary by gender and experience, and that more targeted training is needed. Similarly, Hunter-Johnson and Newton (2014) provide relevant insights; interviewing 40 primary teachers, they found that most held negative views of inclusion due to lack of training and resources, but some believed it could succeed with the right support. Taken together, these studies show that while there is growing support for inclusive education in Ghana, successful implementation depends heavily on adequate teacher preparation, the availability of teaching materials, and strong institutional support.

Asamoah et al. (2018) carried out a study in a second-cycle institution in the Eastern Region of Ghana to understand the perspectives of students and teachers on inclusive education for visually impaired learners. The study involved both visually impaired and non-disabled students, as well as teachers. The findings revealed that while visually impaired students and some teachers supported inclusive education, most non-disabled students were not comfortable with the idea. This situation shows that for inclusion to be effective, there is a need for awareness campaigns and training for both students and teachers to foster acceptance and support for learners with disabilities.

Deku and Vanderpuye (2017) explored teachers' perspectives on the curriculum, physical environment, and their preparedness for inclusive education in Ghana. Conducted in inclusive schools, the study involved a sample of 120 teachers who provided insights through questionnaires. Analysis revealed that many teachers perceived the curriculum as inappropriate and the physical environment as unsatisfactory. Additionally, a significant number felt unprepared for teaching in inclusive settings due to inadequate pre-service training, with 75% rating the inclusive education program as unsuccessful. This calls for urgent attention to developing a suitable curriculum, improving facilities, and providing better training for teachers to enhance the effectiveness of inclusive education in Ghana.

Lastly, Alhassan (2014) explored teachers' attitudes towards inclusive education in the Bole and New Juaben districts. Using both quantitative and qualitative methods, the study involved over 100 teachers, as well as students. It found that teachers' attitudes varied depending on the type and severity of a child's disability. Many teachers had negative attitudes, especially when faced with large class sizes and limited resources. The study concluded that improving disability awareness and making policy changes at the national level were essential for supporting inclusive education.

Providing teachers with the right tools and creating a more enabling environment would go a long way in making inclusion successful.

2.4.2 Practice of inclusive Education

The practical implementation of inclusive education depends on how teachers adapt their teaching strategies to accommodate all learners. This section discusses studies that examine how inclusive education is practiced in schools, focusing on the methods, resources, and support systems teachers use to meet the needs of diverse learners.

For instance, Agbenyega et al. (2023) explored how inclusive education is practiced in ten selected inclusive basic schools in Ghana. They focused on the use of research-based information (RBI) by teachers and discovered that most of the teachers did not use scholarly resources. Instead, they relied on non-academic materials such as social media and personal experience. The study further found that schools that offered better support systems tended to have teachers who were more knowledgeable and confident in their inclusive teaching practices. This emphasizes the need for stronger partnerships between universities and schools to help teachers apply research findings in their daily teaching.

Opoku-Nkoom and Ackah-Jnr (2023) investigated how inclusive culture, environment, and practices support the implementation of inclusive education in Ghanaian primary schools, specifically in the Komenda-Edina-Eguafo-Abrem Municipality (KEEAM). Utilizing an adapted Ghana Inclusive Education Monitoring Tool (IEMT) based on the Index for Inclusion, the research involved 74 headteachers and focused on various aspects of inclusive education. The findings indicated that headteachers acknowledged the importance of admitting learners with special needs and disabilities (LwSEND) to foster inclusion. While collaborative efforts among

teachers, parents, and community stakeholders were noted, the study revealed that school facilities were often less accessible, and teachers had limited knowledge regarding curriculum adaptation. These findings underscore the low enrolment of LwSEND in primary schools, emphasizing the need for improved inclusive education practices that can better serve all learners.

Opoku et al. (2020) looked at how inclusive education policies are being implemented across two regions in Ghana. The study found that efforts to promote inclusion were not well coordinated, mainly because different organisations were funding and managing activities separately. This lack of alignment created confusion and reduced the effectiveness of the policy. The researchers recommended that the entire inclusive education policy be reviewed and properly integrated into Ghana's national education system to ensure that all learners benefit equally.

Boakye-Akomeah (2015) conducted a study in the Cape Coast Metropolis to understand how teachers in basic schools support pupils with disabilities. Using a descriptive survey and collecting data from 76 teachers through questionnaires, the study found that most of the teachers had the necessary knowledge and skills to support inclusive education. They were able to modify the curriculum and use different types of assessment to suit the needs of learners with disabilities. Importantly, many teachers were open to collaborating with professionals like therapists and special educators to improve learning outcomes for these pupils. These findings highlight the importance of providing teachers with continuous support from experts in inclusive education so they can effectively meet the needs of all learners.

2.4.1 Challenges of inclusive Education

Despite efforts to promote inclusive education, several challenges hinder its effective implementation. This section highlights some studies that explore the obstacles teachers face in creating inclusive learning environments.

For instance, Senoo et al. (2024) conducted a qualitative study to examine the challenges preschool teachers face in implementing inclusive education for children with Autism Spectrum Disorder (ASD) in Ghana. The study was carried out in the Greater Accra Region using an exploratory descriptive design. Seventeen participants were selected through purposive sampling. Data were gathered via in-depth virtual interviews and analysed using content analysis. The findings revealed several key barriers to inclusive education for children with ASD, including inadequate parental cooperation, limited teacher knowledge about ASD, socio-cultural and political challenges, and poor collaboration with other professionals. The study concluded that these barriers significantly hinder the successful implementation of inclusive education for children with ASD. As a result, the researchers recommended targeted orientation programs, specialized training for teachers, and improved stakeholder collaboration.

Mills (2021) interviewed educators and social workers to explore the barriers to inclusive education for children with intellectual disabilities. The study found that teachers often lacked the training and support needed to manage these learners effectively. However, it also revealed that social workers played an important role in raising awareness and encouraging collaboration between schools and communities. These findings suggest that inclusive education can be strengthened through teamwork between teachers and social workers, with both groups playing key roles in ensuring that children with intellectual disabilities are not left behind.

Oppong-Boateng (2020) also investigated inclusive education, focusing on how culture and teacher attitudes affect the learning experiences of students with disabilities in the Ashanti Region. Through interviews with six teachers from both public and private schools, the study found that negative cultural beliefs about disability and poor teacher attitudes were major obstacles. However, education was seen as a powerful tool that could help overcome these harmful beliefs. The study concluded that addressing cultural misconceptions and improving teacher training are critical for promoting inclusive practices.

Komabu-Pomeyie (2020), through two case studies involving women with disabilities and policymakers, found that although Ghana's inclusive education policy aims to support children with disabilities, its implementation is weak due to poor coordination, lack of training, and limited resources. Similarly, Nketsia (2016) studied 125 teacher educators across four Colleges of Education in Ghana using surveys, and found that although most educators supported inclusive education in principle, they believed that the country was not ready for full implementation due to inadequate teacher preparation and a shortage of materials.

Additionally, Ofori (2018) conducted a general review of inclusive education in Ghana and identified a number of challenges. These included negative societal attitudes, inadequate facilities, and insufficient teacher training. Despite these difficulties, the study also pointed to opportunities for improvement, especially through the implementation of the national inclusive education policy. The review highlighted that promoting inclusive education requires a shift in public attitudes and a commitment to providing better support and resources for both teachers and learners.

Ametepe and Anastasiou (2015) used policy analysis to examine Ghana's Education Strategic Plan (2003–2015), and found that challenges such as poor infrastructure, weak teacher training systems, and lack of monitoring mechanisms were similar to those faced by other Sub-Saharan African countries. Supporting this, Naami and Saa-Touh Mort (2023) conducted interviews and observations at a College of Education in southern Ghana and found that the teacher training curriculum did not properly prepare student teachers for inclusive classrooms, mainly due to a lack of teaching materials, limited course content, and little focus on disability awareness

In the Shama District, studies on inclusive education are rather limited. For instance, Ahiamenyo and Mochiah (2022) conducted a similar study based on teachers' perspective of assessment policies and practices towards inclusive education in Ghana. The study was a quantitative study conducted in a special school and regular schools in the Shama District. The study was a quantitative study conducted in a special school and regular schools in the Shama District under the Ghana Education Service of the Western region. Fifty-two teachers were involved in the study through census approach, and questionnaire was used to collect the data. Frequency distribution and percentages were used to analyse the data. The findings indicated that though teachers were positive about the importance of educational assessment towards the practice of inclusive education in Ghana, yet they had limited knowledge of its assessment practices and policies in Ghana.

However, these previous studies leave several gaps. Most of the research targeting science teachers has been conducted in non-Ghanaian settings, such as Padillo et al. (2024) in Malaysia, Teo (2020) in Singapore, Phillips (2021) in Finland, Almalky & Alwahbi (2023), and Paseka & Schwab (2020) in Germany. The few studies conducted in Ghana have primarily focused on the general implementation of

inclusive education (Mprah et al., 2023; Opoku-Nkoom & Ackah-Jnr, 2023; Ahiavi & Thomas, 2021; Vanderpuye et al., 2020; Deku & Vanderpuye, 2017). These studies did not specifically explore how inclusivity is viewed and practiced by science teachers. Furthermore, the context of Shama has been overlooked in the existing literature. Previous studies conducted in the Shama District failed to address the unique perspectives and practices of science teachers, which are critical for fostering scientifically and technologically inclined citizens. Additionally, they primarily focused on assessment rather than teachers' views and instructional practices. The limited scope of these studies, drawing from only five schools, including four regular schools and a single special school, restricts the generalizability of their findings to all basic schools in the Shama District. Thus, there remains a significant gap in understanding the nuanced experiences of science teachers within this context.

2.5 Summary of Literature Review

This review examined various sources, including books, journals, and online materials, focusing on inclusive education and teachers' views, practices, and challenges. It critically discussed the relevance of two key theories: the Sustainable Development Goals 4 (UN, 2015) and Rogers' Diffusion of Innovations Theory (1962). The conceptual framework illustrated how teachers' views on inclusive education affect their teaching practices and the challenges they encounter while implementing inclusive strategies. Additionally, the review highlighted gaps in the existing research. Most studies on science teachers have taken place outside of Ghana, while those conducted in Ghana mainly addressed general inclusive education without focusing specifically on science teachers. The context of Shama, in particular, has not been adequately explored in the literature.

CHAPTER THREE

METHODOLOGY

3.0 Overview

This study examined Junior High School (JHS) science teachers' views and practice of inclusive education in the Shama District of the Western Region of Ghana. This chapter explains how data was collected. It describes the research paradigm, approach, and design, study area, population, sample size, and sampling procedure, data collection instruments, validity and reliability, data collection procedure, data analysis, and concludes with a discussion on ethical considerations.

3.1 Research Paradigm

Choosing the right research paradigm is important and depends on the type of questions the study is trying to answer. For this study, the positivist approach was used. This approach fits well with the goal of the study, which was to objectively assess how JHS science teachers perceive and practice inclusive education in the Shama District. According to Cohen, Manion, and Morrison (2018), the positivist paradigm helps researchers to gather data in an unbiased way, without letting personal opinions or feelings influence the results.

The positivist approach is useful to this study because it focuses on collecting clear, factual data through standardized methods, which are often part of quantitative research. According to Carr et al. (2018), this approach assumes that social events and behaviours follow patterns that can be studied objectively. This helps reduce the effect of personal beliefs or cultural differences on the research. In this study, measurement tools like structured questionnaires and observations were used to collect data in a way that was free from personal bias. Also, as Leavy (2017) explains, this approach allows

researchers to study the connections between different factors, which fit with the study's objective of exploring the relationship between teachers' views and their practice of inclusive education. Bachman and Schutt (2020) also note that the positivist approach helps researchers measure and observe data accurately. This was important for the study, as it used clear, structured methods to understand how science teachers perceive and practice inclusive education. Therefore, using the positivist approach was the right choice for this study.

3.2 Research Approach

This study followed the quantitative research method. According to Babbie (2020), the goal of quantitative research is to confirm and explain these relationships, predict outcomes, and make general conclusions that add to existing knowledge. Creswell and Creswell (2017), further explains that using quantitative approach helps researchers measure phenomenon objectively and test their ideas in a clear and structured way.

There are several reasons why this study used the quantitative method. First, it allowed the researcher to remain detached from the participants, ensuring that the conclusions drawn were unbiased (Leedy & Ormrod, 2021). This approach ensured that the researcher focused only on the variables being studied, using clear procedures to measure them in a reliable and valid way (Creswell, 2012). Another reason for choosing this method was that it helped to ensure that the study's findings could be generalized to the larger population, meaning the results could apply to many people, not just those in the study (Queirós et al., 2017). Additionally, the findings were presented with summarizing statistics such as percentages, means, and standard deviations, making it easier to explain and report the results. Lastly, this method ensured a high level of objectivity in data analysis because it used predetermined statistical procedures to

evaluate the data fairly and without bias (Singh, 2017). This level of objectivity was important to ensure accurate assessment of the views and practice of inclusive education among JHS science teachers in the Shama District of the Western Region of Ghana.

3.3 Research Design

The descriptive cross-sectional survey design was used. As Burns and Veeck (2020) point out, this design is particularly useful when researchers want to compare variables, identify trends, and explore relationships without manipulating them. Allen (2017) further highlights that a cross-sectional survey is ideal for capturing information at a single point in time, especially when the goal is to describe characteristics of a population, such as age, gender, or geographic location.

A cross-sectional survey design is appropriate for this study because it allows the researcher to collect data at a single point in time from a large population of Junior High School (JHS) science teachers in the Shama District. This design is well-suited for examining teachers' current views, practices, and challenges regarding inclusive education, as well as exploring the relationship between their views and actual classroom practices (Burns & Veeck, 2020; Allen, 2017). As Creswell (2014) notes, cross-sectional surveys are effective for describing trends, attitudes, and relationships among variables within a specific population. Similarly, David and Sutton (2014) emphasize that descriptive surveys are valuable for gathering attitudinal and behavioural data on beliefs, values, and opinions. Given the study's objectives—to understand teachers' opinions, strategies, and difficulties in practicing inclusive education—a cross-sectional approach enables the researcher to gather broad, representative data efficiently and cost-effectively (Ihudiebube-Splendor & Chikeme, 2020). Furthermore, this design supports the use of quantitative tools such as

questionnaires, which are useful for identifying patterns and correlations, particularly for the fourth research question that seeks to explore the relationship between teachers' views and their inclusive practices (Cohen, Manion, & Morrison, 2018).

3.4 Study Area

The study was conducted in the Shama District Assembly with its capital as Shama. The Shama District Assembly is one of the fourteen districts, created from the Sekondi Takoradi Metropolis in the Western region, Ghana. The Shama District was carved out of the former Shama Ahanta East Metropolis (SAEM) and was established in December, 2007 by Legislative Instrument (LI 1882). Officially, it was inaugurated in March, 2008 with its District Capital at Shama. The District is bordered to the west by the Sekondi-Takoradi Metropolis, to the east by the Komenda-Edina-Eguafo-Abrem District in the Central Region, to the north by the Mpohor Wassa East District and to the south by the Gulf of Guinea. The District covers an area of 193.7 square kilometers with a population density of 423.2 and has 67 settlements. Data from 2021 PHC revealed that the population of the district was 117,224 in 2021, representing 5.7% of the regional population of 2,060,585. Out of the total population, 60,104 are females which represent 51.2% and 57,210 are males representing 48.80%. The rural population of the district is 41,613 represent 35.5% of the entire population whilst the urban population is 75,611 represent 64.5%. The district has a very youthful population with 45% of the population being young people. This creates a great opportunity for a vibrant workforce which support the industrialization drive of the district

Data from the Composite Budget For Shama District Assembly (2023-2026) revealed that the district has six (6) circuits. Statistics from the Shama Education Directorate (2023) indicate the levels of schools in the district from the Pre School up to the second cycle level under both public and private ownership. Under Public

management, Currently, Statistics from the District Education Directorate indicated that, the level of education systems ranges from the Pre School to the second cycle level under both public and private ownership. In terms of number of infrastructures, there are fifty-eight (58) KGs, fifty-eight (58) Primary, and fifty-four (54) JHS (including one (1) Special School), two (1) SHS and one (1) TVET (i.e. Integrated Community Centre for Employable Skills (ICCES) School now Shama Technical Institute. The map of the district is shown on Figure 2.



Fig. 2: Map of Shama District
(Source: Ghana Statistical Service, GIS)

The Shama District was chosen as the study area because it reflects the diversity and inclusion efforts within Ghana's basic education system. The district is characterized by a heterogeneous population, including learners with varied learning needs and abilities who are integrated into mainstream classrooms. This makes it a relevant setting for examining issues related to inclusive education. Furthermore, the researcher's preliminary observations revealed that some JHS science teachers in the district pay limited attention to learners with special educational needs, potentially affecting the effectiveness of inclusive practices. Additionally, during cluster-based Professional Learning Community (PLC) meetings, teachers expressed concerns about the difficulties these learners encounter in understanding lessons, indicating a need to explore teachers' views, practices, and the challenges they face in implementing inclusive education. These contextual factors make the Shama District a suitable and meaningful setting for the current study.

3.5 Study Population

According to Asiamah et al. (2017), a study population refers to the complete set of individuals or units that possess the specific characteristics under investigation, and to whom the study's findings may be generalized. It serves as the broader group from which a sample is drawn for data collection. In research, the population is typically categorized into two types: the target population and the accessible population. As explained by Casteel and Bridier (2021), the target population includes all individuals, groups, or entities that the researcher aims to understand, and to whom the study results are intended to apply. The accessible population, on the other hand, is the subset of the target population that is practically available to the researcher for data collection and is expected to reflect the key characteristics of the target group.

In this study, the target population comprised all Junior High School (JHS) science teachers in the Shama District of the Western Region of Ghana, totalling 88 teachers across six educational circuits. The accessible population included all 88 JHS science teachers, made of 57 teachers from public schools and 31 teachers from private schools within the district. These teachers formed the basis for selecting participants and collecting data for the study.

3.6 Sample Size

In the view of Queirós et al. (2017), a sample refers to a subset of individuals, items, or events selected from a larger population for the purpose of conducting research. In this study, the sample consisted of all the eighty-eight (88) JHS science teachers in the Shama District. The decision to include all of the JHS science teachers was driven by the study's focus on gathering information from every JHS science teacher, ensuring that each teacher's opinion and practice of inclusive education in the Shama District is catered for. The breakdown of the sample is detailed in Table 1.

Table 1: Number of JHS Science Teachers in the Shama District

S/N	Circuits	No. of JHS Science teachers (Population)		No. of JHS Science teachers Used (Sample)
		Public	Private	Both (Public/Private)
1	Bronikrom	8	3	11
2	Beposo	11	4	15
3	Inchaban	8	9	17
4	Aboadze/Abuesi	10	6	16
5	Shama	9	6	15
6	Assokuo	9	5	14
	Total	57	31	88

Source: Shama GES Directorate, EMIS 2024

3.7 Sampling Technique

Sampling techniques help researchers select a small group of individuals, units, or elements from a larger population to represent the entire group. The main goal of sampling is to make inferences about a population without having to study every member of that population. In this study, A multi-stage sampling technique was employed for this study to ensure both comprehensive coverage and representativeness. In the first stage, a census sampling approach was used to administer questionnaires to all Junior High School (JHS) science teachers in the Shama District. According to Creswell (2012), a census frame allows researchers to collect data from every member of a defined population, thereby enhancing the accuracy and generalizability of the findings. Krejcie and Morgan, as cited in Cohen et al. (2018), also recommend including the entire population when the size is small and manageable. Since the total number of JHS science teachers in the district was 88, it was feasible to involve all of them in the survey phase, ensuring that the data truly reflected the views and practices of all teachers in the district.

In the second stage, stratified sampling was used to select twelve (12) teachers for classroom observation. The six circuits in the district served as strata, and teachers were selected proportionally based on the number of science teachers in each circuit. This ensured that each circuit was fairly represented in the observational phase of the study, allowing for a deeper understanding of classroom practices across different local contexts. By combining census and stratified techniques within a multi-stage sampling framework, the study achieved both breadth and depth in data collection. The total number of teachers across the circuits was 88, and each circuit's selection was calculated as follows:

First circuit, Bronikrom (11 teachers):

$$\frac{11}{88} \times 12 = 1.5 \rightarrow 2 \text{ teachers selected}$$

Second circuit, Beposo (15 teachers):

$$\frac{15}{88} \times 12 = 2.05 \rightarrow 2 \text{ teachers selected}$$

Third circuits, Inchaban (17 teachers):

$$\frac{17}{88} \times 12 = 2.32 \rightarrow 2 \text{ teachers selected}$$

Fourth circuit, Aboadze/Abuesi (16 teachers):

$$\frac{16}{88} \times 12 = 2.18 \rightarrow 2 \text{ teachers selected}$$

Fifth circuits, Shama (15 teachers):

$$\frac{15}{88} \times 12 = 2.05 \rightarrow 2 \text{ teachers selected}$$

Sixth circuit, Assorko (14 teachers):

$$\frac{14}{88} \times 12 = 1.91 \rightarrow 2 \text{ teachers selected}$$

Therefore, 2 teachers were randomly selected from each circuit, summing up to 12 JHS science teachers in all. This selection ensured a balanced representation of the JHS science teachers across all the circuits in the Shama District.

3.8 Data Collection Instruments

The data collection instrument used in this study were a structured questionnaire and an observation checklist as follows.

1. Structured Questionnaire

One of the instruments used in the study was a structured questionnaire. Using questionnaires is a common and effective method for survey-based research (Hakim, Reni & Ikhsan, 2019). In this study, an Inclusive Education Questionnaire was used. The purpose of the instrument was to systematically collect quantitative data that reflect

Junior High School (JHS) science teachers' views, practices, and challenges regarding inclusive education in the Shama District. This helped the researcher assess the extent to which inclusive education is understood and implemented by science teachers in the district. This instrument consisted of 27 items designed to gather quantitative data from Junior High School (JHS) science teachers in the Shama District.

The questionnaire was divided into two sections. Section A contained 3 items focused on demographic information, such as gender, age, highest academic qualification, years of teaching science, and participation in inclusive education workshops. These items were factual and close-ended. Section B comprised 24 closed-ended items organized into three thematic parts based on the study objectives. The first part, on teachers' views of inclusive education, included 7 items adapted and modified from Mprah et al. (2023) to suit the JHS science context. The second part, covering teachers' practices of inclusive education, contained 10 items adapted from Teo (2021) and modified to reflect inclusive strategies relevant to science classrooms. The third part, addressing challenges faced in implementing inclusive education, had 7 items adapted from Vanderpuye et al. (2020). The items were reworded to reflect challenges of inclusive education in relations to the teaching of the science.

All items in Section B used a four-point Likert scale (1 = Strongly Disagree, 2 = Disagree, 3 = Agree, 4 = Strongly Agree) to measure the extent of agreement based on teachers' views, practices and challenges of inclusive science education. The use of a four-point scale was intentional to avoid a neutral midpoint, thereby encouraging respondents to take a definite stance on each item. This approach helps reduce social desirability bias to prevent respondents from choosing answers they think are socially acceptable or favourable rather than what they truly believe or experience. In other words, it encourages honest responses. It also enhances the clarity of the data collected:

It makes the data more straightforward and easier to interpret because respondents are given clearly defined options, with no option to sit on the fence. This makes it easier for the researcher to analyse trends and patterns in the responses (Joshi et al., 2015). The scale also allows for straightforward quantification of responses, making it suitable for descriptive and inferential statistical analysis. The questionnaire provided a structured and reliable means of collecting data relevant to the study's objectives and is presented in Appendix A.

2. Structured Observation Checklist

The study also employed a structured observation checklist (Appendix B) as a complementary instrument to assess how JHS science teachers in the Shama District actually practiced inclusive education in their classrooms. The checklist consisted of 10 items, which were derived directly from the structured questionnaire used in the study. These items were adapted to observable behaviors and instructional strategies in the classroom, focusing on practices such as differentiated instruction, use of inclusive materials, peer support, and teacher-student interaction. The purpose of using similar items was to validate the self-reported data provided in the questionnaire through direct classroom observation.

The checklist was divided into two sections: Section A captured general information about the observation, including the class level, topic taught, and date of the lesson; Section B contained the observation criteria, guiding the researcher to note whether each inclusive strategy was demonstrated during the lesson. Observations were conducted in a non-participatory manner, with the researcher sitting quietly in the classroom without interfering. A total of twelve (12) teachers were observed, two teachers randomly selected from each of the six circuits within the Shama District to ensure fair representation. Each observation lasted approximately 30 minutes, and the

researcher marked each item on the checklist as either Yes (strategy observed) or No (strategy not observed).

The structured observation checklist provided objective data on the actual implementation of inclusive practices and is attached as Appendix B.

3.9 Validity and Reliability of Questionnaire

Validity

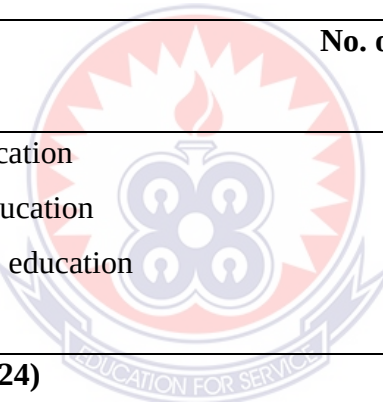
Several steps were taken to ensure that the instruments used in the study were valid. First, questions were adapted from previous studies (Mprah et al., 2023; Teo, 2021; Vanderpuye et al., 2020) that already had strong validity. To check the content validity of the questionnaire, the researcher shared drafts with their supervisor, a professor in Science at the Department of Basic Education at the University of Education, Winneba. This helped confirm that the questions accurately measured the intended topics of view and practice of inclusive education. Additionally, the drafts were reviewed by other science lecturers to assess the face validity of the questionnaire. They looked for typographical errors, unclear wording, and grammatical mistakes, which were corrected before the actual data collection. Finally, the researcher shared the draft with colleagues to identify any remaining errors or issues. Concerns such as the length of the questions and the overall format of the questionnaire were addressed in the final version, ensuring a well-prepared instrument for the study.

Reliability

It is important for research instruments to give consistent results when used on the similar context (Leedy & Ormrod, 2021). To check the reliability of the questionnaire in this study, the researcher conducted a pilot test involving of 18 JHS science teachers in the Wassa East District. The 18 teachers represented 20% of the

actual population of teachers to be used in the actual study and this was deemed appropriate based on the rule of thumb, which state that a pilot test requires a sample size of 10 to 20% of the full-scale survey sample size. The Wassa East District shares close boundaries with the Shama District to the North-East and have similar environment in terms of school and classroom environment, as well as pupil-teacher ratio. The overall reliability coefficient of the instrument was found to be 0.827, which exceeds the commonly accepted threshold of 0.70 proposed by Singh (2017). This indicates that the instrument is capable of producing reliable data. The results of the reliability test are summarized in Table 2.

Table 2: Reliability Results for Questionnaire Items



Variable	No. of items	Cronbach's Alpha
Views of inclusive education	7	0.807
Practice of inclusive education	10	0.791
Challenges of inclusive education	7	0.884
Overall scale	24	0.827

Source: Field work (2024)

3.10 Data Collection Procedure

The data collection process began with an official letter of introduction from the Department of Basic Education at the University of Education, Winneba. This letter was then submitted to the Shama District Education Directorate to obtain permission for ethical clearance for conducting the study with JHS teachers in the area. Following this, the researcher visited the selected junior high schools in the Shama District with the official letter from the District Education Directorate, seeking permission from the school heads to carry out the study. At each school, the researcher first asked for the school head's approval to gather the science teachers for the study. The researcher

interacted with the head of the school to get to know the science teachers and explained the purpose of the study and the methods that would be used to collect data. The teachers were informed about the questionnaire they would complete and the classroom observations that would take place.

The researcher also discussed the scheduling of these activities to ensure they would not disrupt the teachers' regular classes. Some teachers even volunteered to fill out the questionnaires right away while the researcher was present. In completing the questionnaire, teachers were instructed to circle the number that best represented their views on each statement, using a scale of 1 to 4.

After the administration and retrieval of the questionnaire, the researcher proceeded to the observation phase to collect additional data on the actual inclusive practices of Junior High School (JHS) science teachers in the Shama District. The purpose of the classroom observation was to validate the self-reported data obtained from the questionnaires and to capture how inclusive education principles were being implemented during live science lessons. Twelve (12) science teachers were purposively selected for observation. These included two teachers from each of the six educational circuits in the Shama District to ensure broad coverage. The selection was based on availability, willingness to participate, and their prior completion of the questionnaire. Before the observations began, the researcher formally contacted the selected teachers to request access and cooperation. A letter of introduction was provided, and teachers were briefed on the observation's purpose, assuring them of confidentiality and non-evaluation. Consent was obtained verbally.

The researcher arrived at each school prior to the start of the lesson and introduced himself to the class teacher and headteacher. Once the lesson began, the

researcher entered the classroom and took a discreet seat at the back of the room. The observations were non-participatory, meaning the researcher did not interact with the teacher or learners during the session. This allowed for the natural flow of the lesson and reduced the likelihood of behavior change due to the observer's presence. Each observation session lasted approximately 30 to 40 minutes and was carried out during regular scheduled science lessons.

During the lesson, the researcher used the checklist to record whether each of the inclusive practices was demonstrated. For instance, if a teacher used varied instructional methods or adapted tasks for learners with different abilities, these were marked accordingly. The researcher also noted specific examples, where applicable, to provide context for each observed practice. After each observation, the researcher briefly thanked the teacher and left without conducting any post-lesson discussion to maintain neutrality. The completed checklists were securely stored for later analysis. In total, 12 lessons were observed across different schools and class levels within the district.

The data gathered from the classroom observations were later compared with the questionnaire responses to identify patterns, validate self-reported claims, and draw conclusions on the actual implementation of inclusive education practices. The use of a structured, consistent checklist across all sites ensured reliability and objectivity in the observation process. The observation checklist used is provided in Appendix B.

3.11 Data Analysis Procedure

In this study, with the aid of Statistical Products for Service Solution (SPSS) software, descriptive statistics such as frequency counts, percentages, mean and standard deviation were used to analyse the data for research question one, two and

three. Pearson r correlational analysis was used to test for relationship in answering research question four. For the observation data, only frequency counts were used to analyse the data.

3.12 Ethical Considerations

This study adhered to several ethical measures to ensure the integrity and protection of the JHS science teachers used in the study.

One of the measures implemented was informed consent. Each teacher was provided with clear information about the study's purpose, procedures, and their rights before participating. By orally consenting to partake in the study, the JHS science teachers voluntarily agreed to participate, ensuring they were fully informed and understood the nature of the study.

Confidentiality and anonymity were also ensured. The privacy of the science teachers was strictly protected, with personal information not collected nor disclosed at any point. Data collected was anonymized to ensure that responses could not be traced back to specific individuals, thus maintaining the confidentiality of the teachers throughout the study.

Participation was entirely voluntary, and the JHS science teachers were informed that they could withdraw from the study at any time without facing negative consequences. This approach ensured that no teacher was forced or pressured into participating in the study.

The study was designed with the intent to avoid any physical or psychological harm to the science teachers. Careful consideration was given to questionnaire administration and lesson observation to ensure they were non-invasive and respectful of the teachers' professional roles.

Finally, before the study commenced, approval was sought from the Shama District Education office. By implementing these ethical measures, the study was conducted responsibly, respecting the rights and well-being of the JHS science teachers throughout the entire data collection process.



CHAPTER FOUR

RESULTS AND DISCUSSION

4.0 Overview

This chapter presents the results and discussion of the findings. The analysis and discussion of the data aimed at answering the various research questions formulated on JHS science teachers' views and practice of inclusive education in the Shama District of the Western Region of Ghana. The chapter is presented under three sub-sections. The first section is about the analysis of the biographic data of respondents. The second section looks at analysis of the data for each research question. The last section of the chapter gives the discussion of results.

4.1 Demographic information of Respondents

This section presents the results of biodata analysis of the respondents. The data included gender, age category, highest qualification, years of teaching experience, and the number of in-service trainings on inclusive education received. The data gathered are presented on Table 3.

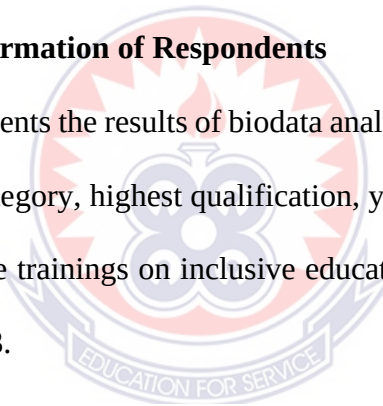


Table 3: Demographic information of Respondents

Variables	Category	Frequency	Percent (%)
Gender of Teachers	Male	58	65.9
	Female	30	34.1
	Total	88	100.0
Age Category of Teachers	20-30 Years	26	29.5
	31-40 Years	27	30.7
	41-50 Years	35	39.8
	Total	88	100.0
Highest Academic Qualification of Teachers	Diploma	35	39.8
	Bachelor's Degree	48	54.5
	Master's Degree	5	5.7
	Total	88	100.0
JHS Science Teacher's years of Teaching Experience	Less than a year	17	19.3
	1-5 years	40	45.5
	6-10 years	21	23.9
	11-15 years	5	5.7
	16-20 years	5	5.7
	21 years and above	21	23.9
	Total	88	100.0
Number of In-Service Training on Inclusive Education Attended	None	21	23.9
	1-3	52	59.1
	4-6	10	11.4
	7-9	5	11.4
	10 and above	0	0.0
	Total	88	100.0

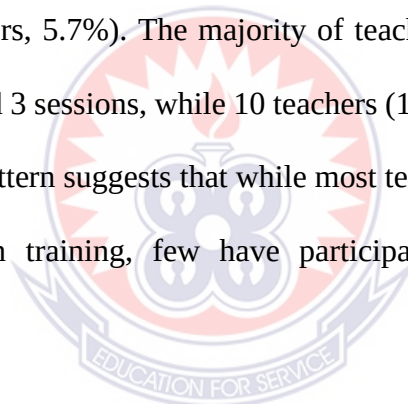
Source: Field Data (2023)

The data presented in Table 3 shows that out of the 88 teachers surveyed, 58 (65.9%) are male, and 30 (34.1%) are female. This indicates that the teachers handling science at the JHS level in the Shama District was predominantly male-dominated. In terms of age, the respondents range from a minimum age group of 20–30 years (26 teachers, 29.5%) to a maximum group of 41–50 years (35 teachers, 39.8%), with 27 teachers (30.7%) falling in the 31–40 age bracket. This distribution suggests a fairly balanced age spread, with a significant majority (60.2%) aged above 31 years, indicating a workforce with considerable life and possibly teaching experience.

Regarding academic qualifications, teachers' credentials range from a minimum of 5 teachers (5.7%) holding master's degrees, through 5 teachers (5.7%) with

diplomas, to a maximum of 48 teachers (54.5%) possessing bachelor's degrees. This demonstrates that the majority of JHS science teachers in the Shama District are bachelor's degree holders, reflecting a generally qualified teaching population. In terms of teaching experience, the range spans from a minimum of less than 1 year (17 teachers, 19.3%) to a maximum of over 21 years (21 teachers, 23.9%). The largest group, however, comprises teachers with 1 to 5 years of experience (40 teachers, 45.5%). This indicates that a large portion of the science teaching workforce is relatively new to the profession, with 64.8% having less than six years of experience.

Finally, the data on in-service training in inclusive education shows that participation ranges from a minimum of 0 sessions (21 teachers, 23.9%) to a maximum of 9 sessions (5 teachers, 5.7%). The majority of teachers (52 teachers, 59.1%) have attended between 1 and 3 sessions, while 10 teachers (11.4%) have attended between 4 and 6 sessions. This pattern suggests that while most teachers have had some exposure to inclusive education training, few have participated in extensive professional development.



4.2 Research Question One

What are the views of JHS science teachers about inclusive education in the Shama District?

Seven (7) items were formulated and administered to the respondents. The items were placed on a four-point Likert scale: 1 = "Strongly Disagree (SD)", 2 = "Disagree (D)," 3 = "Agree (A)" and 4= "Strongly Agree (SA)". The data were analyzed using frequencies, percentages, mean and standard deviations. For the purpose of the analysis, the responses 'Strongly Disagree' and 'Disagree' were combined and interpreted as denoting 'Disagreement (D)' while the responses, 'Strongly Agree' and 'Agree' were similarly joined as indicating 'Agreement (A)' to the statements. The responses were

analysed using frequency, percentages, mean and standard deviation. The mean score was calculated with the formula; $\text{mean } (\bar{x}) = 1 + 2 + 3 + 4 = 10/4 = 2.5$. Therefore, a mean score above 2.5 implies that the majority of the respondents agreed to the statement while $(\bar{x})$ less than 2.5 implies that the majority of the respondents disagreed with the statement. For the standard deviation, an obtained value below 1.0 indicates the homogeneity or similarity of the responses given to the item while a standard deviation 1.0 or above indicate the heterogeneity or variation in the responses given. The results of the data collected on this research question is presented on Table 4;

Table 4: Frequency, Percentages, Mean and Standard Deviations of JHS Science Teachers' responses on Views about Inclusive Education in the Shama District

Statements	Frequency N (%)				
	N	A (%)	D (%)	M	SD
The curriculum used for teaching does not support inclusive educational practices.	88	56 (64)	32 (36)	2.75	1.13
Inclusive education does not adequately benefit children with special educational needs.	88	59 (67)	29 (33)	3.06	1.07
Children with special needs should be sent to special schools.	88	79 (90)	9 (10)	3.44	0.80
The government is imposing inclusive education on us without providing enough resources for special schools.	88	84 (95)	4 (5)	3.59	0.58
The practice of inclusive education gives extra burden to science teachers.	88	83 (94)	5 (6)	3.13	0.96
Inclusive education would retard the academic progress of students who do not have any special educational needs.	88	46 (52)	42 (48)	2.36	1.36
I think inclusive education is a good educational practice.	88	74 (84)	14 (16)	3.52	0.76

Key: Agree (A); Disagree (D); Mean (M); Standard Deviation (SD)

Source: Field Data (2023)

The data in Table 4 reveals a range of teacher views on various aspects of inclusive education. Responses to whether the curriculum supports inclusive practices ranged from a minimum of 32 teachers (36%) who disagreed to a maximum of 56 teachers (64%) who agreed. The mean score of 2.75 suggests general agreement, but the standard deviation of 1.13 indicates diverse opinions among respondents. This suggests that while a majority feel the curriculum is not inclusive, there is no strong consensus.

On whether inclusive education adequately benefits children with special educational needs, agreement ranged from a minimum of 29 respondents (33%) to a maximum of 59 (67%). With a mean score of 3.06 and a standard deviation of 1.07, the data shows agreement, though the variation suggests differing views among the teachers. This implies that while many teachers question the effectiveness of inclusive education for learners with special needs, some still recognize its potential benefits.

A more definitive view was expressed on the placement of children with special needs in special schools, where agreement ranged from a minimum of 9 teachers (10%) to a maximum of 79 (90%). The mean score of 3.44 and a standard deviation of 0.80 reflect strong agreement and consistency. This shows that most teachers believe children with special needs should be educated in specialized settings rather than in inclusive classrooms.

Regarding government support, responses to the statement that inclusive education is being implemented without sufficient resources for special schools ranged from a minimum of 4 teachers (5%) in disagreement to a maximum of 84 teachers (95%) in agreement. The mean score of 3.59 and a standard deviation of 0.58 suggest a strong and nearly unanimous agreement among teachers. This indicates a shared

concern that the implementation of inclusive education lacks the necessary logistical and material backing.

On whether inclusive education places an extra burden on science teachers, agreement ranged from a minimum of 5 teachers (6%) to a maximum of 83 teachers (94%). The mean score of 3.13 indicates general agreement, and the standard deviation of 0.96 points to a relatively consistent viewpoint. This suggests that most science teachers feel additional pressure in adapting their teaching to meet diverse learners' needs.

Views were more divided on the statement that inclusive education retards the academic progress of learners without special needs. Responses ranged from a minimum of 42 teachers (48%) in disagreement to a maximum of 46 teachers (52%) in agreement. The mean score of 2.36 reflects a slight tilt toward disagreement, but the high standard deviation of 1.36 reveals a broad spread of views. This implies that teachers are nearly equally split on whether inclusion negatively affects other students' academic progress.

Finally, on the views that inclusive education is a good educational practice, agreement ranged from a minimum of 14 teachers (16%) to a maximum of 74 (84%). A mean score of 3.52 and a standard deviation of 0.76 demonstrate strong support and uniformity in responses. This suggests that, despite concerns about resources and classroom challenges, the majority of teachers recognize the overall value of inclusive education.

The data suggests that JHS science teachers in the Shama District have mixed views on inclusive education. While most agree that it is a positive practice (84%, $M=3.52$), they express concerns about inadequate curriculum support (64%, $M=2.75$) and insufficient resources (95%, $M=3.59$). Many believe children with special needs

should attend special schools (90%, $M=3.44$) and feel that inclusive education places an additional burden on their workload (94%, $M=3.13$).

4.3 Research Question Two

How do JHS science teachers practice inclusive education in the Shama District?

This research question sought to find out the various strategies teachers employ in practicing inclusive education in their science lessons. Ten (10) items were formulated and administered to the respondents with four response options as 1 = ‘Strongly Disagree’, 2 = ‘Disagree’, 3 = ‘Agree’, and 4 = ‘Strongly Agree’. The data were analyzed using frequencies, percentages, mean and standard deviation. For the purpose of the analysis, the responses ‘Strongly Disagree’ and ‘Disagree’ were combined and interpreted as denoting ‘Disagreement (D)’ while the responses, ‘Strongly Agree’ and ‘Agree’ were similarly joined as indicating ‘Agreement (A)’ to the statements. The responses were analysed using frequency, percentages, mean and standard deviation. The mean score was calculated with the formular; $\text{mean } (\bar{x}) = \frac{1 + 2 + 3 + 4}{4} = 2.5$. Therefore, a mean score above 2.5 implies that the majority of the respondents agreed to the statement while $(\bar{x})$ less than 2.5 implies that the majority of the respondents disagreed with the statement. For the standard deviation, an obtained value below 1.0 indicates the homogeneity or similarity of the responses given to the item while a standard deviation 1.0 or above indicate the heterogeneity or variation in the responses given. The results of the data collected on this research question is presented on Table 5;

Table 5: Frequency, Percentages, Mean and Standard Deviations of JHS Science Teachers' Responses of Inclusive Education Practices in the Shama District

Statements	Frequency N (%)				
	N	A (%)	D (%)	M	SD
I provide a different set of learning materials for special needs learners in my science lessons.	88	57 (64)	31 (36)	2.60	0.98
I put learners with and those without special needs into mixed ability small learning groups during my science lessons.	88	59 (67)	29 (33)	2.75	0.84
I am more lenient when marking science work of learners with special needs.	88	28 (32)	60 (68)	1.92	0.56
I adopt different approaches to cater for learners with special needs in my science lessons.	88	62 (70)	26 (30)	2.84	1.02
I make provision for learners with special needs when planning my science lessons.	88	42 (48)	46 (52)	2.35	0.95
I slow down the pace of my science lessons to meet everyone's needs.	88	65 (74)	23 (26)	2.99	0.83
I frequently check on learners with special needs during individual science work.	88	72 (82)	16 (18)	3.02	0.87
I pay special attention to their non-verbal gestures as cues about their learning during my lessons.	88	69 (79)	19 (21)	3.06	0.84
I plan specific seating arrangements for learners with special needs during my science lessons.	88	44 (50)	44 (50)	2.47	1.17
In my science class, I use technology to enhance inclusivity and accessibility of all learners.	88	28 (32)	60 (68)	1.98	1.04

Key: Agree (A); Disagree (D); Mean (M); Standard Deviation (SD)

Source: Field Data (2023)

The data in Table 5 indicates a range of responses regarding science teachers' classroom practices for supporting learners with special educational needs. On the use of different learning materials, agreement ranged from a minimum of 31 teachers (36%) to a maximum of 57 teachers (64%). The mean score of 2.60 reflects agreement, and the standard deviation of 0.98 suggests that responses were relatively consistent. This

indicates that most teachers adapt learning materials to support learners with special needs. Regarding grouping learners in mixed-ability groups, 59 teachers (67%) agreed while 29 (33%) disagreed. The mean score of 2.75 shows overall agreement, with a low standard deviation of 0.84 indicating consistency in responses. This suggests that grouping learners of different abilities is a commonly used inclusive strategy among science teachers.

When asked whether teachers are more lenient when marking the work of learners with special needs, 60 respondents (68%) disagreed while 28 (32%) agreed. The mean score of 1.92 indicates disagreement, and the low standard deviation of 0.56 points to uniformity in views. This implies that most teachers maintain the same academic expectations for all learners, regardless of their learning needs. In terms of using different teaching approaches for special needs learners, agreement ranged from a minimum of 26 teachers (30%) to a maximum of 62 teachers (70%). The mean score of 2.84 suggests general agreement, but the standard deviation of 1.02 indicates variation in responses. This reflects that while many teachers diversify their teaching methods, there are differing levels of commitment to this practice.

On whether teachers plan lessons specifically for special needs learners, 42 (48%) agreed while 46 (52%) disagreed. The mean score of 2.35 indicates disagreement, and a standard deviation of 0.95 shows that responses were somewhat similar. This suggests that planning lessons with the specific needs of such learners in mind is not a consistent practice among the teachers. Responses to slowing down the pace of lessons to meet all learners' needs ranged from 23 (26%) in disagreement to 65 (74%) in agreement. The mean score of 2.99 reflects agreement, and the standard deviation of 0.83 shows consistent responses. This implies that many science teachers adapt the pace of their lessons to accommodate learners with special needs.

A large majority, 72 teachers (82%), agreed that they frequently check on learners with special needs, while 16 (18%) disagreed. The mean score of 3.02 and standard deviation of 0.87 indicate agreement and consistent views. This shows that regular monitoring of such learners is a common practice among most teachers. In relation to paying attention to non-verbal cues from learners with special needs, 69 teachers (79%) agreed and 19 (21%) disagreed. The mean score of 3.06 supports this agreement, with a standard deviation of 0.84 indicating shared perspectives. This suggests that many teachers are observant of subtle learner behaviors to support their engagement in class.

However, responses were evenly split regarding the planning of specific seating arrangements for special needs learners, with 44 teachers (50%) agreeing and 44 (50%) disagreeing. The mean score of 2.47 shows overall disagreement, and the standard deviation of 1.17 reveals a high level of variation. This suggests that opinions and practices on seating arrangements are mixed among the teachers. Finally, on the use of technology to enhance inclusivity and accessibility in science lessons, only 28 teachers (32%) agreed, while 60 (68%) disagreed. The mean score of 1.98 reflects general disagreement, and the standard deviation of 1.04 shows variation in responses. This indicates that the integration of technology for inclusive purposes is not widely practiced and may require further promotion and support.

The data suggests that in practicing inclusive education, JHS science teachers in the Shama District pay special attention to non-verbal cues ($M=3.06$), frequently check on learners with special needs ($M=3.02$), slow down lesson pace ($M=2.99$), adopt different approaches ($M=2.84$), used mixed-ability groupings ($M=2.75$) and provide different learning materials ($M=2.60$). In contrast, they failed to plan specific seating arrangements ($M=2.47$), made provision for special needs in lesson planning ($M=2.35$),

became lenient when marking ($M=1.92$) nor used technology to enhance inclusivity ($M=1.98$) in their lessons.

The response provided by the teachers were followed up with a classroom lesson observation among twelve of these JHS science teachers. The results are presented in Table 6.

Table 6: Frequency and Percentages of JHS Science Teachers' Practices of Inclusive Education

T1	T2	T3	T4	T5	T6	T7	T8	T9	T10	T11	T12	Practiced YES (%)
Provision of different set of learning materials for special needs learners.												10 (83%)
√	√	√	√	√	×	×	√	√	√	√	√	
Use of mixed ability small learning groups.												11 (91.7%)
√	√	×	√	√	√	√	√	√	√	√	√	
Being more lenient when marking science work of learners with special needs.												10 (83%)
√	√	√	√	√	√	√	√	√	×	×	√	
Use of different approaches in teaching.												12 (100%)
√	√	√	√	√	√	√	√	√	√	√	√	
Planned lesson to cater for learners with special needs.												12 (100%)
√	√	√	√	√	√	√	√	√	√	√	√	
Slowed down the pace of science lessons to meet everyone's needs.												10 (83%)
√	×	√	√	√	√	√	×	√	√	√	√	
Frequently checked on learners with special needs during science work.												12 (100%)
√	√	√	√	√	√	√	√	√	√	√	√	
Paying special attention to their non-verbal gestures as cues during science lessons.												12 (100%)
√	√	√	√	√	√	√	√	√	√	√	√	
Use of specific seating arrangements for learners with special needs.												3 (25%)
√	×	×	√	×	×	×	×	×	√	×	×	
Use of technology to enhance inclusivity and accessibility of all learners.												4 (33%)
√	√	×	√	×	×	√	×	×	×	×	×	

Keys: Yes (√), No (×)

Source: Field Data (2023)

This data presented in Table 6 shows the adherence to inclusive education practices among twelve observed teachers (T1 to T12) in the Shama District. Notably, all twelve teachers (100%) utilized different teaching approaches and planned lessons that catered to learners with special needs. All twelve teachers also consistently checked on learners with special needs during science work and paid special attention to their non-verbal cues. Furthermore, eleven out of twelve teachers (92%) employed mixed

ability small learning groups, while ten (83%) slowed down their lesson pace to accommodate all learners, provided a different set of learning materials for special needs learners, and were lenient when marking the work of learners with special needs. Sadly, a mere four teachers (33%) used technology to enhance inclusivity while 3 (25%) used specific seating arrangements.

In conclusion, it was observed in the twelve science classrooms that teachers highly implemented various inclusive education practices including the use of different lesson plans and teaching, frequent checks on such learners and their non-verbal clues yet some (25-33%) of them need to be supported for improvement in the use of seating arrangements and technology to effectively implement inclusive education in their lessons.

4.4 Research Question Three

What challenges do JHS science teachers face in the practice of inclusive education in the Shama District?

Seven (7) items were formulated and administered to the respondents. The aim of the question was to identify the challenges JHS science teachers face in the practice of inclusive education in the Shama District. Respondents were required to rate their views on a scale of 1 = 'Strongly Disagree', 2 = 'Disagree', 3 = 'Agree', and 4 = 'Strongly Agree'. The data were analyzed using frequencies, percentages, mean and standard deviation. For the purpose of the analysis, the responses 'Strongly Disagree' and 'Disagree' were combined and interpreted as denoting 'Disagreement (D)' while the responses, 'Strongly Agree' and 'Agree' were similarly joined as indicating 'Agreement (A)' to the statements. The mean score was calculated with the formula; $\text{mean } (\bar{x}) = \frac{1 + 2 + 3 + 4}{4} = \frac{10}{4} = 2.5$. Therefore, a mean score above 2.5 implies that the majority of the respondents agreed to the statement while $(\bar{x})$ less than 2.5 implies

that the majority of the respondents disagreed with the statement. For the standard deviation, an obtained value below 1.0 indicates the homogeneity or similarity of the responses given to the item while a standard deviation 1.0 or above indicate the heterogeneity or variation in the responses given. The results of the data collected on this research question are presented on Table 7.

Table 7: Frequency, Percentages, Mean and Standard Deviations of JHS Science Teachers' Responses of Challenges of practicing inclusive science education in the Shama District

Statements	Frequency N (%)				
	N	A (%)	D (%)	M	SD
I did not receive any education on inclusivity during my college or university education.	88	22 (25)	66 (75)	1.80	1.01
My district does not provide frequent in-service education on inclusive education.	88	73 (83)	15 (17)	3.20	0.86
I lack sufficient teaching resources and materials for effective inclusive education.	88	79 (90)	9 (10)	3.49	0.68
Parents in my district do not collaborate and provide support in implementing inclusive education.	88	88 (100)	0 (0)	3.66	0.48
There is no special education resource teacher in my school.	88	83 (94)	5 (6)	3.69	0.58
I find it difficult adapting teaching resources to meet the needs of those with special educational needs in my class.	88	78 (89)	10 (11)	3.23	0.58
Large class size hinders my ability to implement inclusivity in my science lessons.	88	69 (78)	19 (22)	3.18	0.77

Key: Agree (A); Disagree (D); Mean (M); Standard Deviation (SD)

Source: Field Data (2023)

The data in Table 7 reveals several significant challenges confronting teachers in their efforts to implement inclusive science education. First, on whether teachers lacked education on inclusivity during their college or university training, only 22 teachers (25%) agreed, while the majority, 66 (75%), disagreed. The mean score of 1.80 indicates general disagreement, although the standard deviation of 1.01 suggests varied

responses. This implies that most teachers believe they received some form of training on inclusivity during their initial teacher preparation, though experiences may differ.

In contrast, responses to the availability of in-service education opportunities paint a different picture. A large majority, 73 teachers (83%), agreed that their district does not frequently provide in-service training on inclusive education, while only 15 (17%) disagreed. The mean score of 3.20 reflects strong agreement, and the low standard deviation of 0.86 indicates consistency in opinions. This suggests that lack of ongoing professional development is a widespread and acknowledged challenge among teachers.

Teaching resources also emerged as a major concern. A significant majority, 79 teachers (90%), agreed that there is a lack of sufficient materials to support inclusive science education, while just 9 (10%) disagreed. The mean score of 3.49 and a standard deviation of 0.68 point to widespread and uniform agreement. This clearly indicates that the unavailability of teaching and learning resources is a serious barrier to effective inclusion.

Parental support was identified as an even more critical issue, with all 88 teachers (100%) agreeing that parents do not collaborate to support inclusive education. This perfect agreement is reflected in the highest mean score of 3.66 and the lowest standard deviation of 0.48. This highlights a complete lack of parental involvement, which is a crucial component for the success of inclusive practices.

Another commonly cited challenge was the absence of special education resource teachers. Here, 83 teachers (94%) agreed and only 5 (6%) disagreed. The mean score of 3.69, the highest among all items, and a standard deviation of 0.58, confirm strong and consistent agreement. This indicates that the unavailability of specialized support staff significantly limits the implementation of inclusive education.

In terms of adapting teaching resources to meet diverse learner needs, 78 teachers (89%) reported difficulties, while 10 (11%) disagreed. A mean score of 3.23 and a standard deviation of 0.58 suggest agreement and consistent views. This underscores that many teachers struggle to modify materials to suit learners with special needs.

Finally, large class sizes were also identified as a hindrance to inclusivity. While 69 teachers (78%) agreed and 19 (22%) disagreed, the mean score of 3.18 reflects general agreement. However, the standard deviation of 0.77 suggests consistency in views. This implies that many teachers see class size as a barrier, yet a notable minority may find ways to manage or adapt despite the challenge.

Based on the data, the challenges JHS science teachers face in the practice of inclusive education in the Shama District included no special education resource teacher ($M=3.69$), lack of parental support ($M=3.66$), insufficient teaching resources ($M=3.49$), difficulty adapting resources ($M=3.23$), infrequent in-service education ($M=3.20$), and large class sizes ($M=3.18$).

4.5 Research Question Four

What is the relationship between the views and practice of inclusive education among JHS science teachers in the Shama District?

The last research question examined how JHS Science teachers' views about inclusive education influence their practice of inclusion in the Shama District. To address this research question, a null and an alternate hypothesis were stated as follows:

HO: There is no statistically significant relationship between the views and practice of inclusive education among JHS science teachers in the Shama District.

HA: There is a statistically significant relationship between the views and practice of inclusive education among JHS science teachers in the Shama District.

The assumptions for the Pearson correlation analysis were tested and found to be valid. First, the scale of measurement was confirmed as appropriate. Since the study used a 4-point Likert scale, which is measured at the interval level, this assumption was satisfied. This meets the requirement for Pearson correlation, which requires interval data (See Appendix A).

Next, normality was verified through visual inspections (Normal Q-Q plots) and statistical tests (Kolmogorov-Smirnov and Shapiro-Wilk). The results, shown in Figures 3 and 4, confirmed that the data were normally distributed.

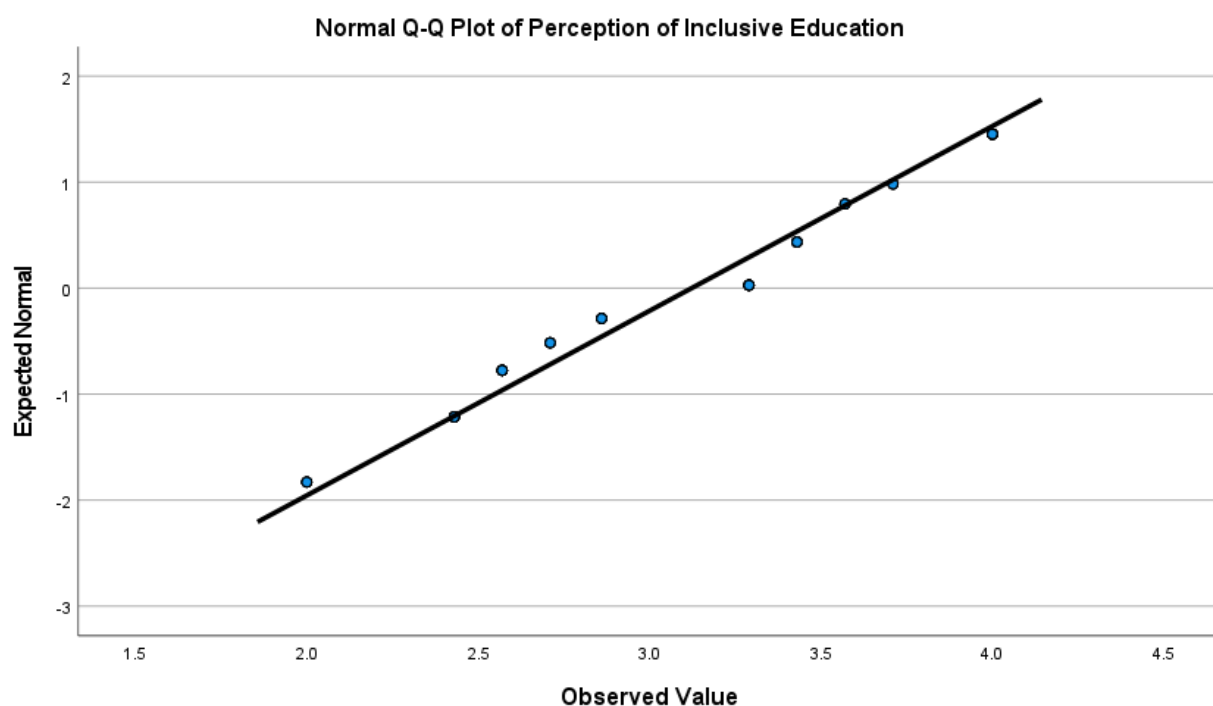


Fig. 3: Normal Q-Q plot for Views of Inclusive Education

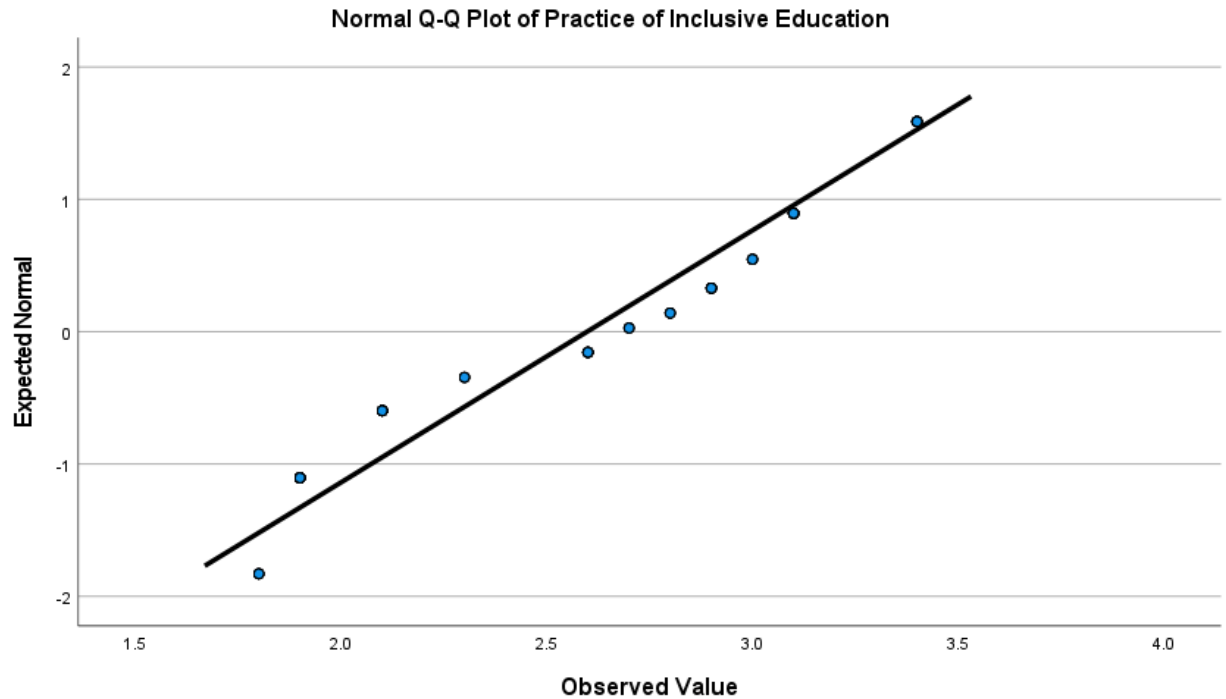


Fig. 4: Normal Q-Q plot for Practice of Inclusive Education

Also, Both the Kolmogorov-Smirnov and Shapiro-Wilk tests showed that the views and practice of inclusive education were normally distributed. The significance values were 0.720 and 0.417 for the Kolmogorov-Smirnov test, and 0.624 and 0.073 for the Shapiro-Wilk test, all of which are greater than the alpha level of 0.05. This indicates that the assumption of normality was met, as shown in Table 8.

Table 8: Test of normality

Aspects	Kolmogorov-Smirnov ^a			Shapiro-Wilk		
	Statistic	df	Sig.	Statistic	df	Sig.
View of inclusive education	.084	88	.720 [*]	.986	88	.624
Practice of inclusive education	.103	88	.417	.963	88	.073

Source: Field data (2024)

Homoscedasticity was also confirmed. The scatter plot in Figure 5 suggests that the variance of the residuals is constant across all levels of predicted values, fulfilling

the assumption of homoscedasticity. No issues with unequal variance were detected, which supports the correlation results.

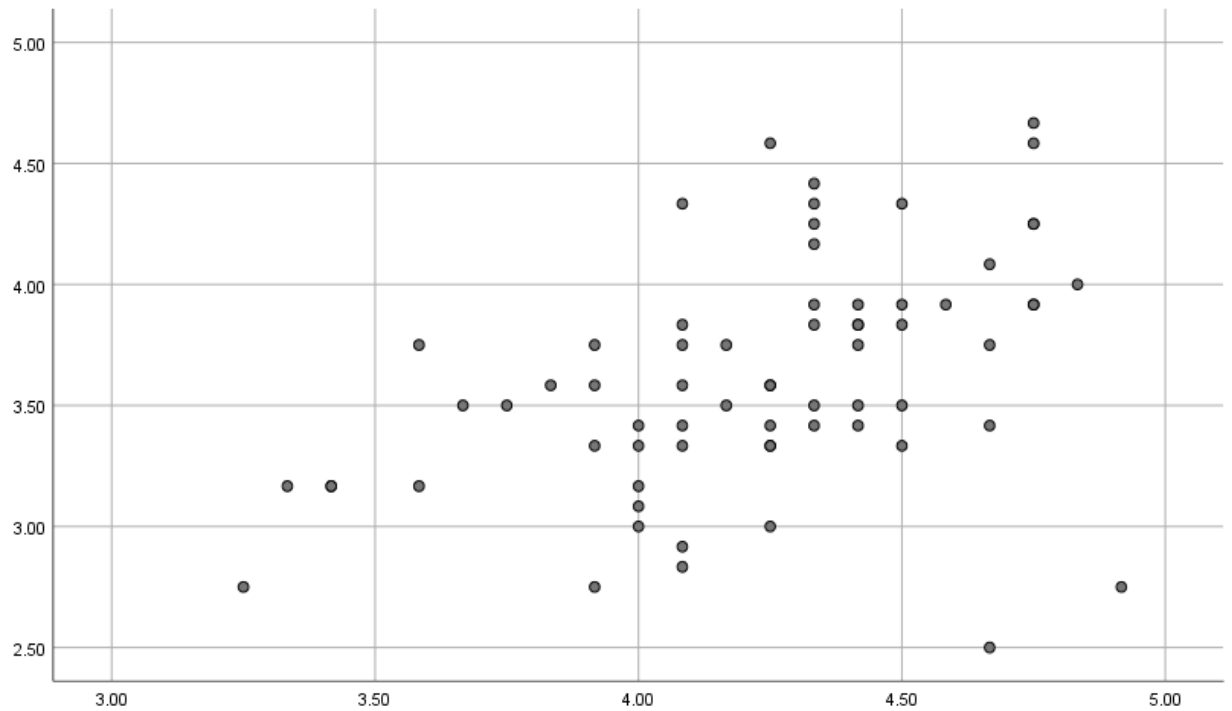


Fig. 5: Scatter plot for Homoscedasticity

Additionally, no significant outliers were found. This was established through the box and whisker plot as shown on Figure 6 and 7.

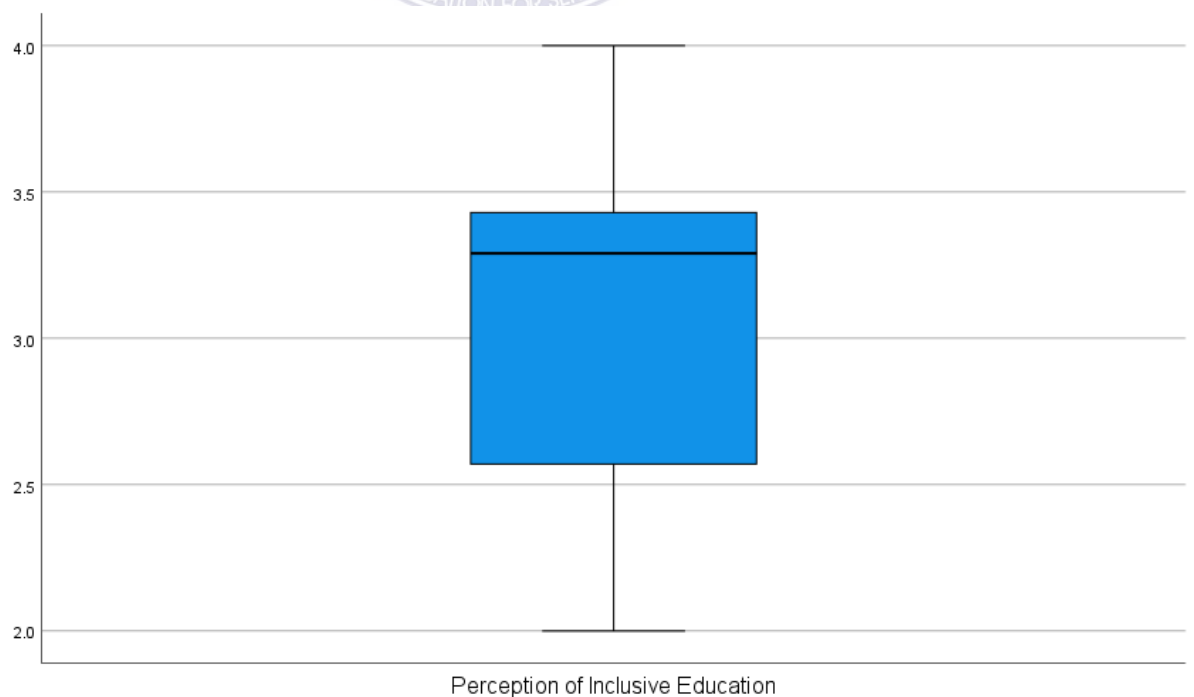


Fig. 6: Box and whisker plot for Views of Inclusive Education

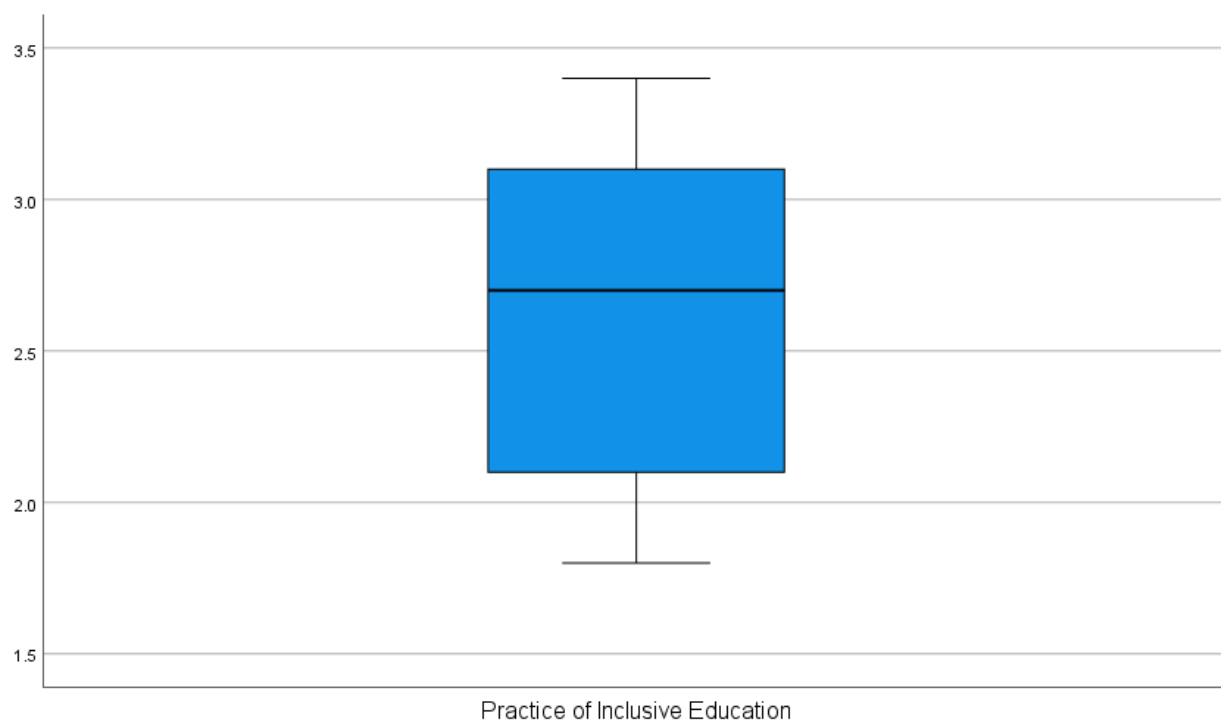


Fig. 7: Box and whisker plot for Practice of Inclusive Education

Furthermore, the assumption of homogeneity of variances was checked using Levene's test. The results showed that the p-value ($p = 0.958$) was above 0.05, indicating that the assumption of equal variances was met. The results are presented in Table 9.

Table 9: Test of Equal Variance

Test of Homogeneity of Variances					
		Levene Statistic	df1	df2	Sig.
<i>Views of inclusive education</i>	Based on Mean	.103	3	58	.958

Source: Field Data (2024)

Finally, the independence of observations was ensured, as data were collected individually from 88 teachers without overlap or influence between responses.

Since all assumptions were satisfied, the Pearson correlation analysis was deemed valid and reliable. Accordingly, a Pearson product momentum correlation analysis was computed. The Pearson correlation results are presented in Table 10.

Table 10: Pearson Correlation Results on the Relationship between teachers' views and their practices of inclusive education in the Shama District.

View of Inclusive Education ~	Pearson Correlation	.217*
	Sig. (2-tailed)	.043
Practice of Inclusive Education	N	88

Source: Field Data (2023).

The data in Table 10 revealed a weak positive correlation between the views and practice of inclusive education, ($r=.217$, $p=.043$). The value of 0.217 indicates a positive but weak correlation. This suggests that as teachers' views of inclusive education improve, their practice of inclusive education also tends to improve, but the relationship is not very strong. The p-value (0.043) is less than 0.05, which means the result is statistically significant. This indicates that the relationship between teachers' views and practice of inclusive education is not due to chance, and there is a meaningful association between the two variables.

In conclusion, the analysis has shown that there is a statistically significant but weak positive correlation between the views and practice of inclusive education among JHS science teachers in the Shama District. This indicates that teachers with more favorable views of inclusive education are somewhat more likely to implement inclusive practices in their classrooms. However, the weak correlation suggests that view alone may not be a strong predictor of actual practice, and other factors beyond their views likely influence teachers' practice of inclusive education.

4.6 Discussion of Findings

Research Question One: What are the views of JHS science teachers about inclusive education in the Shama District?

The first research question explored JHS science teachers' views about inclusive education in the Shama District. The findings indicated a mix of positive and negative views, highlighting both the potential of inclusive education and the challenges teachers face in its implementation. The teachers expressed both support and reservations, with many recognizing the benefits of inclusive education while simultaneously pointing to concerns about its feasibility within the current educational structure. Specifically, they raised issues about inadequate curriculum support, insufficient resources, and the view that inclusive education added an extra burden to their already demanding workload. These findings align with, and in some cases diverge from, existing literature on the subject.

For instance, a similar trend was observed by Ahiavi and Thomas (2021), who investigated teachers' opinions on inclusive education for children with special needs in the Awutu Senya East Municipality. Their study also reported that, although teachers saw the benefits of inclusion in enhancing students' abilities, they struggled with the lack of resources and support services. The congruence of these findings suggests that, different districts in Ghana, teachers' positive attitudes toward inclusive education are tempered by practical challenges.

One of the primary concerns raised by JHS science teachers in the Shama District was the lack of curriculum support and resources as shown in table four (4). This issue is not unique to their context, as teachers in other parts of the world face similar struggles when trying to meet the diverse needs of students in an inclusive environment. For instance, Teo (2020) found in Singapore that, although teachers

supported inclusion, they often felt underprepared and lacked institutional backing. The similarity between Singapore and Ghana indicates that even in more developed educational systems, inclusive education faces significant challenges when resources and support are lacking. However, the situation in East Mamprusi, as reported by Mprah et al. (2023), offers a stark contrast. In their study, teachers not only expressed concerns about a lack of support but also had limited knowledge of inclusive education. This highlights regional differences within Ghana, where some areas may have more foundational gaps in awareness and preparation compared to others.

Another significant finding from the Shama District was that some teachers believed children with special needs might be better served in specialized schools as shown in table four (4). This view suggests that mainstream schools are perceived as not fully equipped to accommodate students with severe disabilities. Ahiavi and Thomas (2021) similarly reported that teachers in the Awutu Senya East Municipality questioned whether mainstream schools could provide the necessary specialized attention. This raises a broader debate about the extent to which inclusive education policies can be successfully implemented without compromising the quality of education for both students with and without special needs. The teachers' belief that specialized schools may offer a better solution reflects concerns about the capacity of mainstream schools to handle the full range of student abilities, especially when support systems are inadequate.

Finally, many JHS science teachers in the Shama District viewed inclusive education as adding to their workload. Without sufficient support, they felt that they were being asked to take on additional responsibilities that stretched their capacity. This sentiment echoes Teo's (2020) findings in Singapore, where teachers felt overwhelmed by the demands of inclusive education. Despite their positive views, they expressed the

need for more time, training, and resources to manage inclusive classrooms effectively. Mprah et al. (2023) similarly found that teachers in East Mamprusi felt overburdened, but with a more negative view, as their lack of preparation and support led to significant opposition to inclusive education. The contrasting levels of support and resources between the Shama District and East Mamprusi highlight the importance of local context in shaping teachers' views.

In summary, the findings from the Shama District reflect broader trends in the literature, where teachers generally express support for inclusive education but raise concerns about practical challenges such as curriculum support, resources, and workload.

Research Question Two: How do JHS science teachers practice inclusive education in the Shama District?

The second research question examined how JHS science teachers implement inclusive education in the Shama District. The findings revealed that teachers actively engage in various inclusive practices to accommodate learners with special needs. Some of the key strategies identified include paying attention to non-verbal cues, frequently checking on learners with special needs, using diverse teaching approaches, and incorporating mixed-ability groupings. Classroom observations confirmed that teachers adapt their lesson plans to meet the needs of all learners and ensure that those with special educational needs receive appropriate attention and support.

One notable practice observed was the teachers' attention to non-verbal cues, such as students' facial expressions and body language as shown in table six (6). This aligns with the findings of Teo (2020), who reported that teachers in Singapore also relied on non-verbal communication as a critical tool in inclusive classrooms. Paying attention to these cues enables teachers to assess whether students are engaged or

confused, allowing for timely interventions. This strategy is particularly useful for students who may struggle to express their difficulties verbally, offering a more nuanced way of understanding their needs. Similarly, Zee and Koomen (2016) emphasized the importance of non-verbal communication, noting that teachers who are attuned to students' body language and facial expressions can better gauge their comprehension and emotional state.

In addition to non-verbal communication, the findings highlighted the teachers' use of diverse teaching approaches and mixed-ability groupings. This practice aligns with the recommendations of Villanueva et al. (2012), who emphasized the need for varied instructional strategies to address the different learning styles and abilities of students. By employing a range of teaching methods, teachers in the Shama District ensure that all students, including those with special needs, are engaged and able to participate in the lessons. This approach fosters an inclusive learning environment where each student's unique learning needs are considered, thereby promoting equal opportunities for academic success.

Another key practice was the modification of lesson plans to cater to the needs of learners with special educational needs. Teachers reported putting extra effort into their planning to ensure that the lessons were accessible to all students, which echoes the findings of Parmar et al. (2015). In their study, teachers similarly reported adjusting their lesson materials and activities to accommodate the diverse learning styles present in their classrooms. This practice not only enhances inclusivity but also promotes a more student-centered approach, where teaching is tailored to the individual rather than the group as a whole.

It is evident from the discussion above that the findings of this study align with previous research on the practices of inclusive education. The strategies used by JHS

science teachers in the Shama District—such as paying attention to non-verbal cues, employing diverse teaching approaches, and modifying lesson plans—are consistent with the methods identified in studies by Teo (2020), Villanueva et al. (2012), and Parmar et al. (2015).

Research Question Three: What challenges do JHS science teachers face in the practice of inclusive education in the Shama District?

The third research question aimed to identify the challenges that JHS science teachers face while practicing inclusive education in the Shama District. The findings revealed a number of significant challenges, including the absence of special education resource teachers, lack of parental support, insufficient teaching resources, difficulties in adapting materials, infrequent in-service training, and large class sizes. These challenges mirror those identified in various studies, highlighting systemic barriers that hinder the effective implementation of inclusive education.

One of the major challenges noted was the infrequent availability of in-service training for teachers. This finding aligns with Deku and Vanderpuye (2017), who explored teachers' perspectives on the curriculum and their preparedness for inclusive education in Ghana. Deku and Vanderpuye found that many teachers felt unprepared for inclusive teaching due to a lack of adequate pre-service and in-service training. Teachers in both studies expressed concerns that their training had not equipped them with the skills and knowledge needed to effectively teach students with diverse learning needs. This highlights a significant gap in professional development, which, if addressed, could enhance teachers' confidence and ability to practice inclusive education.

Another major challenge was the lack of sufficient teaching resources, which was echoed in a study by Wani and Ali (2015). Wani and Ali found that teachers often

feel frustrated by the inadequate resources and materials available to support the implementation of inclusive education. In the Shama District, teachers reported similar frustrations, indicating that they lacked the tools and materials necessary to differentiate instruction for students with special needs. This shortage of resources limits the effectiveness of inclusive practices, as teachers are unable to fully meet the diverse needs of their students. Both studies suggest that without adequate resources, the goals of inclusive education are difficult to achieve.

The lack of parental support was another significant challenge identified by teachers in the Shama District. This challenge is supported by the findings of Davis and Florian (2014), who reported that limited interaction between teachers, students, and parents complicates the implementation of inclusive education. Teachers in both studies noted that insufficient communication with parents made it difficult to understand the individual needs of students. When parents are not actively involved in their children's education, teachers may lack critical information needed to effectively support students with disabilities. This lack of strong two-way communication between parents and teachers hinders the ability to tailor instruction to the specific needs of each student.

Additionally, teachers in the Shama District faced difficulties in adapting materials to accommodate students with special needs. This challenge aligns with research by Kassah et al. (2012) and Naami and Mort (2023), who noted that the lack of training and resources often leads to feelings of inadequacy among teachers. Without proper training on how to modify materials for inclusive classrooms, teachers may struggle to provide accessible lessons for all students. This can result in reluctance to fully embrace inclusive practices, as Mngo and Mngo (2018) found in their study. Teachers who feel unprepared or unsupported are less likely to implement inclusive education effectively, even if they recognize its potential benefits.

It can be concluded that the challenges faced by JHS science teachers in the Shama District are consistent with those reported in other studies, including the lack of in-service training, insufficient resources, and limited parental involvement. These challenges contribute to feelings of inadequacy and reluctance among some teachers to fully embrace inclusive education.

Research Question Four: What is the relationship between the views and practice of inclusive education among JHS science teachers in the Shama District?

Finally, the fourth research question examined the relationship between JHS science teachers' views and practices of inclusive education in the Shama District. The findings revealed a statistically significant but weak positive correlation, suggesting that while teachers with more favorable views of inclusive education are more likely to implement inclusive practices, though their views alone does not strongly predict actual practice. This indicates that other factors also influence the implementation of inclusive education in the Shama District, beyond teachers' views of the policy.

The weak yet statistically significant correlation aligns with the findings of Burch (2019), who demonstrated that teachers with positive views and proper training in inclusive strategies are generally better equipped to support students with diverse needs. While positive views contribute to better practices, Burch's study emphasized the importance of well-developed training in ensuring that these positive attitudes translate into effective teaching practices. Without the necessary skills and resources, favorable views may not be enough to guarantee successful implementation.

Similarly, studies by Kuyini et al. (2020) and You et al. (2019) underscore the role of teachers' perspectives in shaping the outcomes of inclusive education. These studies highlight that when teachers believe in the value of inclusion and feel confident

in their ability to teach diverse learners, they are more likely to engage in inclusive practices. This supports the notion that view is a key factor in promoting inclusive education, but it also suggests that confidence and competence, developed through training and support, are crucial for putting these views into action.

Krischler et al. (2019) and Moberg et al. (2020) also emphasize that teachers' attitudes towards students with special needs play a pivotal role in the success of inclusive education. Their research demonstrates that negative views can lead to lower expectations for students with disabilities, which may hinder their academic and social development. In contrast, positive views help foster an environment where all students feel supported, contributing to their overall success. This highlights the importance of addressing any negative attitudes or misconceptions teachers may have to ensure that inclusive education initiatives are successful.

In sum, the findings suggest that while positive views of inclusive education are important, they are not sufficient on their own to ensure the effective implementation of inclusive practices. Other factors, such as professional development, resource availability, and institutional support, play critical roles in shaping teachers' ability to create inclusive classrooms. Positive views lay the groundwork for inclusive education, but without the necessary tools and support, these views may not fully translate into practice. Thus, fostering both positive attitudes and providing adequate training and resources are key to the successful implementation of inclusive education in the Shama District.

CHAPTER FIVE

SUMMARY, CONCLUSIONS AND RECOMMENDATIONS

5.0 Overview

This chapter provides a summary, conclusions, recommendations, and suggestions for further research.

5.1 Summary of the Study

This study examined Junior High School (JHS) science teachers' views and practice of inclusive education in the Shama District of the Western Region of Ghana. Guided by four research questions, the study employed a quantitative approach with descriptive survey as its design. The sample included all 88 JHS science teachers, selected using census frame and stratified sampling technique. Census frame was used to include all the JHS science teachers during the questionnaire administration while stratified simple random sampling technique was used to select twelve (12) teachers for lesson observation. Data were collected through an observation checklist and a structured questionnaire. Descriptive statistics, such as frequency counts, percentages, means, and standard deviations, were used to analyze data for the first three research questions. Pearson correlation analysis was used to analyze the data for fourth research question. These research questions were as follows:

1. What are the views of JHS science teachers about inclusive education in the Shama District?
2. How do JHS science teachers practice inclusive education in the Shama District?
3. What challenges do JHS science teachers face in the practice of inclusive education in the Shama District?

4. What is the relationship between the views and practice of inclusive education among JHS science teachers in the Shama District?

5.2 Findings

Four key findings emerged from the study:

1. The findings indicated that JHS science teachers in the Shama District held a mix of positive and negative views about inclusive education. They recognized the benefits of inclusive education while simultaneously pointing to concerns such as inadequate curriculum support and resources.
2. The study found that JHS science teachers in the Shama District actively engage in various inclusive education practices. These included paying attention to non-verbal cues, frequently checking on learners with special needs, using diverse teaching approaches, and incorporating mixed-ability groupings.
3. Additionally, the findings revealed that JHS science teachers in the Shama District face various challenges in their practice of inclusive education, including the absence of special education resource teachers, lack of parental support, insufficient teaching resources, difficulties in adapting materials, infrequent in-service training, and large class sizes.
4. Lastly, the study found a statistically significant but weak positive correlation between the views and practices of inclusive education among JHS science teachers in the Shama District.

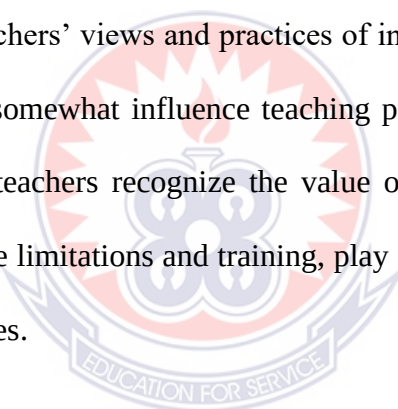
5.3 Conclusions

This study concludes based on the first findings that the mixed views held by JHS science teachers suggest that while they understand and value the potential benefits of inclusive education, practical limitations such as inadequate curriculum support and resources hinder full acceptance and consistent implementation.

Secondly, the fact that JHS science teachers actively engage in inclusive education practices such as paying attention to non-verbal cues, frequently checking on learners with special needs, using diverse teaching approaches, indicates a commitment to supporting all learners. This demonstrates their willingness to adapt their teaching methods to meet diverse needs, likely improving student engagement and learning outcomes.

Again, it is concluded based on the third findings that the challenges faced by JHS science teachers, such as the lack of specialized resources, parental involvement, and professional training, highlight significant barriers to effective inclusive education.

Lastly, on account of the last findings, it is concluded that the weak yet positive correlation between teachers' views and practices of inclusive education suggests that views about inclusion somewhat influence teaching practices, but not strongly. This may imply that while teachers recognize the value of inclusive education, external factors, such as resource limitations and training, play a more decisive role in shaping their day-to-day practices.



5.4 Recommendations

1. In addressing teachers' mixed views on inclusive education, the Shama District Education Directorate should intensify workshops on inclusive curriculum design and equip classrooms with necessary materials, so that teachers feel better supported and more positive about implementing inclusive practices.
2. It is recommended for the District Education Directorate and heads of Junior High Schools in the Shama District to tailor their Continuous Professional Development (CPD) and Professional Learning Communities (PLC) on innovative inclusive strategies like differentiated instruction, adaptive technology, and peer-assisted learning strategies to further enhance teachers'

practice of inclusive education

3. The District Education Directorate should introduce a support system that includes access to special education resources and regular in-service training to help mitigate the challenges that teachers face in practicing inclusive education
4. As a means of strengthening the link between teachers' positive views on inclusive education and their classroom practices, policymakers of education in the Shama District should focus on reducing external barriers by ensuring consistent access to resources and providing ongoing mentorship, where experienced inclusive educators share practical strategies with newer teachers.

5.5 Suggestions for Further Studies

Based on the findings and the defined scope of this study, the following areas are identified as key targets for further research:

1. Future studies could broaden the scope to include teachers from other subject areas or levels (e.g., primary and senior high schools) to provide a more comprehensive understanding of inclusive education practices.
2. Researchers could examine the impact of inclusive teaching practices on student outcomes, such as academic performance, participation, and well-being.
3. It is also recommended that further studies explore the role of parents and school administrators in supporting inclusive education to better understand the systemic and community factors that influence its success.
4. Comparative studies could be conducted across different districts or regions in Ghana to identify regional variations in the implementation of inclusive science education.

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APPENDIX A

QUESTIONNAIRE FOR JHS SCIENCE TEACHERS

I am student pursuing an MPhil in Basic Education at the University of Education, Winneba. As part of my academic journey, I am conducting a study on “JHS science teachers’ views and practice of inclusive education in the Shama District of the Western Region of Ghana. This questionnaire serves as a vital instrument in collecting your valuable opinions, observations, and reflections. By participating in this study, you are actively contributing to the advancement of knowledge in the field of science and inclusive education. Your responses will remain confidential and anonymous. Additionally, the data collected from this questionnaire will be used solely for research purposes and will be treated with the utmost confidentiality. Thank you.

SECTION A

BIOGRAPHIC DATA

Please respond by ticking [✓] in the appropriate box the response applicable to you.

1. **Gender:** Male ☐ Female ☐
[CP]
2. **Age:** 20-30 ☐ 31- 40 ☐ 41- 50 ☐ 51 and above ☐
3. **Highest Academic Qualification:** Tr’s Cert A (Post Sec) ☐ Diploma ☐
Bachelor’s Degree ☐ Master’s Degree ☐ Ph.D ☐
4. **Science Teaching Experience (in years):** 1-5 ☐ 6-10 ☐ 11-15 ☐
16-20 ☐ 20+ ☐
5. **In a year, how many workshops do you attended on Inclusive Education?**
None ☐ 1-3 ☐ 4-6 ☐ 7-9 ☐ 10 and above ☐

SECTION B

Choose the level of agreement or disagreement based on your views and experiences as follows: 1 = “Strongly Disagree (SD)”, 2 = “Disagree (D),” 3 = “Agree (A)” and 4= “Strongly Agree (SA)”. **Please, circle a number.**

Part 1: Basic School Science Teachers’ Views about Inclusive Education in the Shama District.

S/N	Views of Inclusive Education	SD	D	A	SA
1.	The curriculum used for teaching does not support inclusive educational practices.	1	2	3	4
2.	Inclusive education does not adequately benefit children with special educational needs.	1	2	3	4
3.	Children with special needs should be sent to special schools not the mainstream schools.	1	2	3	4
4.	The government is imposing inclusive education on us without providing enough resources for special schools.	1	2	3	4
5.	The practice of inclusive education gives extra burden to science teachers.	1	2	3	4
6.	Inclusive education would retard the academic progress of students who do not have any special educational needs.	1	2	3	4
7.	I think inclusive education is a good educational practice	1	2	3	4

Part 2; Basic School Science Teachers Practice of Inclusive Education in the Shama District

S/N	Practice of Inclusive Education	SD	D	A	SA
8	I provide a different set of learning materials for special needs learners in my science lessons.	1	2	3	4
9	I put learners with and those without special needs into mixed ability small learning groups during my science lessons.	1	2	3	4
10	I am more lenient when marking science work of learners with special needs.	1	2	3	4
11	I adopt different approaches when teaching my science lessons.	1	2	3	4

12	I make provision for learners with special needs when planning my science lessons.	1	2	3	4
13	I slow down the pace of my science lessons to meet everyone's needs.	1	2	3	4
14	I frequently check on learners with special needs during individual science work	1	2	3	4
15	I pay special attention to their non-verbal gestures as cues about their learning during my lessons.	1	2	3	4
16	I plan specific seating arrangements for learners with special needs during my science lessons	1	2	3	4
17	In my science class, I use technology to enhance inclusivity and accessibility of all learners.	1	2	3	4

Part3: Challenges Basic School Science Teachers Face in The Practice of Inclusive Education in The Shama District

S/N	Challenges of Inclusive Education	SD	D	A	SA
18	I did not receive any education on inclusivity during my college or university education.	1	2	3	4
19	My district does not provide sufficient in-service education on inclusive education	1	2	3	4
20	I lack sufficient teaching resources and materials for effective inclusive education	1	2	3	4
21	Parents in my district do not collaborate and provide support in implementing inclusive education.	1	2	3	4
22	There is no special educationist as a resource teacher in my school	1	2	3	4
23	I find it difficult adapting teaching resources to meet the needs of those with special educational needs in my class.	1	2	3	4
24	Large class size hinders my ability to implement inclusivity in my science lessons	1	2	3	4

THE END (THANK YOU FOR YOUR TIME)

APPENDIX B**LESSON OBSERVATION PROTOCOL**

Objective: To observe and assess how JHS science teachers' practice inclusive education in the Shama District of the Western Region of Ghana.

SECTION A: Lesson Information:

School: _____

Class: _____

Topic of Lesson: _____

Date of Observation: _____

SECTION B: Tick to show whether each of these traits are present (Yes) or absent (No) in the lesson observed.

S/N	Practice of Inclusive Education	YES	NO
1	The teacher provided a different set of learning materials for special needs learners in science lessons.		
2	The teacher put learners with and those without special needs into mixed ability small learning groups during my science lessons.		
3	The teacher was more lenient when marking science work of learners with special needs.		
4	The teacher adopted different approaches when teaching science lessons.		
5	The teacher made provision for learners with special needs when planning science lessons.		
6	The teacher slowed down the pace of science lessons to meet everyone's needs.		
7	The teacher frequently checked on learners with special needs during individual science work		
8	The teacher paid special attention to their non-verbal gestures as cues about their learning during lessons.		
9	The teacher planned specific seating arrangements for learners with special needs during science lessons		
10	The teacher used technology to enhance inclusivity and accessibility of all learners in the lesson.		

THE END

APPENDIX C

COVER LETTER FROM THE SHAMA DISTRICT EDUCATION OFFICE



17th July, 2023.

OUR REF: GES/WR/SHD2/VOL.2/124

YOUR REF:

RE-LETTER OF INTRODUCTION

We refer to the letter dated 30th June, 2023 from the Department of Basic Education (University of Education Winneba) on the above subject.

Management of Shama District Education Directorate request your assistance to enable Godson Agbotomey a second year MPhil student with registration number 220011620 to carry out a research on the topic "BASIC SCHOOL SCIENCE TEACHERS' KNOWLEDGE AND PRACTICE OF INCLUSIVE EDUCATION IN THE SHAMA DISTRICT".

Counting on your usual cooperation.

Thank you.


RAPHAEL AIDOO-TAYLOR [MR]
DISTRICT DIRECTOR OF EDUCATION

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