

UNIVERSITY OF EDUCATION, WINNEBA

**IMPLEMENTATION OF UNIVERSAL DESIGN FOR
LEARNING IN EARLY CHILDHOOD CENTRES IN THE
ADAKLU DISTRICT.**



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UNIVERSITY OF EDUCATION, WINNEBA

**IMPLEMENTATION OF UNIVERSAL DESIGN FOR LEARNING IN
EARLY CHILDHOOD CENTRES IN THE ADAKLU DISTRICT.**

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UNIVERSITY OF EDUCATION, WINNEBA**

SEPTEMBER, 2025

DECLARATION

Student's Declaration

I, **GLORIA ADZATOR AMA**, declare that this thesis is a result of my original research except for references to other people's work which have been duly acknowledged and it has neither in whole nor in part been presented for another degree in this university or elsewhere.

Candidate's Signature:

Date:

Supervisor's Declaration

I hereby declare that the preparation and supervision of this research work were done in accordance with the guidelines for the supervision of research work as laid down by the School of Graduate Studies, University of Education, Winneba.

Name of Supervisor: Professor Clement Ali

Supervisor's Signature:

Date:

DEDICATION

To my husband and our lovely sons.



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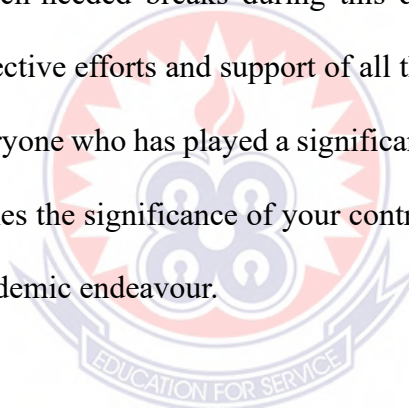


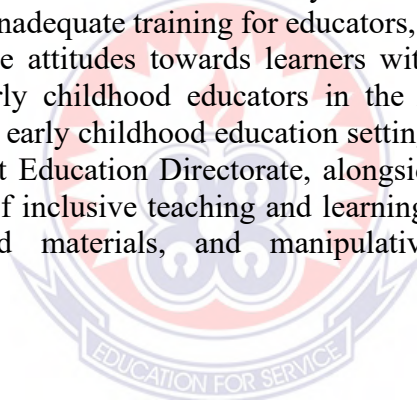
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ABSTRACT

The objective of this research was to investigate the application of Universal Design for Learning (UDL) within early childhood education centres located in the Adaklu District. The methodology employed for this inquiry was an exploratory case study design. This research utilised a purposive sampling approach. The participant sample consisted of 13 early childhood educators. The tools utilised for data collection comprised semi-structured interview guides. The data obtained from the research were subjected to thematic analysis. The findings indicated that early childhood educators in the Adaklu District perceive Universal Design for Learning (UDL) as a robust framework conducive to promoting inclusive, adaptable, and developmentally suitable teaching practices. Furthermore, the successful execution of Universal Design for Learning (UDL) in early childhood centres within the Adaklu District is contingent upon the reliable provision of inclusive teaching and learning resources, continuous professional development for educators centred on inclusive methodologies, and substantial collaboration with parents, communities, and non-governmental organisations (NGOs). Additionally, the research uncovered that pedagogical strategies such as differentiated instruction, technology integration, environmental adaptation, and collaborative teaching are among the methodologies employed in the implementation of UDL. The results of the study further illuminated that challenges such as insufficient resources, inadequate training for educators, elevated teacher-learner ratios, lack of support, and adverse attitudes towards learners with disabilities constitute significant obstacles faced by early childhood educators in the Adaklu District in their efforts to implement UDL within early childhood education settings. It is consequently recommended that the Adaklu District Education Directorate, alongside pertinent stakeholders, prioritise the reliable provision of inclusive teaching and learning resources, encompassing assistive technologies, modified materials, and manipulatives to facilitate effective UDL implementation.



CHAPTER ONE

INTRODUCTION

1.1 Background to the Study

Inclusive education has garnered substantial international attention as a pivotal methodology aimed at guaranteeing that all learners, irrespective of their varying abilities or disabilities, are afforded equitable educational opportunities. The Universal Design for Learning (UDL) framework has surfaced as an essential paradigm for promoting inclusivity within educational environments (CAST, 2023). UDL underscores the necessity of adaptability in pedagogical strategies, evaluative measures, and learning contexts to effectively serve a heterogeneous learner population (Meyer, Rose, & Gordon, 2022). In the realm of early childhood education, the adoption of UDL is imperative as it establishes the groundwork for lifelong learning and holistic development. Nevertheless, the degree to which early childhood educators comprehend and enact UDL within inclusive contexts remains a domain that necessitates further inquiry, especially within the Adaklu District of Ghana.

The notion of inclusive education is codified within numerous international frameworks, including the United Nations Convention on the Rights of Persons with Disabilities (UNCRPD) and the Sustainable Development Goals (SDGs), most notably Goal 4, which underscores the importance of quality education for all individuals (United Nations, 2023). These frameworks advocate for the dismantling of obstacles that impede students with disabilities from obtaining quality educational experiences. Universal Design for Learning (UDL) functions as an effective methodology for realizing these objectives by fostering adaptable learning environments that cater to the heterogeneous needs of learners (Rose et al., 2023). In the context of Ghana, governmental initiatives have been undertaken to advance

inclusive education through policies such as the Inclusive Education Policy (2015), which is in concordance with international benchmarks. Nonetheless, the practical application of UDL in early childhood educational settings continues to be uneven due to a multitude of challenges, which include insufficient teacher training, resource scarcity, and a limited understanding of UDL principles (Agyei, 2023).

The framework of Universal Design for Learning is predicated upon three fundamental principles: diverse means of representation, varied means of engagement, and multiple means of action and expression (CAST, 2023). The principle of diverse means of representation guarantees that information is conveyed in an array of formats to accommodate the diverse learning requirements of individuals. Varied means of engagement emphasize the implementation of strategies that maintain learners' interest and intrinsic motivation, whereas multiple means of action and expression provide opportunities for learners to manifest their comprehension through various modalities (Meyer et al., 2022). Within the context of early childhood education, these principles are essential for cultivating an inclusive learning environment wherein all children, inclusive of those with disabilities, can prosper. Nonetheless, the degree to which educators within the Adaklu District incorporate these principles into their pedagogical practices remains to be rigorously investigated. The framework of Universal Design for Learning is predicated upon three fundamental principles: diverse means of representation, varied means of engagement, and multiple means of action and expression (CAST, 2023). The principle of diverse means of representation guarantees that information is conveyed in an array of formats to accommodate the diverse learning requirements of individuals. Varied means of engagement emphasize the implementation of strategies that maintain learners' interest and intrinsic motivation, whereas multiple means of action and expression provide opportunities for learners to manifest their

comprehension through various modalities (Meyer et al., 2022). Within the context of early childhood education, these principles are essential for cultivating an inclusive learning environment wherein all children, inclusive of those with disabilities, can prosper. Nonetheless, the degree to which educators within the Adaklu District incorporate these principles into their pedagogical practices remains to be rigorously investigated.

The implementation of UDL in inclusive early childhood education requires educators to adopt various teaching strategies and instructional materials tailored to diverse learners. Research suggests that strategies such as differentiated instruction, assistive technology, and multisensory learning approaches are effective in supporting children with varying abilities (Hall, Vue, Strangman, & Meyer, 2023). Additionally, instructional materials such as visual aids, tactile resources, and digital tools can enhance learning experiences for children with special educational needs (Gargiulo & Metcalf, 2023). However, in many early childhood centres, especially in developing countries like Ghana, access to these resources is often limited, posing a challenge to the successful implementation of UDL (Opoku et al., 2023).

Educators assume a critical position in the effective enactment of Universal Design for Learning (UDL), yet numerous obstacles impede their capacity to adeptly implement UDL principles within educational environments. A deficiency in professional development opportunities pertaining to inclusive teaching methodologies constitutes a significant impediment (Agyei, 2023). Research demonstrates that a considerable proportion of early childhood educators possess insufficient knowledge and competencies related to the formulation and execution of instruction grounded in UDL principles (Okai, 2023). Furthermore, elevated student-to-teacher ratios, inadequate instructional resources, and a lack of support from school leadership exacerbate the difficulties encountered by educators in inclusive educational contexts (Anastasiou & Kauffman, 2023). Grasping these challenges

is imperative for the formulation of targeted strategies that can bolster the ability of educators to implement UDL with efficacy.

Despite these challenges, the adoption of UDL in early childhood education has shown promising benefits. Research indicates that UDL fosters active learning, enhances engagement, and improves learning outcomes for children with diverse needs (Rose et al., 2023). The framework encourages inclusive classroom practices that accommodate all learners, thereby reducing educational disparities and promoting equity (CAST, 2023). In Ghana, integrating UDL into early childhood education has the potential to bridge the gap between policy and practice in inclusive education. However, empirical studies assessing its implementation and impact remain limited, particularly in the Adaklu District.

The imperative to investigate the comprehension and application of Universal Design for Learning (UDL) among early childhood educators in the Adaklu District is paramount. Prevailing literature underscores deficiencies in the awareness and execution of inclusive educational strategies within early childhood environments (Opoku et al., 2023). This research endeavor seeks to evaluate educators' grasp of UDL principles, scrutinize the methodologies employed in the implementation of UDL within inclusive early childhood centers, delineate the pedagogical strategies and instructional resources utilized, and investigate the obstacles encountered by educators in the application of UDL. By addressing these dimensions, the study aspires to augment the existing corpus of knowledge pertaining to inclusive education and to guide policy development and practical applications aimed at enhancing early childhood education in Ghana.

Universal Design for Learning serves as an invaluable framework for promoting inclusivity within early childhood education. Nonetheless, the successful execution of this framework necessitates comprehensive teacher training, the provision of necessary resources, and robust

institutional backing. Although both international and national policies underscore the significance of inclusivity, the pragmatic application of UDL principles within early childhood classrooms remains notably variable. This investigation aims to elucidate the current status of UDL implementation in the Adaklu District while proposing recommendations for the improvement of inclusive educational practices. By examining educators' comprehension, strategies for implementation, and the challenges faced, this study intends to enrich the ongoing discourse regarding inclusive early childhood education and highlight the necessity for targeted interventions to adequately support diverse learners.

1.2 Statement of the Problem

Inclusive education is a fundamental aspect of quality early childhood education, ensuring that all children, regardless of their abilities or disabilities, have access to meaningful learning experiences (CAST, 2023). The Universal Design for Learning (UDL) framework has been recognised as an effective approach for achieving inclusivity by providing flexible teaching strategies and multiple means of engagement, representation, and expression (Meyer, Rose, & Gordon, 2022). Despite the growing global emphasis on UDL, it appears its implementation in early childhood centres remains problematic, particularly in developing countries like Ghana (Agyei, 2023). The situation in the Adaklu District reflects broader challenges, including inadequate teacher training, inadequate resources, and insufficient institutional support, which hinder the effective application of UDL principles in early childhood settings (Opoku et al., 2023).

One of the primary concerns prompting this study is the limited understanding of UDL among early childhood educators. Many educators in Ghanaian early childhood centres have little to no formal training in inclusive pedagogies, leading to inconsistent and ineffective teaching strategies for diverse learners (Okai, 2023). Without adequate knowledge of UDL principles,

teachers may struggle to provide differentiated instruction that accommodates the varying needs of learners, thereby reinforcing educational disparities (Rose et al., 2023). This gap in knowledge underscores the need to assess the level of understanding of UDL among early childhood educators in the Adaklu District and identify areas for professional development.

Another critical issue is the lack of structured implementation of UDL in inclusive early childhood settings. Studies indicate that while national policies support inclusive education, there is often a disconnect between policy and practice due to inadequate monitoring and support for teachers (Anastasiou & Kauffman, 2023). In many early childhood centres, rigid curricula and traditional teaching methods fail to accommodate learners with disabilities, limiting their participation and engagement in classroom activities (Gargiulo & Metcalf, 2023). This study aims to examine how UDL is currently implemented in inclusive early childhood centres in the Adaklu District and the extent to which it aligns with best practices.

The availability and use of appropriate teaching strategies and instructional materials are also essential for effective UDL implementation. Research has shown that the use of assistive technology, multisensory learning approaches, and differentiated instructional techniques can significantly enhance learning outcomes for children with diverse needs (Hall, Vue, Strangman, & Meyer, 2023). However, in many early childhood centres in Ghana, access to such resources is limited, and teachers often rely on conventional teaching methods that do not adequately support inclusive learning (Opoku et al., 2023). Identifying the teaching strategies and instructional materials currently employed in the Adaklu District will provide insights into existing gaps and areas for improvement.

The obstacles encountered by educators in the application of Universal Design for Learning (UDL) further intensify the impediments to achieving inclusive education. Elevated student-to-teacher ratios, insufficient infrastructural resources, and a lack of administrative backing

hinder educators' capacity to effectively implement UDL principles within the educational environment (Agyei, 2023). Moreover, prevailing societal attitudes and cultural convictions regarding disability and inclusion persistently shape the perspectives of both educators and parents towards inclusive educational practices (Okai, 2023). Comprehending these challenges is essential for formulating strategies that assist educators in surmounting the obstacles associated with the implementation of UDL.

In optimal circumstances, early childhood education ought to be meticulously designed to address the needs of all learners, regardless of their individual learning capabilities. Universal Design for Learning (UDL) establishes a conceptual framework that promotes inclusive education by integrating adaptable pedagogical strategies that accommodate a wide range of learning requirements (CAST, 2023). In exemplary practice, educators in early childhood settings should undergo extensive training in UDL principles, have access to a variety of instructional resources, and receive continuous institutional support to enable effective execution (Rose et al., 2023). It is imperative for policymakers and educational stakeholders to ensure that UDL is incorporated into the national curriculum and that systems are established to support its implementation across all early childhood educational institutions (Anastasiou & Kauffman, 2023). In optimal circumstances, early childhood education ought to be meticulously designed to address the needs of all learners, regardless of their individual learning capabilities. Universal Design for Learning (UDL) establishes a conceptual framework that promotes inclusive education by integrating adaptable pedagogical strategies that accommodate a wide range of learning requirements (CAST, 2023). In exemplary practice, educators in early childhood settings should undergo extensive training in UDL principles, have access to a variety of instructional resources, and receive continuous institutional support to enable effective execution (Rose et al., 2023). It is imperative for

policymakers and educational stakeholders to ensure that UDL is incorporated into the national curriculum and that systems are established to support its implementation across all early childhood educational institutions (Anastasiou & Kauffman, 2023).

There exists a pressing necessity for precisely targeted interventions aimed at reconciling the discrepancies between policy formulation and practical application in the execution of Universal Design for Learning (UDL) within the realm of early childhood education. Professional development initiatives ought to be meticulously crafted to augment educators' comprehension and competencies pertaining to inclusive pedagogical approaches. Furthermore, a substantial increase in the allocation of resources for education, assistive technologies, and the design of inclusive classroom environments will be imperative for the successful enactment of UDL (Gargiulo & Metcalf, 2023). The collaboration of various stakeholders, which includes the engagement of governmental bodies, non-governmental organisations, as well as local community members, will be fundamentally essential in advancing inclusive educational practices and ensuring that all students receive the requisite support necessary for their academic success (Hall et al., 2023).

The execution of Universal Design for Learning (UDL) within early childhood education establishments in the Adaklu District is imperative for promoting inclusive educational practices. Nonetheless, various impediments, such as inadequate comprehension among educators, absence of a systematic framework for implementation, scarcity of resources, and ongoing difficulties, impede its efficacy. It is within this context that the present study aimed to investigate the application of UDL in early childhood education settings across the Adaklu District of Ghana.

1.3 Purpose of the study

The objective of this investigation was to examine the application of Universal Design for Learning (UDL) within early childhood educational institutions situated in the Adaklu District, with particular emphasis on the methodologies employed, the degree of implementation, and the obstacles encountered.

1.4 Research Objectives

The following objectives guided the study;

1. To evaluate the perceptions of early childhood educators regarding the principles of Universal Design for Learning (UDL) within inclusive educational contexts in the Adaklu District.
2. To investigate the array of support services accessible for the effective implementation of Universal Design for Learning in inclusive early childhood educational facilities in the Adaklu District.
3. To delineate the pedagogical strategies employed to facilitate the learning of diverse students through the application of UDL in early childhood education settings in the Adaklu District.
4. To examine the obstacles encountered by educators in the application of UDL within inclusive early childhood classroom environments.

1.5 Research Questions

The following research questions were formulated for the study;

1. What is the perception of early childhood educators regarding Universal Design for Learning (UDL) principles in inclusive settings in the Adaklu District?

2. What support services are available for the implementation of UDL in inclusive early childhood centres in the Adaklu District?
3. What teaching strategies are utilised to support diverse learners through Universal Design for Learning (UDL) in early childhood centres in the Adaklu District?
4. What are the challenges that teachers encounter in the implementation of Universal Design for Learning (UDL) in inclusive early childhood classrooms in the Adaklu District?

1.6 Significance of the Study

The execution of Universal Design for Learning (UDL) within early childhood educational institutions in the Adaklu District is imperative for cultivating an inclusive pedagogical atmosphere. This research bears substantial ramifications for policy formulation, practical application, and theoretical frameworks, as it elucidates methodologies through which UDL may be proficiently implemented to accommodate a spectrum of learners.

This study contributes to the formulation and refinement of educational policies that promote inclusive education through the integration of UDL principles. By assessing early childhood educators' understanding of UDL, policymakers will gain valuable insights into the level of awareness and knowledge gaps that need to be addressed through targeted training and professional development programs. Furthermore, the findings will inform national education strategies, ensuring that inclusive education frameworks are not only established but also effectively implemented at the local level (Anastasiou & Kauffman, 2023). The study will also serve as an advocacy tool for increased government funding and resource allocation to support inclusive education in early childhood settings (CAST, 2023).

On a practical level, this study provides empirical data on how UDL is currently implemented in inclusive early childhood centres in the Adaklu District. By identifying the teaching

strategies and instructional materials used to support diverse learners, the study will offer recommendations for best practices that can be adopted by early childhood educators to enhance inclusivity. Additionally, by exploring the challenges teachers face in implementing UDL, the study will highlight key barriers and suggest interventions that can be adopted to enhance classroom practices (Opoku et al., 2023). This will empower teachers with the knowledge and tools to create more accessible and engaging learning environments for all students.

From a theoretical standpoint, this investigation enhances the current corpus of knowledge regarding inclusive education and the implementation of Universal Design for Learning (UDL) within early childhood contexts. Through an analysis of the application of UDL principles in Ghanaian early childhood education, this research aims to yield contextualized insights that contribute meaningfully to global discourses surrounding inclusive pedagogical practices. Moreover, the study intends to advance the theoretical framework of UDL by examining its flexibility across diverse educational settings, particularly in environments characterized by limited resources. In addition, it seeks to reconcile the disconnect between policy formulation and practical application by offering evidence-based recommendations that will guide subsequent research and inform theoretical constructs related to inclusive education.

In summary, the importance of this investigation transcends the confines of the Adaklu District, as it possesses wider ramifications for educational policy formulation, pedagogical methodologies, and theoretical progressions within the domain of inclusive education. By systematically examining the obstacles and possibilities associated with the application of Universal Design for Learning (UDL), this inquiry will significantly enhance the ongoing

initiatives aimed at establishing equitable academic environments that address the diverse needs of all students.

1.7 Delimitations of the Study

This research investigation concentrated on the application of Universal Design for Learning (UDL) within early childhood educational institutions situated in the Adaklu District. The inquiry was limited to early childhood education establishments located in the Adaklu District of Ghana. This particular locale was selected due to its heterogeneous educational environment and the necessity to evaluate the extent to which inclusive education policies, specifically UDL, are being enacted at the community level.

The study specifically examines early childhood educators' understanding of UDL principles, the methods of implementation in inclusive settings, the instructional strategies and materials used, and the challenges encountered. It does not extend to other aspects of inclusive education, such as special education policies outside the scope of UDL.

The research was conducted within the context of early childhood education, emphasising inclusive practices that support diverse learners. It considers factors such as teacher training, resource availability, and institutional support for UDL implementation within early childhood settings. The study does not focus on primary, secondary, or tertiary education institutions.

A qualitative research approach was adopted, incorporating case studies, interviews, and classroom observations to gather in-depth insights into UDL implementation. The study does not employ experimental methods or quantitative analysis, as the focus is on understanding teachers' experiences, practices, and challenges in implementing UDL.

1.8 Limitations of the Study

The study was limited by time constraints, which affected the extent to which more schools and participants across the Adaklu District could be involved. The researcher had a limited window to collect, transcribe, and analyze data, which made it difficult to capture broader variations in teachers' experiences with the use of UDL in ECE settings in the District. Secondly, access to participants posed a challenge. Some teachers were unwilling to participate in the interviews due to their tight teaching schedules or administrative responsibilities. This limited the sample size and reduced the diversity of perspectives included in the study. Since the study relied on interviews, there was a possibility that some teachers provided socially desirable responses or underreported the challenges they faced in implementing UDL in early childhood settings.

1.9 Operational Definition of Terms

The following terms were operationally defined in the study;

Universal Design for Learning (UDL): A framework that guides the design of inclusive educational environments by providing multiple means of engagement, representation, and action/expression to accommodate diverse learners.

Inclusive Education: An educational approach that ensures all learners, regardless of ability or background, receive quality education within the same learning environment, with appropriate accommodations and support.

Early Childhood Education (ECE): This type of education focuses on the development of children from birth to approximately eight years old, emphasizing foundational learning experiences.

Adaklu District: A geographical area in Ghana where this study is conducted, comprising various early childhood education centres implementing or exploring the adoption of UDL principles.

Teaching Strategies: The specific methods and approaches used by educators to facilitate learning, including differentiated instruction and adaptive learning techniques within the UDL framework.

1.10 Organisation of the Study

The investigation was systematically structured into five distinct chapters. Chapter one encompassed the foundational background of the inquiry, the articulation of the research problem, the objectives of the study, and the research questions posed. This chapter further includes the significance of the research, the delimitation parameters, the limitations encountered, operational definitions of pertinent terms, and the overall organisation of the study. Chapter two addressed theoretical considerations pertaining to the conceptual review, the theoretical framework, and the empirical review that informed the research process. The third chapter elaborated on the research paradigm, the methodological approach, the research design, the population under study, the sample selection, and the sampling techniques employed, as well as the data collection instruments utilized, their validity and reliability, and the procedures for data collection. The concluding section of this chapter examined the protocols established for data gathering and the analytical methods applied to the data. The fourth chapter delineated the data analysis, the findings, and the discussions derived from the results. This chapter was segregated into two sections: the initial segment presented the preliminary or demographic data, while the latter segment addressed the principal findings. The final chapter encapsulated the summary of the study, the conclusions drawn, and the

recommendations proffered. Additionally, avenues for future research endeavors will be proposed.



CHAPTER TWO

REVIEW OF RELATED LITERATURE

2.0 Overview

This chapter concentrated on an examination of pertinent literature relevant to the explicit objectives of the research. The literature was analysed under the subsequent subheadings:

Theoretical Framework

- Differentiated Instruction Theory (Tomlinson, 2001)

Conceptual Review

- Universal Design for Learning (UDL) Framework
- Inclusive Education in Early Childhood
- Policy and Regulatory Framework on UDL and Inclusion

Empirical Review

- Early Childhood Educators' Perception of Universal Design for Learning (UDL)

Principles

- Support Services Available in UDL Implementation
- Teaching Strategies Used to Support learners through UDL
- Challenges to the Implementation of UDL

2.1 Theoretical Framework

Differentiated Instruction Theory (Carol Ann Tomlinson, 2001)

Differentiated Instruction (DI) Theory, articulated by Carol Ann Tomlinson in 2001, delineates a pedagogical framework that underscores the necessity for instructional modifications to address the heterogeneous learning requirements, capacities, and interests of learners (Tomlinson, 2001). This theory critiques the conventional, uniform instructional

paradigm, advocating instead for adaptable teaching methodologies that promote inclusivity and optimise student learning outcomes. In light of the escalating diversity within educational environments, particularly in early childhood education, Differentiated Instruction offers a comprehensive strategy for customising educational experiences to elevate student engagement, motivation, and academic achievement (Santangelo & Tomlinson, 2019). This review examines the foundational principles, methodologies, challenges, and significance of Differentiated Instruction in the context of contemporary education, with a particular focus on early childhood educational settings.

Principles of Differentiated Instruction

Differentiated Instruction is predicated upon the assertion that learners exhibit diverse modalities of comprehension and progress at disparate velocities. Tomlinson (2001) delineates four fundamental components that may be subject to differentiation within pedagogical practices: content, process, product, and learning environment.

1. **Content Differentiation:** This involves modifying what students learn to align with their readiness levels, interests, and learning preferences (Tomlinson & Moon, 2013). This may involve providing varying levels of texts, using multimedia resources, or integrating hands-on activities to make content more accessible.
2. **Process Differentiation:** This aspect focuses on how students engage with learning. Teachers employ strategies such as tiered assignments, learning stations, and scaffolding techniques to cater to different cognitive abilities (Sousa & Tomlinson, 2018). Group work, individualized learning plans, and problem-solving activities ensure students remain engaged at their optimal learning level.
3. **Product Differentiation:** This principle allows students to demonstrate their understanding in diverse ways, including written reports, oral presentations, creative

projects, or digital portfolios (Tomlinson, 2014). Providing multiple assessment formats accommodates various intelligences and ensures a fair evaluation of student learning.

4. **Learning Environment Differentiation:** The physical and psychological aspects of the classroom significantly impact learning. Flexible seating, varied instructional materials, and culturally responsive teaching methods contribute to an inclusive learning atmosphere (Hall, Vue, Strangman, & Meyer, 2020).

Differentiated Instruction Strategies

Educators employ several strategies to implement Differentiated Instruction effectively.

These include:

Flexible Grouping

Flexible grouping constitutes a fundamental approach within the framework of Differentiated Instruction (DI), facilitating educators in the arrangement of students in accordance with their distinct learning requirements, competencies, interests, or favoured modalities of learning (Santangelo & Tomlinson, 2019). Unlike static ability grouping, flexible grouping allows students to move between groups depending on the task, ensuring they receive targeted instruction while benefiting from diverse peer interactions. This approach fosters collaborative learning, where students support each other's growth through peer-assisted strategies (Fuchs et al., 2021). For instance, in an early childhood classroom, children may be grouped by literacy proficiency for phonics instruction but later mixed based on interests for a science activity. This adaptability enhances engagement and accommodates different learning paces, preventing students from being permanently labeled as high- or low-achieving (Tomlinson, 2017). Furthermore, the implementation of flexible grouping is congruent with the principles of Universal Design for Learning (UDL) as it fosters diverse

avenues for engagement, thereby guaranteeing that all learners possess equitable access to educational opportunities (Meyer et al., 2014).

Ongoing Assessment

Continuous evaluation constitutes an essential element of differentiated instruction, as it permits educators to consistently oversee students' academic advancement and modify pedagogical approaches as necessary. Formative evaluations, including observational checklists, student self-reflections, and unstructured quizzes, furnish immediate insights into the specific learning requirements of each individual learner (Tomlinson, 2017). These assessments help teachers identify gaps in understanding and modify lesson plans to provide targeted support where necessary (Brookhart, 2020). For example, in an inclusive early childhood classroom, a teacher might use anecdotal records to track a child's grasp of letter recognition and adjust instruction based on observed strengths and challenges. Research indicates that frequent formative assessments contribute to better student outcomes by ensuring instruction remains responsive and adaptive (Black & Wiliam, 2018). Furthermore, formative assessment is congruent with the principles of Universal Design for Learning (UDL) as it provides diverse methods of representation and engagement, thereby guaranteeing that learners are afforded individualised educational experiences that address their distinct cognitive and developmental requirements (CAST, 2022).

Choice Boards and Learning Menus

Choice boards and learning menus represent pedagogical instruments that enhance student autonomy by affording them the opportunity to choose from an array of educational activities aligned with their interests, competencies, and levels of preparedness (Gregory & Chapman, 2019). These tools encourage engagement by providing options that align with diverse learning preferences. For example, a choice board for a literacy lesson might include options

such as reading a book, listening to an audiobook, creating a story through drawings, or engaging in a dramatic retelling. Research suggests that student autonomy in learning fosters intrinsic motivation and deeper engagement with content (Ryan & Deci, 2020). In inclusive early childhood educational environments, choice boards facilitate differentiated instruction by catering to students possessing diverse abilities, encompassing individuals with special educational requirements (Hall et al., 2020). This methodology is congruent with Universal Design for Learning (UDL), as it guarantees that educational activities provide various avenues for engagement and expression, thereby enhancing accessibility and significance of learning experiences for all students (Meyer et al., 2014).

Scaffolding Techniques

Scaffolding is a DI strategy that involves breaking down complex concepts into manageable steps, enabling gradual skill acquisition and independence (Sousa & Tomlinson, 2018). The concept is grounded in Vygotsky's (1978) Zone of Proximal Development (ZPD), which posits that learners derive optimal educational benefits when facilitated by a proficient peer or educator prior to attaining autonomous proficiency. Scaffolding techniques include modeling, guided practice, questioning strategies, and using visual aids to simplify abstract concepts. For example, in an early childhood literacy lesson, a teacher might initially model how to sound out words before guiding children through practice with decreasing levels of support. Research highlights that scaffolding enhances comprehension and retention by providing structured support that is gradually removed as learners gain confidence (Wood, Bruner, & Ross, 1976). This approach is consistent with the principles of Universal Design for Learning (UDL) by providing diverse modalities of representation and engagement, thereby guaranteeing that every learner is afforded the requisite resources to effectively access and interact with educational materials (CAST, 2022).

Technology Integration

The incorporation of technology within Differentiated Instruction (DI) facilitates the provision of personalized and accessible educational experiences for students exhibiting varying needs (Hall et al., 2020). Digital tools, including adaptive learning applications, speech-to-text technologies, and engaging educational games, deliver customized instruction that aligns with individual learning preferences and competencies. For example, a learner experiencing reading difficulties may find advantages in text-to-speech software, which permits access to information through auditory channels, whereas another learner may interact with dynamic phonics games to enhance foundational literacy skills. Empirical studies indicate that the infusion of technology into pedagogical practices improves student engagement and enables differentiated pacing, thereby granting learners greater autonomy within their educational experiences (Collins & Halverson, 2018). In inclusive early childhood educational contexts, technology advances the principles of Universal Design for Learning (UDL) by providing multiple avenues for representation, engagement, and expression, thereby ensuring that all students, irrespective of their capabilities, attain equitable access to high-quality educational opportunities (Meyer et al., 2014).

Strategies associated with Differentiated Instruction, which encompass flexible grouping, continuous assessment, choice boards, scaffolding, and technology integration, are congruent with the principles of Universal Design for Learning, thereby fostering inclusive and stimulating early childhood educational environments. Through the application of these strategies, educators affirm that all learners, regardless of their abilities, receive equitable access to significant learning experiences. The amalgamation of DI and UDL cultivates a student-centred framework that enhances motivation, accessibility, and profound learning outcomes within heterogeneous classroom settings.

Relevance of the Theory to the Study

Differentiated Instruction (DI) Theory, as articulated by Carol Ann Tomlinson (2001), underscores the importance of customizing pedagogical strategies, curricular content, and evaluative measures to accommodate the varied requirements of learners. This theoretical framework is closely aligned with the principles of Universal Design for Learning (UDL), which seeks to establish inclusive educational environments by offering diverse avenues for engagement, representation, and expression (CAST, 2022). Within the context of early childhood education (ECE), particularly in inclusive settings, the integration of DI and UDL promotes equitable access to educational opportunities, addressing the spectrum of abilities, learning modalities, and developmental requirements.

Addressing Learner Variability

Both Differentiated Instruction (DI) and Universal Design for Learning (UDL) recognize that learners exhibit a range of readiness levels, interests, and learning preferences. DI underscores the necessity of modifying content, processes, products, and the learning environment to meet the diverse needs of individual students (Tomlinson, 2017). In a parallel manner, UDL offers multiple avenues for learning by incorporating flexibility in instructional methodologies and resources (Meyer, Rose, & Gordon, 2014). Within an inclusive Early Childhood Education (ECE) framework, educators who implement UDL draw upon the principles of DI to guarantee that all children, including those with disabilities, are afforded meaningful learning opportunities. For example, an educator might provide visual schedules for students who thrive on structured routines while simultaneously offering tactile activities for those who learn best through kinesthetic engagement.

Multiple Means of Engagement and Differentiation of Content

A key principle of UDL is providing multiple means of engagement to foster motivation and sustain interest (CAST, 2022). DI supports this by differentiating content delivery based on children's learning profiles. In an inclusive preschool, teachers might introduce literacy through storytelling, audiobooks, and interactive digital tools, ensuring that all children, including those with speech or auditory processing challenges, can access and enjoy the learning experience (Courey et al., 2013). By embedding choices and varying content complexity, educators align DI with UDL to maximize engagement.

Multiple Means of Representation and Differentiation of Process

UDL's second principle, multiple means of representation, ensures that information is accessible to all learners through varied formats, such as text, images, videos, and tactile materials (Meyer et al., 2014). DI complements this by differentiating the learning process, allowing students to explore concepts using diverse instructional approaches. In an inclusive ECE setting, a teacher might introduce mathematical concepts through manipulatives, interactive games, and verbal explanations, ensuring children with different cognitive and sensory needs grasp the content effectively (Tomlinson, 2017).

Multiple Means of Action and Expression and Differentiation of Products

Differentiated Instruction (DI) is congruent with the third principle of Universal Design for Learning (UDL), which emphasises multiple means of action and expression by facilitating various modalities for children to exhibit their learning. While certain students may articulate their comprehension through verbal interactions, others may opt for visual representations, physical gestures, or digital media (CAST, 2022). In an inclusive educational setting, this methodology is particularly beneficial for neurodivergent learners who may encounter difficulties with conventional assessment methodologies (Rao & Meo, 2016). By providing

alternatives for showcasing knowledge, the synergistic application of DI and UDL fosters inclusivity and equity in educational outcomes.

The theoretical frameworks of Differentiated Instruction and Universal Design for Learning converge on a shared objective: to cultivate inclusive, adaptable, and stimulating educational experiences that address the varied needs of students. When implemented within the realm of early childhood education, this alignment guarantees that all learners, irrespective of their abilities, are afforded significant opportunities to cultivate foundational competencies. By amalgamating the adaptive methodologies of DI with the accessibility tenets of UDL, educators establish supportive environments wherein every child can flourish.

2.2 Conceptual Review

2.2.1 Concept of Universal Design for Learning (UDL)

Universal Design for Learning (UDL) constitutes a comprehensive educational framework meticulously formulated to address the heterogeneous requirements of all learners by facilitating multiple modalities of engagement, representation, and expression (CAST, 2018). Initially theorised by the Centre for Applied Special Technology (CAST), UDL is fundamentally grounded in cognitive neuroscience and aspires to eliminate educational barriers by guaranteeing that every child, irrespective of their abilities, is afforded equitable access to educational opportunities (Meyer et al., 2014). Within the realm of early childhood education (ECE), UDL assumes a critical function in cultivating an inclusive atmosphere that accommodates various learning styles and developmental requirements (Connell et al., 2020).

Principles of UDL in Early Childhood Education

The Universal Design for Learning (UDL) framework is underpinned by three fundamental principles that pertain to the diverse modalities through which children acquire knowledge.

These principles, which encompass multiple means of engagement, multiple means of representation, and multiple means of action and expression, are crucial in the formulation of adaptable learning environments that cater to the needs of young learners (CAST, 2018).

Multiple Means of Engagement

Engagement denotes the manner in which learners interact with educational content and sustain their motivation throughout the learning experience. Young children exhibit diverse interests, cultural backgrounds, and varying degrees of prior knowledge, thus necessitating the provision of multifaceted approaches to sustain their attention and motivation (Coyne et al., 2020). Empirical studies indicate that student engagement is enhanced when educational activities are congruent with children's interests, afford autonomy, and facilitate opportunities for social interaction (Hall et al., 2020).

Strategies such as play-based learning, interactive storytelling, and hands-on activities can help sustain children's interest and foster a sense of belonging (Gargiulo & Metcalf, 2021). For example, dramatic play allows children to take on different roles, helping them develop social and cognitive skills while maintaining high engagement levels (Darragh, 2021). Interactive storytelling, where children actively participate in the narrative, supports comprehension and vocabulary development (Nelson & Basham, 2018). Additionally, incorporating movement-based activities, such as dance or outdoor play, enhances engagement by accommodating kinesthetic learners (Coyne et al., 2020).

Another effective engagement strategy is incorporating student choice into learning activities. Providing young learners with options such as selecting books, choosing between art or music activities, or deciding on group versus individual tasks encourages autonomy and intrinsic motivation (Dalton & Brand, 2019). Research indicates that when children have

a sense of control over their learning, they demonstrate higher levels of persistence and engagement (Meyer et al., 2014).

Multiple Means of Representation

Representation guarantees that information is disseminated in diverse formats, thereby enabling all children to engage with and comprehend the material with efficacy. Given that early learners exhibit a range of sensory and cognitive capacities, it is imperative to deliver content in multiple formats to facilitate understanding (CAST, 2018). Research has demonstrated that multimodal learning experiences, which integrate visual, auditory, and kinesthetic components, significantly enhance comprehension and retention among young children (Nelson & Basham, 2018).

In ECE, visual aids such as picture schedules, diagrams, and illustrated books support children who learn best through images (Darragh, 2021). Tactile materials like building blocks, puzzles, and textured letters help reinforce concepts through hands-on experiences (Coyne et al., 2020). Auditory storytelling, including songs, rhymes, and recorded stories, benefits children who process information best through listening (Dalton & Brand, 2019). Digital tools, such as interactive apps and videos, provide another means of representation by combining visual and auditory elements to enhance learning experiences (Hall et al., 2020).

Additionally, real-world examples and contextualised learning help young children connect new knowledge to familiar experiences. For instance, teaching basic math concepts using real objects like fruits or toys allows children to grasp abstract ideas more easily (Gargiulo & Metcalf, 2021). Providing multiple representations of information ensures that all children, including those with disabilities, language barriers, or varying cognitive abilities, can access and understand learning materials effectively (Meyer et al., 2014).

Multiple Means of Action and Expression

This principle emphasises the importance of offering a multitude of modalities through which children can manifest their acquired knowledge. Given that early learners exhibit the development of communication and motor skills at heterogeneous rates, permitting various forms of expression guarantees that all children can effectively demonstrate their comprehension (CAST, 2018). Conventional assessment techniques, such as oral responses or written tasks, may not adequately represent the competencies of all young learners. Universal Design for Learning (UDL) advocates for educators to implement diverse assessment strategies, including oral responses, artistic expression, kinesthetic activities, and technology-mediated interactions (Dalton & Brand, 2019).

For example, children who struggle with verbal communication may express their understanding through art-based activities, such as drawing or sculpting (Nelson & Basham, 2018). Kinesthetic learners may prefer to demonstrate their learning through physical activities, such as role-playing or using manipulatives to solve problems (Darragh, 2021). Technology-based tools, such as voice recordings or interactive digital portfolios, allow children to document and present their knowledge in alternative ways (Coyne et al., 2020).

Moreover, collaborative learning experiences provide another means of expression by allowing children to work together and share their ideas through discussions, group projects, and peer-assisted learning (Gargiulo & Metcalf, 2021). Research indicates that when children are given multiple ways to express their knowledge, they develop confidence and a deeper understanding of concepts (Meyer et al., 2014).

The tenets of Universal Design for Learning (UDL), encompassing multiple means of engagement, representation, and action/expression, advocate for a flexible and inclusive paradigm in early childhood education. By recognising the diverse cognitive, sensory, and

motor capabilities of young learners, UDL establishes a framework that guarantees equitable access to educational experiences (CAST, 2018). The application of UDL methodologies, including play-based learning, multimodal instructional strategies, and diverse assessment techniques, significantly enhances engagement, comprehension, and self-expression among early learners (Hall et al., 2020). As educators progressively embrace the principles of UDL, early childhood educational environments will evolve to become increasingly inclusive and effective in addressing the needs of all children, irrespective of their abilities or backgrounds (Coyne et al., 2020).

2.2.2 Benefits of UDL in Early Childhood Education

The implementation of Universal Design for Learning (UDL) within Early Childhood Education (ECE) yields substantial advantages, particularly in fostering inclusivity, augmenting educational experiences, and addressing the diverse requirements of young learners.

Promotes Inclusive Education UDL facilitates the establishment of an inclusive educational environment wherein all students, including those with disabilities, are afforded the opportunity to engage in and benefit from learning activities (Pisha & Coyne, 2019). In contrast to conventional pedagogical approaches that adopt a uniform model, UDL recognises the inherent variability among learners and guarantees that instructional methodologies are tailored to meet a wide array of needs (Rao et al., 2021).

Enhances Engagement and Motivation. Young learners engage better when they have choices in how they learn. UDL allows educators to tailor lessons to align with children's interests and strengths, increasing motivation and persistence (Basham et al., 2020). Providing interactive and sensory-rich learning experiences helps children stay focused and actively involved in the classroom.

Supports Early Literacy and Numeracy Development. Research indicates that early exposure to multimodal instructional strategies improves literacy and numeracy skills (Dalton & Brand, 2019). By incorporating visual, auditory, and kinesthetic learning tools, UDL facilitates a deeper understanding of fundamental concepts and fosters early academic success (Courey et al., 2020).

Encourages Social and Emotional Development. UDL promotes a classroom culture that values diversity and encourages peer collaboration. By designing activities that accommodate different learning preferences, children develop empathy, communication skills, and a positive attitude toward learning (Nelson et al., 2021). Group-based projects, storytelling, and role-playing activities further support emotional and social growth in young learners.

2.2.3 Concept of Inclusive Education

Inclusive education constitutes a pedagogical paradigm that guarantees all learners, irrespective of their capabilities, origins, or distinctions, possess equitable access to high-quality education within mainstream educational settings (UNESCO, 2020). This framework is anchored in the tenets of equity, diversity, and social justice, advocating for the comprehensive engagement of students with disabilities, language impediments, and various learning challenges within the general education framework (Florian & Spratt, 2019). This model accentuates the eradication of educational obstacles, cultivating an atmosphere in which all students are afforded the necessary support to thrive (Ainscow, 2020). In the last twenty years, inclusive education has garnered international recognition, shaped by policies such as the Salamanca Statement (1994) and the Sustainable Development Goals (SDG 4), which endorse inclusive and equitable educational opportunities for all individuals (UNESCO, 2019).

Inclusive education is grounded in multiple educational theories, including Vygotsky's Sociocultural Theory, which underscores the significance of social interactions in the learning process (Vygotsky, 1978). According to this theoretical framework, children achieve optimal learning within a communal context where they can engage collaboratively with peers and receive guided instruction from educators (Florian, 2021). This viewpoint corresponds with inclusive education by advocating for classroom environments that facilitate peer-assisted learning and scaffolded instruction tailored to diverse learners.

Another pivotal theory is Bronfenbrenner's Ecological Systems Theory, which delineates the impact of various environmental systems—family, school, community, and policy—on a child's developmental trajectory (Bronfenbrenner, 2005). Within the realm of inclusive education, this theory posits that effective inclusion necessitates a comprehensive approach, engaging not solely educators but also parents, policymakers, and the wider community (Ainscow, 2020).

The Universal Design for Learning (UDL) framework also assumes a vital role in the advancement of inclusive education. UDL advocates for multiple modalities of engagement, representation, and action/expression to ensure that all learners, regardless of their abilities, have equitable access to educational experiences (Meyer et al., 2014). This framework emphasises adaptability in instructional methodologies, curricular resources, and assessments to meet the diverse requirements of learners (Coyne et al., 2020).

Key Principles of Inclusive Education

Equity and Accessibility

Equity in education guarantees that all learners have equitable access to the curriculum, educational resources, and support services essential for their academic and social

achievements. In contrast to equality, which posits that all students necessitate identical resources, equity recognises the heterogeneous requirements of learners and delivers tailored support accordingly (Schuelka et al., 2019). Within inclusive educational environments, equity is realised through personalised learning plans, differentiated instructional strategies, and principles of universal design for learning (UDL) that specifically address the needs of students with disabilities and other learning difficulties (Nelson & Basham, 2019).

Accessibility constitutes a fundamental element of equity in education, mandating that educational institutions dismantle physical, instructional, and technological obstacles that impede student engagement. The implementation of assistive technologies, including screen readers, speech-to-text applications, and alternative input devices, significantly improves access for students with disabilities (Westwood, 2021). Furthermore, accessible instructional materials, such as large-print textbooks, braille formats, and audiobooks, facilitate effective engagement with the curriculum for students with visual impairments (UNESCO, 2020). Alternative assessment methods, encompassing oral examinations, portfolio assessments, and project-based evaluations, provide additional support for diverse learning needs (Dalton & Brand, 2019).

Diversity and Differentiation

Inclusive education acknowledges and appreciates the diversity among students, recognising variances in cognitive capabilities, cultural heritages, linguistic skills, and socio-economic conditions (Tomlinson, 2019). A pivotal approach within inclusive education is differentiated instruction, which guarantees that pedagogical techniques, educational resources, and evaluative methods are tailored to accommodate a heterogeneous array of learners (Gregory & Chapman, 2020).

Teachers implement differentiation through flexible grouping, scaffolding, and multimodal teaching approaches. Flexible grouping allows educators to tailor instruction to specific student needs by organising learners into small, dynamic groups based on their skills and learning preferences (Santangelo & Tomlinson, 2021). Scaffolding techniques, such as guided practice, peer tutoring, and instructional prompts, support students as they develop new skills (Florian & Beaton, 2018). Meanwhile, multimodal teaching strategies, including visual, auditory, and kinesthetic approaches, enhance engagement and comprehension for all learners (Meyer et al., 2021).

Collaboration and Support Systems

The efficacy of inclusive education is contingent upon robust collaboration among educators, special education professionals, therapists, parents, and policymakers (Ainscow, 2020). Educational institutions must cultivate a culture of collaborative engagement and collective accountability, wherein educators synergistically endeavour to facilitate student learning.

Collaborative teaching frameworks, such as team teaching and parallel instruction, enable general and special education instructors to jointly design and implement instructional lessons (Gargiulo & Metcalf, 2021). Additionally, peer mentoring and cooperative learning methodologies further augment inclusive educational settings by promoting an environment where students actively assist one another in both their academic and social growth (Florian, 2021).

Parental involvement is also essential in inclusive education, as families play a key role in reinforcing learning at home and advocating for their children's needs (Westwood, 2021). Schools should establish strong home-school communication channels and provide workshops to help parents understand inclusive practices (UNESCO, 2020).

Student-Centred Learning

A student-centred pedagogical framework is pivotal to the advancement of inclusive education, transitioning the emphasis from traditional teacher-directed instruction to dynamic student engagement. This paradigm underscores the significance of personalised learning, wherein students actively participate in the construction of their educational journeys, informed by their individual interests, strengths, and needs (Coyne et al., 2020).

Student-centred learning cultivates autonomy, promotes critical thinking, and enhances self-advocacy competencies. Through the integration of inquiry-based methodologies, project-oriented tasks, and experiential learning activities, educators facilitate an environment in which students assume ownership of their educational processes (Dalton & Brand, 2019). Furthermore, the utilisation of self-assessment instruments, such as reflective journals and goal-setting activities, enables students to track their own progress while fostering confidence in their capabilities (Meyer et al., 2021).

Additionally, inclusive educational settings prioritise social-emotional learning (SEL) to bolster the holistic well-being of students. SEL initiatives concentrate on fostering resilience, empathy, and effective communication skills, thereby ensuring that all students perceive themselves as valued and integral members of the learning community (Schuelka et al., 2019).

2.2.4 Policy and Regulatory Framework on Universal Design for Learning (UDL) and Inclusion

The execution of Universal Design for Learning (UDL) and inclusive education is undergirded by an array of policy and regulatory frameworks at international, national, and institutional strata. These frameworks delineate standards for equitable educational access,

accentuating diversity, differentiation, and accessibility for all learners, with particular emphasis on individuals with disabilities.

International Policy Frameworks on UDL and Inclusion

United Nations Convention on the Rights of Persons with Disabilities (UNCRPD, 2006)

The United Nations Convention on the Rights of Persons with Disabilities (UNCRPD) constitutes a crucial international legal instrument that fortifies the principle of inclusive education as an essential human right. Article 24 stipulates the necessity for educational systems to be inclusive across all tiers, guaranteeing that students with disabilities are afforded reasonable adjustments to facilitate their access to high-quality education (United Nations, 2016). The convention obligates member states to develop laws and policies that eliminate barriers to education, promoting non-discrimination and accessibility in learning environments (Schuelka et al., 2019). Countries such as Canada, Finland, and South Africa have reformed their national education policies in response to the UNCRPD, embedding inclusive principles into mainstream education (Florian, 2021).

The implementation of UNCRPD requires significant structural reforms, including teacher training in inclusive pedagogy, curriculum adaptation, and the provision of assistive technologies (Ainscow, 2020). However, disparities remain in low-income countries due to inadequate funding, limited resources, and societal stigma against disabilities (UNESCO, 2022). Governments must invest in stronger monitoring mechanisms to ensure compliance and effectiveness in inclusive education practices (Gargiulo & Metcalf, 2021).

Sustainable Development Goals (SDGs) – Goal 4: Quality Education

The Sustainable Development Goals (SDGs), inaugurated by the United Nations in 2015, delineate a comprehensive global framework aimed at achieving equity in educational access

and quality. Goal 4 particularly accentuates the necessity for inclusive and equitable quality education for all individuals, placing significant emphasis on individuals with disabilities and those belonging to marginalised groups (UNESCO, 2021). Target 4.5 underscores the imperative to eradicate educational disparities by guaranteeing access to learning opportunities for all children, irrespective of their gender, disability status, or socioeconomic background (UNESCO, 2022).

In addition, Target 4.A underscores the criticality of establishing disability-inclusive learning environments, which encompasses the development of accessible educational infrastructure, the provision of assistive technologies, and the availability of specialised instructional materials tailored to accommodate diverse learning requirements (Dalton & Brand, 2019). Nations such as Sweden and Australia have implemented policies aligned with SDG 4 by incorporating Universal Design for Learning (UDL) principles into their respective national curricula (Meyer et al., 2021).

Notwithstanding these advancements, significant discrepancies in policy implementation remain, particularly in developing regions where financial limitations and inadequate institutional frameworks impede progress (Schuelka et al., 2019). To mitigate these challenges, UNESCO advocates for enhanced investment in inclusive teacher training initiatives, the proliferation of digital learning resources, and the reinforcement of policy enforcement at both national and local tiers (UNESCO, 2022). Collaborative endeavours among governmental entities, non-governmental organisations, and international agencies are pivotal in realising the aspirations of SDG 4 by the year 2030 (European Commission, 2021).

2.2.5 Salamanca Statement (1994)

The Salamanca Statement, ratified during the World Conference on Special Needs Education in 1994, established a foundational framework for inclusive education policies on a global scale. It emphasised the tenet that all children, irrespective of their disabilities or socio-economic backgrounds, ought to receive education within mainstream educational institutions, supplemented by requisite accommodations and support services (Ainscow, 2020). This policy articulates that inclusive education transcends mere entitlement; it is an essential strategy for enhancing educational quality for all learners (Florian, 2021).

Key recommendations from the Salamanca Statement include:

- Strengthening teacher education programs to equip educators with skills for inclusive pedagogy (Dalton & Brand, 2019).
- Developing flexible curricula that accommodate diverse learning styles and needs (Schuelka et al., 2019).
- Ensuring accessibility in learning environments through infrastructure adaptations, assistive technologies, and community engagement (Gargiulo & Metcalf, 2021).

While the Salamanca Statement has influenced numerous national policies, its implementation varies across countries due to economic disparities, resource constraints, and differences in political commitment (UNESCO, 2022). Despite these challenges, many governments have adopted inclusive education strategies aligned with its principles, particularly in Europe and North America (European Commission, 2021).

The Americans with Disabilities Act (ADA, 1990) and the Individuals with Disabilities Education Act (IDEA, 2004) – United States

In the United States, the Americans with Disabilities Act (ADA) and the Individuals with Disabilities Education Act (IDEA) represent two pivotal legal frameworks that significantly influence the formulation of inclusive education policies. The ADA guarantees that individuals with disabilities are afforded equal access to public services, including educational opportunities, thereby prohibiting discrimination within educational institutions, workplaces, and public environments (Westwood, 2021). This legislation necessitates the implementation of accommodations such as wheelchair-accessible educational facilities, assistive communication technologies, and specialised educational services within conventional classroom settings (Florian & Beaton, 2018).

The **IDEA**, originally enacted in 1975 and re-authorised in 2004, specifically focuses on students with disabilities. It mandates:

- **Free Appropriate Public Education (FAPE):** Schools must provide education tailored to individual needs at no cost to families (Meyer et al., 2021).
- **Individualized Education Programs (IEPs):** Schools must create personalized learning plans to address students' unique challenges and strengths (Tomlinson, 2017).
- **Least Restrictive Environment (LRE):** Students with disabilities should be placed in inclusive settings whenever possible, with necessary support services provided (Gregory & Chapman, 2019).

Although IDEA and ADA have significantly improved access to education for students with disabilities in the U.S., disparities in implementation persist, especially in underfunded

districts and rural areas (Schuelka et al., 2019). Continued policy refinement and increased funding are necessary to ensure equity in education across all states (UNESCO, 2022).

2.2.6 Ghana's Inclusive Education Policy (2015)

Ghana's Inclusive Education Policy (IEP) was instituted in 2015 to resonate with global frameworks such as the United Nations Convention on the Rights of Persons with Disabilities (UNCRPD) and the Sustainable Development Goals (SDGs), highlighting the imperative of equitable access to high-quality education for all students, encompassing individuals with disabilities and those with specialized educational requirements (Ministry of Education, Ghana, 2019). The policy accentuates the significance of inclusive pedagogical approaches, curriculum adaptations, and the professional development of educators to effectively cater to a heterogeneous learner population (Opoku et al., 2021).

Key features of Ghana's IEP include:

- **Curriculum Adaptations:** Adjusting teaching materials and instructional strategies to accommodate learners with different needs (Anum-Odoom et al., 2022).
- **Teacher Training in Inclusive Pedagogy:** Enhancing teachers' skills in differentiated instruction and UDL to support diverse learners (Opoku & Agbenyega, 2021).
- **Stakeholder Collaboration:** Encouraging partnerships among educators, parents, policymakers, and disability advocacy groups to ensure effective implementation (Adams & Amponsah, 2020).

Notwithstanding these stipulations, obstacles including insufficient financial resources, a lack of teacher readiness, and a dearth of assistive technology impede the comprehensive execution of these initiatives (UNESCO, 2022). Confronting these impediments necessitates

more robust policy enforcement, augmented investment in inclusive educational infrastructure, and ongoing professional development for educators (Gbadamosi et al., 2023).

Universal Design for Learning Guidelines by CAST

The Center for Applied Special Technology (CAST) has formulated the Universal Design for Learning (UDL) Guidelines with the objective of establishing adaptable and inclusive educational settings that accommodate a heterogeneous range of learners (Meyer et al., 2021). UDL is predicated upon three fundamental principles:

1. **Multiple Means of Engagement:** Providing different ways to motivate and involve learners, including personalized learning experiences and culturally relevant content (Rose & Dalton, 2022).
2. **Multiple Means of Representation:** Presenting information through varied formats such as text, audio, videos, and interactive media to accommodate diverse learning preferences (Nelson & Basham, 2019).
3. **Multiple Means of Action and Expression:** Allowing learners to demonstrate knowledge in various ways, including written assignments, oral presentations, and hands-on projects (Florian, 2021).

These principles influence institutional policies by promoting accessible instructional materials, adaptive assessments, and digital learning tools (Basham et al., 2021). UDL implementation enhances learning outcomes by fostering engagement, reducing barriers, and promoting equity in education (Hall et al., 2022).

Higher Education and UDL Policies

Universities across the globe have embraced Universal Design for Learning (UDL)-oriented policies to facilitate inclusive and accessible education for the entire student body, with

particular emphasis on individuals with disabilities (Seale, 2020). Esteemed institutions including Harvard University and the University of Toronto incorporate UDL tenets into their academic frameworks, thereby guaranteeing:

- **Accessible Course Design:** Developing syllabi and learning materials that accommodate diverse learning styles (Fovet, 2021).
- **Assistive Technology:** Providing screen readers, captioning services, and digital accessibility features (Kelly & Phipps, 2022).
- **Faculty Training:** Equipping lecturers with skills to implement UDL strategies effectively (Basham et al., 2021).

While higher education institutions recognize the benefits of UDL, challenges such as faculty resistance, lack of awareness, and funding limitations impact widespread adoption (Rose & Dalton, 2022). Policymakers and educational leaders must continue advocating for UDL integration to foster inclusivity in higher education (Hall et al., 2022).

Ghana's **Inclusive Education Policy**, the **UDL Guidelines by CAST**, and **higher education policies** collectively contribute to fostering inclusivity in education. Nevertheless, the successful execution of initiatives necessitates the resolution of systemic obstacles, enhancement of pedagogical training, and fortification of institutional assistance. Through the prioritisation of Universal Design for Learning (UDL) and the establishment of inclusive policies, educational frameworks have the potential to cultivate equitable learning environments for all learners.

2.3 European Disability Strategy (2021-2030)

The European Disability Strategy (2021-2030) signifies the European Union's dedication to enhancing the rights of individuals with disabilities and fostering inclusive educational practices. This strategic framework is congruent with the principles of Universal Design for Learning (UDL) and emphasises:

- Removing barriers to education for students with disabilities (European Commission, 2021).
- Enhancing teacher professional development to implement inclusive pedagogies effectively (Dalton & Brand, 2019).
- Expanding access to assistive technologies and digital learning resources to support diverse learners (Gargiulo & Metcalf, 2021).

The strategy encourages EU member states to integrate inclusive education into national policies, fostering a harmonised approach across the region. Countries such as Sweden and Finland have successfully implemented these policies by embedding UDL in their education systems, ensuring that students with disabilities receive equitable learning opportunities (Florian, 2021).

However, challenges remain, including differences in implementation across EU nations, funding gaps, and the need for continued professional development for educators (UNESCO, 2022). The European Commission continues to monitor progress and advocate for stronger policy enforcement to achieve the strategy's goals by 2030.

2.4 Empirical Review

2.4.1 Perceptions of Early Childhood Educators on the Implementation of UDL

Early Childhood Educators (ECEs) serve a pivotal function in the establishment of inclusive educational environments, and their interpretations of Universal Design for Learning (UDL) profoundly affect its application. UDL, a conceptual framework aimed at enhancing accessibility to learning for all students, is extensively acknowledged as a strategy for fostering inclusivity, especially for children with varied learning requirements (CAST, 2018). The perceptions of educators regarding UDL are influenced by numerous elements, including their degree of professional development, the accessibility of resources, institutional endorsement, and individual experiences within the classroom setting (Florian & Beaton, 2018). While a considerable number of educators recognize the advantages of UDL, some also underscore pragmatic obstacles that impede its comprehensive execution (Dalton & Brand, 2019).

Numerous early childhood educators regard Universal Design for Learning (UDL) as a potent framework for cultivating inclusivity within educational settings. They acknowledge that it facilitates accessibility and engagement by accommodating a spectrum of learning styles and capabilities (Meyer et al., 2021). The principles of UDL underscore the importance of offering diverse means of representation, engagement, and expression, thereby enabling children to engage with learning materials in manners that align with their unique requirements (Rose & Meyer, 2002). Educators who have effectively integrated UDL into their practices assert that it enhances student participation and addresses the educational needs of children with disabilities, as well as those hailing from marginalized communities (Nelson & Basham, 2018). These affirmative experiences bolster the belief that UDL serves

as an essential instrument for fostering equitable educational prospects within early childhood environments (Novak & Thibodeau, 2016).

Another significant viewpoint among educators is that UDL provides adaptability in pedagogical approaches, permitting instructors to adjust instructional strategies in accordance with children's capabilities and interests (Coyne et al., 2020). The framework advocates for the implementation of multimodal instruction, which includes the use of visual aids, tactile activities, technological resources, and collaborative learning techniques to enhance the engagement and accessibility of lessons (Rao et al., 2014). A considerable number of educators value the capacity of UDL to enable them to tailor teaching methods in support of neurodiverse learners, thereby fostering an inclusive classroom atmosphere wherein all students can flourish (Darragh, 2021). This flexibility is particularly significant in the realm of early childhood education, where young learners exhibit a wide array of developmental trajectories across cognitive, linguistic, and social-emotional domains (Pisha & Coyne, 2001).

Despite the perceived benefits of UDL, many educators cite resource constraints as a major challenge in its implementation (Florian, 2021). The lack of assistive technologies, adapted learning materials, and professional development opportunities limits their ability to integrate UDL principles effectively (Westwood, 2021). Some teachers report that while they understand the importance of UDL, they lack the necessary resources to create accessible learning environments (Katz & Sokal, 2016). In many low-resource settings, particularly in developing countries, inadequate funding for inclusive education results in limited access to UDL-supportive infrastructure, making it difficult for teachers to meet the diverse needs of their students (UNESCO, 2021).

Another significant issue confronting educators pertains to the insufficiency of comprehensive professional development in Universal Design for Learning (UDL). A considerable number of educators express feelings of inadequacy regarding their preparedness to implement the UDL framework, primarily due to a lack of adequate training in differentiated instruction, scaffolding, and inclusive pedagogical strategies (Ainscow, 2020). In the absence of targeted professional development, educators may encounter difficulties in effectively applying UDL principles within their instructional environments (Gregory & Chapman, 2019). Professional training programs that prioritise practical methodologies for modifying curriculum content, utilising assistive technology, and constructing flexible assessments are imperative for endowing educators with the requisite competencies necessary for the successful implementation of UDL (Basham et al., 2020). Educators who have undergone specialised professional training report an enhanced sense of confidence in the application of UDL principles and demonstrate a greater propensity to foster inclusive learning environments (Novak & Rodriguez, 2016).

Educators further underscore the critical role of institutional and policy support in the effective execution of UDL (Tomlinson, 2017). Educational institutions and policymakers are pivotal in facilitating the adoption of UDL by providing explicit guidelines, curriculum modifications, and resources that are congruent with UDL principles (UNESCO, 2021). In environments that are well-supported, educators benefit from mentorship, opportunities for collaborative teaching, and administrative support, which collectively augment their capacity to integrate UDL effectively within their instructional methodologies (Salend, 2016). Nevertheless, in numerous instances, the absence of institutional commitment to policies promoting inclusive education culminates in a fragmented implementation of UDL across various educational settings and geographical regions (Dalton & Brand, 2019). Addressing

these deficiencies necessitates enhanced collaboration among educators, policymakers, and stakeholders to ensure that inclusive education frameworks, such as UDL, are accorded priority and are sufficiently resourced (Meyer et al., 2021).

Some educators express skepticism about the practicality of implementing UDL in overcrowded classrooms, particularly in schools with high student-to-teacher ratios (Santangelo & Tomlinson, 2019). Teachers find it challenging to personalise instruction and provide individualised support when managing large groups of learners (Katz & Sokal, 2016). Differentiating instruction and assessment for a diverse student population can be overwhelming, especially when educators face heavy workloads and limited classroom support (Coyne et al., 2020). In such situations, teachers may struggle to maintain student engagement and provide the necessary accommodations to ensure that all learners can access and participate in learning activities (Pisha & Coyne, 2001).

Overall, early childhood educators acknowledge the significance of Universal Design for Learning (UDL) in promoting inclusive educational practices and enhancing academic outcomes for all learners (Meyer et al., 2021). They value its adaptability and its capacity to address a spectrum of diverse learning requirements (Novak & Thibodeau, 2016). Nonetheless, obstacles such as insufficient resources, inadequate professional training, absence of institutional backing, and the complexities associated with the implementation of UDL in extensive classrooms impede its comprehensive adoption (Florian, 2021). Mitigating these challenges through enhanced investment in professional development, optimised resource distribution, and reinforced policy advocacy will be imperative for ensuring the effective application of UDL within early childhood education contexts (Ainscow, 2020). Looking ahead, cultivating collaboration among educators, administrators, and policy-

makers will be vital in establishing a more inclusive and equitable educational environment for young learners (UNESCO, 2021).

2.4.2 Support Services in UDL Implementation

Universal Design for Learning (UDL) constitutes an empirically supported framework that advocates for inclusive educational practices by ensuring that pedagogical methods, instructional materials, and evaluative measures are accessible to all students, which includes individuals with disabilities (Meyer, Rose, & Gordon, 2014). The effective application of UDL within inclusive early childhood education (ECE) settings necessitates comprehensive support services that equip educators and students with the requisite resources, professional development, and guidance to cultivate an inclusive educational atmosphere (CAST, 2022).

Teacher Professional Development and Training

One of the paramount support services in the implementation of Universal Design for Learning (UDL) is the provision of ongoing professional development for educators. Educators must possess the requisite knowledge and competencies to create adaptable learning experiences that cater to a heterogeneous learner population (Alquraini & Gut, 2023). Empirical evidence suggests that specialised training initiatives focused on UDL principles substantially bolster educators' confidence and their capacity to differentiate instruction (Novak & Rodriguez, 2023). Professional development activities such as workshops, coaching, and collaborative peer sessions furnish educators with pragmatic strategies for incorporating multiple means of representation, engagement, and expression within their instructional practices (Chardin & Novak, 2022; Hall, Meyer, & Rose, 2023). Additionally, professional learning communities (PLCs) are instrumental in fostering collaboration among teachers, allowing them to exchange best practices and collectively address implementation challenges (Rao, Smith, & Lowrey, 2021). Studies show that

teachers who participate in ongoing UDL-focused training demonstrate greater adaptability in designing inclusive learning environments (Courey, Tappe, Siker, & LePage, 2022). Moreover, administrative support in the form of instructional coaching and mentorship strengthens educators' ability to implement UDL effectively (Edyburn, 2023). Without adequate training, teachers may struggle to integrate UDL strategies into their instructional practices (CAST, 2022). Consequently, the allocation of resources towards continuous professional development is imperative for the effective implementation of Universal Design for Learning (UDL) within inclusive early childhood education environments.

Assistive Technologies and Classroom Resources

Assistive technology is instrumental in facilitating the implementation of Universal Design for Learning (UDL) within inclusive early childhood education (ECE) centres. Digital resources, including text-to-speech software, interactive whiteboards, and tailored learning applications, effectively accommodate learners with a spectrum of educational needs (Edyburn, 2020). For example, empirical research conducted by Rose et al. (2022) demonstrates that augmentative and alternative communication (AAC) devices significantly enhance the participation of children experiencing speech and language challenges. Additionally, adaptive instructional materials such as tactile learning aids, large-print texts, and multisensory educational resources further advance accessibility and engagement in early childhood educational environments (Okolo & Bouck, 2021). Nevertheless, achieving equitable access to assistive technology poses a considerable challenge, thereby necessitating strategic administrative and policy-level interventions to guarantee that all ECE centres are endowed with sufficient technological support (CAST, 2022).

Assistive technology (AT) is pivotal in the facilitation of UDL implementation by offering diverse means of engagement, representation, and expression (Meyer et al., 2021). Through

the integration of AT tools into pedagogical practices, educators are empowered to enhance accessibility, promote personalised learning experiences, and cultivate student autonomy. Engagement constitutes a fundamental principle of UDL, and assistive technologies are capable of sustaining students' interest and motivation. Digital instruments such as interactive whiteboards, gamified learning environments, and virtual reality applications address varied learning preferences and stimulate active participation (Rose & Dalton, 2019). Text-to-speech (TTS) software, exemplified by Read & Write and Voice Dream Reader, aids students with reading impairments by transforming digital text into auditory speech, thus rendering content more accessible (Smith & Okolo, 2020). Furthermore, adaptive learning applications like Kurzweil 3000 and ClaroRead customise instructional delivery by modulating difficulty levels and offering immediate feedback, thereby ensuring that students maintain engagement at an appropriate level of challenge (Edyburn, 2021).

Collaborative Partnerships and Multidisciplinary Support

The effective implementation of Universal Design for Learning (UDL) necessitates a collaborative effort among educators, specialists, families, and community stakeholders. Research conducted by Blackwell and Rossetti (2022) underscores the significance of interdisciplinary teams that encompass special education instructors, speech-language pathologists, occupational therapists, and psychologists in facilitating the support of diverse learners. Collaborative pedagogical approaches, including co-teaching models and inclusive curriculum development, guarantee that children obtain tailored assistance while concurrently profiting from a cohesive learning atmosphere (Novak & Rodriguez, 2023). The involvement of parents is also paramount, as families contribute critical perspectives regarding their children's strengths and learning preferences (Rao et al., 2021). Evidence

indicates that robust school-family partnerships result in enhanced educational outcomes and a heightened advocacy for inclusive educational policies (Chardin & Novak, 2022).

Policy and Administrative Support

The effective execution of Universal Design for Learning (UDL) within inclusive early childhood education (ECE) environments is significantly shaped by policies that advocate for inclusive methodologies and equitable distribution of resources. National educational policies ought to elevate UDL as a foundational framework for inclusive pedagogical practices (CAST, 2022). Administrative backing, encompassing a commitment from leadership and well-defined guidelines, guarantees the integration of UDL into both curricular and assessment frameworks (Okolo & Bouck, 2021). Furthermore, school administrators are instrumental in cultivating an inclusive educational culture by offering mentorship opportunities and establishing policies that promote inclusive instructional strategies (Blackwell & Rossetti, 2022). Government initiatives, including inclusive education task forces and evaluative frameworks, further bolster the implementation of UDL by ensuring compliance with exemplary practices (Alquraini & Gut, 2023).

Funding and Resource Allocation

Adequate funding is a fundamental requirement for effective UDL implementation in ECE centres. Financial support ensures that schools can acquire necessary assistive technologies, provide teacher training, and develop inclusive curriculum materials (Rose et al., 2022). Research by Meyer et al. (2014) indicates that underfunding remains a significant barrier to inclusive education, limiting access to essential resources for learners with disabilities. Grant programs and government subsidies can bridge this gap by enabling schools to invest in adaptive learning environments and support services (Novak & Rodriguez, 2023). Additionally, partnerships with non-governmental organisations (NGOs) and corporate

sponsors can supplement funding and provide schools with innovative solutions to enhance UDL implementation (Edyburn, 2020).

The execution of Universal Design for Learning within inclusive early childhood education environments necessitates a thorough support system that integrates professional development, assistive technologies, collaborative efforts, policy endorsement, and financial resources. Educator training programmes significantly augment teachers' capacities to implement UDL proficiently, whereas assistive technologies and adaptive materials guarantee accessibility for a diverse array of learners. The collaboration among educators, specialists, and families fortifies individualised support, while policy frameworks furnish the requisite administrative support for sustainable implementation. Ultimately, adequate funding is crucial for the procurement of resources and the training of personnel. Addressing these essential support service requirements will enhance the effective incorporation of UDL principles, thereby promoting a more inclusive and equitable early childhood education system.

2.4.3 Teaching Strategies Used to Support Learners through UDL

Universal Design for Learning (UDL) constitutes a pedagogical framework that advocates for inclusive educational practices by offering diverse avenues for engagement, representation, and expression, thereby facilitating the learning of heterogeneous student populations (CAST, 2021). This framework ensures that every learner, including individuals with disabilities, those facing language obstacles, or possessing varied learning preferences, can effectively access and engage in educational experiences. Educators employ a range of instructional methodologies that align with the tenets of UDL to construct adaptable learning environments that cater to the unique requirements of each student. Such methodologies encompass differentiated instruction, technological integration, scaffolding, formative

assessments, and collaborative learning, all designed to enhance engagement, accessibility, and profound understanding.

Differentiated instruction represents a highly prevalent strategy within the implementation of UDL, permitting educators to tailor content, instructional processes, and assessment products in accordance with the diverse needs of learners (Tomlinson, 2021). This approach guarantees that students receive instruction that corresponds to their levels of readiness, interests, and individual learning profiles. For instance, educators may deliver content through visual, auditory, and kinesthetic modalities to effectively accommodate a range of learning preferences (Hall et al., 2020). Furthermore, offering various avenues for students to exhibit their understanding—such as through oral presentations, written assignments, or creative projects—aligns with UDL’s principle of providing multiple means of expression (Meyer et al., 2021).

The integration of technology assumes a pivotal role in facilitating learner engagement within UDL-informed instructional frameworks. Assistive technologies, including screen readers, speech-to-text applications, and adaptive keyboards, empower students with disabilities to independently access educational resources (Flanagan et al., 2020). Digital instruments such as interactive whiteboards, instructional video content, and educational applications afford multiple modalities of information representation, thereby enhancing accessibility for students with diverse learning preferences (Al-Azawei et al., 2019). For instance, captioned audiovisual materials and audiobooks support those with auditory or reading challenges, while text-to-speech technology aids learners with dyslexia or visual impairments. The adaptability of digital resources guarantees that all students can engage with educational content in ways that align with their abilities and preferences.

Environmental adaptation serves as a fundamental strategy within the framework of Universal Design for Learning (UDL), promoting equitable access and participation for all learners, particularly in early childhood educational settings. This strategy entails the design of both physical and social learning environments that eliminate barriers and cultivate engagement among diverse learners. By configuring classrooms to facilitate movement, integrating sensory-friendly areas, and employing visual supports, educators ensure that children with varying needs can meaningfully access and interact with the curriculum (CAST, 2018).

For instance, learning spaces can be structured with clear pathways for children with physical disabilities or calm corners for those with sensory sensitivities (Gargiulo & Metcalf, 2021). Labels with symbols, colour coding, and tactile materials help learners with visual impairments or cognitive challenges navigate their environment independently. Furthermore, flexible seating options and accessible materials promote learner autonomy and inclusivity (Coyne, Pisha, Dalton, Zeph, & Smith, 2019).

When effectively operationalised, environmental adaptation is congruent with the Universal Design for Learning (UDL) principle of offering diverse means of engagement and representation, thus facilitating the comprehensive development of all children within inclusive educational contexts (Nelson & Basham, 2020).

An additional efficacious strategy that aligns with UDL principles is scaffolding, characterised by the provision of temporary support mechanisms designed to assist learners in attaining elevated levels of comprehension and skill acquisition (Wood et al., 2020). Educators employ methodologies such as modelling, guided practice, and think-aloud techniques to aid students in mastering novel concepts. For instance, deconstructing intricate tasks into smaller, more manageable components enables struggling learners to process

information with greater efficacy (Gonzalez & Nelson, 2021). The utilisation of tools such as sentence starters, graphic organisers, and guided questioning further enhances comprehension and critical thinking competencies, thereby ensuring that all students can actively engage with the curriculum.

Formative assessments hold paramount importance in UDL-enacted classrooms, as they furnish continuous feedback that informs instructional practices and bolsters student development (Black & Wiliam, 2018). In contrast to conventional summative assessments, formative assessments permit educators to monitor student progress in real-time and modify their teaching methodologies accordingly. Techniques such as peer reviews, self-assessments, and exit tickets facilitate educators in identifying students' strengths and areas necessitating improvement (Heritage, 2021). Moreover, the provision of alternative assessment modalities, such as oral presentations, multimedia projects, or open-ended discussions, is congruent with UDL's objective of offering multiple means of action and expression (Rose & Dalton, 2019).

Collaborative learning constitutes another strategy that is conducive to UDL principles, fostering social interaction and the co-construction of knowledge. Group activities, peer tutoring, and cooperative learning tasks promote peer-to-peer learning while simultaneously cultivating communication and teamwork skills (Gillies, 2020). Educators can implement structured collaborative techniques, such as jigsaw activities and think-pair-share formats, to ensure that all students actively engage in discussions and problem-solving endeavours (Johnson & Johnson, 2019). This methodology not only supports learners with varied abilities but also nurtures an inclusive classroom environment in which students feel valued and supported.

To optimise engagement, educators also integrate student choice and autonomy within UDL-oriented instruction. Offering alternatives for assignments, learning resources, and methods of participation empowers students to assume responsibility for their educational journey (Deci & Ryan, 2020). For instance, permitting students to select between composing an essay, creating a digital presentation, or producing a podcast grants them the latitude to articulate their understanding in ways that resonate with their strengths and interests. Empirical research suggests that when students exert control over their learning experiences, their motivation and engagement levels are significantly enhanced (Reeve, 2018).

Notwithstanding the efficacy of these UDL pedagogical strategies, obstacles such as insufficient teacher training, resource limitations, and substantial class sizes may impede successful implementation (Florian, 2021). Numerous educators necessitate professional development regarding UDL principles and their practical applications to fully assimilate inclusive strategies into their instructional methodologies (Rao et al., 2021). Furthermore, educational institutions must ensure access to technological resources and assistive tools to effectively support diverse learners. Addressing these impediments through policy advocacy, collaboration, and ongoing training will significantly improve the implementation of UDL strategies within early childhood education.

In summation, pedagogical strategies aligned with Universal Design for Learning (UDL), encompassing differentiated instruction, the integration of technology, scaffolding techniques, formative assessments, collaborative learning, and the provision of student choice, are instrumental in facilitating the needs of diverse learners. These methodologies foster accessibility, enhance engagement, and create individualized learning experiences, thereby ensuring that all students are positioned for success. Nonetheless, for the effective implementation of UDL, it is imperative that educators receive sufficient training,

institutional backing, and access to requisite resources. Augmenting professional development initiatives and policy support will empower educators to cultivate more inclusive and equitable learning environments that are consistent with UDL principles.

2.4.4 Challenges ECE Teachers Face in the Implementation of Universal Design for Learning (UDL)

Universal Design for Learning (UDL) constitutes a pedagogical framework aimed at fostering inclusive educational environments by facilitating diverse avenues for engagement, representation, and expression (CAST, 2021). Within the realm of early childhood education (ECE), UDL assumes particular significance owing to the heterogeneous learning requirements of young learners, encompassing those with disabilities, linguistic obstacles, and varying cognitive styles. Notwithstanding its advantages, numerous ECE educators encounter considerable obstacles in the effective application of UDL principles. These obstacles encompass insufficient professional development, constrained resources, elevated student-to-teacher ratios, inflexible curricular structures, and a deficiency of institutional backing.

Inadequate Teacher Training and Knowledge of UDL

One of the foremost obstacles in the execution of Universal Design for Learning (UDL) is the insufficiency of comprehensive teacher training. Numerous Early Childhood Education (ECE) instructors possess limited familiarity with UDL tenets throughout their professional development (Rao et al., 2021). A scholarly investigation conducted by Al-Azawei et al. (2019) revealed that although educators acknowledge the significance of UDL, many lack the requisite pedagogical expertise to effectively incorporate it into their instructional practices. In the absence of adequate training, educators encounter difficulties in employing UDL methodologies, such as differentiated instruction and the integration of technology, to

cater to the needs of diverse learners. Furthermore, research suggests that a considerable number of teacher preparation programs fail to adequately furnish educators with the competencies essential for designing adaptable learning environments that are congruent with UDL principles (Smith & Lowrey, 2020).

Limited Access to Resources and Assistive Technology

The effective execution of Universal Design for Learning (UDL) necessitates the availability of a diverse array of educational resources, encompassing assistive technologies, adaptive materials, and digital instruments (Flanagan et al., 2020). Nevertheless, numerous Early Childhood Education (ECE) educators encounter constraints related to resources, particularly within low-income or inadequately funded educational institutions. As posited by Chardin and Novak (2021), an absence of technological instruments such as screen readers, speech-to-text software, and digital learning environments significantly impedes educators' capacity to offer varied means of representation and expression. Furthermore, a considerable number of early childhood education centres lack access to sensory-friendly instructional materials, thereby complicating the accommodation of children with heterogeneous learning requirements. In the absence of sufficient resources, educators face considerable challenges in fostering inclusive and stimulating educational settings.

Large Class Sizes and Individualised Instruction Challenges

Large class sizes present another significant barrier to UDL implementation in ECE settings. Research suggests that when classrooms exceed recommended student-teacher ratios, educators find it difficult to provide individualised instruction that aligns with UDL principles (Gonzalez & Nelson, 2021). In a study conducted by Florian (2021), teachers reported that managing diverse learners in overcrowded classrooms limited their ability to provide multiple means of engagement and personalised learning experiences. Young

children require hands-on support and frequent interaction, which becomes challenging when a single teacher is responsible for too many students. The inability to offer individualised attention prevents some children, particularly those with disabilities or learning differences, from fully engaging in learning activities.

Curriculum Rigidity and Lack of Flexibility

Many early childhood curricula are structured in ways that do not support the flexibility required for UDL implementation (Nelson & Sheen, 2022). Traditional teaching methods often prioritise standardised lesson plans and assessments, leaving little room for differentiated instruction. ECE teachers may struggle to modify content, adapt activities, or provide alternative assessment methods due to rigid curriculum guidelines. Research by Rose and Dalton (2019) highlights that curriculum policies in some educational systems emphasise standardised learning outcomes, making it difficult for teachers to implement UDL strategies such as scaffolding, student choice, and project-based learning. As a result, some educators feel constrained in their ability to tailor lessons to meet the needs of all learners.

Lack of Institutional Support and Professional Development Opportunities

Institutional endorsement is paramount for the effective execution of Universal Design for Learning (UDL); however, numerous early childhood educators convey a lack of sufficient administrative support. Schools and early childhood centers often lack professional development opportunities that focus on UDL best practices (Smith & Thierfeld Brown, 2021). Without ongoing training, teachers may not have the confidence or knowledge to adapt their teaching strategies effectively. Furthermore, school leadership plays a crucial role in fostering an inclusive culture that supports UDL adoption. Research by Rao et al. (2021) indicates that when administrators fail to prioritise inclusive education, teachers are less likely to implement UDL strategies consistently. In some cases, educators face resistance

from colleagues who are unfamiliar with or resistant to change, further complicating efforts to integrate UDL in ECE settings.

Cultural and Attitudinal Barriers

The perspectives and convictions of educators regarding inclusive education possess the potential to significantly influence the execution of Universal Design for Learning (UDL). Certain instructional professionals may harbour erroneous beliefs concerning the practicality of UDL within early childhood educational settings, positing that its implementation is excessively intricate or labour-intensive (Gillies, 2020). Additionally, cultural factors influence perceptions of inclusive education. In some societies, there is a strong emphasis on traditional teaching methods that do not align with the flexible and student-centred approaches of UDL (Gonzalez & Nelson, 2021). Overcoming these attitudinal barriers requires ongoing professional development, peer collaboration, and advocacy for inclusive teaching practices.

2.5 Chapter Summary

Chapter Two presents an extensive examination of the prevailing scholarly discourse concerning the application of the Universal Design for Learning (UDL) within early childhood inclusive settings. The chapter commences with the theoretical framework that underscores the Differentiated Instruction Theory and its pertinence to the research inquiry. Additionally, the chapter articulates the principles of the Universal Design for Learning (UDL) Framework, Inclusive Education in Early Childhood, as well as the Policy and Regulatory Framework pertaining to UDL and Inclusion. Furthermore, the chapter delineates the essential components that underpin the study's objectives. It conducts a literature review focusing on early childhood educators' perceptions of the principles of Universal Design for Learning (UDL), the support services accessible for UDL implementation, and the

pedagogical strategies employed to facilitate learner engagement through UDL, alongside the obstacles encountered in the execution of UDL.



CHAPTER THREE

METHODOLOGY

3.0 Overview

This chapter delineates the research methodology employed to investigate the integration of Universal Design for Learning (UDL) within early childhood educational institutions in the Adaklu District. It offers a comprehensive exposition of the research paradigm, approach, and design, alongside an elucidation of the population, sample, and sampling methodologies utilised. Furthermore, it articulates the data collection instruments, criteria for trustworthiness, procedures for data collection, methods for data analysis, and ethical considerations that informed the study.

3.1 Research Paradigm

The interpretivist paradigm has been identified as the most suitable framework for this investigation, as it endeavours to comprehend the subjective experiences, beliefs, and perceptions of early childhood educators regarding the enactment of Universal Design for Learning (UDL) within early childhood centres situated in the Adaklu District. The foundation of interpretivism rests on the premise that reality is constructed socially and is most effectively understood through the perspectives of individuals situated within their particular contexts (Creswell & Creswell, 2018). Given that the focus of this study is to delve into educators' experiences, knowledge, and challenges associated with the implementation of UDL, an interpretivist approach facilitates a comprehensive exploration of how teachers perceive and incorporate UDL principles within their instructional environments.

The interpretivist paradigm is congruent with qualitative research methodologies, which underscore the importance of capturing rich, descriptive data through methods such as interviews, observations, and document analysis (Merriam & Tisdell, 2016). In contrast to

the positivist paradigm, which aspires to uncover objective truths through quantifiable measures, interpretivism prioritises the intricacies and singularities inherent in human experiences. This is especially pertinent in the domain of early childhood education, wherein pedagogical strategies, learning outcomes, and classroom interactions are shaped by an array of social, cultural, and institutional influences (Denzin & Lincoln, 2018).

Furthermore, the adoption of an interpretivist paradigm facilitates a more intimate engagement between the researcher and participants, thereby nurturing a profound understanding of how educators interpret UDL and the degree to which they incorporate its principles—such as multiple means of engagement, representation, and expression—into their pedagogical practices (Meyer, Rose, & Gordon, 2019). This investigation recognises that educators' viewpoints on UDL are influenced by their professional training, experiences, institutional backing, and the accessibility of resources. Through this paradigm, the research captures these intricate insights, providing a holistic understanding of how UDL is operationalised within early childhood environments.

In addition, this methodological approach enables the identification of contextual impediments, such as restricted access to assistive technology, insufficient teacher training, and difficulties in curriculum adaptation, which may remain obscured through quantitative methodologies alone (Yin, 2018). By examining educators' lived experiences, the study offers a comprehensive viewpoint on the myriad factors affecting the implementation of UDL in early childhood education. Consequently, the interpretivist paradigm is exceptionally well-suited for this inquiry, as it allows for an exhaustive examination of the complexities surrounding inclusive teaching and learning practices in the Adaklu District.

3.2 Research Approach

This investigation utilised a qualitative research methodology, which was considered apt for delving into educators' viewpoints, experiences, and obstacles encountered in the execution of Universal Design for Learning (UDL) within early childhood centres located in the Adaklu District. Qualitative research centres on comprehending human experiences within their authentic contexts, rendering it particularly suitable for scrutinising the ways in which educators interpret and implement UDL principles in their teaching environments (Patton, 2020). Given that UDL underscores adaptable and inclusive pedagogical strategies, a qualitative methodology facilitates a thorough exploration of its application and efficacy in early childhood educational settings.

In contrast to quantitative research, which depends on numerical data to quantify variables and ascertain statistical correlations, qualitative research emphasises substantial, narrative data that yield profound insights into participants' experiential realities (Cohen, Manion, & Morrison, 2018). This study employs interviews, observations, and document analysis to collect comprehensive data on the methods by which educators incorporate UDL principles—such as multiple means of engagement, representation, and expression—into their instructional methodologies. Through this investigative framework, the study reveals the practical implementations of UDL and the obstacles educators face in fostering inclusive educational environments for all learners.

Moreover, qualitative research permits a degree of flexibility in both data collection and analysis, empowering the researcher to modify inquiries in response to emerging themes identified within participants' feedback (Nowell et al., 2019). This adaptability proves particularly advantageous when examining UDL, as its execution is contingent upon institutional resources, the quality of teacher training, and the dynamics present within

classroom settings. Furthermore, direct engagement with educators promotes a more profound comprehension of the contextual and pedagogical elements that influence the adoption of UDL in early childhood educational contexts (Merriam & Tisdell, 2021).

By adopting a qualitative framework, this investigation guarantees a contextually immersive examination of how UDL is operationalised in early childhood education. This approach yields insights into the efficacy of UDL strategies, the barriers hindering their implementation, and the support mechanisms necessary for enhancing inclusive educational experiences—perspectives that may not be adequately captured through quantitative methodologies alone.

3.3 Research Design

This investigation employs an exploratory case study methodology, which is particularly advantageous for examining the application of Universal Design for Learning (UDL) in the context of early childhood education within authentic settings. Case study research facilitates a comprehensive analysis of distinctive educational practices, thereby rendering it particularly suitable for elucidating educators' experiences, perceptions, and obstacles encountered in the implementation of UDL principles within their instructional environments (Baxter & Jack, 2022). Since this study focuses on UDL implementation in early childhood centres within the Adaklu District, the case study design provides a comprehensive exploration of how inclusive teaching strategies are applied within this specific educational and cultural environment.

Exploratory case studies are particularly valuable in areas where limited research exists or when new insights are needed to deepen understanding (Yin, 2023). Given that UDL implementation in early childhood settings in Ghana has not been widely studied, this design allows the researcher to engage directly with teachers, observe classroom interactions, and

analyse institutional factors influencing UDL adoption. Additionally, the flexibility of this design enables the researcher to refine the study based on emerging themes, ensuring a responsive and dynamic inquiry process (Stake, 2021).

Moreover, the case study design supports the use of multiple data collection methods, such as interviews, classroom observations, and document analysis, providing a holistic view of how UDL is implemented in early childhood settings (Merriam & Tisdell, 2021). The interactive nature of this approach allows for close engagement with participants, which is crucial for capturing the complexities involved in inclusive teaching practices (Denzin & Lincoln, 2023). By utilising an exploratory case study design, this research will generate contextually relevant insights that contribute to educational policy, teacher training, and best practices for inclusive early childhood education.

3.4 Population

The demographic cohort for this investigation encompasses all educators specialising in early childhood education (ECE) within the confines of the Adaklu District. According to the most recent Educational Directorate Report (2024), the district has a total of 135 early childhood teachers working across public and private kindergarten institutions. These educators are responsible for implementing early childhood teaching strategies, including inclusive instructional methods aligned with UDL principles.

Defining the study population is crucial for ensuring that findings are relevant and applicable to the targeted educational context (Creswell & Creswell, 2023). Since this research seeks to explore how UDL is applied in early childhood classrooms, focusing on teachers within the district provides valuable insights into their experiences, challenges, and professional needs. Early childhood educators play a critical role in shaping the learning environment, making

them essential participants for understanding the practical realities of UDL implementation (Tracy, 2022).

By studying this population, the research will contribute to a deeper understanding of inclusive pedagogical practices in Ghanaian early childhood education. It will also highlight how factors such as teacher training, resource availability, and institutional support impact the effective implementation of UDL, providing recommendations for improving inclusive education at the foundational learning stage.

3.5 Sample and Sampling Techniques

The purposive sampling methodology was utilised in this investigation to facilitate the intentional selection of participants possessing substantial expertise in early childhood education and the application of Universal Design for Learning (UDL) principles. Given that the focus of the study is the execution of UDL within early childhood education, the selection of educators with a minimum of ten years of pedagogical experience enables a comprehensive examination of their perceptions, practices, and obstacles. A cohort of 13 early childhood educators from the Adaklu District was deliberately chosen to furnish rich and contextually pertinent data.

Purposive sampling is extensively employed in qualitative research methodologies, as it enables researchers to select participants according to pre-established criteria that are congruent with the objectives of the study (Creswell & Creswell, 2023). This methodological approach ensures that only individuals possessing pertinent experience and expertise contribute to the research, thereby enhancing the credibility and reliability of the resultant findings (Merriam & Tisdell, 2021). Educators with substantial professional experience are more inclined to have engaged with a variety of inclusive teaching strategies, including

Universal Design for Learning (UDL), and can provide significant insights into their efficacy and associated challenges (Patton, 2022).

Furthermore, purposive sampling facilitates the identification of information-rich cases, which is imperative for exploratory research endeavors (Yin, 2023). By deliberately selecting teachers with considerable teaching experience, this study guarantees that participants are capable of critically reflecting on the influence of UDL in promoting inclusive learning environments and accommodating diverse learners. Seasoned educators are also more likely to have encountered various curriculum reforms, policy modifications, and resource limitations, rendering their insights vital for comprehending systemic impediments to the implementation of UDL in early childhood education (Denzin & Lincoln, 2023).

In light of the exploratory character of this investigation, a sample size comprising 13 participants is deemed adequate to encapsulate diverse yet comprehensive perspectives, while also ensuring feasibility in data collection and analysis (Stake, 2021). This methodological strategy ensures that the findings yield meaningful contributions to the fields of research, policy formulation, and best practices concerning the integration of UDL in early childhood education within the context of Ghana.

3.6 Data Collection Instrument

This investigation employs a semi-structured interview framework as the principal instrument for the collection of qualitative data. The semi-structured interview framework is particularly advantageous for qualitative research, as it strikes a balance between systematic inquiry and the requisite flexibility to thoroughly examine the perspectives of participants (Bryman, 2023). This methodology guarantees that fundamental themes pertinent to the incorporation of musical arts within early childhood education are methodically explored

while concurrently permitting participants to articulate their individual experiences, perceptions, and challenges (Tracy, 2022).

The interview framework is comprised of open-ended inquiries that aim to elicit educators' perspectives regarding the utilisation of musical arts, its influence on early childhood development, and the challenges they encounter during its execution.

This method is particularly effective in producing detailed, descriptive data, as it enables the interviewer to probe further into responses, clarify ambiguities, and explore emerging themes (Guest et al., 2023). Additionally, semi-structured interviews provide a nuanced understanding of complex educational practices that might not be fully captured through standardised surveys or other rigid data collection techniques (Silverman, 2022).

By employing a semi-structured approach, this study ensures that meaningful discussions are fostered, leading to a richer exploration of how musical arts contribute to early childhood learning while uncovering the contextual factors that influence their implementation in classrooms.

3.7 Trustworthiness of the Study

Ensuring the integrity of qualitative research is imperative for establishing the credibility, transferability, dependability, and confirmability of the outcomes (Lincoln & Guba, 1985).

This investigation conformed to these standards to augment the rigour and reliability of the research methodology, particularly in examining the application of Universal Design for Learning (UDL) within early childhood education.

3.7.1 Credibility

The credibility of the research was fortified through extensive engagement and member verification. The extensive engagement facilitated the researcher's acquisition of a comprehensive understanding regarding the implementation of Universal Design for Learning (UDL) within early childhood educational settings, while simultaneously fostering rapport with the participants, thereby assuring that the responses provided were both precise and genuine (Shenton, 2004). Member verification entailed the distribution of interview summaries to the participants, enabling them to confirm the veracity of their statements, which in turn mitigated potential researcher bias and misinterpretation (Creswell & Poth, 2023). This methodological approach augmented the trustworthiness of the research by guaranteeing that the findings accurately encapsulated the viewpoints of early childhood educators engaged in the implementation of UDL.

3.7.2 Dependability

Dependability was maintained through an audit trail, which systematically documented the research process, including data collection methods, coding procedures, and analytical decisions (Nowell et al., 2017). This transparent documentation allows for the replication of the study and confirms the consistency of findings over time. Additionally, triangulation was employed by gathering data from multiple sources, including interviews, classroom observations, and document analysis, to validate the findings and ensure that interpretations were not based solely on a single perspective (Yin, 2023).

3.8 Data Collection Procedures

Before commencing the data collection process, the researcher secured an introductory letter from the Department of Early Childhood Education at the University of Education, Winneba. This correspondence was utilised to formally solicit permission from the designated

educational institutions, the Adaklu District Education Directorate, and other pertinent authorities. The letter delineated the objectives of the study, underscored the significance of participant engagement, and assured the confidentiality and anonymity of their responses. Subsequently, the Adaklu District Education Directorate provided an official letter of approval to the sampled schools, thereby granting the researcher the necessary access to conduct the study.

Upon obtaining the requisite permissions, the researcher interacted with the head teachers of the chosen early childhood education centres to elucidate the objectives of the study and to solicit their collaboration. Following their endorsement, data collection commenced utilising a semi-structured interview guide aimed at investigating teachers' perceptions regarding the implementation of Universal Design for Learning (UDL) within early childhood education contexts. The interviews concentrated on educators' comprehension of UDL principles, their experiences in employing inclusive pedagogical strategies, the advantages of UDL for a diverse student population, and the obstacles encountered during its implementation.

The data collection procedure encompassed face-to-face interviews with selected early childhood educators, each lasting approximately 15 to 20 minutes. To ensure precision and facilitate subsequent transcription, the participants' responses were audio-recorded with their consent. This methodology allowed for an in-depth examination of the integration of UDL principles within early childhood classrooms and yielded insights into the systemic impediments that hinder effective implementation.

3.9 Data Processing and Analysis

The data obtained through the semi-structured interview framework were subjected to thematic analysis, adhering to the methodological guidelines established by Braun and Clarke (2006). Thematic analysis constitutes a qualitative data evaluation technique that entails the

identification, examination, and articulation of recurring patterns (themes) present within the dataset. This methodological choice was predicated on its capacity to facilitate a comprehensive investigation of participants' viewpoints concerning the enactment of Universal Design for Learning (UDL) within early childhood education contexts (Nowell et al., 2017).

The analytical process commenced with data familiarisation, wherein the researcher meticulously transcribed the audio-recorded interviews verbatim and engaged in iterative readings of the transcripts to achieve a profound comprehension of the data (Creswell & Poth, 2023). This phase was succeeded by initial coding, during which salient phrases and concepts pertinent to the study's objectives—such as educators' comprehension of UDL principles, their instructional modifications, and the challenges associated with UDL implementation—were systematically extracted and assigned specific codes (Clarke & Braun, 2017).

Subsequent to the coding phase, the identified codes were systematically organised into emergent themes that corresponded with the research inquiries. Themes including “Teachers' Understanding of UDL,” “Inclusive Teaching Strategies,” and “Challenges in UDL Implementation” were discerned from the data (Patton, 2022). These themes were subsequently subjected to rigorous review, refinement, and definition to guarantee that they accurately encapsulated the experiences and perspectives of the participants.

To bolster the trustworthiness of the analysis, the researcher engaged in peer debriefing and maintained a reflexive journal to chronicle analytical decisions, thereby ensuring transparency and mitigating potential biases (Denzin & Lincoln, 2023). Ultimately, the findings were interpreted in conjunction with the extant literature on UDL to yield significant insights regarding the implementation of UDL within early childhood education environments.

3.10 Ethical Considerations

In this investigation, ethical principles were meticulously adhered to safeguard the rights, privacy, and welfare of the participants involved. Principal ethical issues that were examined encompassed informed consent, anonymity, and confidentiality to guarantee the implementation of ethical research methodologies.

3.10.1 Informed Consent

Informed consent represents a fundamental ethical principle that guarantees participants willingly consent to engage in a research study after comprehensively comprehending its aims, objectives, and possible risks (Seidman, 2016). Prior to the commencement of data collection, the researcher disseminated extensive information regarding the study to the participants, encompassing its significance and their entitlement to withdraw at any point without repercussions. Each participant was provided with a consent document to endorse, thereby affirming their voluntary involvement in the research concerning the application of Universal Design for Learning (UDL) within early childhood education. This process assured that educators involved in the study proceeded with complete awareness and were free from any form of coercion.

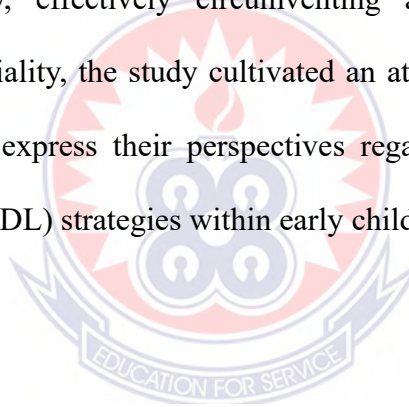
3.10.2 Anonymity

Anonymity was a key ethical priority to protect participants' identities and maintain research integrity. Gujarati (2013) emphasised that ensuring anonymity helps safeguard participants from potential repercussions related to their responses. To uphold this principle, no personal identifiers such as names or institutional affiliations were recorded. Instead, pseudonyms and codes such as T1, T2, and T3 were assigned to participants' responses. This approach ensured that individual identities remained untraceable, reducing the risk of bias or any unintended

consequences, particularly when discussing challenges in UDL implementation in early childhood education.

3.10.3 Confidentiality

Confidentiality constituted a fundamental ethical consideration in the present investigation. Participants were provided with assurances that their responses would be kept confidential and that access to the raw data would be restricted solely to the researcher. The study's findings were devoid of any identifying information, thereby ensuring that no participant could be associated with particular responses (Creswell & Creswell, 2023). Furthermore, the researcher upheld academic integrity by meticulously citing all sources utilised to substantiate the study, effectively circumventing any incidence of plagiarism. By safeguarding confidentiality, the study cultivated an atmosphere of trust, thereby enabling educators to candidly express their perspectives regarding the application of Universal Design for Learning (UDL) strategies within early childhood education contexts.



CHAPTER FOUR

DATA ANALYSIS, RESULTS AND DISCUSSIONS

4.0 Overview

This chapter delineates the findings derived from the examination of the questionnaire data, which are grounded in the outcomes of the four (4) research inquiries. The analysis was predicated on the complete return rate data acquired from the distributed questionnaire.

4.1 Analysis

Research Question One: What is the perception of early childhood educators regarding Universal Design for Learning (UDL) principles in inclusive settings in the Adaklu District?

Theme 1: UDL as a Tool for Inclusive Participation and Engagement”

This thematic focus underscores the imperative to guarantee that all learners, irrespective of their individual capabilities, are integrally involved in the educational experience via diverse modalities of representation, expression, and engagement, which are fundamental tenets of the Universal Design for Learning (UDL). Below are several excerpts derived from the interviews;

Using UDL in my classroom means every child, no matter their ability, has a way to be part of the learning process. It helps me make sure no one is left behind. (T6)

Another teacher (T12) also said;

I've seen how offering different ways to learn, like using visuals, songs, and hands-on activities, helps children with and without disabilities feel included and confident in what they can do.

The quotes highlight the positive impact of UDL in fostering inclusive learning environments. Educators acknowledge that the implementation of diverse pedagogical methodologies, including visual aids, auditory stimuli, and kinesthetic activities, enables all

students to engage with the curriculum. Such methodologies not only assist learners with disabilities but also foster increased participation and self-efficacy among the entire student body. The implication is that Universal Design for Learning (UDL) empowers educators to address a spectrum of individual needs and to cultivate equity within early childhood educational environments.

Theme 2: UDL Encourages Holistic Development

The theme highlights how early childhood teachers view UDL as a framework that supports the whole child, not just academic achievement. They appreciate that it addresses children's cognitive, social, emotional, and physical needs by offering multiple ways to engage, express, and participate in learning. Here are some verbatim quotes that support the theme;

With UDL, I'm not only teaching letters and numbers, but I'm also helping children build confidence, interact better with others, and express themselves in ways that suit them. (T3)

Another teacher also added that;

Some children may struggle with writing, but when we let them draw, sing, or use gestures, you see their personalities shine. It's about supporting their whole development, not just test scores. (T9)

These quotes imply that UDL goes beyond academic teaching by fostering children's confidence, creativity, and social skills. By offering multiple means of expression, teachers support each learner's emotional and interpersonal growth. The implication is that UDL encourages a well-rounded approach to education, helping early learners thrive in all areas of development, not just academics.

Theme 3: UDL Encourages Innovation and Flexibility in Teaching

This theme emphasises how early childhood education (ECE) teachers perceive the principles of Universal Design for Learning (UDL) as a driving force for innovation and flexibility in inclusive classroom settings. They view UDL as a framework that inspires them to move beyond rigid instructional approaches, adopt creative strategies, and tailor teaching methods to accommodate the diverse abilities, interests, and learning preferences of all children. Here are some quotes that support this assertion;

UDL has really pushed me to think outside the box. I'm always trying new methods like incorporating technology, hands-on activities, or role play to keep every child engaged, no matter their learning style. (T5)

With UDL, I'm not just following a set lesson plan. I feel empowered to adjust things on the fly, based on how the kids are responding, so they're always included in the learning process. (T8)

It's about being flexible and creative. Sometimes a child might not grasp a concept through writing or speaking, so we try using visuals or music. UDL lets me adapt to what works for each child." (T2)

The implications of these quotes suggest that UDL empowers teachers to be flexible and innovative in their teaching methods. By embracing diverse instructional strategies, such as technology, hands-on activities, and visuals, teachers can better engage all learners. UDL fosters an adaptive approach where lesson plans are not rigid, allowing educators to adjust based on students' needs, ensuring inclusive participation and enhancing the learning experience for each child, regardless of their learning style.

Theme 4: UDL Aligns with Developmentally Appropriate Practice

ECE teachers perceive Universal Design for Learning (UDL) as closely aligning with developmentally appropriate practices (DAP). UDL principles offer a flexible framework that caters to the developmental needs of all children, ensuring that learning activities and materials are suitable for diverse age groups, abilities, and stages of development. Teachers value how UDL integrates well with DAP by providing various ways to engage, represent, and express learning in ways that respect the unique developmental trajectories of young children. Here are some excerpts from the interview;

UDL really complements what we already know about developmentally appropriate practices. It allows me to adjust how I present information, so it's age-appropriate and accessible for all children, no matter where they are in their learning journey. (T7)

With UDL, I can offer multiple ways for children to explore ideas and express themselves, which aligns perfectly with developmental stages. It ensures that every child can engage with the material in a way that's right for them. (T4)

UDL gives me the flexibility to meet children where they are, developmentally. Whether they're just beginning to grasp basic concepts or advancing in their skills, I can adjust the teaching methods to support their growth at each stage. (T10)

The quotes highlight that UDL aligns closely with developmentally appropriate practices by offering flexible, age-appropriate strategies that meet children at their unique learning stages. ECE teachers view UDL as a tool to tailor instruction, ensuring that content is accessible and relevant to each child's developmental needs. By providing various ways to engage with and express learning, UDL promotes inclusivity and supports individual progress. This approach fosters an environment where all children, regardless of their abilities or developmental

stages, can actively participate in the learning process, ensuring a more equitable and effective educational experience.

Discussions

The findings of the study reveal that early childhood educators perceive the Universal Design for Learning (UDL) framework as a powerful tool for promoting inclusive participation and engagement in early learning environments. As illustrated by several participants, UDL facilitates the inclusion of all children regardless of ability by allowing for multiple means of representation, expression, and engagement. For instance, one teacher (T6) stated, *“Using UDL in my classroom means every child, no matter their ability, has a way to be part of the learning process.”* Another teacher (T12) affirmed that offering diverse approaches such as visuals, songs, and hands-on activities enables all children to feel both included and confident. These sentiments align with the literature, which highlights that UDL promotes accessibility and engagement by accommodating various learning styles and abilities (Meyer et al., 2021; Rose & Meyer, 2002). Educators who implement UDL report that it supports the learning needs of all children, including those with disabilities and those from marginalized backgrounds, thereby fostering equitable educational opportunities (Nelson & Basham, 2018).

Beyond mere access, the data also suggest that UDL supports the holistic development of learners. Teachers noted that UDL not only addresses academic content but also nurtures children’s social, emotional, and physical development. For example, one teacher (T3) expressed, *“With UDL, I’m not only teaching letters and numbers I’m helping children build confidence, interact better with others, and express themselves in ways that suit them.”* Another teacher (T9) shared how non-traditional modes of expression, such as drawing or using gestures, reveal children’s personalities and support their development beyond test

performance. These insights resonate with findings from Novak and Thibodeau (2016), who argue that UDL contributes to the comprehensive growth of young learners by promoting their confidence, creativity, and social competence. Through varied and multimodal approaches, UDL empowers children to learn in ways that are emotionally supportive and developmentally appropriate.

The results also underscore that early childhood teachers see UDL as a catalyst for innovation and flexibility in teaching. The framework encourages educators to move beyond rigid, one-size-fits-all teaching methods. As teacher T5 explained, *“UDL has really pushed me to think outside the box. I’m always trying new methods like incorporating technology, hands-on activities, or role play to keep every child engaged.”* Similarly, teacher T8 highlighted the flexibility UDL offers by allowing them to adapt lessons dynamically based on students’ responses. This aligns with the literature that celebrates UDL’s emphasis on creative instructional strategies, multimodal resources, and adaptability (Coyne et al., 2020; Darragh, 2021). UDL allows teachers to respond effectively to learners’ diverse needs, thus creating a dynamic and inclusive classroom culture. The framework’s flexibility is especially valuable in early childhood settings where learners exhibit varied cognitive, linguistic, and social-emotional profiles (Pisha & Coyne, 2001).

In addition to its emphasis on flexibility, the teachers emphasized how UDL aligns closely with developmentally appropriate practice (DAP). Teachers reported that UDL allows them to tailor instruction to meet children at their individual developmental levels. For instance, one participant (T7) said, *“UDL really complements what we already know about developmentally appropriate practices. It allows me to adjust how I present information, so it’s age-appropriate and accessible.”* Other teachers (T4 and T10) echoed that UDL’s adaptability makes it easier to provide meaningful learning experiences that match each

child's stage of growth. These insights are consistent with the views of Florian and Beaton (2018), who noted that UDL supports the individual developmental trajectories of learners by promoting varied, child-centred approaches. Through this lens, UDL becomes not just a framework for inclusion but also a guide for pedagogical decisions that respect young children's unique capabilities.

In summary, the results of this study highlight early childhood educators' largely positive perceptions of UDL as an effective framework for fostering inclusive, flexible, and developmentally appropriate learning environments. Teachers appreciate UDL's capacity to promote participation, support holistic development, and inspire pedagogical innovation. These perceptions are well-supported by existing literature, which affirms the value of UDL in enhancing learning for all children. However, the successful implementation of UDL also depends on adequate resources, professional development, and institutional support. Addressing these systemic barriers is crucial to ensuring that UDL can be effectively adopted in diverse educational contexts, particularly in early childhood settings where inclusivity is foundational to long-term learning outcomes.

Research Question Two: What support services facilitate the implementation of UDL in inclusive early childhood centres in the Adaklu District?

This research question explores the types and extent of support systems that enable the successful implementation of Universal Design for Learning (UDL) principles in inclusive early childhood education (ECE) settings within the Adaklu District. Here are some of the themes that emerged from the interviews:

Theme 1: Teaching and Learning Resources

This theme highlights on access to diverse teaching and learning resources. These resources play a crucial role in helping teachers cater to the varied learning needs and abilities of young learners. Teachers in the Adaklu District highlighted the importance of having access to visual aids, manipulative materials, audio tools, and assistive devices that support differentiated instruction. Such resources not only make lessons more engaging but also help ensure that all learners, including those with disabilities, can participate meaningfully in classroom activities. Here are some excerpts from the interview:

My access to teaching and learning resources like visual aids, audio materials, and storybooks makes it easier to implement UDL. These tools help me reach every learner, especially those who need alternative ways to engage. (T4).

When we are provided with the right materials like manipulatives, assistive devices, and inclusive storybooks it becomes possible to teach every child meaningfully, regardless of their learning needs or abilities. (T8).

The quotes highlight that access to diverse teaching and learning resources is a crucial support service for effective UDL implementation. Such resources empower teachers to present content in multiple ways, address varying learning needs, and foster inclusive

participation. Without these materials, delivering instruction that caters to all learners especially those with disabilities becomes difficult. Therefore, sustained provision of inclusive resources is essential to promote equity, engagement, and meaningful learning in early childhood classrooms.

Theme 2: Professional Development

From this theme, Teachers in the Adaklu District emphasised the importance of continuous training and capacity-building opportunities that focus on inclusive pedagogy and UDL strategies. Such training equips educators with the knowledge, confidence, and practical skills needed to design flexible, accessible lessons that meet the diverse needs of all learners in their classrooms. Here are some of the verbatim quotes that emerged from the interviews;

When there UDL training available to early childhood teachers, it will help me understand how to modify my teaching to suit different learners. Other than that, it will be difficult for us those handling children with special educational needs effectively. (T6)

Workshops on inclusive education need to be given to equip teachers with new strategies, like using multiple means of engagement and representation. Without these trainings, we would struggle to reach every child in my classroom. (T11)

The quotes highlight the critical role of professional development in supporting the effective implementation of UDL in inclusive early childhood settings. Teachers acknowledge that without targeted training, they may lack the knowledge and strategies needed to address the diverse needs of learners, particularly those with special educational needs. Access to workshops and UDL-focused training equips educators with practical tools for adapting instruction, ensuring inclusive practices, and promoting equitable learning opportunities for all children, regardless of their abilities or learning styles.

Theme 3: Collaboration with Stakeholders

This theme underscores the critical role that stakeholders including individual include parents, NGOs in education play in the effective implementation of the UDL principles in early childhood settings within the Adaklu District. Here are some quotes that emerged from the interview,

I believe when parents and community members collaborate with early childhood teachers and educational administrators, it will offer the needed support that will be needed to ensure a comprehensive and effective UDL implementation. T10

Another teacher also said that;

When NGO's provide the needed support in terms of teaching and learning resources, professional development and teacher training, teachers will have a good UDEL implemented. T8

The quotes emphasise the importance of strong partnerships between early childhood educators, parents, community members, and external organizations such as NGOs in ensuring effective implementation of Universal Design for Learning (UDL). Teachers recognize that UDL cannot be fully realised in isolation; rather, it requires collective support. Parental and community involvement fosters shared responsibility and creates a more inclusive and responsive learning environment. Additionally, the support of NGOs in providing resources, training, and capacity building empowers teachers to adopt UDL strategies confidently. Such collaboration not only enhances teacher preparedness but also ensures that diverse learners receive equitable educational opportunities. Ultimately, a unified approach from all stakeholders contributes to the successful integration of UDL principles in early childhood education settings.

Discussions

Insights from the interview data revealed three major themes: the provision of teaching and learning resources, professional development for educators, and collaboration with key stakeholders. Each of these support services plays a vital role in promoting inclusive practices and ensuring that the principles of UDL are meaningfully applied in early childhood classrooms.

A primary finding from the interviews was the importance of access to diverse teaching and learning resources. Teachers expressed that, materials such as visual aids, audio tools, manipulatives, and assistive devices enable them to cater to the varied learning styles and abilities of their learners. These resources help in presenting content through multiple means, thereby enhancing engagement and participation core tenets of the UDL framework. One teacher explained, “My access to teaching and learning resources like visual aids, audio materials, and storybooks makes it easier to implement UDL. These tools help me reach every learner, especially those who need alternative ways to engage.” Another teacher echoed this sentiment by stating, “When we are provided with the right materials like manipulatives, assistive devices, and inclusive storybooks, it becomes possible to teach every child meaningfully, regardless of their learning needs or abilities.” These reflections illustrate that without the sustained provision of inclusive and adaptive materials, the implementation of UDL becomes significantly constrained.

Teachers underscored the need for ongoing training and capacity building focused specifically on inclusive pedagogy and UDL strategies. The findings show that educators recognise the value of learning how to adapt their instructional methods to meet the diverse needs of their students. One teacher noted, “When there is UDL training available to early childhood teachers, it will help me understand how to modify my teaching to suit different

learners.” Another pointed out, “Workshops on inclusive education need to be given to equip teachers with new strategies, like using multiple means of engagement and representation. Without these trainings, we would struggle to reach every child in my classroom.” These observations affirm the importance of equipping teachers with the tools and knowledge necessary for inclusive instruction. Without proper training, many teachers feel underprepared to handle the needs of children with disabilities or varying learning profiles.

Teachers emphasised that support from parents, community members, and non-governmental organisations (NGOs) is vital to successfully implement UDL principles. These stakeholders contribute not only material and financial resources but also help create a community-based approach to inclusion. As one teacher stated, “I believe when parents and community members collaborate with early childhood teachers and educational administrators, it will offer the needed support that will be needed to ensure a comprehensive and effective UDL implementation.” Another teacher highlighted the role of NGOs, saying, “When NGOs provide the needed support in terms of teaching and learning resources, professional development and teacher training, teachers will have a good UDL implemented.” This points to the necessity of collective responsibility in the inclusion process. UDL cannot be fully realised in isolation; instead, it requires a multi-stakeholder approach where every party plays a supportive role.

These findings are consistent with existing literature, which underscores that successful UDL implementation is contingent on the availability of robust support systems. According to Meyer, Rose, and Gordon (2014), UDL promotes inclusive education by ensuring teaching methods, materials, and assessments are accessible to all learners, including those with disabilities. Effective application of UDL principles in early childhood settings, therefore, demands comprehensive support that includes teacher training, access to assistive

technology, stakeholder collaboration, policy backing, and sustainable funding (CAST, 2022).

Teacher professional development and training is especially significant. Research by Alquraini and Gut (2023) supports the idea that continuous professional development increases teachers' confidence and capacity to differentiate instruction. Through workshops, coaching, and collaboration, educators learn to apply multiple means of engagement, representation, and expression in their daily teaching. Professional learning communities also offer a platform for peer-to-peer exchange, allowing teachers to navigate the challenges of UDL implementation collectively (Rao, Smith, & Lowrey, 2021).

Assistive technologies and classroom resources likewise play a pivotal role. Technologies like text-to-speech software, augmentative and alternative communication (AAC) devices, and interactive learning platforms cater to the needs of learners with various disabilities (Edyburn, 2020; Rose et al., 2022). However, equitable distribution of these resources remains a challenge, often requiring systemic interventions to ensure all schools have access to the tools they need.

Moreover, the role of collaborative partnerships cannot be overstated. Research shows that interdisciplinary support teams and strong parent-school relationships significantly improve the implementation of inclusive strategies (Blackwell & Rossetti, 2022; Chardin & Novak, 2022). When teachers, therapists, administrators, families, and community organizations work together, they create a more responsive and inclusive learning environment.

Finally, policy and funding support are foundational. The success of UDL is influenced by policy frameworks that encourage inclusive practices and allocate the necessary resources. School leadership plays a crucial role in creating an inclusive culture and setting up systems

that support UDL. Without adequate funding, schools struggle to invest in training, technology, and materials that make inclusive education possible (Meyer et al., 2014; Novak & Rodriguez, 2023).

In conclusion, the implementation of Universal Design for Learning in inclusive early childhood education centres within the Adaklu District hinges on multiple interdependent support services. Access to inclusive teaching resources, ongoing professional development, stakeholder collaboration, supportive policies, and adequate funding all contribute to fostering an inclusive, equitable, and effective learning environment. Addressing these needs will not only promote the successful application of UDL but also ensure that all learners, regardless of ability, are given the opportunity to thrive.

Research Question Three: What teaching strategies support diverse learners through Universal Design for Learning (UDL) in early childhood centres in the Adaklu District?

This research question explores the teaching strategies that support diverse learners through Universal Design for Learning (UDL) in early childhood centres within the Adaklu District. UDL offers a flexible and inclusive framework that helps teachers address the varied learning needs of young children. By using multiple means of engagement, representation, and expression, educators can ensure that all learners, regardless of ability, are actively included and supported in their development and learning journey. Here are some themes that emerged from the interviews.

Theme 1: Differentiated Instruction

This theme highlights on how Early Childhood Education (ECE) teachers in the Adaklu District perceive differentiated instruction as a foundational teaching strategy in implementing Universal Design for Learning (UDL). They understand that children come with diverse abilities, interests, and learning styles, and therefore, instruction must be varied

to meet these individual needs. Differentiated instruction allows teachers to adjust content, process, and product to ensure that learners can access the curriculum in ways that suit them best. Here are some excerpts.

I don't use the same activity for every child. Some children prefer drawing, others love storytelling or singing, so I let them show what they know in different ways. (T3)

Differentiating my lessons helps me reach all learners. For example, when teaching numbers, some children use counters, others use drawings or songs—it depends on what works best for each child. (T7)

The quotes suggest that differentiated instruction enables ECE teachers to accommodate the diverse needs and learning styles of young children. By varying instructional methods and assessment strategies, teachers ensure that all learners, including those with special needs, are actively engaged and able to express their understanding. This flexible approach aligns with UDL principles and promotes equity, participation, and meaningful learning for every child in inclusive classrooms.

Theme 2: Technology Integration as a Teaching Strategy in UDL Implementation

Early Childhood Education (ECE) teachers in inclusive classrooms recognize technology as a powerful tool that supports Universal Design for Learning (UDL) implementation. Integrating digital tools and multimedia resources allows educators to present information in varied formats and engage learners with different abilities and preferences. Through audio-visual content, educational apps, and assistive technologies, teachers can better meet the diverse needs of their students and promote active participation.

Using tablets and audio-visual aids in my class helps children who struggle with reading or writing. It keeps them interested and gives them another way to learn and respond. (T11).

Another teacher added that;

Some of my learners respond better to videos and interactive games. Technology helps me reach those who may not do well with traditional methods like writing or talking alone. (T9)

The quotes highlight how technology integration enhances inclusive teaching by offering multiple means of engagement and expression. Through tools like tablets, videos, and interactive games, teachers can cater to learners with varied needs and preferences. This approach ensures that children who struggle with conventional methods still participate actively, promoting equity and supporting the core principles of Universal Design for Learning (UDL).

Theme 3: Environmental Adaptation

This theme highlights on how the physical classroom space to accommodate the diverse learning needs of young children. In the context of Universal Design for Learning (UDL), early childhood educators recognise the importance of creating flexible, safe, and accessible learning environments that promote independence and participation for all learners, including those with disabilities. Here are some verbatim quotations that support this assertion;

Quotes from ECE Teachers:

I arrange the classroom to make space for movement and easy access to materials. Children with physical challenges feel more confident and included. (T6)

We use labelled shelves, quiet corners, and clear pathways so all children can navigate the room and find what they need without always asking for help. (T4)

These quotes emphasise that adapting the learning environment helps foster inclusivity, autonomy, and equal access. By organizing physical spaces thoughtfully such as providing clear pathways, accessible materials, and designated calm zones educators ensure that all

children, regardless of ability, can engage fully in the learning process. Environmental adaptation therefore acts as a foundational UDL strategy, supporting learners' physical, emotional, and academic development in inclusive early childhood classrooms.

Theme 4: Collaborative Teaching

Collaborative teaching involves teamwork among educators, support staff, and specialists to meet the diverse learning needs of children in early childhood education settings. Within the Universal Design for Learning (UDL) framework, this approach ensures that teaching is inclusive, flexible, and enriched by multiple perspectives. Teachers working together can better plan, differentiate instruction, and provide individualised support, making learning more accessible for all children, including those with special educational needs. Here are some quotes that support the theme;

Working with a speech therapist and special educator helps me adjust my teaching methods.

Together, we come up with strategies that work for every child in the class. (T3)

Team teaching has been very helpful. While I lead a group activity, my colleague supports those who need extra help it ensures no child is left behind. (T7)

These quotes highlight how collaboration among educators enhances the implementation of UDL. By sharing responsibilities and insights, teachers can better address the varying needs of learners in inclusive settings. Collaborative teaching allows for real-time support, differentiated instruction, and shared problem-solving, which enriches the classroom experience for both students and teachers. It fosters an inclusive environment where children benefit from a range of expertise, ensuring more effective and responsive learning experiences for all.

Discussions

The third research question sought to explore the teaching strategies that support diverse learners through Universal Design for Learning (UDL) in early childhood centres in the Adaklu District. The findings revealed that early childhood educators employed a variety of strategies aligned with UDL principles to meet the unique needs of all learners. The main themes that emerged from the data included differentiated instruction, technology integration, environmental adaptation, and collaborative teaching.

A key strategy identified by participants was differentiated instruction, which allows teachers to tailor their teaching methods based on individual learners' abilities, interests, and learning preferences. Teachers in the study emphasised the importance of offering varied learning activities so that each child could engage and express understanding in ways that best suited them. For instance, one teacher (T3) explained that they do not use the same activity for every child; some learners prefer drawing, while others are more inclined toward storytelling or singing. Another teacher (T7) noted that using different methods such as counters, drawings, or songs enabled each child to grasp numerical concepts more effectively. These accounts reflect the literature, which affirms that differentiated instruction modifying content, process, and product supports learner variability and promotes engagement, accessibility, and achievement (Tomlinson, 2021; Hall et al., 2020; Meyer et al., 2021). The practice aligns with the UDL principles of providing multiple means of representation, engagement, and expression.

The study also highlighted technology integration as a central strategy for inclusive teaching. Teachers reported using tablets, audio-visual aids, and educational apps to support learners who struggle with traditional instructional methods such as reading or writing. Teacher T11 shared that such tools maintain student interest and provide alternative ways for learners to

absorb and respond to information. Similarly, another participant (T9) observed that some learners responded better to videos and interactive games than to conventional approaches. These insights are consistent with existing literature that stresses the role of digital tools and assistive technologies such as screen readers, speech-to-text software, and captioned videos in enhancing accessibility and learner autonomy (Al-Azawei et al., 2019; Flanagan et al., 2020). By incorporating technology into classroom instruction, educators are able to present content in varied formats and meet the needs of learners with disabilities or diverse learning styles.

Another significant theme that emerged from the data was environmental adaptation. Participants noted that physical classroom arrangements play an essential role in supporting inclusivity and independence among learners, particularly those with physical or sensory challenges. Teacher T6 mentioned that arranging the classroom to allow space for movement and easy access to materials boosts learners' confidence and sense of inclusion. Another educator (T4) described how features such as labelled shelves, quiet corners, and clear pathways help children navigate their environment without constant adult assistance. These findings support scholarly views on the importance of designing accessible, safe, and responsive classroom environments (CAST, 2018; Gargiulo & Metcalf, 2021). According to Coyne et al. (2019) and Nelson & Basham (2020), environmental adaptation aligns with UDL principles by removing physical and cognitive barriers, ensuring that all children can fully participate in learning.

The final theme that emerged from the study was collaborative teaching, which involves the cooperation of teachers, specialists, and support staff to enhance inclusive practices. Participants spoke positively about co-teaching models and interdisciplinary collaboration. For example, Teacher T3 discussed the value of working with a speech therapist and special

educator to adjust instruction and tailor strategies for individual learners. Teacher T7 noted how team teaching allows for simultaneous support during group activities, ensuring that no child is left behind. These experiences underscore the importance of collective responsibility and shared expertise in fostering inclusive environments. Literature affirms that collaborative teaching promotes real-time differentiation, improves problem-solving, and allows teachers to draw on a range of professional insights (Gillies, 2020; Johnson & Johnson, 2019).

In addition to the themes from the fieldwork, existing literature points to other effective UDL-aligned strategies, including scaffolding, formative assessment, and student choice. Scaffolding, as described by Wood et al. (2020) and Gonzalez & Nelson (2021), involves providing guided support such as modelling and chunking tasks to help learners build independence. Formative assessments offer real-time feedback and allow for instructional adjustments (Black & Wiliam, 2018; Heritage, 2021). Alternative assessment methods, such as oral presentations or multimedia projects, also reflect UDL's emphasis on multiple means of expression (Rose & Dalton, 2019). Student choice, as discussed by Deci & Ryan (2020) and Reeve (2018), enhances motivation and engagement by giving learners agency over how they demonstrate learning.

While these strategies are effective in promoting inclusive learning, challenges persist. The literature acknowledges barriers such as limited teacher training, insufficient technological resources, and large class sizes that may impede the full implementation of UDL (Florian, 2021; Rao et al., 2021). Addressing these barriers through targeted professional development, policy support, and investment in resources will be critical to ensuring the success of UDL strategies in early childhood education.

In conclusion, the findings from the Adaklu District affirm that teaching strategies grounded in UDL, such as differentiated instruction, technology integration, environmental adaptation,

and collaborative teaching, are instrumental in supporting diverse learners. When these strategies are implemented effectively, they foster inclusion, autonomy, and equitable access to learning for all children, laying a strong foundation for lifelong learning and development.

Research Question 4: What are the challenges teachers encounter in the implementation of Universal Design for Learning (UDL) in inclusive early childhood classrooms?

This research question highlights that early childhood educators often face several challenges in putting UDL principles into practice. These may include limited teaching resources, lack of training, large class sizes, and time constraints. Research Question 4 explores the specific challenges teachers encounter while implementing UDL in inclusive early childhood settings, to identify barriers that hinder effective teaching and learning, and inform strategies for improved support and policy enhancement. Here are some themes that emerged from the study;

Theme 1: Inadequate Teaching and Learning Resources

One of the key challenges to implementing Universal Design for Learning (UDL) in inclusive early childhood classrooms is the insufficient availability of teaching and learning resources. UDL principles require a variety of materials and tools to support diverse learning needs, but many teachers face barriers when these resources are unavailable or inadequate. This scarcity limits their ability to differentiate instruction, engage all students, and create accessible learning opportunities for every child. Here are some excerpts from the interviews.

We often don't have the resources like adapted books, technology, or manipulatives to fully support each child's learning needs. Without these, it's hard to provide the level of individualised instruction UDL calls for. (T5)

The lack of visual aids, special learning tools, and assistive devices makes it difficult to apply UDL strategies in my class. It becomes a real challenge when I can't offer different modes of representation to meet the needs of all my learners. (T9)

These quotes reflect the significant challenge posed by the lack of essential teaching and learning resources. Without the proper tools, such as assistive technology, visual aids, and differentiated materials, teachers are unable to fully implement UDL strategies. This gap makes it harder to address the individual needs of learners, especially those with disabilities or diverse learning styles, limiting the effectiveness of UDL in fostering an inclusive classroom environment.

Theme 2: Lack of training opportunities on UDL

A significant challenge to the successful implementation of Universal Design for Learning (UDL) in inclusive early childhood classrooms is the lack of adequate professional development opportunities. Teachers often feel unprepared to implement UDL principles effectively due to insufficient training in these methods. Without targeted training, educators may struggle to apply UDL strategies in ways that effectively support the diverse learning needs of all students. Here are some excerpts from the interviews.

I've never had formal training on UDL. I try to apply what I know, but without proper training, I'm unsure if I'm doing it the right way or if I'm truly meeting all my students' needs. (T6)

Another teacher also added that;

There are no workshops or ongoing professional development on UDL in my area. I'd feel more confident applying these strategies if I had proper guidance and hands-on experience from experts. (T12)

These quotes highlight the critical gap in training that hampers the effective application of UDL principles. The lack of professional development opportunities leaves teachers unsure of how to implement UDL strategies with confidence and consistency. This lack of knowledge can lead to the misapplication of UDL, limiting its effectiveness in meeting the needs of diverse learners and reducing the potential for inclusivity in the classroom. Proper training is essential to ensure that educators are equipped to create accessible, engaging, and equitable learning environments for all students.

Theme 3: High Teacher-Learner Ratio

The theme emphasises that the significant challenge to the effective implementation of Universal Design for Learning (UDL) in inclusive early childhood classrooms is the high teacher-learner ratio. Large class sizes limit teacher's ability to provide individualised attention to each learner, especially when applying UDL strategies that require differentiated instruction and personalised learning experiences. The overwhelming number of students in the classroom makes it difficult to support the diverse needs of learners, particularly those with disabilities or other learning challenges. Here are some verbatim quotes that support it.

With so many children in my class, I find it hard to give each one the individual attention they need, especially when I'm trying to implement UDL strategies. It's overwhelming. (T4).

Another teacher also said;

In a class of 62 children, it's challenging to meet the needs of all learners. Some children need more one-on-one support, but the teacher-learner ratio makes that nearly impossible. (T8)

These quotes reveal the difficulties that arise when teachers are faced with large class sizes. The high teacher-learner ratio limits the teacher's ability to implement UDL effectively, as

personalised learning and the adaptation of resources for individual students become more challenging. Teachers are unable to provide the tailored support that students with diverse learning needs require, which undermines the inclusive goals of UDL. Smaller class sizes or additional support staff would allow for more effective implementation of UDL principles and a better learning experience for all students.

Theme 4: Lack of support

A lack of support from various stakeholders (such as administrators, colleagues, and parents) is a significant challenge to implementing Universal Design for Learning (UDL) effectively in inclusive early childhood classrooms. Without proper backing, teachers often struggle to find the necessary resources, professional development, and collaborative opportunities to successfully integrate UDL strategies. Here are some quotes that support this theme;

Sometimes, I feel like I'm alone in trying to implement UDL in my classroom. There's not much support from the administration, and it makes it harder to make the changes needed to help every child. (T2)

Without proper collaboration from other teachers and parents, implementing UDL effectively feels like a huge challenge. We need more support to really make it work. (T6)

These quotes highlight the frustration teachers face when there is insufficient support for UDL implementation. The lack of administrative, peer, and parental involvement limits the teacher's ability to implement UDL strategies effectively. Teachers need a collaborative, well-supported environment to fully embrace UDL principles, which can be achieved through professional development, collaborative planning, and greater administrative encouragement. Without these forms of support, UDL implementation becomes difficult, and the goals of inclusive education may not be fully realised.

Theme 5: Negative Attitude Towards Learners with Disabilities

Negative attitudes towards learners with disabilities can be a significant barrier to the effective implementation of Universal Design for Learning (UDL) in inclusive early childhood settings. When teachers or other staff hold misconceptions or prejudices about the capabilities of children with disabilities, it can hinder their willingness to adopt inclusive teaching practices. Here are some excerpts from the interviews;

Sometimes, there's a feeling among some teachers that children with disabilities won't be able to keep up, which makes it harder to implement UDL effectively in the classroom. (T4)

Some of my colleagues still have doubts about including children with disabilities in the regular classroom. This negative attitude makes it difficult for us to use UDL strategies that work for every child. (T7)

These quotes suggest that negative attitudes towards learners with disabilities significantly impede the implementation of UDL. Teachers who may hold these views are less likely to embrace the flexibility and adaptability needed to successfully implement UDL strategies. To overcome this challenge, there is a need for professional development that addresses these negative perceptions, helping teachers understand the potential of all learners, regardless of their disabilities, and fostering a more inclusive classroom culture.

Discussions

It is evident from the results that although UDL holds immense promise for fostering inclusive, equitable learning environments, several systemic and practical barriers hinder its successful execution. The data analysis reveals five dominant themes that collectively underscore the multifaceted difficulties teachers experience, including inadequate teaching and learning resources, lack of training, high teacher-learner ratios, insufficient support, and

negative attitudes toward learners with disabilities. These findings resonate strongly with existing literature on UDL implementation in early childhood education (ECE).

A key finding from the study was that many teachers lacked access to sufficient teaching and learning resources, which are essential for delivering UDL-based instruction. Interview excerpts revealed that teachers frequently grappled with a lack of adapted books, assistive technology, manipulatives, and visual aids. This directly undermines UDL's core principle of providing multiple means of representation, engagement, and expression (CAST, 2021). As emphasised by Flanagan et al. (2020), access to adaptive resources such as screen readers, speech-to-text tools, and sensory-friendly materials is critical for meeting diverse learners' needs. When these resources are unavailable, teachers are unable to differentiate instruction or support individual learning preferences, particularly for children with disabilities. This resource gap is especially pronounced in underfunded or rural educational settings, further compounding educational inequalities.

Another substantial barrier identified was the limited availability of training opportunities focused on UDL. Teachers in the study admitted to never having received formal training on UDL, leaving them uncertain about the correct application of its strategies. This aligns with the research of Rao et al. (2021), who found that many educators enter the field without adequate exposure to UDL concepts during their teacher preparation programs. Similarly, Al-Azawei et al. (2019) noted that while teachers generally recognise UDL's value, many lack the pedagogical competencies to apply it effectively in diverse classrooms. Without structured professional development, educators are left to rely on fragmented or self-taught approaches, which often result in inconsistent implementation. As Smith and Lowrey (2020) argue, professional development must be embedded in ongoing, hands-on experiences that empower teachers to translate UDL theory into practical classroom applications.

Moreover, the high teacher-learner ratio severely limits the feasibility of individualised instruction, which is a foundational component of UDL. Teachers in the study recounted managing classrooms with as many as sixty-two children, making it virtually impossible to deliver tailored learning experiences. Gonzalez and Nelson (2021) contend that overcrowded classrooms hinder teachers' ability to observe, assess, and respond to each child's learning needs, especially when attempting to provide multiple modes of instruction and engagement. Florian (2021) also notes that young learners benefit most from personalised, hands-on teaching, which becomes less attainable in oversized classrooms. Without additional support staff or smaller class sizes, teachers are overburdened and less able to effectively incorporate UDL principles into their practice.

A recurring theme from the interviews was the lack of support from school administrators, colleagues, and parents. Teachers expressed feelings of isolation and frustration in their attempts to implement UDL, often receiving minimal encouragement or assistance. This finding aligns with the work of Smith and Thierfeld Brown (2021), who emphasised that institutional support is a critical enabler of successful UDL implementation. Without administrative prioritisation of inclusive practices or collaborative planning structures, teachers are left to navigate complex instructional demands alone. Rao et al. (2021) further suggest that a school culture that fosters teamwork, shared leadership, and collective responsibility is essential for sustaining inclusive practices. The absence of such a culture in many ECE settings contributes to the stagnation of UDL adoption.

The study further revealed that some teachers and staff held negative or limiting beliefs about the potential of children with disabilities. Such attitudes present a significant barrier to inclusion, as they influence teachers' willingness to adapt instruction or embrace UDL principles. Teachers reported that some colleagues doubted the capabilities of learners with

disabilities or viewed inclusive practices as futile. These findings are corroborated by Gillies (2020), who noted that teachers' beliefs and attitudes are critical determinants of their instructional decisions. If educators perceive UDL as overly complex or inappropriate for certain learners, they may avoid implementing it altogether. Professional development efforts must therefore not only focus on skill-building but also on reshaping attitudes and fostering an inclusive mindset.

In conclusion, while the Universal Design for Learning framework offers a powerful approach for addressing learner variability and promoting inclusion, its implementation in early childhood settings is fraught with challenges. The current study provides a comprehensive view of the obstacles teachers face, ranging from a lack of resources and training to large class sizes, inadequate support, and prevailing negative attitudes. These findings align with existing research and highlight the urgent need for systemic reforms, including better funding for inclusive resources, targeted professional development, stakeholder collaboration, and institutional commitment to inclusive education. If these challenges are addressed, UDL can truly transform early childhood classrooms into spaces where all learners thrive, regardless of their backgrounds or abilities.

CHAPTER FIVE

SUMMARY, CONCLUSION AND RECOMMENDATIONS

5.0 Overview

This final chapter comprises a summary of the study, emphasising the major findings. It discusses the conclusion, recommendations, and suggestions for future research.

5.1 Summary of the Study

The purpose of this study was to explore the implementation of Universal Design for Learning (UDL) in early childhood centres in the Adaklu District. To achieve this purpose, the following research objectives were formulated to guide the study:

1. To assess early childhood educators' perception of Universal Design for Learning (UDL) principles in inclusive settings in the Adaklu District.
2. To examine the support services that facilitate the implementation of Universal Design for Learning in inclusive early childhood centres in the Adaklu District.
3. To identify the teaching strategies used to support diverse learners through UDL in early childhood centres in the Adaklu District.
4. To explore the challenges teachers encounter in implementing UDL in inclusive early childhood classrooms.

Key Findings

The study found that early childhood educators in the Adaklu District view Universal Design for Learning (UDL) as an effective framework for fostering inclusive, flexible, and developmentally appropriate teaching. UDL was seen to promote participation, confidence, and holistic development in diverse learners through varied instructional methods. Teachers

also noted that UDL complements developmentally appropriate practice and encourages innovative, responsive teaching tailored to individual learner needs.

The study revealed that effective implementation of Universal Design for Learning (UDL) in early childhood centres within the Adaklu District relies on three key support services: the consistent provision of inclusive teaching and learning resources, ongoing professional development for educators focused on inclusive practices, and strong collaboration with parents, communities, and NGOs. These elements collectively enable teachers to create flexible, accessible, and inclusive learning environments for all learners.

The study found that early childhood educators in the Adaklu District employed several Universal Design for Learning (UDL)-aligned strategies to support diverse learners. These strategies included differentiated instruction, technology integration, environmental adaptation, and collaborative teaching. Teachers used varied activities to cater to individual learning preferences, incorporated digital tools to enhance accessibility, adapted classroom layouts to promote inclusivity, and engaged in collaborative teaching models to provide tailored support.

The study revealed several key barriers to Universal Design for Learning (UDL) implementation, which include: inadequate resources, limited teacher training, high teacher-learner ratios, lack of support, and negative attitudes towards learners with disabilities. These challenges hinder UDL's effectiveness, highlighting the need for systemic reforms and better support in early childhood education.

5.2 Conclusions

The following conclusions were drawn from the study;

Early childhood educators in the Adaklu District perceive Universal Design for Learning (UDL) as an effective and developmentally appropriate framework that supports inclusive teaching. They believe UDL promotes active participation, confidence, and holistic development in learners through flexible and varied instructional approaches.

The successful implementation of UDL in early childhood settings is highly dependent on consistent access to inclusive teaching and learning resources, ongoing professional development, and collaboration with parents, communities, and NGOs. These support systems are essential for creating inclusive and accessible classrooms.

Teachers have begun to incorporate UDL-aligned strategies such as differentiated instruction, use of technology, environmental adaptations, and collaborative teaching. These strategies allow them to address individual learning needs and foster an inclusive environment where every learner is supported.

Despite recognising UDL's benefits, teachers face significant challenges in applying it effectively. These include inadequate resources, limited training, large class sizes, insufficient institutional support, and negative attitudes toward learners with disabilities. These barriers limit the full realisation of UDL's potential in early childhood education.

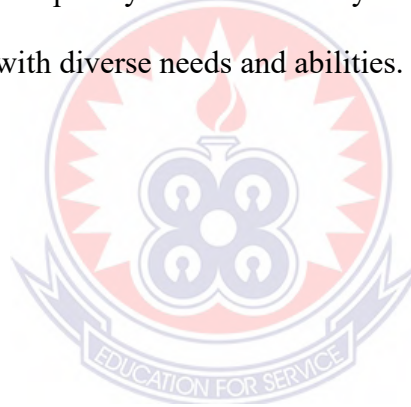
5.3 Recommendations

Based on the conclusions drawn from the study, the following recommendations are proposed to enhance the implementation of Universal Design for Learning (UDL) in early childhood education within the Adaklu District:

1. Given that teachers recognise UDL as a beneficial and developmentally appropriate framework, it is recommended that the Ghana Education Service (GES) and school leaders in the Adaklu District should formally adopt UDL as part of teaching standards and curriculum delivery. Awareness campaigns and advocacy efforts should also be intensified to reinforce its value across all levels of early childhood education.
2. To ensure a successful UDL application, the Ghana Education Service in the Adaklu District and other relevant stakeholders should prioritise the consistent provision of inclusive teaching and learning resources, such as assistive technologies, adapted materials, and manipulatives. Furthermore, there should be stronger partnerships between schools, parents, communities, and NGOs to mobilise support for inclusive education initiatives.
3. Early childhood teachers in the Adaklu District should be given continuous training and mentorship on UDL-aligned strategies to improve their competence and confidence in inclusive instruction. Professional development programmes should be practical, hands-on, and integrated into regular teacher capacity-building sessions to ensure effective translation of theory into practice.
4. To overcome barriers such as overcrowded classrooms and inadequate support, policymakers must invest in recruiting additional early childhood educators and support staff, especially in underserved areas. School leaders should also cultivate a supportive, inclusive culture by challenging negative attitudes toward learners with disabilities and promoting shared responsibility for inclusive practices among all staff.

5.4 Suggestions for Further Studies

Future studies should explore the long-term impact of Universal Design for Learning (UDL) on learner outcomes in early childhood education across different socio-economic contexts in Ghana. Comparative studies between rural and urban settings may reveal context-specific challenges and opportunities. Further research can also investigate the role of school leadership in facilitating or hindering UDL implementation. Additionally, examining pre-service teacher training curricula could provide insight into how UDL principles are introduced at the foundational level of teacher education. Finally, more participatory research involving learners, parents, and community members could offer a holistic understanding of how inclusive practices shaped by UDL affect early learning experiences and development, especially for children with diverse needs and abilities.



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APPENDIX A

UNIVERSITY OF EDUCATION, WINNEBA

DEPARTMENT OF EARLY CHILDHOOD EDUCATION

INTERVIEW GUIDE FOR TEACHERS

Dear respondents,

Thank you for participating in this interview. The purpose of this study is to explore the implementation of the Universal Design for Learning (UDL) in early childhood education within the Adaklu District.

Your insights and experiences as educators are crucial to this study. Your cooperation is greatly appreciated, as it will help the researcher gain a deeper understanding for the implementation of the Universal Design for Learning (UDL) in inclusive early childhood education centers within the Adaklu District. Please note that participation is voluntary, and all information provided will be used solely for academic purposes while ensuring confidentiality. You also have the right to decline answering any questions that make you feel uncomfortable. Thank you for your time and contribution.

SECTION A: DEMOGRAPHIC CHARACTERISTICS

1. Age: 20 – 30 31 – 40 41 – 50 51 – 60
2. Gender: Male Female
3. Education qualification: Diploma Bachelor's Degree M.Ed. MPhil.

APPENDIX B

Research Question One: What is the perception of early childhood educators regarding Universal Design for Learning (UDL) principles in inclusive settings in the Adaklu District?

4. What is your understanding of Universal Design for Learning (UDL)?
5. How do you apply its principles in your early childhood classroom?
6. How do you design lessons and activities to accommodate diverse learning needs using UDL strategies in an inclusive setting?
7. How does the application of UDL influence the learning experiences and engagement of children with diverse abilities in your classroom?

Research question two: What support services are available for implementing UDL in inclusive early childhood centres in the Adaklu District?

8. What type of support services are available to assist early childhood educators in implementing UDL in inclusive classrooms?
9. How do educational authorities, such as the Municipal Education Directorate, support adopting UDL principles in early childhood education?
10. What role do special education coordinators play in supporting teachers to implement UDL in inclusive settings?

Research Question three: What teaching strategies are utilized to support diverse learners through Universal Design for Learning (UDL) in early childhood centres in the Adaklu District?

11. What specific teaching strategies do you use to engage all learners, including those with diverse learning needs, in an inclusive early childhood classroom?
12. How do you incorporate multiple means of representation to ensure that children with different learning styles (e.g., visual, auditory, kinesthetic) can access the curriculum effectively?
13. What types of activities do you use to encourage active participation and expression among learners with varying abilities?
14. How do you modify or adapt learning materials and classroom environments to accommodate the diverse needs of children in your early childhood center?

Research Question four: What are the challenges that teachers encounter in the implementation of Universal Design for Learning (UDL) in inclusive early childhood classrooms in the Adaklu District?

15. What are the main difficulties you experience when trying to implement UDL principles in your early childhood classroom?
16. How does the availability of resources (e.g., teaching materials, technology, classroom space) impact your ability to implement UDL effectively?
17. What challenges do you face in adapting lessons to accommodate the diverse learning needs of all children in your classroom?