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Assessing Knowledge and Competence of Teachers in Managing Children with Neurodevelopmental Disorders in Mainstream Institutions

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DECLARATION

I, Valda Deide Commey, do hereby attest that the current thesis is the outcome of my research and no other person has presented it for academic award to this university or any other. Every single reference used in this research has been appropriately acknowledged. I bear full responsibility for any identified drawback of this research.

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LIST OF ABBREVIATIONS

NDD -	Neurodevelopmental Disorders
ASD -	Autism Spectrum Disorder
LD -	Learning Disability
CP-	Cerebral Palsy
IEP-	Inclusive Education Policy

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ABSTRACT

The Inclusive Education Policy (IEP) of Ghana has resulted in an increase in children with neurodevelopmental disorders (NDD) in mainstream schools and its successful implementation has been largely dependent on mainstream teachers. This research assessed knowledge levels and competence of teachers in mainstream institutions in managing students with Autism Spectrum Disorder (ASD), Learning Disability (LD), and Cerebral Palsy (CP). Using a quantitative cross-sectional survey design, 150 teachers were purposively sampled from 46 basic schools comprising 29 public and 17 private institutions through Special Needs coordinators in Eastern and Greater Accra Regions of Ghana. Measures including the LRC Teacher's Professional Competency Scale, the Autism Knowledge Questionnaire (AKQ), the Learning Disability Knowledge Questionnaire (LDKQ), and Knowledge of Cerebral Palsy were employed. Data were analysed using both descriptive and inferential statistics analysis. Significant differences were found in the dimensions of competence among instructors of children with ASD, LD, and CP with teachers of children with CP exhibiting greater levels of competence followed by teachers of children with ASD and LD using MANOVA. Using Pearson correlation, significant positive relationship was found between knowledge of NDD and all dimensions of competence except attitudes. Also, higher levels of competence were discovered among older teachers as well as teachers who had more years of teaching experience. Hierarchical Multiple Regression showed that Knowledge of NDD and Years of teaching experience are significant predictors of competence. Also, teacher competence was found to be unaffected by gender. Implications of the findings of this study and recommendations are further discussed.

CHAPTER ONE

INTRODUCTION

1.1 Background

Neurodevelopmental Disorders (NDDs) are a category of conditions that display developmental deficiencies in a child's early years, resulting in impairments in social interaction, intellectual functioning, vocational functioning or personal performance (Almogbel et al., 2017; American Psychological Association [APA], 2015). Attention-Deficit/Hyperactivity Disorder (ADHD), Developmental Coordination Disorder, Developmental Language Disorder, Dyscalculia, Dyslexia, Intellectual Disability, Tic Illnesses, and Fetal Alcohol Syndrome and Autism Spectrum Disorder (ASD) are all included within this spectrum of disorders (APA, 2013; Cleaton & Kirby, 2018). According to the American Psychological Association [APA] (2015), deficits ranging from Specific Learning Disabilities or executive functioning impairments to social skills or IQ impairments emerge from these conditions, which commonly co-occur. This means that people with Autism Spectrum Disorder (ASD) may have an intellectual impairment (ID), and many children with ADHD may also have a Specific Learning Disorder (SLD) (Cleaton & Kirby, 2018).

NDDs are becoming prevalent in school-aged children and adolescents, with the most common being Attention Deficit Hyperactivity Disorder, Learning Disorders, Autism Spectrum Disorder, and Intellectual Disability (Boyle et al., 2011; Mullin & Faundez, 2013; Ribeiro, 2019; Yoro et al., 2020). Globally, Developmental diseases affect 52.9 million children under the age of five, according to estimates with 95 per cent of these children living in countries with low and middle income (Global Research on Developmental Disabilities Collaborators [GRDDC], 2018). The high frequency of NDDs in these countries is a result of frequent

deprivation, genetic and prenatal issues, infectious illness incidence, immunological inadequacies, and dietary variables (Idro et al., 2010; McCoy et al., 2016).

In Ghana, there is paucity of data on the prevalence of NDDs (Dickson et al., 2020). However, secondary research sources indicate that 38.7% of Ghanaian children below age 14 have ASD (e.g., Ruparelia et al., 2016). In addition, Kusi-Mensah et al. (2019) discovered that 1.64% of children in Kumasi-Ghana had ADHD, 1.97% had conduct disorder, and 1% had an intellectual handicap. Additionally, Afeti and Nyarko (2017) discovered a 12.5% overall prevalence of ADHD in the Hohoe municipality. There is a limited amount of information regarding the incidence of NDDs, considering the stigma associated with children who do not seem to be growing normally (Bello-Mojeed et al., 2014; Oti-Boadi et al., 2020). There is currently no comprehensive community-based epidemiological study on the occurrence of NDDs among African children, particularly in Ghana.

Physical, facial, or well-being-related signs assist parents or guardians in detecting and diagnosing NDDs. However, they are rarely discovered during the early years of growth without these signs (Srivastava et al., 2017). This is especially true for diseases whose identification and diagnosis are guided by cognitive and academic performance or classroom observation of behavior (Alali et al., 2020). Few studies in Ghana have documented the existence of ASD, ADHD, and Specific Learning Disorders in mainstream classrooms (Afeti & Nyarko, 2017; Special Attention Project, 2011). Romski et al. (2018), however, assert that all types of NDDs can be found in the mainstream classroom. Additionally, when NDDs such as ASD and ADHD are mild, they are almost invisible and undiagnosed in the classroom (Venkova & McGarraghy, 2014).

Furthermore, Cerebral Palsy is a condition that is typically apparent and more severe but also present in the regular classroom (Hasan, 2020; Schulze, 2021). It is a common neurodevelopmental disorder that is the leading causative factor of phhysical disability in children worldwide (Donald et al., 2014; Polack et al., 2018). Globally, it is reported to occur in approximately 2 to 2.5 per 1000 live births (Shevell et al., 2013). However, very little is reported on the etiology, manifestations, and management of this disease in Africa (Donald et al., 2014). Moreover, dyscalculia and dyslexia are both learning disorders that are prevalent in mainstream classroom settings in Ghana (Kusi-Mensah et al., 2019; Special Attention Project, 2011). This syndrome has also been observed to occur in roughly 25%–75% of individuals with ASD, half of the children with dyscalculia are reported to have ADHD, and approximately 20%–30% of children with ADHD have learning disorders (O'Brien & Pearson, 2004; Shalev, 2004).

Carey and Jacobson (2016) disagree with the assertion that all crucial elements of brain development take place before the commencement of formal schooling and thus, teachers are not capable of guiding the path of neurodevelopment. They however opine that early childhood should be viewed as a critical period to brain development. NDDs, when detected early and well managed, have the potential to optimize the developmental outcomes of the child and also attenuate severity (Blackmer & Freinstein, 2016; Ekinci et al., 2008).

Underdiagnosis, misdiagnosis, and over-medicalization of neurodevelopmental disorders continue to be a major issue in developing countries due to a lack of diagnostic tools, awareness of the illnesses' presentations, and poor help-seeking behaviours (Bakare et al., 2009; Bello-Mojeed et al., 2014; Villagomez et al., 2019). Moreover, there is a knowledge gap among educational and health professionals on the myriad of NDDs that exist in Ghana (Dickson et al., 2020; Donald et al., 2015; Ruparelia et al., 2016). Ruparelia et al. (2016) emphasize that

not only is the literature replete on the NDDs in Ghana, but also on disorder specific knowledge. This implies that an NDD will be diagnosed much later than an ideal time, subsequentlyintervention is less effective (Bello-Mojeed et al., 2014).

Knowledge of the various NDDs will assist professionals in providing more effective support for children with these conditions, as well as reducing over-medicalization and improving NDD outcomes (Dickson et al., 2020; Gyasi et al., 2020). Knowledge of the patterns of condition presentation will also aid in the reformation of policies, particularly in the context of instructional design, planning, and methods of execution (Dickson et al., 2020; Navarro et al., 2016). Council of Chief of State School Officers [CCSSO] (2010) articulates that specialised knowledge of specific disabilities and their implications for teaching and learning is an important dimension of teacher's professional competence.

1.2 Education for Children with NDDs in Ghana

Primary education in Ghana is primarily built around two systems: the mainstream system and the special school system. Children with evident disabilities such as intellectual, visual, or hearing impairments attend segregated special schools, while those without disabilities attend mainstream schools (Vanderpuye et al., 2018). However, this system appeared to marginalize some students based on their disability, prompting the adoption of an Inclusive Education Policy (IEP), a critical adjustment to the 2003-2015 Education Strategic Plan (Ministry of Education [MOE], 2003; MOE, 2015; Vanderpuye et al., 2018). Previously, children with NDDs attended exclusively specialized schools. However, advocacy efforts through the current Inclusive Education Policy (IEP) have increased their representation in mainstream schools (Akalin et al., 2014; Gomez-Mari et al., 2021; Roberts, 2020). The policy encourages all students, including those with physical and mental health disabilities to participate in mainstream schools and also advocate for the reform of school cultures, policies, and practices to reflect the diversity of

pupils (Kunyini & Desai, 2007). This initiative began in the 2003/04 academic year with 35 schools in three of Ghana's sixteen regions and has grown significantly to include over 3022 mainstream schools around the country (Deku & Vanderpuye, 2017).

According to research, children with NDDs make greater social, psychological, and academic progress when placed in mainstream settings (Hamma & Mamman, 2019; Kunyini et al., 2020; Messiou, 2017). Furthermore, it has been shown to aid in stigma reduction, academic and social development, and overall mental wellness (Dash, 2018; Fisher & Meyer, 2002; Messiou, 2017). The Ministry of Education (MOE, 2015) indicates that, IEP is more cost-effective than special education which is why it is actively advocated by the government.

Mainstream schoolteachers in Ghana are uniquely positioned to manage both undiagnosed and diagnosed children with NDDs per the Inclusive education policy (IEP) irrespective of the paucity of knowledge and training that special education teachers have (Alali et al., 2020; Monico et al., 2018). Teachers handling primary classes are particularly in the position to identify children with NDDs considering the age of onset (Ribeiro, 2019). Thus, the professional competence of teachers is considered an essential factor for a successful implementation of inclusive education (de Boer et al., 2011; Guanglun et al., 2015). Studies have shown that teachers are not only responsible for identifying students who require additional support and making appropriate referrals for their diagnosis, but also for managing their unique needs in the classroom (Department of Basic Education, 2016; Ribeiro, 2019; Rothi et al., 2007)

One significant factor influencing teachers' capacity and desire to accommodate children with varying needs in their classrooms to promote inclusive practice and positive student outcomes is their competency (Cate et al., 2018; Kunyini et al., 2016). Competencies are the abilities and

knowledge that enable teachers to be effective in their practice, and their significance is demonstrated by the outcomes of student learning and growth in the Inclusive Education system (Cate et al., 2018). According to Kunter et al. (2013), teachers' competency is an interaction of a complex set of capacities that includes knowledge, beliefs, motivational, and self-regulatory traits which inform how instructors handle the demands of their profession effectively. Several studies (e.g., Agbenyega & Deku, 2011; Guanglun et al., 2015; Kunter et al., 2013; Zulfija et al., 2013), establish four core dimensions of teachers' competence for inclusivity. These are Attitudes or Motivational Orientation, Skills, Knowledge, and Agency.

Attitudes, the first facet of competence are defined as an individual's tendency to act favourably or negatively toward an object, person, or situation, and are typically shown through their beliefs or readiness to act in particular ways (Kunter et al., 2013). Attitudes affect how devoted instructors are to adopting inclusive education (Desombre et al., 2019; Leung & Mak, 2010). According to Savage and Erten (2015), favourable teacher attitudes toward inclusive education affect students' well-being and academic achievement. The second facet of teachers' competency is that they possess a comprehensive set of skills necessary to execute inclusion in the mainstream classroom. Researchers identify a variety of skill areas in this regard, including instructional adaptation, curriculum modification, classroom management, and collaborative teaming with more experienced special needs educators (Fisher et al., 2003; Idol, 2006; O'Connor et al., 2016).

The third aspect of competence is knowledge which comprises the knowledge of subject content and the extended syllabus for students with disabilities, instructional knowledge which requires teachers to understand and to effectively communicate these contents to students with disabilities, the specialised information of specific disabilities and the knowledge of the special education policies and procedures that specify the framework within which teaching of students

with disabilities occurs (Guanglun et al., 2015; MOE, 2015). Finally, Guanglun et al. (2015) identified teacher agency, or reflective practice, as the fourth dimension of teacher competency, emphasizing the need to actively seek resources, support, and assistance from a variety of sources. This includes assistance from psychologists, special needs teachers, and other subject-matter experts. CCSSO (2010) emphasizes the relevance and importance of assistance seeking within competence.

Additionally, these components of competence are assessed on three levels (Zulfija et al., 2013). There are three types of levels: adaptive, reproductive, and optimum. At the adaptive level, teachers lack awareness and acceptance of ideology and philosophy of inclusive education as well as the enthusiasm to work with children with disabilities. The reproductive level is also characterized by teachers' conditional compliance and readiness for inclusive education and a weak motivation to obtain the required knowledge on the subject matter. The third and final, which is the optimum level, reflects the criteria and indicators of readiness to inclusive education for children with disabilities and also awareness, reflexivity and autonomy in finding solutions to the educational and professional goals. Teachers at this level have a holistic, comprehensive, in-depth knowledge about the peculiarities of working with children with disabilities.

In Ghana, inclusive education has numerous obstacles and issues, most notably weak teacher attitudes and skills, as well as a lack of pedagogical understanding (Bukator et al., 2018; Mprah et al., 2016). This is primarily due to a lack of understanding about the unique characteristics of disabled children, as well as a scarcity of specialized skills for their training (Zulfija et al., 2013). According to researchers, these factors are the most powerful predictors of competence for inclusive practice (Beckler & Boakes, 2010; Fisher & Meyer, 2002; Guanglun et al., 2015). Significant evidence indicates that both instructors' skills and attitudes, individually and in

combination, play a critical role in successfully integrating students with NDDs into regular classes (Cate et al., 2018).

Inadequate child management results in significant psychological, emotional, and physical distress, as well as adverse effects on their academic performance (Muin et al., 2019). Proper care and treatment are also critical for students with NDDs since they are more likely than other students to experience diminished psychological, social, and physical well-being (Hilton et al., 2019; Mendelez et al., 2020). Additionally, Bukator et al. (2018) argue that to overcome the obstacles or barriers to inclusive education in the Ghanaian context, teachers must be knowledgeable about the conditions they are addressing and adapt their teaching and learning strategies to meet the needs of these students. This has been reiterated in other studies as well (e.g., Dickson et al., 2020; Gyasi et al., 2020). Therefore, it is critical to examine the knowledge and competency of Ghanaian mainstream teachers who practice Inclusive Education. This information is critical in assisting the development and adjustment of policies, as well as the redesign of an appropriate training framework, to improve the overall quality of inclusive education practice in Ghana.

1.3 Problem Statement

Teachers are primarily responsible for implementing Inclusive Education and their characteristics are crucial for its success (Cate et al., 2018; World Health Organization, 2011). Several instructors report feeling unprepared to deal effectively with children who have NDDs (Cate et al., 2018; Smith & Tyler, 2011). These feelings of inadequacy are problematic, given the relationship between teacher effectiveness and student achievement (Smith & Tyler, 2011). Teachers encounter tremendous obstacles in an inclusive system with a diverse student population, and they frequently feel inadequate, reducing their willingness to accept students

with NDDs to the mainstream classroom (Agbenyega, 2007; Blanton et al., 2011). Moreover, Akalin et al. (2014) discovered that Ghanaian teachers exhibit unfavourable attitudes about inclusion, which they attribute to a lack of knowledge and competencies. Research indicates that disorder-specific knowledge contributes to the competence and overall success of Inclusive Education (Hansen et al., 2020; Herwegen et al., 2019).

Since the beginning of the Inclusive Education Policy (IEP), Ghanaian mainstream teachers' knowledge of the various NDDs has not been adequately highlighted in literature. In Ghana, inconsistent findings and a scarcity of well-designed studies in the field of inclusive education make it impossible to determine which children and what disability types are truly benefiting from the provisions of the policy (Lamptey et al., 2015; MacFarlane & Marks, 2013). Additionally, studies have concentrated on defining important instructional competencies to develop competency frameworks (Guanglun et al., 2015; Kudlacek et al., 2020; Kunyini et al., 2016). However, a direct assessment of teachers' competence based on the myriad of competency frameworks is scarce in research.

The current study aims to fill the gaps in research by assessing teachers' knowledge of and capacity to manage NDDs. More specifically, because the IEP is being reviewed, this study is being conducted to increase understanding of Ghana's present status of inclusive education practice in order to contribute to the policy review.

1.4 Objectives of the Study

The primary objective of this study is to assess the knowledge and competence of mainstream teachers concerning managing children with NDDs in Ghana.

The specific objectives of this research thus are:

- Examine the differences in the dimensions of competence (attitude, knowledge, skill, and agency) among mainstream teachers managing students with ASD, Learning Disability and Cerebral palsy
- Assess the relationship between teachers' knowledge of neurodevelopmental disorders and their competence in managing students with NDD
- Examine the relationship between the age of the teacher, the years of work experience and competence in managing the neurodevelopmental disorder.

1.5 Relevance of Study

The study's relevance will be multifaceted, with critical consequences for policy, theory, and practice. The findings from this study will primarily provide empirical suggestions that will benefit inclusive education reform by assisting in the enhancement of current policies and programs that ensure that every teacher of record is capable of instructing both typically developing children and those with NDDs.

Additionally, this study will measure the quality of knowledge mainstream instructors have about NDDs and their competency. This will aid in determining their effectiveness in attaining positive outcomes and ensuring that children benefit enough from the policy. Results will also help suggest specific areas teachers will need assistance in supporting children with NDDs.

Finally, this study provides an initial objective exploration into teachers' knowledge and competence in managing children with NDDs thus, findings will serve as a baseline or future research that seek to address similar areas

CHAPTER TWO

LITERATURE REVEIW

2.1 Theoretical Framework

2.1.1 Vygotsky's Socio-Cultural Theory

Vygotsky's social development theory (Vygotsky, 1978) asserts that social connection is essential for a learner's cognitive progress. A fundamental aspect of his theory is that the capacity for cognitive development is contingent on the Zone of Proximal Development (ZPD) which is a level of development attained when a child participates in social behaviour (Fani & Ghaemi, 2011). The ZPD is the difference between a child's actual developmental level as measured by independent problem solving and their prospective developmental level as determined by problem solving under adult supervision or with a more capable peer. Vygotsky (1978). When a student is in the zone of proximal development for a specific task, Vygotsky believed that providing the necessary assistance will give the student enough of a boost to complete the task (Balakrihnan & Balakrihnan, 2012).

Furthermore, the theory suggests that in order to help a person move through the zone of proximal development, educators should focus on ensuring the presence of an individual with knowledge and skills above the learner's social interaction to assist the student as he or she is led through the ZPD (Yan-bin, 2009). According to Vygotsky (1978), much of a child's crucial learning occurs through social interaction with a knowledgeable tutor who may model behaviour and/or provide vocal instruction to the child referred to as a collaborative dialogue. The child tries to comprehend the tutor's activity or instruction, then internalizes the information and uses it to direct or regulate their performance.

In terms of the nature of the disability, he argues that it undergoes constant change in its structure and content during development and under the effect of education or remediation. Pablo and Amelia (2007) derive several basic assertions from the theory that explain child development and are entirely applicable to children with disabilities. To begin with, they believe that human development is a socio-genetic process that takes place in social activity and that every child, including those with disabilities, goes through. Second, education is said to teer the development process since it involves social learning through the internalization of culture and social relationships. Finally, they assert that a child's growth is an eerie of qualitative, dialectic transformation, a complicated process of integration and disintegration, rather than a straight path of quantitative gain and accumulation.

This theory stresses the essential nature of the activities within the education system and the inclusion of children with disabilities and their contributions to the optimum development of these children. The use of good practices as indicators of teacher competence in education as proven by researchers leads to great outcomes for children with NDDs (Cate et al., 2018; Roberts & Simpson, 2016). According to Vygotsky (1978), a progressive divergence in a child's social and natural development leads to social deprivation and adverse effects on the overall developmental process thus, the emergence of delay and deficiency as well as a secondary handicapping condition.

2.1.2 Theory of Planned Behavior

The theory of planned behavior (TPB) is a helpful paradigm for understanding the association between attitude and behavior (Ajzen, 1991). This idea stems from the theory of reasoned action and suggests that in order to forecast a certain behavior, attitudes, subjective norms, perceived behavioural control, and behavioural purpose must all be considered (Ajzen, 1991).

According to the theory, subjective norm represents an individual's perception of how significant others will approve of their behavior, perceived behavioural control represents an individual's perception of how easy or difficult it is to perform the behavior, and behavioural intention represents an individual's willingness to perform the given behavior. TPB theorizes that the likelihood of a behavior being performed is proportional to how favorable these components are.

Consequently, behavioural intention is determined by attitudes, subjective norms and perceived behavioural control. In effect, an individual's behaviour is determined by their attitudes, subjective norm and perceived behavioural control, mediated by behavioural intention. The literature is however replete concerning the application of TPB to teacher attitudes and behaviour toward children with special needs in inclusive settings. Kunyini and Desai (2007), measured actual behaviour as an outcome variable and found perceived behavioural control as the strongest predictor of behaviour. Ajzen (1991) and Fishbein and Cappella (2006), argue that perceived behavioural control can be conceptualized as teacher efficacy which according to Cate et al. (2018) is likened to teacher competence in many cases. In a study by MacFarlane and Marks (2013), it was found that teachers' beliefs, taking into consideration knowledge and perceptions and perceived behavioural control or efficacy predicted behavioural intention. It can thus be posited that; teacher attitudes are largely influenced by their knowledge and competence. Assessing teachers' competence thus comes of research interest looking at findings from Ghanaian studies which report negative teacher attitudes and poor reception of inclusive education (Agbenyega, 2007; Ayoka, 2018; Bukator et al., 2018).

2.2 Review of related studies

2.2.1 Teachers' Knowledge of Neurodevelopmental Disorders

A significant issue that has been identified however less explored and referenced in the literature is the issue of teachers' knowledge and conceptualization of Inclusive education (Monico et al., 2018). This raises significant concerns because teachers' knowledge of inclusive practices is positively correlated with their attitudes. (Brownell & Pajares, 1999; Mitchel & Hedge, 2007). According to (Forlin & KuenFung, 2010) teachers' comprehensive knowledge of inclusive education, and its pedagogies is required for successful implementation and particularly in managing learners with diverse needs. Kurniawati et al. (2012) assert that sufficient training, more knowledge and experience will positively influence teachers' attitudes. This, therefore, leads to the assertion that if teachers' knowledge about Inclusive education is positive, their competence could also be high.

Roberts and Simpson (2016) problematized that, outcomes for students with ASD are poor compared to students with other NDDs and typical students. Thus, to better understand facilitators and hindrances to a successful education for students with ASD, they reviewed papers that have tackled attitudes of educators, parents and people with ASD towards inclusive education for students with ASD. Their results indicated that the level of knowledge and understanding of ASD among teachers is the primary issue with all stakeholders. This implied that teachers lacked adequate knowledge of the disorder, thereby impeding their competence in managing children with ASD. This position by Roberts and Simpson (2016) is consistent with the objectives of this study such that it brings to bare the fact that teachers' knowledge is an essential influence on their level of competence.

Teachers' knowledge of NDDs is low in many countries. For instance, in a study by Rae et al. (2011) to examine the impact of a short training session on teachers' knowledge of Intellectual Disabilities in Scotland, it was found that teachers' level of knowledge before training was significantly low. Training however significantly improved the basic knowledge they needed to understand intellectual disability in a post-test and in a 1-month follow-up. This study is consistent with the objectives of this study to assess the knowledge mainstream teachers possess beyond receiving training on inclusive education before the onset of the implementation of the policy.

Also, Khalil et al. (2020) in a recent study aimed at assessing the knowledge and opinions of elementary school teachers toward integrating children with autism in mainstream classrooms. They utilized a descriptive cross-sectional correlational survey research design to include 79 elementary school teachers conveniently sampled from two schools located in Jeddah, in Saudi Arabia. The autism knowledge and opinion scale as well as behavioural strategies used by the teachers in managing children with ASD. Findings revealed that most respondents had poor knowledge of ASD. Only 40.5% of the respondents also had positive opinions about inclusion for children with ASD. Two major limitations are noticed. Firstly, was the small sample size of participants and also, the sampling of only female teachers. This study is in line with the current study to examine teachers' knowledge of NDDs in Ghana including ASD, by integrating views from both male and female genders and a larger sample of mainstream teachers.

Alali et al. (2020) explored in-service teachers' knowledge of signs and symptoms associated with NDDs. The study sampled 448 teachers and evaluated their knowledge using a purposely developed tool comprising 30 items covering intellectual disabilities, ASD, Behavioural and

Emotional Disorders, learning disabilities, and ADHD. The results indicated that teachers lack sufficient knowledge of some features associated with disorders and developmental disabilities. Also, although learning disorders and ADHD are common disorders in school children, teachers seemed to lack the necessary knowledge about these conditions. The method of assessing teachers' knowledge of a myriad of NDDs by Alali et al. (2020) is consistent with the approach of this study.

Gomez-Mari et al. (2021) also posited that the increasing number of students with ASD in mainstream education environments requires mainstream teachers to know how to identify their needs and be able to adapt their education processes to make their inclusion easier. Their study sought to conduct a systematic review about mainstream teachers' knowledge of ASD, sampling teachers from all stages and specialization. The research utilized data from four databases including Web of Science, Scopus, PsycInfo and Google Scholar considering papers between 2015 and 2020. Twenty-five articles were analyzed. And results proved that teachers' knowledge of ASD is generally poor. Furthermore, it was found that teachers' knowledge of ASD was contingent on their level of education, prior training and possible prior contact with students with ASD. This study highlights the possible effect of certain factors like age and experience on teachers' knowledge which thence informs one of the objectives of this study to examine the effects of teachers' age and years of experience on knowledge and competence.

Toye et al. (2019) conducted a study investigating the effect of ADHD knowledge and stigma on professionals' attitudes towards mainstream inclusion capturing views from teachers, support staff, school managers and educational psychologists with questionnaires. They assessed ADHD knowledge, stigma and attitudes towards inclusion by sampling 135 participants working within the Scottish state education system. Results showed that

Psychologists displayed more knowledge, had fewer stigmatizing beliefs and had more positive inclusive attitudes than other professions. Also, with regression analysis, they found that participants with more knowledge of ADHD and less stigma held more positive attitudes towards mainstream inclusion. Relating to this study, it is then asserted that, higher knowledge among teachers, which is strongly associated with less stigma will thus lead to more positive attitudes, skills and zeal to do more for children with NDDs. These as explained from the beginning greatly contribute to teacher competence.

These results showing low knowledge have been reiterated in a study in Ghana. A notable Ghanaian study by Ayoka (2018) sought to identify pre-school teachers' knowledge of ASD in the Adentan and Medina Municipalities in Ghana. A semi-structured qualitative interviewing was employed in this study and the results showed that the majority of the respondents had low to no knowledge about the characteristics, specific organizations and intervention approaches of ASD. Also, regarding inclusive education for children with ASD, half of the participants supported the idea while the others suggested that, children with ASD should be sent to special schools because they did not have the competencies to manage them. It can be deduced that from the results, Ghanaian teachers have both inadequate knowledge and competence in handling children with ASD however, its relationship was not been adequately explored due to the qualitative method used by the study. Also, teachers' knowledge of other known NDDs that are also found in the Ghanaian mainstream classrooms is left out. The current study, therefore, assesses the relationship between teachers' knowledge and competence in a similar context and also considers the knowledge levels of additional NDDs.

Ghanaian teachers have however been found to have higher knowledge levels compared to other countries. This was seen in a study by Monico et al. (2018) who maintained that teachers

in mainstream schools are essential assets for the inclusion of students with diverse conditions. He further asserts that factors such as teaching experience, attitudes, and knowledge can however promote or obstruct these goals towards inclusion. On this ground, they conducted a cross-cultural study to examine the knowledge, perceptions and attitudes towards inclusion among teachers in Ghana, Spain and Germany, concerning inclusive education. The participants comprised 363 teachers from these three countries and the findings showed that there were significant differences in teachers' self-confidence and in the resources made available to them from administrators and schools. Spanish teachers reported having the least knowledge, attitudes and perceptions about inclusion. All the teachers however showed adequate levels of knowledge about instructional strategies and students' characteristics, although those from Ghana demonstrated significantly more knowledge than the others about students' characteristics. Also, the teachers' attitude towards inclusion differed significantly with the teachers from Spain and Germany demonstrating slightly better attitudes. Teachers' knowledge of NDDs was not covered in this study however Ghanaian teachers demonstrated adequate knowledge of the inclusion practice. The comparative nature of this study makes it difficult to suppose that their knowledge, which is considered as a dimension of competence in this study of inclusive pedagogies is on the optimum level. The current study objectively assesses Ghanaian teachers' knowledge of inclusion to clarify the level at which they are.

Ribeiro (2019) also obtained a contrasting result to previously found low levels of teacher knowledge of NDDs. He sought to assess mainstream and specialized foundation-phase teachers' understandings of autism spectrum disorders in South Africa. The Autism Spectrum Disorder Knowledge Questionnaire (ASD-KQ), a self-developed instrument was used. Two hundred and nine (209) foundation-phase teachers from across mainstream and specialized sectors were surveyed to establish the current state of knowledge on ASD in the foundation-

phase educational sector in South Africa. The findings suggested that the teachers who took part in the survey performed well and demonstrated that they were well-versed in the subject. Specialized teachers, on the other hand, had a higher total knowledge level than mainstream teachers. The findings suggested that south-African foundation-phase teachers were appropriately prepared with the disorder-specific information required to begin accommodating students on the spectrum. Because the process of implementing inclusive education is similar to that of Ghana, and studies suggest that imprevious growth of maintream teachers in South Africa, it is also critical to ae teachers' development since the start of inclusive practice.

2.2.2 Knowledge and Competence of Mainstream Teachers in Inclusive Practice

Venkova and McGarraghy (2014) investigated the awareness of NDDs, and support strategies used to address these conditions among Irish mathematics lecturers. The study finds out that awareness of NDDs is high generally, but the specifics of how to address and manage students with the conditions are less widely known. This raises concerns about how teachers may be knowledgeable about NDDs but may not have the competence in managing them.

Several factors have been found to influence teachers' knowledge of NDDs. Johnson et al. (2013) found in their study that a teacher's age and degree of experience with children with disorders increases their awareness. Results from 148 caregivers of five-year-old children with autism spectrum disorders (ASD) showed that teachers' daily interaction with the children enhanced their knowledge of ASD. This is consistent with one of the objectives of this study to examine the relationship between the teachers' age and years of experience between knowledge and competence of mainstream teachers.

Lara-Cruz et al. (2020) found a correlation between knowledge and competence. They conducted a study to describe the knowledge about neurodevelopmental disorders and the level

of acceptance of the inclusive education model among basic education teachers. Teachers' knowledge of ADHD, Learning Disorders and intellectual disability was assessed. Data were obtained from 511 teachers in Mexico and Central America. Results revealed that greater knowledge about NDDs was associated with acceptance of the inclusive education model which is the element of attitudes incompetence. This brings to light the significant correlation between teachers' knowledge and competence which this study also assesses.

Aside from the positive influence of experience or length of practice on teachers' knowledge of NDDs, it has also been found to influence competence. Ahsan et al. (2013) in light of this investigated the preparedness of pre-service teachers to teach in inclusive classrooms in Bangladesh. They measured the attitudes and perceived teaching-efficacy for inclusive education of 1623 pre-service teachers from 16 teacher education institutions. The findings indicated that the level and length of training, along with gender, influenced both teacher attitudes and teaching efficacy.

Kim (2011) also studied the influence of teacher preparation programs on preservice teachers' attitudes toward inclusion. A survey method was utilized to obtain data from preservice teachers in ten teacher preparation programs. Responses from 110 preservice teachers were analyzed according to the type of teacher preparation program, which was either combined, separate, or general teacher preparation programs. The findings showed that preservice teachers from combined teacher preparation programs, in which general and special education teacher training curriculum were merged, had a significantly more positive attitude toward inclusion than preervice teachers from separate programs. Ghanaian teacher training is typically a combined preparation process however most researches have not reported positive attitudes among teachers. This indicates the influence of other factors on the overall competence of teachers such as experience with disorders and as suggested by Johnson et al. (2013).

2.2.3 Competence of Teachers in Managing NDDs

A natural corollary of the inclusive education policy is the expectation that mainstream teachers are required to have the appropriate attitudes, knowledge and skills to fulfill their roles and responsibilities within the system Das et al. (2013) and Zulfija et al. (2013) also posit that a major factor in the success of inclusive education is teacher's professional competence in managing children with disabilities. concerning inclusive education, it is required for the teacher to have new conceptual thinking, also the ability to recognize the personal and social significance of their activities in managing children with disabilities and to be responsible for the outcomes (Zulfijan et al., 2013). In Ghana, a lot of mainstream teachers exhibit little confidence in inclusive education practice due to the inadequate experience to address the academic, social and emotional needs of pupils with Disorders (Agbenyega & Deku, 2011). This lack of confidence is proven to stem from insufficient preparation of the teachers (Ahsan et al., 2013; Kim, 2011).

Zulfija et al. (2013) conducted a study on the professional competence of teachers working in inclusive education. Data were obtained from 50 primary school educational institutions and 200 university students teaching specialties in Semey. The results of the study the presence of a weak motivation for the implementation of inclusive education.

Das et al. (2013) examined from 223 primary school teachers and 130 secondary mainstream schoolteachers in Delhi, India their skill levels in managing students with disabilities in inclusive education settings. Findings showed that almost 70% of the participants had not had any training in special education or had any experience teaching students with disabilities.

Furthermore, 87 percent of teachers said their classrooms lacked support services. They evaluated themselves as having a low level of competence for working with disabled students.

Akalin et al. (2014) also posited that preschool teachers in mainstream schools face serious challenges when managing students with diverse abilities in the same environment. Though teachers have demonstrated positive attitudes towards the idea of inclusive education, they usually do not want children with NDDs in their classrooms because of their insufficient knowledge levels and skills regarding inclusive practices. This paper thus sought to develop and implement an effective and functional training program for inclusive preschool classroom teachers. They aimed at thoroughly looking into the needs of preschool teachers concerning the inclusion of children with disabilities in their classes. Results showed that teachers mainly needed knowledge, skills, experience, and support in various competency areas such as assessing the performance of children with NDDs, working with their parents, preparing individualized education programs, adapting and modifying their curriculum, and handling behavioural problems.

Children with NDDs schooled in mainstream institutions pose peculiar challenges to teachers as opined by Yoro et al. (2020). They thus focused on finding out the specific support strategies used by recently qualified teachers in mainstream institutions in managing children with NDDs. Six teachers were purposively sampled, and data was obtained using semi-structured interviews, observations and critical incident reports. Results showed that teachers employed peer learning, cooperative learning, ability grouping, curriculum differentiation and extensive visual aids in an attempt to support learners and learners were able to learn and understand the lessons.

These results however contrast with research findings that teachers lack skills, training and knowledge to support learners with NDDs Phasha et al. (2013). This is however justified by the argument that these strategies found are rather general teaching and learning strategies.

According to Rothi et al. (2007), school teachers are not expected to be only educators by delivering the curriculum, are expected to take up responsibility in the early identification of children's mental health problems and to refer these children for appropriate support. They thus examined teachers' experiences considering these expectations and also regarding inclusion. A qualitative research approach was used to explore teachers' views on competency and training in mental health management. their findings indicate that teachers feel inadequately prepared to manage pupils with mental health needs.

Bandura (1990) as cited in Cate et al. (2018) suggests that competence does not only involve knowledge and skills, but also the motivation and ability to utilize these successfully in diverse situations and likens it to what he terms self-efficacy. According to him, efficacy does not only reflect perceived ability but also affects an individual's attitude and motivation to perform a given task. Teachers' efficacy and motivation have been associated with more positive teaching behaviour which in turn affects student engagement and learning outcomes (Cate et al., 2018). Bukvic (2014) asserts that a teacher in an inclusive school has to know specific characteristics about disabilities, strategies of teaching and develop personal competencies to create an enabling environment for learners with special education needs. Thus, in his study, he aimed at discussing teachers' perception of their competency in teaching children with disabilities in mainstream schools. Data were drawn from 100 basic schoolteachers, in regular schools using questionnaires. Results indicated that about 70% of examined teachers have no or very little knowledge about teaching students with NDDs, and their attitudes were mostly negative.

However, younger teachers had higher competencies. Furthermore, some teachers who had positive attitudes about inclusive education reported they would not accept children with conditions if they were to make a choice. This result suggests also that, attitudes alone may not predetermine teachers' competence to manage children with disabilities in their classrooms.

In another study by Supena et al. (2020) the knowledge and understanding of teachers about the nature of inclusive education services and the importance of their implementation were studied in madrasah. The study also sought to describe training and empowerment to improve teacher competence in inclusive education services. This research used qualitative methods, data collection techniques from observations, interview questionnaires and secondary sources. They sampled mainstream teachers, principals, schools, counselling teachers, and deputy heads of student affairs. This study found that teachers' understanding and expertise of inclusive education in Banten province is lacking, despite ongoing efforts to improve teacher competency in inclusive education services, such as training meetings, discussions, workshops, and focus group discussions.

2.2.4 Teacher Attitudes

According to Savage and Erten (2015), teachers' attitudes towards inclusive education influenced educational outcomes significantly yielding good outcomes when they are positive. Cate et al. (2018) has also demonstrated that both teacher competence and attitudes also influence inclusive education however the relationship between the two have been understudied in the literature.

Researchers argue that the concept and practice of inclusive education are difficult to understand and implement amongst mainstream teachers (Deku & Vanderpuye, 2017; Makoelle, 2016). This is reflected in negative teacher attitudes and behaviour in managing

children with disabilities (Nel et al., 2011). Most teachers according to Engelbrecht et al. (2013), experience anxiety and stress when interacting with learners with special needs in an inclusive classroom because they lack sufficient training to accommodate and support these learners.

Concerning the organization of inclusive education, teachers' attitudes and their self-efficacy beliefs are proven to be essential predictors of their intention to manage a heterogeneous classroom (de Boer et al., 2011; Savolainen et al., 2012). Also, significant correlations have been found between teachers' attitudes and their self-efficacy beliefs towards inclusion (Sharma & Jacobs, 2016). This is in agreement with Savolainen et al. (2012), a comparative study of attitudes and self-efficacy belief of in-service teachers in implementing inclusive practices in South Africa and Finland. They sampled 319 South African and 822 Finnish primary and secondary education teachers and their findings reveal a positive correlation between self-efficacy and overall attitudes towards inclusion.

Savolainen et al. (2020) also posited that a lot of studies have assessed teacher attitudes and self-efficacy beliefs related to inclusive education. However, the empirical evidence of the causal relationship between efficacy and attitudes is rare and inconclusive. Their study, therefore, focused on finding the relationship between the two variables using a cross-lagged panel design path analysis. Thousand three hundred and twenty-six teachers were sampled from Finish schools and their self-efficacy beliefs were assessed five times whereas attitudes were assessed three times over three years. Results indicated that both constructs were relatively stable over the measured period. Also, self-efficacy had a positive effect on attitudes but not vice versa. Responses were similar between novice and expert teachers indicating the less significant effect of experience on attitudes and self-efficacy. Their results generally imply that

increasing teacher efficacy for inclusive practices will change their attitudes toward a positive direction.

Teachers' age, qualification, and teaching experience have also been found to influence the way they perceive the inclusive education curriculum, physical environment and pre-service teacher preparation in Ghana (Deku & Vanderpuye, 2017). Their research aimed at exploring the perspectives of teachers on the curriculum and physical environment as well as teachers' preparation for inclusive education in Ghana. They sampled 120 teachers selected from 35 inclusive schools using questionnaires. Their findings suggest general unpreparedness however this study did not have a clear focus on looking into possible factors that may affect Ghanaian teachers' attitudes and unpreparedness other than their demographics. In the current study, factors such as disorder-specific knowledge and competence will be assessed and how they possibly affect each other taking into consideration the type of Neurodevelopmental disorder.

Nel et al. (2011) compared the effect of South African and Swedish teachers' attitudes towards the implementation of inclusive education in the mainstream classroom. They aimed to highlight and explore problem areas about teachers' attitudes to inclusivity. In this paper, teachers from South Africa and Sweden completed questionnaires on perceptions of inclusive education in their school system. Results indicated that there were significant negative responses to some of the attitude constructs in both Swedish and South African inclusive systems. Also, finding revealed various issues in specific areas such as policy comprehension, limited teacher support structures, difficulty in the practical implementation of inclusive education, the poor receptiveness of inclusive education on the part of the teachers, the feasibility of proposed inclusive practices and insufficient support from special schools.

Hind et al. (2019) utilized a mixed-method approach to examine the influence of age, experience, qualification, and the support teachers got on their attitudes toward the inclusion of children with social, emotional, and behavioural difficulties. They also looked into the relationship between their attitude and their willingness to work with these students in the main classroom. Fifty primary school teachers were surveyed, and the findings revealed that age, time in the profession, and support received were all significant predictors of teacher attitude, with time in the profession being the most significant predictor. When adjusting for the amount of support received, they discovered that attitude had a significant impact on willingness to include.

Desombre et al. (2019) sought to understand why mainstream teachers exhibit less favourable attitudes toward inclusion than special education teachers. They argued that this can be mediated by the low sense of efficacy in mainstream teachers. They gathered information on the attitudes and efficacy of general and special education teachers, and the results revealed that general teachers have a more positive attitude toward inclusion than special education teachers. and this discrepancy is partly maintained by the lower sense of efficacy of general teachers.

Holley (2015) performed research on teachers' attitudes toward inclusion. Data was gathered from grade six to grade eight teachers in a southern country in a mid-Atlantic state. Findings suggested that teachers' attitudes towards inclusion are split and unambiguous towards specific disabilities. The findings revealed that more teachers believe that students with learning disabilities, physical disabilities, visual and hearing impairments, communication disorders, and health impairments are suitable for learning in a regular classroom, whereas students with

mental disabilities, such as cognitive disabilities or developmental delays, behavioural disorders, and multi-disabled students, should be educated in a special institution.

Miesera et al. (2019) also asserted that the personal characteristics of the mainstream teachers are essential influencing factors in the inclusive classroom setting. They conducted a study on the role of teacher attitudes, concerns and efficacy in inclusion practice in Germany. The results of the study confirmed that teachers with fewer concerns had more positive attitudes, also had a greater sense of self-efficacy and stronger intentions to implement inclusivity than those with more concerns.

Bukator et al. (2018) examined Ghanaian teachers' attitudes toward inclusive education. They sampled 280 teachers in Ghana and administered the Multidimensional Attitudes Toward Inclusive Education Scale. They found out that, the more experienced teachers were in teaching, the less they exhibited negative behavioural attitudes towards inclusion. Thus, more negative attitudes were found among teachers with less teaching experience.

In Ghana, Agbenyega (2007) addresses teachers' concerns and attitudes regarding inclusive education for students with disabilities. A 20-item Attitude Toward Inclusion in Africa scale was filled out by 100 teachers from five inclusive and five non-inclusive schools in the Greater Accra metropolis. From the results, it was indicated that teachers perceived their professional knowledge and skills to be inadequate to enable them to effectively manage students with disabilities in regular schools and this was contributing to a reduction in the academic success of their schools. Furthermore, teachers' views on inclusion suggested that they have a negative attitude toward students with disabilities, particularly those with sensory impairment, and would prefer that they be educated in a special school. Furthermore, teachers feared that incorporating students with disabilities would reduce the amount of instructional work they

could do, resulting in the syllabus not being completed. It was widely assumed that incorporating students with disabilities in regular classes would affect the academic performance of students without disabilities, and that, as a result, teachers would support the implementation of an inclusive education policy.

The relevance of primary school teachers' attributes such as teachers' attitudes towards inclusive and their perceived collective self-efficacy beliefs in practicing inclusivity was studied by Hellmich et al. (2019). They looked at 290 primary school teachers' daily routines, and the findings show that primary school teachers' daily routines in heterogeneous classrooms were significantly predicted by their intention to implement inclusive education and their attitude toward inclusive education, but not by their collective elf-efficacy belief or their perception of school management's expectations. More specifically, the impact of a teacher's attitude on their daily practice in an inclusive classroom was found to be significantly mediated by their intention to undertake inclusive education.

2.2.5 Inclusive Education in Ghana

Mahlo (2017) conducted a qualitative study theorized by Bronfenbrenner's ecological theory, which emphasizes the interaction between the systems of education and its influence on the developing child. The study contends that if teachers can appropriately manage the diversity in their classes, the goal of inclusive education will be attained. Ten teachers primary school teachers were purposively sampled, and data were obtained through interviews, observations, and document analysis. Results indicated that generally, lack of parental support, inadequate training for teachers, and social problems of the learners made the teaching of learners with

diverse needs challenging. Thus, he concluded that, if teachers are provided with support, more learners will be able to sail through the system of inclusive education.

Vanderpuye et al. (2018) investigated the sustainability of inclusive education in Ghana by delving into teachers' attitudes and their opinions on their needs for the effective implementation of inclusive education. They sampled 142 teachers from 8 inclusive schools in the central region of Ghana and their findings revealed that teachers generally have positive but weak attitudes and perceptions towards inclusion however, the resources they opined they need to include teaching and learning materials, knowledge about special needs and disabilities and training on all aspects of inclusive education.

In Ghana, Mprah et al. (2016) investigated teachers' concerns and attitudes concerning inclusion of students with disabilities. The study intended to improve the level of knowledge and preparedness of teachers in five schools piloting inclusive education in the Ahanti Region of Ghana's Ejiu Juaben Municipality. The study used a qualitative data collection approach to sample 40 participants, and the results revealed that teachers in the school chosen for the inclusive education program had no or insufficient awareness about the program before it was implemented. In addition, the study identified other drawbacks, such as a teacher's lack of preparation and a teacher's negative attitude toward children with special needs.

Gyasi et al. (2020) also problematized that parents and other stakeholders usually complain about equity and inclusive education for students with special educational needs in mainstream schools. The study's goal was to determine the level of teacher awareness of students with special educational needs and disabilities, as well as their classroom management procedures and strategies. The study used a qualitative research design and a descriptive technique to

collect data that was then evaluated thematically. The findings revealed that teachers' understanding of special educational needs and students with special needs was insufficient. It was also shown that teachers lacked in-depth understanding of inclusivity, legislated and operational policies and how to apply them, as well as classroom management procedures and supervision of students with special educational needs. They suggested that teachers be properly evaluated and qualified before being allowed to teach in a school.

2.4 Statement of Hypotheses

1. There will be significant differences in competence (attitude, knowledge, skill, and agency) among mainstream teachers with students with ASD, Learning disabilities and Cerebral Palsy
2. There will be a significant positive relationship between knowledge of neurodevelopmental disorders and competence in managing students with NDD
3. There will be a significant positive relationship between Demographic characteristics (e.g., Age of the teacher and Years of work experience) and competence in managing neurodevelopmental disorders
4. Knowledge of NDD will significantly predict competence.

2.3 Rationale of the Study

Much of today's research is focused on identifying a list of competencies and skills that future teachers will need to work with children with disabilities (Zulfija et al., 2013). Also, an exhaustive exploration into attitudes of teachers in the literature which however is proven not to be a standalone factor of competence but a contributor to teacher's overall competence. Despite the great interest of researchers in the problem of preparing teachers to work in inclusive education, to date, little is known about Ghanaian teachers in inclusive schools'

knowledge of neurodevelopmental disorders as well as no direct study on the assessment of these identified competencies in effectively managing children with these conditions among teachers within the inclusive system.

Although some efforts have been made by Ghanaian researchers (e.g., Mahlo, 2017; Mprah et al., 2016; Vanderpuye et al., 2018) in exploring teachers' knowledge of NDDs and their attitudes and perceptions towards inclusive education, research on a broader spectrum of NDDs teachers are encountering in the Ghanaian inclusive education system and how they are dealing with have not been adequately covered. This makes it difficult to highlight the topical issues and also blur the goals in providing sufficient training and assistance to teachers. The few available research in Ghana on NDD knowledge among mainstream teachers also centred on a very limited scope of interest (Ayoka, 2018). This study seeks to broaden the scope of NDD knowledge teachers possess by covering more disorders including ASD, Learning Disability and Cerebral Palsy and further assess their level of professional competence in managing these conditions in the classroom.

2.5 Operational Definition of Terms

Knowledge: This refers to facts and information about the symptoms, manifestations and management techniques of neurodevelopmental disorders. (Haimour & Obaidat, 2013; Kidd, 2000).

Competence: A diverse set of capacities that interact to determine how teachers can meet the demands of inclusion which is set to include attitude or motivational orientation, knowledge, skill and agency (Guanglun et al., 2015; Fisher et al., 2003).

Neurodevelopmental Disorders (NDDs): A group of conditions that occur at the beginning of a child's development that manifest developmental deficits, yielding impairments in

personal, social, academic or occupational functioning which in this study includes ASD, Learning disability and Cerebral Palsy (Almogbel et al., 2017; APA, 2015)

CHAPTER THREE

METHODOLOGY

3.0. Introduction

This chapter provides a full account of how the research was conducted. It starts with a description of the research design and approach, as well as the study setting, followed by crucial components including the target population, sample frame, and actual sample employed. It also presents measures used in data collection. The chapter also involves the data-gathering technique and a breakdown of preliminary analysis, as well as the procedure employed in data collection analysis.

3.1 Research Design

This study used a quantitative cross-sectional survey design. The nature of the study, as well as the variables of interest strongly influenced the use of this research design which allows for structure and flexibility in data collection, analysis, interpretation, and discussion. A cross-sectional design aims at collecting data concurrently from a defined population at a single point in time (Wang & Cheng, 2020). The strength of this approach is that it is relatively faster and less expensive to implement as questionnaires are used to contact a large sample of the population of interest, and also much easier to get data on all variables at the same time. This design was thus deemed appropriate to allow for the acquisition of data from a relatively large group of mainstream teachers who manage children with NDDs, across different stages of practice, within a relatively short period, given the aims and objectives of this research, which were primarily to assess the knowledge and competence of heterogenous mainstream teachers.

3.2 Research Setting

This study took place in forty-six inclusive schools made up of 29 public schools and 17 private schools from selected districts in Ghana's Greater Accra and Eastern Regions (see appendix

IX). These schools were specifically located in the New-Juaben North and South municipalities, the La-Nkwatanang municipality, the Ga East and West municipalities, the Akuapem North and South municipalities, Tema metropolitan among others. Greater Accra is the country's capital and is a multicultural setting where most socio-economic activities of the country take place (Ntiamoah, 2008). The Eastern Region of Ghana is also located in the coastal part of the country, bordered to the east by Lake Volta and the fifth largest region in the country. Schools selected from these two regions are notable for having actively running inclusive schools, both privately owned and government owned. These settings were thus chosen due to their heterogeneity and ease of access to the population of interest.

3.3 Participants

The inclusive education project has been rolled out in all 16 regions of Ghana and teachers have been trained from 1322 basic schools across the country (MOE, 2015). The target population for this study, therefore, focused on teachers in mainstream private and government schools who have currently implemented inclusive education in their schools. Fifty Inclusive schools were sampled and in all 150 teachers were reached in 46 schools.

Inclusion criteria: (1) Teachers from both private and public operating under the supervision of the Ghana Education Service qualified to be sampled for this study; (2) Teachers of both primary and junior high levels from this category who at the time of participation had at least one of children diagnosed with either ASD, Learning Disability or Cerebral Palsy in their classroom also qualified to be sampled for this study.

Exclusion criteria: *(1)* Teachers who had students with special needs conditions other than ASD, Learning Disability or Cerebral Palsy (for example, vision or hearing impairment) in their classroom were not eligible to take part in the study; (2) Teachers with students who have special needs but have not yet received a diagnosed were also ineligible to participate in the

study; (3) Also excluded from the study were national service personnel and interns who served as teaching assistants in the classrooms.

3.4 Sampling Technique

Purposive and convenient sampling were used to obtain 46 inclusive schools in the two regions. Participants (teachers) were selected using purposive sampling technique. Thus, teachers with students diagnosed with either ASD, Learning Disability or Cerebral Palsy were selected to participate in the study. This sampling technique enabled the researcher to reach individuals with specific characteristics that reflect the objectives of the study more easily and faster.

3.5 Sample Size

One hundred and fifty (150) participants were sampled for this study. The sample size for the study was based on Tabachnick and Fidell's rule of thumb (2007). It is suggested that increasing the sample size also increases the likelihood of extracting significance from the lightest of variance, making it necessary to measure the minimum number of cases. The recommendation is that the sample size (N) be equal to or greater than 50 + 8k, [N50 + 8k], with k equaling the number of predictor (independent) variables. Based on this, a minimum of 66 case samples were required for this study. Also, they suggest that, with the sample size (N) for studies using multivariate analysis of variance (MANOVA), a sample size of at least 20 each for the dependent and independent variables is enough to ensure robustness. Therefore, a sample size of 150 was arrived at based on the data analysis methods that were to be used and also factoring in the response rate of participants. One hundred and fifty (150) questionnaires containing demographic characteristics, knowledge, and competency assessment tools were delivered to mainstream teachers to achieve this goal. In all, a hundred and thirty-eight filled questionnaires were retrieved representing a 92% response rate. However, 113 (75.33%) of the returned questionnaires met the criteria for quantitative analysis. The participants were made up of 50 male teachers (44.25%) and 63 female teachers (55.75%) with 50 of them which is 44.2%

managing children with ASD, 43, which is 38.1% managing children with LD and 20 which is 17.7% managing children with Cerebral Palsy. Sixty-seven of these teachers (59.3%) were found in public schools and the remaining 40.7% in private schools. These figures are presented in Table 1 below.

While the average age of teachers was 37 years old, the youngest was 24 and the oldest was 57. In addition, the teacher with the least work experience had only been with the school for a year, while the teacher with the longest tenure had 30 years of work experience, with an average of about nine years. Furthermore, most of these educators worked in public schools, with the majority holding a diploma, followed by a bachelor's degree, and a few holding a master's degree. Teachers with students with autism spectrum disorder were also more prevalent, followed by those with students with learning disabilities and Cerebral Palsy, in that order. In sum, it could be said that female instructors were the majority in the current study, and many of these teachers worked in public schools, with the majority having a diploma educational qualification.

Table 1

Summary of Personal Characteristics of Mainstream Teachers who Manage Students with NDDs

Teacher Characteristics		*Frequency*	*Percentage (%)*
Gender	*Male*	*50*	*44.25*
	Female	*63*	*55.75*
Sector	*Teachers in public sector*	*67*	*59.3*
	Teachers in private sector	*46*	*40.7*
Qualification	*Diploma*	*55*	*48.7*
	First Degree Masters	*48*	*42.5*
		8	*7.1*
NDD Type	*Autism Spectrum Disorder*	*50*	*44.2*
	Learning Disability	*43*	*38.1*
	Cerebral Palsy	*20*	*17.7*

Summary of Personal Characteristics of Mainstream Teachers who Manage Students with NDDs

Teacher Characteristics	*Minimum*	*Maximum*	*Mean*	*Median*	*Standard deviation*
Age	24	57	35.60	34.00	7.95
Years of practice	1	30	8.87	6.00	6.98

3.5 Measures

Standardized self-report measures were used to obtain data from participant with their reliability established before collecting the actual data. Measures were made up of the LRC Teachers' Professional competency Scale (Guanglun et al., 2015), Autism Knowledge Questionnaire (AKQ; Haimour & Obaidat, 2013), Learning Disability Knowledge Questionnaire (LDKQ; Kidd, 2000) and Knowledge of Cerebral Palsy Questionnaire (KCPQ; Dambi et al., 2016) all described into detail in subsequent sections. Each questionnaire was made up of three sections with section A obtaining demographic information form participants, B assessing competence and C having knowledge assessment scales.

3.5.1 Section A: Demograhic Information

This section included questions that sought demographic information of participants including their age, gender, years of practice, institution category, location of the school and NDD type encountered.

3.5.2 Section B: Competence Assessment Scale: LRC Teachers' Professional Competency Scale (Guanglun, et al., 2015).

This section of the survey presented the assessment of teachers' competence using the LRC Teachers' Professional competency Scale (Guanglun et al., 2015). (See Appendix IV). The 28-item scale has 4 subscales assessing teacher competence on four different dimensions including attitude, knowledge, skill, and agency on a 5-likert scale ranging from strongly agree to strongly disagree. The first dimension, attitude, which included eight items, looked into instructors' views about students with neurodevelopmental disorders' educational rights (e.g. as students without disorders, students with NDDs are entitled to receive an education) and views on the impact of inclusive education on these children (e.g. through Inclusive Education, students with NDDs can have the opportunity for learning improvement.).

Teachers' knowledge of inclusive education policies (e.g., I know the principles and methods of teaching students with NDDs), ideas (e.g., Inclusive Education urges school reform and improves school quality), and practices (e.g., I know the principles and methods of teaching students with NDDs) were tested in the second dimension, which included six items. The third dimension, which included seven items, focused on teachers' abilities to plan (e.g., I can design flexible coursework and individual assessment for students with NDDs), implement, (e.g., I can use the Individualized Education Program to address the learning needs of students with disabilities) and adapt (e.g., I can adjust teaching objectives according to the characteristics of students with NDDs.) teaching to meet the unique needs of students with NDDs. The final dimension, which was represented by seven items, inquired about instructors' autonomy in seeking and obtaining various sorts of support to assist students with NDDs (e.g., I actively negotiate with leaders at various levels to support Inclusive Education). The scale was adapted by changing the word 'disability' to NDDs and piloted before being used in the main study.

The Cronbach's α for the instrument according to the originators is .94 and that for each dimension, namely attitudes, knowledge, skills, and agency are .89, .89, .90, and .83 respectively, which are all greater than the suggested cut-off of .80 by Kline (1999) signifying acceptable reliabilities. Similar scores were obtained after the pilot in the current study which is discussed in subsection 3.6.2.

Responses on the LRC Teachers' Professional Competence scale was scored by firstly reverse scoring all items on the scale to obtain a positive direction of scores and then generating a total score of the 28 items. The minimum score on the scale was 68 and maximum score was 140. Thus, higher competence levels were associated with higher scores and lower competence with lower scores. Levels of competence were determined using a median split of scores. With a middle score of 112, a score of 28 to 56 depicted adaptive competence, 57 to 111 represented reproductive competence and 112 to 140 for optimal competence.

3.5.3 Section C: Knowledge Assessment Scales

The third section, Section C of the questionnaire had knowledge assessment scales of either Autism Spectrum Disorder, Learning Disability or Cerebral Palsy. Knowledge of Cerebral Palsy Questionnaire (KCPQ), (Dambi et al., 2016) (see appendix VI) Autism Knowledge Questionnaire (AKQ) (Haimour & Obaidat, 2013) (see appendix V) and Learning Disability Knowledge Questionnaire (LDKQ) (Kidd, 2000) (see appendix VII) were used to obtain data on mainstream teachers' knowledge of the conditions they are managing.

3.5.3.1 Autism Knowledge Questionnaire (AKQ) (Haimour & Obaidat, 2013)

The Autism Knowledge Questionnaire (AKQ) (Haimour & Obaidat, 2013) contains 30 items proposed to measure one's knowledge of Autism which according to the originators, has a reliability coefficient of .926. The questionnaire primarily assesses and measures broad

knowledge about the onset (e.g., Autism disorder is usually diagnosed during the first three years of the child's age), causes (e.g., in many cases, the cause of Autism disorder is unknown), manifestation (e.g., some children with Autism demonstrate inconsistency in motor skills), and management (e.g., Behavioural intervention is considered the most effective treatment method of Autism) of ASD. Questions presented on this scale were given as True/False statements and a Don't know option which respondents were urged to pick rather than guessing the correct response.

3.5.3.2 Learning Disability Knowledge Questionnaire (LDKQ) (Kidd, 2000)

The Learning Disability Knowledge Questionnaire (LDKQ) (Kidd, 2000) also contains 30 items and with a reliability coefficient of .80 as reported by the scale developers. The scale assesses teachers' beliefs about learning Disability (e.g., All people have a learning disability to some degree) as well as general knowledge about its causes (A head injury cannot cause a learning disability), types (e.g., Dyslexia is a type of learning disability) and charactistics (e.g., Behaviour problems are not more common in people with a learning disability). Similar to the AKQ, response items on the scale were True, False and Don't Know. The scale also assesses teachers' knowledge of the causes, manifestations, beliefs and management of children with Learning disabilities.

3.5.3.3 Knowledge of Cerebral Palsy Questionnaire (KCPQ) (Dambi et al., 2016)

Lastly the Knowledge of Cerebral Palsy Questionnaire (KCPQ), (Dambi et al., 2016). Twenty knowledge statements were presented with three responses for respondents to choose from for each question which was True, False and Don't know. The questions covered various domains of knowledge of Cerebral Palsy including definition, etiology, presentation, and management. The scale is internally consistent, with a Cronbach's alpha (α) value of 0.891, and stable, with a reliability coefficient (r) of 0. 80.

Scoring

In scoring the knowledge scales, correct responses were separated from incorrect ones using information given by the test developers which were also verified using DSM-5 and other reliable academic sources. A correct response was given a score of 2 and an incorrect response was scored 0. Highest score thus was 60 on the Autism knowledge and Learning Disability knowledge scales and 40 on the Cerebral Palsy knowledge scale` and the least score was 0. Higher levels and lower levels of knowledge were determined using median split technique suggesting that scores below the median scores on these scales represent low levels of knowledge and scores above the median scores represent higher levels of knowledge.

3.6 Pilot Study

A pilot study was done using 30 regular school teachers to ascertain the psychometric properties of the instrument for data collection, with 10 samples of each scale. Revisions were made in the competence scale by replacing the word 'disability with 'NDD' before administering them. This was done to make the statements more specific to children with neurodevelopmental disorders rather than children with general disabilities. Approval was sought from the head teachers of two basic schools in the Akwapim North Municipality and questionnaires were administered to all the teachers on these staffs. Findings from the pilot study revealed that the LRC Teachers' Professional competency Scale has a reliability score of .85 and the Autism Knowledge Questionnaire (AKQ), Knowledge of Cerebral Palsy Questionnaire (KCPQ), and The Learning Disability Knowledge Questionnaire (LDKQ) yielded .83, .86 and .74 respectively.

3.7 Procedure

A letter of introduction was obtained from the Department of Psychology and sent to Ghana Education Service offices for approval of the research to be conducted in schools in the various municipalities. An official letter of introduction was then provided to be given to the headteachers of the various schools, and a prior notice sent to special needs coordinators assigned to the various schools. Permission was obtained from heads of schools and with the assistance of special needs coordinators, participants were informed and recruited in the study. Google forms were used to obtain responses from teachers who were far from researcher as well as teachers who were on vacation. They received the google forms link to the survey was shared via WhatsApp and text message. Paper-and-pencil questionnaires were to obtain responses from teachers who were in school and easily accessible to researcher.

Teachers managing children diagnosed with ASD, LD or CP each received a letter introducing the researcher, a description of the study, an informed consent form, and a demographic survey sheet. In addition, they were given the LRC Teachers' Professional competency Scale and either of the Autism Knowledge Questionnaire (AKQ), Learning Disability Knowledge Questionnaire (LDKQ) or Knowledge of Cerebral Palsy Questionnaire (KCPQ) depending on the NDD type they were managing. The participants were informed of their rights to choose whether or not to participate and signed the informed consent form. Participants were also assured of their anonymity and confidentiality, thus only signature and the date of completion of the surveys were required on the consent form to maintain anonymity. the A pilot study was then conducted a week before the main study.

Questionnaires were given out to 150 teachers in their respective schools at their convenience and in order to avoid interference with classroom activities, the participants were made to fill

questionnaires during their break time or after closing of school and submitted to delegated teachers to be handed over to the researcher on the following day. Use of hand sanitizers and wearing of nose masks was ensured during data collection in adherence to COVID-19 safety protocols. Data was collected over a period of 8 weeks spanned from July 2021, to September 2021.

3.8 Ethical Consideration

The research looked at the fundamental principles of treating participants and the research community with fairness and honesty. Given this, Ethical approval was sought from two ethical review boards including the Ethics Committee for Humanities (ECH 159/20-21) and University of Ghana and the Departmental Research and Ethics Committee (DREC/002/20-21) and was granted by both. For the main study, participants' consent was sought at the onset of the study both verbally and with a written informed consent document attached to every questionnaire which they read and signed beneath. Through the verbal and written consent document, assurance of confidentiality was emphatically stated and their rights to withdraw from the study at any point they wished to at no cost at all. Their responses were also kept anonymous by not indicating any names or codes on questionnaires that could be used to identify them by their responses.

3.9 Data Analysis

IBM Statistical Product and Service Solutions (SPSS) version 26.0 software was used for the coding of the items on the questionnaire and the entry of the responses of the participants. To check wrong entries and also ensure the quality of data entered each questionnaire was given a special coding and the responses on the Likert scale were also coded to help in rejecting wrong entries. Data was screened by visual observation. Data was stored on SPSS and copies were on google drive. Two major forms of analysis were done including descriptive and inferential

statistics analysis. For the demographic variables, frequency and percentage analysis were done. For study variables, minimum scores, maximum scores, standard deviation, skewness and kurtosis and reliability analysis was also conducted.

For the inferential statistics analysis, the Multivariate Analysis of variance (MANOVA) was conducted to examine the differences among the various levels of teachers on competency with four dimensions. In addition, Pearson Product-Moment Correlation (Pearson *r*) was used to analyze the relationships between knowledge and competence as well and age and years of work experience of the participants on the subject matter (NDD) and competence. Finally, Hierarchical Multiple Regression analysis was performed to predict the influence of Knowledge of NDD on Competence adjusting covariates, age, gender and teaching experience.

CHAPTER FOUR

RESULTS

4.0. Introduction

This chapter focuses on the statistical findings of the study organized into three parts. The preliminary analysis, analysis of study hypotheses and summary of results. The statistical tests used to analyze each hypothesis are discussed, followed by presentations of the various tables with their interpretations.

4.1. Preliminary Analysis

This section of the chapter contains results on the descriptive analysis of data. This includes descriptive and reliability analysis of criterion variables (mean, standard deviation, minimum and maximum scores, skewness of the criterion variable, and the reliability coefficients of the subscales and composite criterion scale) and the assessment of competence levels in handling neurodevelopmental disorder students.

4.1.1. Assessment of Descriptive and Reliability of Competence Scale

To be able to apply the criterion variable to parametric statistical testing and analysis, a proper description using identifiable and well-known central tendency (mean), a measure of dispersion (standard deviation), and examination of the normalcy level using skewness were required. The detailed results are shown in Table 2 below.

Table 2

Summary of Mean, Standard Deviation, Minimum and Maximum Scores, Skewness and Reliability Coefficients of the Subscale and Composite Criterion Scale

Variables	Min	Max	Mean	Std. Dev	Skew	Alpha(α)
Attitude	9	40	34.94	5.28	-2.07	.88
Knowledge	6	30	20.79	6.13	-.40	.93
Skill	8	35	24.87	6.38	-.65	.91
Agency	7	34	21.58	7.04	.06	.87
Competence	56	135	102.17	20.78	-.38	.95

Overall, the skew value for the whole competence scale is acceptable because it lies within ±1. The three subscales, namely knowledge, skill, and agency, were normally distributed since they lie within ±1, while the attitude subscale scale did not stray significantly from normality because it falls within ±2. This indicates that the criterion variable did not experience any normality problems and hence is suitable for parametric analysis. The total competence and subscale reliability coefficients were outstanding (.88, .93, .91, .87, .95), indicating acceptable level of consistencies among the individual items. Furthermore, the higher levels of reliability coefficients indicate that the competence instrument was capable of providing a sufficient discrimination score among teachers in terms of competency in dealing with students with neurodevelopmental disorders. When compared to others, some teachers were more skilled in dealing with these students.

4.1.2. Assessment of Competence Levels of Mainstream Teachers in Managing NDDs

The ability of mainstream teachers to manage students with neurodevelopmental problems was assessed using frequencies and percentages. The details are shown in Table 3 below.

Table 3

Summary of Competence Levels against Neurodevelopment Disorders

Variables	NDD Type (n)	Competence Levels		
		Adaptive F *(%)*	Reproductive F *(%)*	Optimal F *(%)*
Competence		1 *(0.90)*	67 *(59.30)*	45 *(39.80)*
	ASD (50)	1 *(2.00)*	27 *(54.00)*	22 *(44.00)*
	LD (43)		35 *(81.40)*	8 *(18.60)*
	CP (20)		5 *(25.00)*	15 *(75.00)*
Attitude	ASD (50)		7 *(14.00)*	43 *(86.00)*
	LD (43)	2 *(4.70)*	9 *(20.90)*	32 *(74.40)*
	CP (20)		2 *(10.00)*	18 *(90.00)*
Knowledge	ASD (50)	4 *(8.00)*	22 *(44.00)*	24 *(48.00)*

	LD (43)	8 *(18.60)*	26 *(50.50)*	9 *(20.90)*
	CP (20)	2 *(10.00)*	4 *(20.00)*	14 *(70.00)*
Skill	ASD (50)	4 *(8.00)*	21 *(42.00)*	25 *(50.00)*
	LD (43)	8 *(18.60)*	22 *(51.20)*	13 *(30.20)*
	CP (20)		4 *(20.00)*	16 *(80.00)*
Agency	ASD (50)	10 *(20.00)*	29 *(58.00)*	11 *(22.00)*
	LD (43)	10 *(23.30)*	28 *(65.10)*	5 *(11.60)*
	CP (20)	2 *(10.00)*	7 *(35.00)*	11 *(55.00)*

From the analysis, more than half of the mainstream teachers (67%) demonstrated a reproductive level of competence in dealing with children with neurodevelopmental disorders. Moreover, 45% of these teachers demonstrated optimal competency in managing NDD students and less than 1% exhibited an adaptive level of competence. Furthermore, the dimensional (attitude, knowledge, competence, and agency) level analysis reveals that these teachers managing students with various NDDs were distributed among three levels, namely adaptive, reproductive, and optimal. Only mainstream teachers with students with learning disabilities indicated an adaptive level of attitude, while a greater number of all three teacher groups fell under optimal levels of attitude. With teacher Agency, greater numbers were found under adaptive and reproductive levels with few under optimal.

4.2. Hypotheses Testing

Hypothesis 1: *There will be significant differences in competence (attitude, knowledge, skill, and agency) among mainstream teachers with students with ASD, learning disabilities and Cerebral Palsy*

This hypothesis was examined using Multivariate Analysis of Variance (MANOVA). This is appropriate because the researcher tested a three-level factor on a criterion variable with four dimensions. The results are shown in Tables 4.

Table 4

Results of Multivariate analysis of variance of NDD type on Competence in Managing Neurodevelopmental Disorders

Source	Dependent Variable	SS	df	MS	F	p	η^2	*1-α*
Corrected	Attitude	318.07	2	159.03	6.25	.003	.10	.89
Model	Knowledge	311.010	2	155.51	4.39	.015	.07	.75
	Skill	599.66	2	299.83	8.34	.000	.13	.96
	Agency	579.48	2	289.74	6.41	.002	.10	.90
Intercept	Attitude	120297.12	1	120297.12	4725.12	.000	.98	1.00
	Knowledge	43416.45	1	43416.45	1225.23	.000	.92	1.00
	Skill	62186.83	1	62186.83	1730.32	.000	.94	1.00
	Agency	48344.82	1	48344.82	1068.72	.000	.91	1.00
NDD Type	Attitude	318.067	2	159.03	6.25	.003	.10	.89
	Knowledge	311.01	2	155.50	4.39	.015	.07	.75
	Skill	599.66	2	299.83	8.34	.000	.13	.96
	Agency	579.48	2	289.74	6.41	.002	.10	.90
Error	Attitude	2800.50	110	25.46				
	Knowledge	3897.89	110	35.44				
	Skill	3953.35	110	35.94				
	Agency	4975.97	110	45.24				

From Table 4, the results showed that there is a statistically significant difference among the three teacher groups on the attitude dimension of competence, Pillai's Trace = .20, F (4, 107) = 2.99, p = .003; partial eta squared = .10. Considering the individual dimensions separately, results showed that the mainstream teachers differ in their Attitude towards children with NDD, $F_{(2, 110)} = 6.25$, $p = .003$, in Knowledge, $F_{(2, 110)} = 4.39$, $p = .015$, in Skill, $F_{(2, 110)} = 8.34$, $p = .001$ and in Agency, $F_{(2, 110)} = 6.41$, $p = .002$. These results implies that they differ across the dimensions of competence, therefore, the hypothesis was supported.

4.2.1 Post Hoc Test

A Bonferoni adjustment was conducted to inspect the differences in the dimensions of competence of the three teacher groups reported in Table 5.

Table 5

Post Hoc Bonferoni test with means and standard deviations for the three Neurodevelopmental Disorder groups on Competence subscales

	ASD		LD		CP		
Measure	*M*	*SD*	*M*	*SD*	*M*	*SD*	*Post hoc*
Attitude	35.76	3.95	32.91	6.49	37.25	3.77	ASD>LD; CP>LD
Knowledge	21.42	6.47	18.86	5.42	23.35	5.71	CP>LD
Skill	25.96	6.03	22.09	6.57	28.10	4.35	ASD>LD; CP>LD
Agency	21.56	6.94	19.53	6.18	26.05	7.31	CP>ASD; CP>LD

Regarding the scores on Attitudes, teachers managing children with ASD (M=35.76, SD= 3.95) and teachers managing students with CP (M= 37.25, SD=3.77) had higher scores than those managing LD students (M=32.91, SD= 6.49). mainstream teachers with children with Cerebral Palsy had higher competence in handling their students on all four measures of competence, A followed by teachers with Autism Spectrum Disorder and those with students with learning disabilities. There were significant disparities between teachers who worked with students who had Cerebral Palsy and those who worked with students who had learning disabilities. Teachers who worked with students with Cerebral Palsy demonstrated much higher levels of agency competence than teachers who worked with students with ASD.

Hypothesis 2: *There will be a significant positive relationship between knowledge of neurodevelopmental disorders and competence in managing students with NDD.*

This hypothesis was examined using Pearson r. This is appropriate because the researcher tested a relationship between knowledge and dimensions of competence. The results are shown in Table 6 below.

Table 6

Inter-Correlation matrix of Knowledge of NDD, Attitude, Knowledge, Skill, Agency and overall competence (n = 113)

Study variables	1	2	3	4	5	6
1.Knowledge ASD	-					
2. Attitude	.23	-				
3. Knowledge	.46**	.71**	-			
4.Skill	.46**	.59**	.82**	-		
5. Agency	.41**	.41**	.69**	.69**	-	
6. Competence	.47**	.74**	.94**	.91**	.85**	-
1. Knowledge LD	-					
2. Attitude	.07	-				
3.Knowledge	.47**	.51**	-			
4.Skill	.54**	.45**	.73**	-		
5.Agency	.43**	.03	.37**	.56**	-	
6.Competence	.49**	.66**	.84**	.90**	.64**	-
1. Knowledge CP	-					
2. Attitude	.33	-				
3. Knowledge	.20	.64**	-			
4. Skill	.37	.82**	.65**	-		
5. Agency	.24	.65**	.80**	.61**	-	
6. Competence	.31	.84**	.90**	.84**	.91**	-

*p < .05 means significant at .05 level of significance

**p < .01 means significant at .05 level of significance

The table shows that, mainstream teachers' awareness of Autism Spectrum Disorder was found to have a significant positive relationship with knowledge, skill, and agency dimensions of competence, but not with attitude dimensions. Furthermore, their knowledge showed a significant positive relationship with total competence score in handling students with autism spectrum disorders. This indicates that although higher scores on the knowledge of ASD did not have any relationship with the scores on attitudes, those that acquired higher scores on knowledge of ASD also have higher scores on knowledge, skills and agency as well as total competence.

Also, there was no significant correlation between knowledge of learning disabilities and attitude among teachers managing children with learning disabilities. However, a significant positive correlation was found between knowledge of Learning disability and the knowledge dimension of competence, skill and agency as well as total or overall competence. This finding indicates that teachers who had higher knowledge of learning disabilities were also found to score high on the knowledge dimension of competence as well as higher levels of skill and agency. They also showed higher score on the total score of competence.

Results for mainstream teachers managing children with Cerebral Palsy was different from that of the other groups i.e., ASD and Learning disability. No statistical significant correlation was foundbetween knowledge of Cerebral Palsy and all the dimensions of the competence scale including knowledge, skill and Agency. There was also no significant correlation between knowledge of Cerebral Palsy and total competence. Teachers managing children with Cerebral Palsy's score on knowledge of Cerebral Palsy was found not to have any relationship with their competence and its dimensions.

Hypothesis 3: *There will be a significant positive relationship between the age of the teacher, the years of work experience and competence in managing the neurodevelopmental disorder.*

This hypothesis was examined using Pearson r. This is appropriate because the researcher tested a relationship between age, years of work experience and competence. The results are shown in Table 7 below.

Table 7

Descriptive and Correlations for Age Years of Experience and Competence

	Mean	Std. Deviation	1	2	3
1. Age	35.60	7.95	—		
2. Years of practice	8.87	6.98	.94**	—	
3. Competence	102.18	20.78	.23**	.17*	—

*p < .05, **p< .01, n = 113

Results from Table 7 show that there is a significant positive relationship between the age of mainstream teachers and competence in managing students with neurodevelopmental disorders. This implies that older mainstream teachers were more competent in managing students with neurodevelopmental disorders. There was a significant positive relationship between years of work experience and competence. This result suggests that competence is influence by years of service. Therefore, the hypothesis that '*There will be a significant positive relationship between age of the teacher, the years of work experience and competence in managing neurodevelopmental disorder*s was supported.

Hypothesis 4: *Knowledge of NDD will significantly predict competence*

A hierarchical multiple regression was conducted with Knowledge of Neurodevelopmental Disorders entered at the first step and competence entered at the second step. The findings for the regression analysis are displayed in Table 8 below.

Table 8

Hierarchical Multiple Regression of Knowledge of NDDs Predicting Competence while Controlling Teachers' Demographic Factors (Gender, Teaching Experience)

Step	Variables	*B*	Std. Error	β	*Sig*
1	(Constant)	3.61	97.44		.000
	Sex	4.00	.39	.01	.923
	Years of practice	.29	.51	.17	.077
2	(Constant)	3.74	86.58		.000
	Sex	3.55	-1.04	-.03	.771
	Years of practice	.25	.58	.19	.024*
	KnowledgeNDD	3.49	19.54	.47	.000*

Note. *p ≤ 0.05.

The first model was not statistically significant while the second model was found to be statistically significant. In the first step (R^2 = .03, *F* (2, 110) = 1.70, p = .188) both tearchers' gender (β=.01, p=.923). and teaching experience (β=.17, p=.077) did not statistically predict competence. In the second model (ΔR^2 = .22, F (1, 109) = 11.96, p < .001) after adjusting for gender and teaching experience, the significant predictors of competence were having higher knowledge of NDD (β = .47, p =.000) and having more years of teaching experience (β = -.19, p = .024).

4.3 Summary of Key Findings

Four hypotheses were tested in this study. Hypothesis one and two were confirmed and fully supported while hypothesis two was partially supported. Below is a summary of the findings:

1. There were significant differences in competence (attitude, knowledge, skill, and agency) among mainstream teachers with students with ASD, learning disabilities and Cerebral Palsy

2. There was a significant positive relationship between knowledge of neurodevelopmental disorders for ASD and Learning disability and competence in managing students with NDD but not for Cerebral Palsy.
3. There was a significant positive relationship between the age of the teacher, the years of work experience and competence in managing the neurodevelopmental disorder.
4. Knowledge of NDD and teachers' years of teaching experience significantly predicted competence.

CHAPTER FIVE

DISCUSSION

5.1. Introduction

This chapter provides elaborations, explanations and analytical comparisons of results with related studies and theories. It goes on to discuss the limitations and makes relevant recommendations for interventions, and future research. This study mainly investigates the knowledge and competence of mainstream teachers in managing children with neurodevelopmental disorders. It specifically examined the significant differences in the dimensions of competence which comprise attitude, knowledge, skill, and agency among mainstream teachers who are managing students with ASD, learning disability, and Cerebral Palsy. It finally assessed the relationship between the demographics of teachers including the age of the teacher, the years of work experience, and their level of competence in managing children with NDDs.

Knowledge levels of mainstream teachers regarding the neurodevelopmental condition they manage was analyzed. Results revealed that, teachers managing children with ASD and Cerebral Palsy had knowledge that was above an average level on the conditions they are managing. On the other hand, teachers managing children with Learning disability's knowledge of the condition was found to be below average levels. Higher level of ASD knowledge among mainstream teachers that was found in this study corroborate findings from other studies (e.g., Herwegen et al., 2019; Monico et al., 2018; Ribeiro, 2019) who found mainstream teachers manging children with ASD to be high in South Africa, Ghana and UK. Low levels of knowledge and understanding of ASD have however been shown in the literature from most parts of the African continent (Bello-Mojeed et al., 2014; Gomez-Mari et al., 2021; Ruparelia

et al., 2016). Also, lower rates of NDD knowledge have been revealed among teachers (Haimour & Obaidat, 2013; Liu, et al., 2016).

In Ghana, Ayoka (2018) also found low levels of ASD knowledge among mainstream teachers. The findings of this study contradict these studies, suggesting that, on average, Ghanaian mainstream instructors have a moderate level of knowledge on the subject of ASD and Cerebral Palsy in the mainstream educational institutions. The findings of this study indicate that teachers in Ghana's mainstream inclusive classrooms are now better informed on ASD and Cerebral Palsy than they were at the start of the policy, when most studies found them unprepared. (Agbenyega, 2007, Deku & Vanderpuye, 2017; Kunyini & Desai, 2007). Teachers' past encounter with the condition and amount of experience in the service may have impacted this and also the growing number of students with these disorders in mainstream schools may have substantially sensitized them, resulting in their increased level of knowledge (Gomez-Mari et al., 2021; Monico et al., 2018)

Although these findings are positive, it is crucial to note with concern that mainstream instructors in this study have a lower level of knowledge of Learning Disability. They had very little awareness of the condition, which is consistent with many other studies that have found NDD knowledge to be poor across the world. For instance, a study by Bassim et al. (2019) found that, teachers lacked adequate knowledge about the concept and causes of Learning Disability. Also, Deena et al. (2019) in their study also showed that majority of teachers fell within average to low knowledge levels of Learning Disability. This may be due to the confusing nature of Learning Disability to teachers as stated by Mehta (2006). This is because they barely exhibit physiological symptoms and can be mistaken with other children with learning difficulties thus accounting for teachers' difficulty understanding the concept and exact manifestation of Learning Disability in the mainstream classroom.

Further, competence levels were measured at the adaptive, reproductive and optimal levels and mainstream teachers generally fell under the reproductive level. This level of competence signifies a conditional compliance readiness towards inclusion for children with NDDs. There is the presence of a low motivation level to acquire knowledge in the field to aid in a better management of children with disabilities. Also, teachers on this level possess undifferentiated theoretical concepts of inclusive education and poor digestion methods in solving professional problems in the system of inclusive education (Zulfija et al., 2013). Forty-five teachers, making 39.8% of the sample of this study identified with the optimal stage of competence which reflects readiness to inclusive education for children with disabilities and also awareness, reflexivity, and autonomy in finding solutions to the educational and professional goals (Zulfija et al., 2013). As further stated by Zulfija et al. (2013), teachers at this level have understanding of key concepts and accept of the ideology of inclusive education, have personal orientation and direction of consciousness to inclusion and a comprehensive, in-depth knowledge about the peculiarities of working with children with NDDs. This is consistent with several other studies (e.g., Agbenyega, 2007; Zulfija et al., 2013) who found the presence of a weak motivation and a conditional compliance for the implementation of inclusive education.

The current study tested several hypotheses. The first hypothesis focused on whether there is a statistically significant difference in competence i.e., attitude, knowledge, skill, and agency among mainstream teachers with students managing students with ASD, learning disability, and Cerebral Palsy. This hypothesis was confirmed indicating differences in the mean scores of mainstream teachers managing children with NDDs on attitudes knowledge, skill and Agency with teachers managing children with Cerebral Palsy appearing higher on all dimensions of competence. This implies that, although, majority of teachers share in a positive attitude toward inclusion for children with NDDs, teachers managing children with Cerebral Palsy were found

to have more positive attitude compared to the other teachers. They also support the idea that inclusive is beneficial in making students more confident, socialize more, reducing stigmatization and providing the opportunity for learning improvement. Generally, teachers also believe in the reformation inclusive education gives to the education system in Ghana. (Guanglun et al., 2015).

On the knowledge dimension of competence, mainstream teachers were generally within the reproductive stage as well implying average levels of knowledge of the pedagogies of inclusion for children with NDDs. Most teachers on this dimension partially know the principles and methods of teaching students with NDDs and the local regulations and the institutions of inclusive education. According to Guanglun et al. (2015), teachers who fall on this level under this dimension have difficulty understanding the psychological and behavioural characteristics of students with NDDs in their classrooms and also have difficulty with assessment of these students. Also, the practice and implementation of inclusion as well as its theories are partially known among most teachers. This is consistent with the findings of the study by Venkova and McGarraghy (2014) who find out that awareness of inclusion among teachers is high generally, but the specifics of how to address and manage students with the conditions to be less known. These average levels of knowledge however show improvement as compared to earlier studies which showed little to no knowledge (e.g., Mprah et al., 2016; Vanderpuye et al., 2018) and can be explained in light of the fact that inclusive education and varied learning demands have been incorporated into many teacher-training, undergraduate and graduate-level education programs across the country (Rebeiro, 2019).

Another component of competence assessed in this research is the skill of the mainstream teachers in handling students with NDD. This is explained by Guanglun et al. (2015), to be teachers' ability to optimize the learning experience of students with NDDs by enabling them

to learn from other students, working with other professionals to teach them, designing a flexible coursework for these students and adjusting teaching objectives to suit their needs. Teachers managing children with Cerebral Palsy exhibited adequate skill level as well as those managing students with ASD. Teachers of students with Learning Disability however demonstrated low skill levels. These results can be linked with the knowledge levels of the condition they encounter discussed earlier in this chapter.

It was observed that teachers of ASD and Cerebral Palsy having higher knowledge knowledge levels affects their skills set in properly managing them which is unlike that of those with LD students. They demonstrated low knowledge levels at the same time low skill level. Although various researchers have found mainstream teachers to have inadequate skill sets to cater to their students with NDDs and posit that specialized schoolteachers are better (Vanderpuye et al., 2018), this study found that mainstream teachers of children with ASD and Cerebral Palsy possess a good level of the requisite skills to deal with students with NDD's. Delving into the specifics, teachers catering for students with Cerebral Palsy were identified to be more skilful and industrious in managing their students compared with their compatriots. This means that these teachers adapt to different modes of instruction to suit the students, are better at classroom management, can modify the curriculum, and are ready to learn and develop themselves to meet the challenges of their students.

Moreover, Liu et al. (2016) assert that although LRC practices have made significant progress over the past decades, there remains a lack of systematic support and resources for LRCs. Whilst this is consistent with many other researchers, this research found that mainstream teachers generally partially were willing to seek resources, support, and help from psychologists, special needs teachers, and other professionals more prolific in the subject area. Specifically, this research found that mainstream teachers were catering to students with Cerebral Palsy are likely

to seek more resources to help their students than teachers catering for ASD. The same can be said for teachers of ASD as against teachers of LD.

Despite previous studies finding that mainstream teachers are limited in their knowledge of NDD', have insufficient skills to support them, and are less likely to seek resources, this research work found that mainstream teachers do have some level of skills and that exceptional cases of learner's disability are covered in training colleges. Suffice it to say, teachers who teach children with Cerebral Palsy appeared superior on all the dimensions of competence, having stronger positive attitudes, more knowledgeable, highly skilful, and more enthused to improve on their practice compared to teachers who manage students with ASD and Learning Disability. The study revealed that the difference in competence among mainstream teachers of students with NDD's assessed was statistically significant, this is supported by the findings in the works of Haimour and Obaidat (2013) and Gomez-Mari et al. (2021).

Again, the second hypothesis of the study tested relationship between the knowledge teachers of NDDs and their level of competence. Significant corelations were established between knowledge of NDD and skills, pedagogical knowledge and agency but not the attitude dimension. This showed that while having a greater knowledge of ASD score did not correlate with having a good attitude, those who had a higher knowledge of ASD score also had higher competence, were more educated, highly skilled, and more reflective in their practice. Teachers who work with children with Learning Disabilities established similar outcomes. They also had a significant positive relationship between their understanding of Learning Disabilities and their total competence level, as well as the knowledge, skill, and agency components of competence. These findings are consistent with several other studies (e.g., Johnson et al., 2013; Lara-Cruz et al., 2020). There was however no significant correlation between their knowledge of NDD and their attitude dimension of competence. The outcomes of mainstream teachers managing

children with Cerebral Palsy was however dissimilar to that of the other groups i.e., ASD and Learning Disability. No significant correlations were established between their knowledge of Cerebral Palsy and any of the dimensions on the competence scale as well as total competence.

Teachers' knowledge of NDDs have been proven by other researchers to be related with their competence and the findings among mainstream teachers of children with ASD and Learning Disability strongly corroborates those studies (Ahsan et al., 2013; Lara-Cruz et al., 2020; Savolainen et al., 2012; Sharma & Jacobs 2016). The non-significant relationship is not surprising as, Savolainen et al. (2020) found in their study They found that, although competence had a positive effect on attitudes, it did was not same for vice versa. Moreover, Bukvic (2014) revealed that teachers who had positive attitudes about inclusive education reported their inability to accept children with conditions if they were to make a choice.

The third hypothesis tested whether teacher sociodemographic variables such as teaching experience and age would be significantly correlated with levels of competence. This was hypothesized based on other researches around the globe; Ghana (Deku & Vanderpuye 2017), China (Liu et al., 2016), and Saudi Arabia (Haimour & Obaidat, 2013). This was supported and is consistent with the growing body of research attesting to and confirming the link between teaching experience and knowledge of NDD (Johnson et al., 2013; Lian et al., 2008), In addition, this finding would be the one to substantially account for the differences witnessed in mainstream teachers' knowledge on NDD's. The results of the current study point to the fact that older mainstream teachers were more competent in managing students with neurodevelopmental disorders given a positive and significant relationship between years of work experience and competence.

The final hypothesis was to test the effect of teachers' knowledge of NDD on competence while controlling for age, gender, and teaching experience. Teachers' knowledge of the condition they are managing, as well as their years of teaching experience, were found to predict their competence. As a result, it can be deduced that having a better understanding of the neurodevelopmental disorder leads to greater competence. Teacher competence is also enhanced by having more years of teaching experience. This can be explained by the fact that teachers who have a better understanding of the causes, manifestations, and management of the condition they are managing are better able to manage their students' various needs in an inclusive setting. Many other researchers have made similar discoveries, so this finding is not surprising. For example, Ahsan et al. (2013), Alnahdi and Schwab (2021), and Kristiana (2018) all suggest that knowledge, experience, attitudes, and interactions with children with disabilities are specific predictors of teacher self-efficacy and competence. Furthermore, it has been discovered that frequent contact with children with NDDs improves teacher competence, as they become better informed, more skilled, and develop more empathy to help these children succeed in school (Gomez-Mari et al., 2021; Kurniawati et al., 2012). Alnahdi & Schwab (2021) go on to say that teacher efficacy is unaffected by gender, which supports the current study's findings.

The theory of planned behavior (Ajzen, 1991), which provides a useful framework for analyzing the relationship between teacher attitudes toward inclusion and the execution of competence in managing them, is used to frame this research. Though this theory is not extensively employed in educational settings, it has been used in studies to predict teachers' usage of cooperative learning in the classroom as well as the relationship between teacher attitudes toward inclusive education and self-efficacy (Kunyini & Desai, 2007; Lumpe et al., 1998). Other variables indicated to predict the execution of competence in behavior were combined in this study, and

the idea was found to have strong support. According to Ajzen (1991) and Fishbein and Cappella (2006), perceived behavioral control is conceptualised as teacher efficacy and was measured as an outcome variable in this study, which is determined by attitudes, subjective beliefs, and perceived behavioral control (MacFarlane & Marks, 2013). This study's findings support the theory's premise of knowledge as a predictor of competence. In this study, teachers' knowledge was found to be improved by their ages and teaching experience, all of which were also found to increase competence. Furthermore, higher levels of teacher attitudes for inclusive education were discovered in the current study, leading to a better overall level of competence. These results can be explained using the premise of the theory that positive attitudes help to produce positive behaviors.

5.2 Implications for Practice and Policy

This study contributes to the establishment of the current state of inclusive education practice in Ghana by ascertaining the level of knowledge of teachers on specific disorders and their level of competence.

In essence, the primary implication of this study is that it contributes to the limited research resource on inclusive education and neurodevelopmental disorders in Ghana. At the time of this research, no study had particularly assessed knowledge and competence levels of mainstream teachers manging children with neurodevelopmental disorders in the country. The results of this study are thus essential they provide critical empirical data regarding inclusion for children with NDDs and answer the prudent call for the advancement in research on inclusion for the IEP reformation as the policy is still under review.

A major implication of the results of this study for policy is the positive representation of mainstream teachers of children with NDDs. The results of this study contrast previous research results (Agbenyega & Deku, 2011, Kunyini & Desai 2007) which portrayed unpreparedness of

teachers for inclusivity in Ghana. The impact of experience in advancement of teachers from lower levels of knowledge and competence to an average to high levels reflects their capacity for growth and improvement with the policy. The future of inclusive education is thus seen as promising and will require sustainable efforts within the policy to attaining its goals. Teachers are identified to be adequately equipped to manage children with NDDs and thus empirically supports the idea that they are to be involved in identification and diagnosis of students with disorders and mentioned by (Alali et al., 2020; Department of Basic Education, 2016) Considering the fact that they are within the average levels of performance teachers' continuous development assistance programs be incorporated into policy to ensure a proper tracking of progress with the IEP. This study provides a call for policy makers to highlight the specific roles of other stakeholders e.g., psychologists, parents, medical practitioners etc in assisting teachers in identification of students with NDD, delivery of coursework and evaluation of students in the framework of the policy. Teacher monitoring and evaluation system should also be developed as part of the policy to ensure a more systematic tracking of teacher progress within the policy.

This study also has implications for practice. The outcomes of this study highlight the necessity of comprehensive in-service training for mainstream schoolteachers. The involvement of Ghana education service, headteachers, special needs coordinators and other supervisory bodies, in in-service training of teachers, and implementing mechanisms to ensure identification, management, and facilitation of provision, and the importance of implementing mechanisms at the local level to ensure identification, management, and facilitation of provision of classroom care. A handbook or module on managing NDDs can be made available for all teachers to refer to them once they encounter any in an academic year. Teacher agency, one dimension of competence was found to be low among many teachers in this study. It thus needs to be

encouraged. As stated by Guanglun et al. (2015) teachers' personal initiative to seek resources and consider the point of view of significant others helps to disentangle perplexities surrounding the IEP.

5.3 Limitations

The finding of this study though providing substantial insights into knowledge and competence of mainstream teachers managing children with Neurodevelopmental Disorders, it is not without limitations as with all other studies. Firstly, a small number of teachers were sampled under each neurodevelopmental condition and for the overall study. COVID-91 measures instituted in schools may have hampered participants' access and response rate. Visitors were not allowed into some schools, and most schools had shorter school hours. Secondly, self-report measures used is likely to make participants sampled to be susceptible to social desirability bias on competence. This suggests that they may have responded to the questions to present themselves in a favourable way thereby making their scores higher.

5.4 Recommendations for future research

Firstly, a replication of this study sampling a higher number of mainstream teachers is recommended to increase reliability and validity of this study and also to ensure a more representative sample. Studies may also consider the use of other standardized measures, to assess teachers in mainstream schools

Also, other sources in information are recommended to be used to ascertain knowledge and competence of mainstream teachers in Ghana such as observations, critical incident reports and open-ended subjective questions.

5.5 Conclusion

According to the findings of this study, mainstream teachers have made significant and commendable progress over the years in their knowledge and competence levels in managing children with NDDs however, still have opportunities for enhancement. This therefore serves as a rallying cry for all other stakeholders, including parents, the ministry of education, community agents, mental health professionals, and special education educators to strengthen their support for teachers. This can be accomplished through comprehensive pre-service and in-service training, resource provision and effective collaboration and systematic monitoring and evaluation of progress. Effective collaboration among these entities has the potential of bringing about optimum development of these children to benefit them, their families, the society, the nation as a whole.

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APPENDICES

APPENDIX I- ETHICAL APPROVAL LETTER

UNIVERSITY OF GHANA
ETHICS COMMITTEE FOR THE HUMANITIES (ECH)

P. O. Box LG 74, Legon, Accra, Ghana

My Ref. No…ECH 159/ 20-21 …

June 9, 2021.

Valda Deide Commey
Department of Psychology
University of Ghana
Legon

ETHICAL CLEARANCE
(ECH 159/ 20-21)

The protocol title below has been reviewed and approved by the ECH Committee.

TITLE OF PROTOCOL: **ASSESSING KNOWLEDGE AND COMPETENCE OF TEACHERS IN MANAGING CHILDREN WITH NEURODEVELOPMENTAL DISORDERS IN MAINSTREAM INSTITUTIONS**

PRINCIPAL INVESTIGATOR: **VALDA DEIDE COMMEY**

Please note that the final review report must be submitted to the Committee at the completion of the study. Your research records may be audited at any time during or after the implementation. Any modification of this research project must be submitted to ECH for review and approval prior to implementation.

Please report all serious adverse events related to this study to ECH within seven (7) days verbally and in writing within fourteen (14) days.

This certificate is valid till June 8, 2022. You are to submit annual reports for continuing review.

Please accept my congratulations.

Yours Sincerely,

Professor C. Charles Mate-Kole
ECH Chair

Cc: Dr. Mabel Oti-Boadi, Department of Psychology, UG
Dr. Benjamin Amponsah, Department of Psychology, UG

Tel: +233-303933866 Email: ech@ug.edu.gh

APPENDIX II- CONSENT FORM

UNIVERSITY OF GHANA

Official Use only
Protocol number

Ethics Committee for Humanities (ECH)

PROTOCOL CONSENT FORM

Section A- BACKGROUND INFORMATION

Title of Study:	Assessing Knowledge and Competence of Teachers in Managing Children with Neurodevelopmental Disorders in Mainstream Institutions
Principal Investigator:	Valda Deide Commey
Certified Protocol Number	

Section B– CONSENT TO PARTICIPATE IN RESEARCH

General Information about Research

Your participation is requested for this study which is purposed to obtain your knowledge as a mainstream schoolteacher of the neurodevelopmental Disorder you have encountered or currently handling. The research also seeks to assess your competence in managing these children. The questionnaire will take about 20 to 30 minutes for you to complete. Kindly read the questionnaire and indicate the extent to which you agree or disagree with each statement by circling the most appropriate answer that applies to you

Benefits/Risks of the study

There will be no risks involved in this study. Results from this study will help reform inclusive education policy in Ghana and also help design a suitable training program for you and other teachers for the practice of inclusive education.

Confidentiality

You are assured that data gathered during this research will not be shared with any other person apart from my supervisors. You will also not be required to indicate your name or the name of the school in which you practice. The data collected will be analyzed and results published in an academic journal. However, there will be no link between the results and the identity of the participants.

Compensation

This research is solely academic in nature and as such there will be no compensation packages either in cash or kind available for participants who participate in this study.

Withdrawal from Study

Participation is voluntary and you may withdraw at any time without penalty. You will not be adversely affected if you decline to participate or later stop participating. Your legal representative will be informed promptly if information becomes available that may be relevant to your willingness to continue participation or withdraw.

Contact for Additional Information

- For additional information and inquiry, please contact the researcher via;
  Valda Deide Commey
  University of Ghana, Psychology Department
  0553572833 naadeide97@gmail.com
- If you have any questions about your rights as a research participant in this study you may contact the Administrator of the Ethics Committee for Humanities, ISSER, the University of Ghana at ech@ug.edu.gh or 00233- 303-933-866.

Section C- PARTICIPANT AGREEMENT

"I have read or have had someone read all of the above, asked questions, received answers regarding participation in this study, and am willing to give consent for me, my child/ward to participate in this study. I will not have waived any of my rights by signing this consent form. Upon signing this consent form, I will receive a copy for my records."

_____

Signature or mark of Participant Date

APPENDIX III- SECTION A: DEMOGRAPHIC INFORMATION

This survey is conducted for academic purposes. There are no right or wrong answers. Please read carefully over the items and choose the best-fit answer.

AGE: _____

SEX: MALE- ☐ FEMALE ☐

INSTITUTION CATEGORY: PRIVATE/ PUBLIC

LOCATION: _____

CLASS OF PRACTICE: _____ **RANK:** _____

YEARS OF PRACTICE: _____

NDD CONDITION ENCOUNTERED: _____

HIGHEST EDUCATION LEVEL: _____

APPENDIX IV- SECTION B: LRC TEACHER COMPETENCE SCALE

For each question, please indicate the extent to which you agree or disagree: Strongly agree (1), Agree (2), Neither agree nor disagree (3), Disagree (4), Strongly disagree (5)

NO.	ITEM	1	2	3	4	5
1	As students without disorders, students with NDDs are entitled to receive an education.					
2	Inclusive education makes students with NDDs more confident.					
3	I am confident to provide good teaching to students with NDDs in my class.					
4	Inclusive Education helps students with NDDs to socialize with others.					
5	Inclusive Education helps to reduce social discrimination against people with NDDs.					
6	Through Inclusive Education, students with NDDs can have the opportunity for learning improvement.					
7	Inclusive Education helps teachers to pay closer attention to differences amongst individual students					
8	Inclusive Education urges school reform and improves school quality.					
9	I know the principles and methods of teaching students with NDDs.					
10	I know the local regulations and institutions of Inclusive Education					
11	I understand the psychological and behavioural characteristics of the students with NDDs in my class.					
12	I know how to assess my teaching of students with NDDs					
13	I know the practices and implementations associated with Inclusive Education					
14	I understand the theories about Inclusive Education.					
15	I can make students with and without NDDs help and learn from each other through Inclusive Education					
16	I can work collaboratively with other teachers and professionals to teach students with NDDs.					
17	I can design flexible coursework and individual assessment for students with NDDs.					

18	I can adjust teaching objectives according to the characteristics of students with NDDs.					
19	I can arrange group discussions and collaborative learning to help students with NDDs.					
20	I can use the Individualized Education Program to address the learning needs of students with disabilities.					
21	I can effectively conduct behavioural management for students with NDDs.					
22	I can work effectively with parents to help students with NDDs.					
23	I actively negotiate with leaders at various levels to support Inclusive Education					
24	I actively seek help and advice from teachers in special schools.					
25	I establish connections with professionals to get advice and service (e.g., Medical and Speech Therapy).					
26	I can use resource rooms to help students with NDDs.					
27	I negotiate with communities to support my teaching.					
28	I can acquire useful equipment to support my teaching					

APPENDIX V- SECTION C: ASD KNOWLEDGE SCALE

For each question, please indicate whether it is TRUE, FALSE or you DON'T KNOW

NO.	ITEM	True	False	Don't Know
1	Most children with Autism have an intellectual disability			
2	Autism disorder is usually diagnosed during the first three years of the child's age			
3	Children with Autism usually manifest special abilities like drawing and facts and figures remembering			
4	Children must exhibit impaired social interaction and language communication to be diagnosed with Autism			
5	Autism is a developmental disorder			
6	With proper intervention, most children with Autism disorder will eventually "outgrow" the disorder			
7	Most autistic children do not talk			
8	The majority of children with Autism are female			
9	Children with Autism do not make any visual communication during a conversation with others			
10	Most children with Autism have a problem with imaginary playing			
11	Some children with Autism have high or low sensitivity of visual, auditory, tactile, or olfactory stimuli			
12	Autism disorder is diagnosed by medical methods			
13	Behavioural patterns in children with Autism are similar			
14	We can diagnose Autism disorder depending on physical features.			
15	Behavioural intervention is considered the most effective treatment method of Autism			
16	In many cases, the cause of Autism disorder is unknown			
17	Children with Autism tend to be auditory learners			
18	Some children with Autism demonstrate inconsistency in motor skills			

NO.	ITEM	True	False	Don't Know
19	Poor parenting practices can cause Autism disorder			
20	children with Autism behave better only in organized educational environments			
21	If a particular method of treatment achieved effective results with some children with Autism, then it is necessarily effective with all children with Autism.			
22	Autism could be associated with Epilepsy			
23	Autistic children prefer routine activities			
24	A child with Autism appears like a deaf			
25	Autism disorder can be diagnosed through behavioural observation			
26	Medication can alleviate the core symptoms of Autism disorder			
27	Genetic factors play an important role as a cause of Autism disorder			
28	Children with Autism frequently repeat the talk they hear			
29	Generally, children with Autism understand the feelings and emotions of others.			
30	Children with Autism demonstrate stereotypical behaviours like fluttering			

APPENDIX VI- SECTION C: Knowledge of Cerebral Palsy Questionnaire (KCPQ)

For each question, please indicate whether it is TRUE, FALSE or you DON'T KNOW

NO.	ITEM	True	False	Don't Know
1	Cerebral palsy is caused by injury to the developing brain.			
2	Children with cerebral palsy are at a high risk of suffering from seizures/epilepsy.			
3	Children with cerebral palsy may attain developmental milestones, such as rolling, sitting, at a late stage when compared to children of similar age.			
4	Difficulties during the childbirth process, such as prolonged labour, may predispose the child to acquire cerebral palsy.			
5	A child may develop cerebral palsy if they do not cry soon after birth.			
6	Cerebral palsy may be a result of witchcraft.			
7	If a pregnant woman is promiscuous during pregnancy, it may lead to the child acquiring cerebral palsy			
8	Cerebral palsy may be a result of punishment by ancestral spirits.			
9	If a child suffers from jaundice after birth, they may have a high chance of acquiring cerebral palsy.			
10	Most children with the cerebral palsy present with stiff limbs or muscles.			
11	Children with cerebral palsy may have floppy limbs			
12	Children with cerebral palsy may have difficulties in learning.			
13	Some children with severe cerebral palsy may have difficulties with chewing and feeding.			
14	Saliva drooling can persist in children with cerebral palsy.			
15	Cerebral palsy can be cured.			
16	Exercises are important in the management of a child with cerebral palsy.			
17	Assistive devices such as corner sit maybe recommended in the management of a child with cerebral palsy			

NO.	ITEM	True	False	Don't Know
18	Rehabilitation professionals may assist in training children with cerebral palsy in daily activities, such as feeding, grooming among others.			
19	Participation in self-help groups to share ideas and experiences with caregivers of children with cerebral palsy is essential.			
20	If a child with cerebral palsy gets early treatment, they are likely to improve more.			

APPENDIX VII- SECTION C: LEARNING DISABILITY KNOWLEDGE QUESTIONNAIRE (LDKQ)

For each question, please indicate whether it is TRUE, FALSE or you DON'T KNOW

NO.	ITEM	True	False	Don't Know
1	People with a learning disability have significantly low intelligence			
2	People with a learning disability need support with everyday living			
3	A learning disability is not acquired during childhood			
4	A learning disability cannot be inherited			
5	A virus cannot cause a learning disability			
6	Most people with a learning disability live in residential care			
7	Sexual problems are more common in people with a learning disability			
8	The law for people with a learning disability is the same as for everyone.			
9	A learning disability and a learning difficulty are not the same things.			
10	A learning disability is not a type of mental illness.			
11	Autism is not a type of learning disability.			
12	Eyesight problems are more common in people with a learning disability			
13	A learning disability cannot be cured.			
14	Hyperactivity is a type of learning disability.			
15	Dyslexia is a type of learning disability.			
16	Hearing problems are more common in people with a learning disability			
17	Mental retardation and learning disability are not the same things.			
18	All people have a learning disability to some degree			
19	A head injury cannot cause a learning disability			

NO.	ITEM	True	False	Don't Know
20	Behaviour problems are not more common in people with a learning disability			
21	Epilepsy is more common in people with a learning disability.			
22	People with a learning disability can get married.			
23	It is not against the law for people with a learning disability to drive a car.			
24	Health problems are not more common in people with a learning disability.			
25	Communication problems are more common in people with a learning disability.			
26	People with a learning disability have the same rights as the general population.			
27	There are more women than men with a learning disability			
28	A learning disability can be diagnosed with a brain scan.			
29	Nutritional problems are more common in people with a learning disability.			
30	Mobility problems are not more common in people with a learning disability.			

APPENDIX VIII- GES INTRODUCTORY LETTER

GHANA EDUCATION SERVICE

In case of reply the number and date of this Letter should be quoted

My Ref. No. GES/LaNNM/34/Vol4/79
Your Ref. No......

REPUBLIC OF GHANA

MUNICIPAL EDUCATION OFFICE
LA NKWANTANANG-MADINA
P.O.BOX MD 545
MADINA

12TH JULY, 2021

ALL HEADTEACHERS
PUBLIC & PRIVATE BASIC SCHOOLS
LA NKWANTANANG-MADINA MUNICIPAL
MADINA

LETTER OF INTRODUCTION

I write to introduce to you Miss. Valda Deide Commey, an MPhil. Level 200 Degree student from the University of Ghana, Legon.

Miss. Valda Deide Commey has to write and submit an original thesis on the topic: '**Assessing Knowledge and Competence of Teachers in Managing Neurodevelopment disorders in Mainstream Institutions'.**

To enable her collect data, she would like to administer questionnaires and or conduct interviews. Heads are by this letter being requested to make the necessary arrangements to help her conduct her research, taking into consideration the observance of all COVID - 19 safety protocols.

It must however be noted that the conduct of this research should not affect instructional hours unduly.

.....

ANGELA FRIMPOMAA NKANSAH (MS.)
MUN. DIRECTOR OF EDUCATION
LA NKWANTANANG-MADINA

Cc:

Prof. Joseph Safo, Head of Department, College of Humanities, UG, Legon
All SISOs, LANMMED
Miss. Valda Deide Commey,

INTEGRI PROCEDAMUS

Email:gesgarlanmmeo13@gmail.com *TEL: 0245502009/0204354060*

GHANA EDUCATION SERVICE

In case of reply the number and date of this letter should be quoted .

My Ref. No : GES/ER/ANMO/MC:4429
Your Ref. No.:.....

REPUBLIC OF GHANA

MUNICIPAL EDUCATION OFFICE
P. O. BOX 102
AKROPONG AKUAPEM-NORTH

18TH JULY, 2021

TO WHOM IT MAY CONCERN

INTRODUCTORY LETTER
MISS VALDA DEIDE COMMEY

I write to introduce to you the above named Mphil Psychology student from the University of Ghana (Legon).

She would like to collect data for her research on "Assessing Knowledge and competence of Teachers in Managing Children with Neurodevelopmental Disorders from both Private and Government schools in the Municipality.

Kindly grant her the needed assistance.

Thank you.

.....Amanor.....
ELIZABETH KORKOR AMANOR (MS)
MUNICIPAL DIRECTOR OF EDUCATION
AKUAPEM-NORTH

INTEGRI PROCEDAMUS

APPENDIX IX: LIST OF SCHOOLS VISITED

NO.	NAME OF SCHOOL	LOCATION	LD	ASD	CP
1	Medina Cluster of Schools	La Nkwantanag Madina	4	1	3
2	La Nkwatanang Cluster of Schools	La Nkwantanag Madina	5	3	1
3	Madina Fire Armour Cluster of Schools	La Nkwantanag Madina	8	0	0
4	Umar Bun Hatab (UBH) Islamic school-Madina	Madina Zongo	7	2	0
5	Hannah School Complex-Madina	Madina		1	0
6	Presec Staff Cluster of Schools	Presec Cluster	2	1	2
7	Madina Islamic School	Madina Islamic	2	2	1
8	Elim Cluster of Schools	Madina			1
9	EP Basic School Madina	Madina	1		
10	Dome Cluster of schools	Dome Kwabenya	3	2	
11	Nifa Basic School	Adukrom Akuapem	1		
12	Akuapem Hills Preparatory School	Akropong Akuapem	1	1	
13	Adukrom Methodist Basic School	Adukrom Akuapem		4	
14	Akropong Methodist Basic School	Akropong Akuapem		2	
15	Okuapemman M/A Basic School	Akropong Akuapem		1	
16	Akropong Presby Primary School	Akropong Akuapem		2	1
17	Krutiase D/A Basic School	Adukrom Akuapem	1		
18	Kokormu Basic School	Kokormu Akuapem North	1		2
19	Adawso Basic School	Adawso Akuapem North	1		1
20	Tinkong Presby Basic School	Tinkong Akuapem North	1	2	2
21	Trinity Presby Model School	Adweso Koforidua E/R		3	1
22	Okorase Methodist Basic School	Okorase Akuapem North	2	2	
23	Dodowa Presby Basic School	Dodowa	2	2	
24	The Lord's Pentecoatal School	Kwashieman			1
25	Wesley International School	Koforidua E/R	2		
26	Aspire International School	Okorase Akuapem North		1	
27	Herman Gmeiner School	Tema		4	1
28	My First Step International	East Airport		2	
29	Mother's Nest International	Cantoments	2		2
30	St Thomas Preparatory School LA	Abeka Accra		5	
31	Adenta Community School	Adenta	1	3	
32	New legon International school	Adenta		1	
33	Cosmos Schools Limited	Lapaz Accra	3	2	1
34	Riis Presby Model School	Betom Koforidua E/R		1	
35	Nsukwao M/A Basic School	Koforidua E/R	8		
36	PWCE Demonstration basic school	Aburi	1	2	
37	Nyamebekyere Basic School	Nyamebekyere Akuapem North	1	1	1
38	Crown Prince Academy	Lapaz Accra		1	

39	ashaley botwe Sowa Din Cluster Of Schools	Madina		1	2
40	Globen School	Lapaz Accra	1	1	
41	mamfe presby	Mamfe Akuapem			2
42	Vine Christian School	East Legon Accra			1
43	konko D/A JHS	Konko AkuapemNorth			2
44	Sons of God preparatory	Tinkong Akuapem North		1	
45	Adweso Mile 50 M/A Basic School	Koforidua E/R		1	
46	Mampong Presby Primary 'A' School	Mampong Akuapem	1	2	
			62	60	28