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POST GRADUATE SCHOOL FOR  
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DOCTORAL UNIT OF RESEARCH AND  
TRAINING IN SCIENCE OF EDUCATION  
AND EDUCATIONAL ENGINEERING

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SPECIAL EDUCATION

# LEARNING METHOD AND COGNITIVE CAPACITY OF AUTISTIC PUPILS: THE CASE OF AN AUTISTIC PUPIL OF BSC LA MARFEE MARIE CLAIRE NOAH-ETOUDI.

Thesis presented in order to obtain a Master's Degree in Special Education (EDS)

Option : Professional Psychopedagogue in Mental Skills

BY

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September 2024

**CERTIFICATION**

We undersigned hereby certify that the Thesis entitled “Learning method and cognitive capacity of austistics students: the case of autistic student of BSC La Marfee Marie Claire Noah Etoudi”. Summited to the department of specialized education in the faculty of education in the University of Yaounde I was carried by FONKPU Celestine DINNYUY matricule 21V3510, under our supervision. The work has been properly referenced and acknowledged to ensure that the work is original and does not to the best of our knowledged, breach any law of copyright.

**THE DEAN****HEAD OF DEPARTMENT****SUPERVISOR****Dr IGOUI MOUNANG Gilbert**

## **DEDICATION**

**To**

**FONKPU Ella James Mckeen, our son, and to the entire family of FONKPU**

## ACKNOWLEDGEMENT

This master thesis could not be accomplished without the help and support I received from several important persons in my life whom I am about to mention below:

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## ABSTRACT

This thesis investigates the influence of the cooperative learning method on the cognitive capacity of autistic pupils, focussing on a case study at La Marfee Marie Claire Naoh School in Yaounde, Cameroon. The research was inspired by our experience as teachers in mainstream school in Yaounde, where including autistic learners posed numerous challenges. The principle research question is: What influence does the cooperative learning method have on the cognitive capacity of autistic pupils at La Marfee Marie Claire Noah? A qualitative case study approach was adopted. Data were collected through classroom observation, structured interviews with Ali's teachers, parents, peers and analysis of schoolwork and behavioural changes.

Findings reveal that the cooperative learning method had a positive and measurable impact on Ali's cognitive development. Improvements were observed in attention, working memory, verbal communication, social interaction and problem-solving skills. Interviews with parents and classmates confirmed a marked change in his learning engagement and social inclusion. The study concludes that cooperative learning is an effective pedagogical approach that promotes inclusive education by fostering peer interaction and cognitive development among autistic Pupils. These findings support its broader implementation in mainstream classrooms in Cameroon and similar educational context.

**KeyWords.** Autism, Cooperative Learning, Cognitive development.

## RÉSUMÉ

Ce mémoire exploire l'influence de la méthode d'apprentissage coopératif sur la capacité cognitive des élèves autistes, à travers une étude de cas menée à l'école La Marfée Marie Claire Noah de Yaoundé, au Cameroun. Cette recherche est née de notre expérience en tant qu'enseignants dans une école ordinaire à Yaoundé, confrontée aux défis liés à l'inclusion des élèves autistes. La question centrale est : Quelle influence la méthode d'apprentissage coopératif exerce-t-elle sur la capacité cognitive des élèves autistes de La Marfée Marie Claire Noah ? Une approche qualitative par étude de cas a été recueillie par observation en classe, entretiens structurés avec les enseignants, les parents et les camarades d'Ali, ainsi que par l'analyse de ses productions scolaires et comportements.

Les résultats montrent que l'apprentissage coopératif a eu un impact positif d'Ali. Des améliorations notables ont été enregistrées au niveau de l'attention, de la mémoire de travail, de la communication verbale, de l'interaction sociale et de la résolution de problèmes. Les témoignages des parents et des pairs d'Ali ont confirmé un changement significatif dans son engagement scolaire et son intégration sociale. L'étude conclut que l'apprentissage coopératif est une méthode pédagogique efficace qui favorise l'éducation inclusive en stimulant les interactions entre pairs et les fonctions cognitives des élèves autistes. Ces résultats appuient son intégration dans les classes ordinaires au Cameroun et dans des contextes éducatifs similaires.

**Mots-Clés :** Autisme, apprentissage coopératif, développement cognitif,

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## ABREVIATIONS

**ABA:** Applied Behavior Analysis

**TEACCH:** Treatment and Education of Autistic and Communication Handicapped Children.

**PECS:** The Picture Exchange Communication System.

**APA:** American Psychiatric Association

**ASRS:** ADHD Self Report Screener

**ADHD:** Attention Deficit Hyperactivity Disorder

**BOLD:** Blood Oxygenation Level Dependent

**CDA:** Contralateral Delay Activity

**DASS:** Depression Anxiety Stress Scale

**DSM:** Electroencephalography<sup>22</sup>

**ERN:** Error Related Potential

**IQ:** Intelligent Quotient

**ABC:** Autistic Behavior Checklist

**ACYC:** Autistic Centre for Young Children

**AD:** Autistic Disorder

**AIF:** Average Intellectual Functioning

**AS:** Average Syndrome

**BIF:** Borderline Intellectual Functioning

**FSIQ:** Full Scale IQ

**DLS:** Daily Living Skills

**CDI:** Communicative Development Inventory

**EF:** Exercise Functioning

**MID:** Moderate Intellectual Quotient

**ToM:** Theory of Mind

**WPPSI:** Wechsler Preschool and Primary Scale of Intelligence

**SID:** Severe Intellectual Disability

**PARIS:** Paris Autism Research International Sib Pair Study Schedule

**CBT:** Cognitive Behavioral Theory

**PD:** Panic Disorder

**LIC:** Low Income Countries

**HIC:** High Income Countries

**CDCP:** Center for Disease Control and Prevention

**ASD:** Autism Spectrum Disorder

**DSM-5:** Dignostic and Statistical Manual of Mental Disorder

**HFA:** High Functioning Autism

**NDD:** Neuro Developmental Disorder

**WHO:** World Health Organisation

**PDD:** Pervasive Developmental Disorder

**PDD-NOS:** Pervasive Developmental Disorder Not Otherwise Specified

**BSC:** Bilingual School Complex

**RQ:** Research Question

**RH:** Research Hypothesis

**PECS:** Picture Exchange Communication System

**CNS:** Centre Nervous System

**PNS:** Peripheral Nervous System

**EDS:** Specialized Education

**UNESCO:** United Nations Educational Scientific and Cultural Organisation

**UDHR:** Universal Declaration of Human Right

**AAC:** Alternative and Augmentative Communication

**ADHD:** Attention Deficit Hyperactivity Disorder

**WCC:** Weak Central Coherence Theory

**EF:** Executive Function

**PWDs:** Persons with Disabilities

**CRPD:** Convention on the Rights of Persons with Disability

**AS:** Aperger Syndrome

**WAAD:** World Autism Awareness Day

## GENERAL INTRODUCTION

According to the Centers for Disease Control and Prevention (CDC, 2019), as many as 1 in 69 children were diagnosed with ASD in 2012, compared with previous estimates of four to five per 10,000. According to Firestone, Cole, and Buissink (2008), ASD diagnoses were more common than pediatric cancer, diabetes, and AIDS combined. The Missouri Autism and Developmental Disabilities Monitoring Network (2020), a group funded by the (CDC 2019), estimated that 1 in 74 children in the St. Louis area had a diagnosis of ASD in 2016. Nationally, the (CDC 2019) estimated that 1 in 59 children were diagnosed with ASD in 2019 based on counts from key cities. ASD is not identified at the same rate for various locations or various racial/ethnic groups.

According to Durkin et al. (2010), the disparities in identification can be quite large based on the cities' access to diagnosticians and the diagnostic bias of a clinician. Research on ASD is still in its infancy, and knowledge about the brain disorder is growing by leaps and bounds. Forty-four percent of the children diagnosed with ASD have an IQ score in the average to above average range (Baio et al., 2018, p. 2). This means their IQ score falls between 85 and 115. According to (Shattuck et al.2012), 34.7% of individuals with ASD attempt college within six years of leaving high school. While students with ASD may come to college academically prepared, they are often underprepared socially (VanDerBeek et al., 2008). Many factors lead to an individual's successful transition from high school to college, but having a transition plan may be a key indicator of success. (Pinder-Amaker & Bell 2012) stated a transition plan should be developed for those young people with ASD who plan to attend college. One idea is to establish a campus support system for the student, much like the parent-teacher-therapist teams, that support students with ASD throughout the college experience. Another idea is for campuses to create a summer transition program for ASD students that teaches skills and strategies for navigating different parts of campus life.

Establishing a transition plan and defining success assists vocational rehabilitation counselors the university to identify the needs of students with ASD. As part of a transition plan, the student should work closely with the higher education institution's disability services program. Working with the university's disability services program requires the student to disclose ASD and provide documentation of the disability and accommodation needs. For individuals living with

ASD, self-disclosure can be challenging and often they prefer to avoid these situations. (Foden & Anderson, 2011). The stigma associated with disclosure is one of the most persistent problems facing individuals with ASD. “The disclosing could lead to subtle or obvious forms of prejudice” (Sarris, 2018). For many, disclosure makes them different from the rest of the student body. However, if disability services personnel are armed with reasonable accommodation information, learning supports could potentially assist the student to be successful. Milton (2016) indicated that it is still a matter for debate whether disclosing autism leads to better outcomes for the person with autism, although medical policy and charity information emphasize the importance and value of diagnosis for improved outcomes.

ASD is an acronym that is pervasive in our zeitgeist, but it is not always entirely understood. (Barahona-Correa & Filipe 2016) provided a historical description of how ASD evolved.. According to Barahona-Correa and Filipe, in 1944, Hans Asperger, a Viennese pediatrician, first described ASD as a neurological disorder. ( Chown & Hughes ,2016) indicated that at the same time, Leo Kanner, an Austratian physician living in the United States, began to describe children he saw with similar characteristics.

Both physicians called the disorder they described ‘autism.’ However, it was Dr. Kanner’s form of autism that became the subject of extensive research for the next 40 years. ( Kanner’s 1943) theory was characterized by significant cognitive and communicative deficiencies, including delayed or absent language development. According to (Barahona-Correa & Filipe 2016), in 1944, Asperger described children with social-communication impairment, eccentric manners, unusual interests, and cognitive domains of hyper-functioning. (Attwood 2007) indicated that Lorna Wing, a British psychiatrist, realized that many of the patients she was seeing did not meet the criteria for autism as described by Kanner. According to (Attwood ,2007) Wing described some of her clients as being more similar to the individuals Asperger had written about and she used the term Asperger’s Syndrome to provide new diagnostic criteria within ASD. However, according to the American Psychiatric Association (APA, 2013), within the fifth edition of the Diagnostic and Statistical Manual of Mental Disorders (DSM-5), Asperger Syndrome is now absorbed under ASD and rated on a severity scale.

There are two prominent characteristics of individuals living with autism: communication and social challenges, and an abnormal focus on a specific topic or interest (Gobbo & Shmulsky, 2012). Autism is referred to as a spectrum disorder due to the wide range of ability levels. Some individuals with ASD are non-verbal and engage in stereotypic, repetitive behaviors while others are very high functioning, contributing members of the

community (Attwood, 2007). Professors will most likely encounter higher functioning individuals within the spectrum in their university courses (White, Ollendick, & Bray, 2011). Individuals with high functioning autism (HFA) bring many positive attributes to the college campus. According to Attwood (2007), they have a unique perspective that will enrich group activities, and tend to be honest and loyal. They also tend to be persistent in their efforts and can focus on one thing for extended periods. In general, those with HFA are conscientious, logical, and attentive to detail, and thrive on routine and clear expectations (Attwood, 2007).

According to the World Health Organisation (WHO,2011),handicap is one of the major preoccupation more and more due to high increase prevalence that is explain by high number of autistic students population and the high risk in their social abilities characterised by poor or lack of communication,stereotyped behaviours,added to the high increase number of health problems such as dabetes,cardiovascular diseases,cancer and the mental disorders.In the whole world ,person with handicap(PWH) are showing poor results in the health condition like in the dormain of education leading to least participation in the economic life with high rate of poverty more than the persons with no handicap (NHP) .Due to the fact that they face alots of challenges in having access to services that a good number of people considered accessible mostly in the domains of health ,education,employment,transport and information.

According to World Health Organisation ( WHO,2017),autism spectrum disorder or ASD refers to a range of conditions characterised by some degree of impaired social behaviour,communication, language and narrow of interests and activities that are both unique to the individual and carried out repetitively behaviors.Centers for Disease Control and preventions,2015,ASD is a neurodevelopmental disorder that typically affects a person ability to communicate and interact socially with ASD also exhibit challenging or repetitive behaviours because Autism is a spectrum disorder,it affects each person differently and presents with varying degrees of severity.According to Centers for Disease Control and Prevention (2015),one in every 68 children has ASD who is affected.The disorder affects people from various racial ethnic and socio-economic backgrounds and it occurs in males five times more often than in females.The exact caused of autism is unknown,however certain factors increase the risk of autism such as an existing family history and children born to parents of an older age (Centers for Disease Control and Prevention,2015).

(Fleury et al.,2014) The number of learners with autism spectrum disorder (ASD) who are included and participating in mainstream classrooms has increased over the past yaers,this

presents teachers with additional responsibilities to meet the social needs of these students, unfortunately many general education teachers are not informed about how the characteristics associated with ASD can impact students performance, academic profiles of individual with ASD across content areas and learning method that is found to be successful with their cognitive capacity across individuals with ASD (Fleury et al., 2014).

These challenges are very visible in our communities. It is better to give to persons with handicaps the means to be fully independent in some of the basic needs and permit them to go above the various obstacles that are hindering them from participating in their community life, to acquire a quality education, to obtain a decent job and to make their voices be heard (WHO, and the World Bank, 2011; Zobo, 2023). Autism is amongst the cases that face a lot of challenges as mentioned by the World Health Organisation. The number of learners with autism spectrum disorder (ASD) who are included and participating in mainstream classrooms has increased over the past few years (Fleury et al., 2014). This presents teachers with additional responsibilities to meet the social, behavioural, and academic needs of these learners. Mainstream classrooms benefit all learners by minimizing stereotypes while encouraging learning to occur between all peers. Stigma often follows students who have autism, and ensuring that students with autism are included within regular classrooms can increase the knowledge around autism, along with creating more positive attitudes toward it (Anthony et al., 2020).

A vast majority of children with ASD who are provided with appropriate education show improvements not only in academic learning and functional language but also in socialization, adaptive skills and communication, while many of them can take better advantage of their abilities and skills, in this respect that they can use them in a more productive and generalised way. Addressing the Additional research, specifically to determine what methods might be best for each individual with ASD, is necessary to ensure that teachers have knowledge of the initiatives needed to make a positive difference in their students' lives (Muchetti, 2013).

The purpose of this literature review is to address social, behavioural, and academic teaching strategies that can be implemented to improve the educational experiences of students with ASD. The strategies that are discussed are practical and easily applicable to both general education and special education learning environments. Each strategy can be used for students with ASD, regardless of age, but modified appropriately for their individual

needs throughout their school years. These strategies address common issues related to the social, behavioural, and academic challenges that most students with ASD experience.

While dividing the strategies into the three areas of social, behavioural, and academic interventions, there is still some overlap among the categories because the three domains are interrelated and directly affect each other. For example, improved social skills lead to a decrease in repetitive behaviours (Boyd, Woodard, & Bodfish, 2011). The decrease of repetitive behaviours can lead to increased engagement in learning activities, which directly affects knowledge acquisition (Muchetti, 2013). There is also a noted relationship between the impacts of enhanced social abilities and academic learning ; therefore, improving students' social skills will in turn improve their academic performance (Fleury et al., 2014). The social abilities of students with ASD also directly affect how they interact with their peers and what types of relationships are formed (Ostmeyer & Scarpa, 2012). Improved peer relationships potentially affect the students' emotional well-being and confidence, which also contribute to improved engagement, and again improved academic performance. Individuals with ASD have difficulties properly interacting and communicating with others. A considerable percentage of children with ASD are hardly speaking when they start school, according to Mucheti et al. [6]. Many students have difficulties with both responsive and expressive interaction. Their failure to understand social circumstances may cause their difficulties in their cognitive ability.

Research on ASD is still in its infancy, and knowledge about the brain disorder is growing by leaps and bounds. Forty-four percent of the children diagnosed with ASD have an IQ score in the average to above average range (Baio et al., 2018,). This means their IQ score falls between 85 and 115. According to Shattuck et al. (2012), 34.7% of individuals with ASD attempt college within six years of leaving high school. While students with ASD may come to college academically prepared, they are often underprepared socially (VanDerBeek et al., 2008). Many factors lead to an individual's successful transition from high school to college, but having a transition plan may be a key indicator of success. Pinder-Amaker and Bell (2012) stated, A transition plan should be developed for those young people with ASD who plan to attend college. One idea is to establish a campus support system for the student, much like the parent-teacher-therapist teams, that support students with ASD throughout the college experience. Another idea is for campuses to create a summer transition program for ASD students that teaches skills and strategies for navigating different parts of campus life. Establishing a transition plan and defining success assists vocational

rehabilitation counselors and the university to identify the needs of students with ASD. As part of a transition plan, the student should work closely with the higher education institution's disability services program. Working with the university's disability services program requires the student to disclose ASD and provide documentation of the disability and accommodation needs. For individuals living with ASD, self-disclosure can be challenging and often they prefer to avoid these situations. (Foden & Anderson, 2011). The stigma associated with disclosure is one of the most persistent problems facing individuals with ASD. "The disclosing could lead to subtle or obvious forms of prejudice" (Sarris, 2018). For many, disclosure makes them different from the rest of the student body. However, if disability services personnel are armed with reasonable accommodation information, learning supports could potentially assist the student to be successful. Milton (2016) indicated that it is still a matter for debate whether disclosing autism leads to better outcomes for the person with autism, although medical policy and charity information emphasize the importance and value of diagnosis for improved outcomes.

ASD is an acronym that is pervasive in our zeitgeist, but it is not always entirely understood. Barahona-Correa and Filipe (2016) provided a historical description of how ASD evolved. According to Barahona-Correa and Filipe, in 1944, Hans Asperger, a Viennese pediatrician, first described ASD as a neurological disorder. Chown and Hughes (2016) indicated that at the same time, Leo Kanner, an Austratian physician living in the United States, began to describe children he saw with similar characteristics.

Both physicians called the disorder they described 'autism.' However, it was Dr. Kanner's form of autism that became the subject of extensive research for the next 40 years. ( Kanner's 1943) theory was characterized by significant cognitive and communicative deficiencies, including delayed or absent language development. According to (Barahona-Correa and Filipe 2016), in 1944, Asperger described children with social-communication impairment, eccentric manners, unusual interests, and cognitive domains of hyper-functioning. ( Attwood 2007) indicated that Lorna Wing, a British psychiatrist, realized that many of the patients she was seeing did not meet the criteria for autism as described by Kanner. According to (Attwood 2007), Wing described some of her clients as being more similar to the individuals Asperger had written about and she used the term Asperger's Syndrome to provide new diagnostic criteria within ASD. However, according to the American Psychiatric Association (APA, 2013), within the fifth edition of the Diagnostic and Statistical Manual of Mental

Disorders (DSM-5), Asperger Syndrome is now absorbed under ASD and rated on a severity scale.

There are two prominent characteristics of individuals living with autism: communication and social challenges, and an abnormal focus on a specific topic or interest (Gobbo & Shmulsky, 2012). Autism is referred to as a spectrum disorder due to the wide range of ability levels. Some individuals with ASD are non-verbal and engage in stereotypic, repetitive behaviors while others are very high functioning, contributing members of the community (Attwood, 2007). Professors will most likely encounter higher functioning individuals within the spectrum in their university courses (White, Ollendick, & Bray, 2011).

Individuals with high functioning autism (HFA) bring many positive attributes to the college campus. According to (Attwood 2007), they have a unique perspective that will enrich group activities, and tend to be honest and loyal. They also tend to be persistent in their efforts and can focus on one thing for extended periods of time. In general, those with HFA are conscientious, logical, attentive to detail, and thrive on routine and clear expectations (Attwood, 2007). According to the Centers for Disease Control and Prevention (CDC, 2019a), as many as 1 in 69 children were diagnosed with ASD in 2012, compared with previous estimates of four to five per 10,000. According to ( Firestone et la 2008), ASD diagnoses were more common than pediatric cancer, diabetes, and AIDS combined. The Missouri Autism and Developmental Disabilities Monitoring Network (2020), a group funded by the CDC (2019a), estimated that 1 in 74 children in the St. Louis area had a diagnosis of ASD in 2016. Nationally, the ( CDC 2019) estimated that 1 in 59 children were diagnosed with ASD in 2019 based on counts from key cities. ASD is not identified at the same rate for various locations or various racial/ethnic groups. According to Durkin et al. (2010), the disparities in identification can be quite large based on the cities' access to diagnosticians and the diagnostic bias of a clinician.

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## CHAPTER ONE: PROBLEMATIC OF STUDY

In this chapter ,we are going to present the context and justification of our study ,formulate the problem of our research ,This is also to present the interest and objectives followed by the study ,the corpus of the hypothesis that we are going to try to answer and shortcoming,What is a research problem, According to Hennink et al .[2011] a research question is a a question that you propose to answer through data collection.It guides all other subsequent task in the research process and analysis ;An essential step in the scientific research process ,comprises different components that should be combined within the same time frame ,hence its complexity ,there is no consensus regarding its definition and the ways in which it can be constructed have received little attention in the literature .

According to Campenhoudt et Quivy (2011) a problematic is an approach or the theoretical perspective that we adopted to treat the problem posed by the question.It is an angle from which study shall be carried out.Forming a research problem is an intellectual and reflective process that involves questioning ,documentation and choices aimed at moving from one idea to or subject to a specific research question ,In particular research question ,In particular the construction of the research problem makes it possible to define the theoretical ,methodological and analytical orientation of the research ,this is an essential step that position research within a continuum of disciplinary knowledge and in this case within the History of nursknowledge.-What Role does learning methods play in the cognitive capacitation of autistic student-Can a Learning Method Influence the cognitive capacitation of Autistic Students

### **1.1. CONTEXT AND JUSTIFICATION**

#### **1.1.1. Context of Study**

Handicap is today at the centre of our every social debate. More interest is put on it by the Government, non Governmental organisations, as we all know that by only mentioning handicap, it comes along with notions like discrimination, stigmatisation, social limitations, disadvantages and withdrawal from social participation Bruns (2002); Aubry (2017) and Becuwe et Merle (2013).

ASD is a pervasive developmental disorder that is generally recognised and diagnosed between the ages of 18 months and three years (Tway, Connolly & Novak, 2007). According to the Diagnostic and Statistical Manual of Mental Disorders (2000) children with

autism have low social functioning, impaired communication and repetitive behaviours and interest. They may insist on sameness and show resistance to insignificant changes.

For decades' autism was thought to be a rare disorder affecting about four children per 10 000 (Tanguay, 2000). The prevalence of autism increased dramatically over the last number of years.

Autism today is at the centre of social debates; much interests is being given to this mental handicap this explain why an AUTISM awareness day has been set aside on every 2<sup>nd</sup> of each year is being observed as AUTISM DAY ever since the United Nations General Assembly designated 2<sup>nd</sup> April as World Autism awareness Day(WAAD) in 2007.The United Nations has observed the day as a means to affirm and promote the full realization of all human rights and fundamental freedoms for autistic people on equal basis with others. The autism awareness day theme of 2024 is,"Moving from surviving to Thriving",autistic individuals share regional perspectives.This theme emphasizes the need to change the focus from simply dealing with autism to creating an environment in which autistic people can thrive.Autistic learners are still regarding today as evil person expecially in Africa where they faced a lot of discrimination,stigmatisation and limitations,restrictions from participationg in social life Bruns (2002) Aubry (2017) Beawe et Merle (2013).

In the United State of America,from the recent report by the autism follow up commission and other disorder of development made up of 11 sites,that is more than 337000 children,the prevalence of autism in children of 9 was estimated at about 14,7 in 1000 in 2012,that 1 in 68 children of 9 and above (23,6 out of 1000 in boys and 5,3out of a 1000 in girls ratio 4.5.1).While thses follow up prevalence commission noticed an increase in the prevalence rate since 2002,the network estimation were similar between 2010 and 2012.Even so,lacked of setback does not gurantee to conclude that there is a stability in the prevalence statistic.In France,the epidiomological data available are from the set of children with a handicap,coming from the register of the two regions (RHE31 et RHEOP)(11,23,14).The prevalence rate in 2003 in children of less vthan ten years was estimated at 4,1/1000 for the child integrative disorder and 0,1/1000 for the Asperger Syndrome. In England,the National Autistic Society describes autism as "a lifelong, developmental disability that affects how a person communicates with and relates to other people, and how they experience the world around them" ([www.autism.org.uk](http://www.autism.org.uk)). Current prevalence rates in the UK are thought to be around 1 in 100 (Baird et al., 2006).

Autism is classed as a disability under the Equality Act 2010 and is estimated to cost the UK economy around 32 billion pounds per annum, mostly due to lost earnings (Knapp, Romeo and Beecham, 2009). The Diagnostic and Statistical Manual of Mental Disorders, fifth edition (DSM – 5) suggests that many individuals diagnosed with autism, even without intellectual disability, “have poor adult psychosocial functioning as indexed by measures such as independent living and gainful employment”. (American Psychiatric Association, 2013). The Autism Act was passed in the UK in 2009 and this has helped to embed autism into the local commissioning of services. The UK Government has also published an autism strategy for adults in 2010 (DH, 2010), which was updated in 2015 (DH, 2015).

An under estimation of the prevalence is possible given the fact that cases of moderate disorder are not identifiable in those registers .In Sweden,the administrative factors could explain an increased in the prevalence of autism spectrum disorder obtained from the national records between 1993 and 20002, Has,2018.The present data are not available for Cameroon.Cameroon is not having a control system in place to gives precise data and statistic on the prevalence of Autism in Cameroon (MINISTRY OF PUBLIC HEALTH ,2014).In the African context ,a child who does not evolve like all other children ,who does not speak quickly becomes a great tragedy for the family .Misunderstood ,it is often rejected ,ostracized from social life and reclude in his family,indexed and charged with crimes against custom and ancestors .In Cameroon ,Autism is linked to witchcraft,a curse ;that is why autistic children are excluded and rejected;their parents are often indexed as authors of disease.Also because of beliefs,most autistic children ,instead of going to the doctor ,are more oriented towards traditional healers ,also called marabouts for rituals [Camervoice,2010].

In Cameroon, a few years back, we got rid of autistic children by throwing them downstream of a river so that they turned into snake and returned to their country of origin. In some families with autism children, they are locked in bedrooms when visitors come, because they are disgrace to the family. Autism is therefore a great suffering for families whose attitudes, practise and beliefs in relation to this disease are still influenced by traditions [Heider,1958, Tsala Tsala ,2009].

Estimates of the global prevalence of autism vary considerably but reach up to 1% of the total population and even higher in some countries (Elsabbagh, Divan et al., 2012). Russell et al. (2014) estimate a prevalence of 1.7% among the primary school children in the UK. Autism diagnoses have increased in prevalence. Taylor et al. (2013) suggest that there

was a five-fold increase in the UK during the 1990s. In 2011, approximately 190,000 Canadians were diagnosed with ASD, with a higher prevalence found in boys [Gale,2011]. ASD is a range of neurodevelopmental disorder that have a profound effect on language, social skills and produces varying restrictive and stereotyped behaviours [Anagnostou et al ...,2014].

The traditional beliefs about the cause of disability remain prevalent across sub-Saharan Africa. One set of explanations is linked to traditional animism. This carries beliefs that disabilities are punishments for bad deeds, or the result of witchcraft. Stigmatization still exist in large scale and leads to exclusion and continued poverty and poor standard of life for persons with disabilities ,especially for those living in Africa .The main cause of stigmatization in Africa is a lack of education about disabilities and the needs of persons with disabilities. But this is not our objective, the objective of this work is to observed the influence of learning method on the cognitive capacity of autistic students.

The ministry of social affairs (MINAS,2013),to him in Cameroon more than 100000 children are autistic. Many centres in term of structure of followed up are created and received children on daily basis. The State through Education on inclusive, contribute to education and to followed up of thses children. In the universities the problematic of autism are being taught and are in the same time a deeply research subject, we noticed also the strong implication from the first lady of Cameroon in the followed up of autistic children, actions that clearly showed the important of autism in Cameroon and that autism is a reality.

Disorder at the plannification in autistic children is not yet expored by the researchers. From the onlooking, we have made a good number of discoveries according to our research problem of this work. Autism is a term that englobed more than twenty differents sickness, developmental disorder with characteristic such as lack of interest to other people, lack of language ,difficulties in formulating and expressing needs, stereotyped movements, auto mutilation. Autism is part of pervasive developmental disorder (PDD). An autistic child is a child that lives his/her on way of life. An autistic child is a child like other children that need to benefit an education. This education is what will permit him/her to learn the social and adaptable behaviors in the society. In a typical development, some learning are just for a certain given length of time ,and so are being acquired through through social experience. Others like learning of type of schools must be a systematic teaching ,for the children with autism ,systematic teacher must be made for the acquisition of competence like

other children will learn. This goes the same with social skills, imitational behaviors and game play. Education can be considered as a choice for the treatment of autism, the aim is to provide the child with autism the developmental and full independency. Educating children with autism is having as first objective to support the child in his development (Magerotte et al., 2010). Its specificity or particularity in the treatment of information and functioning. At the level of the handicap and cultural reality, autism is a reality based on consciousness of personality and emotional behaviors.

Autism Spectrum Disorder (ASD) and Autism are both general terms that are used to classify a group of comprehensive disorders that are associated with brain development. Each individual with ASD is unique, as they have their own degree of difficulty (Autism Speaks, 2015). Individuals who lie on the ASD Continuum may experience difficulty with social interaction, verbal and nonverbal communication and repetitive behaviours (Autism Speaks, 2015). Moreover, others may have intellectual disabilities and experience difficulty in motor coordination and attention. Some individuals with ASD are more advanced than others in visual, music, math, and art skills (Autism Speaks, 2015). These difficulties are seen in communities with lesser advantages. It is preferable to give the means to people with handicap to act and to carry out actions that will reduce the obstacles that are preventing them from participating in the community life, to acquire a quality education, to have a job that will permit them to make their voices heard (World Health Organisation and the World Bank, 2011; Zobo, 2023). Autism is among the various cases that face challenges according to WHO.

After the establishment of the DSM-5 (Autism Speaks, 2015), all autism disorders were merged under one umbrella diagnosis of ASD (Autism Speaks, 2015, para. 1). The DSM-5 encompasses a set of criteria that is used to evaluate individuals who may have the disorder; these disorders include autistic disorder, childhood disintegrative disorder, pervasive developmental disorder-not otherwise specified (PDD-NOS) and Asperger Syndrome (Autism Speaks, 2015). "In the 2005-06 school year, school boards in Ontario reported that 7,888 students in publicly funded elementary and secondary schools were identified by an Identification Placement. There is increasing awareness that individuals with an Autism Spectrum Disorder [ASD] represent a population with a wide range of cognitive abilities including individuals who are identified as academically gifted [Assouline, Foley Nicpon and Doobay, 2009]. Autism is now a day at the centre of social discussions. It is today having much interest knowingfully well that Autism is one of the Mental handicaps that

comes with notions like discrimination ,stigmatisation ,limitations ,desadvantages and restriction from participating in the social life [Brun 2002]and Aubry[2017]

World health organisation estimated already the epidemiological situation of Autism with about ten percent of the world population ,In Cameroon ,the law number 13<sup>th</sup> April 2010 on the protection and the promotion of persons living with an Handicap as”All possible limitation from full participation of a person by presenting a deficiency toward an activity in a given environment as such is considered an handicap person ,Any body in a situation of being incapable of assuring by he or her all or part of necessities of an individual life or normal social life due to physical or mental deficiency ,the case with Autism which is our research problem meanwhile Article 3 of the said law declared that the term person living with handicap is applicable to the following categories :Physical Handicap ,Mental Handicap ,Social Handicap and PolyHandicaps; ,mentors, teachers and learning guides users to support and enrich the learning journeys of learners . Our learning method guides the learning process and the people who help learners reach the goals.

The UN estimates that there are 700000 autistic people in Cameroon .Many of them school age kids ,but says too many families keep the at home because of stigma and lack of resources.Autism is a complex neurobiological disorder that inhibits a person,s ability to communication and development and develop social relationships.It is also characterized by restricted and repetitive behaviour .the Parents usually notice signs in the first two or three years of a child,s life .Although there is no known cure ,there have been cases of children who have recovered from the condition.Not many children with autism live independently after reaching adulthood.Autism Spectrum disorder is a highly heritable neurodevelopmental disorder .More than 100 genetic Polymorphisms have been associated with autism spectrum disorder ,with Africa having greater genetic diversity than any other continent.In Cameroon ,there exist a plethora of laws for the protection of the right of PWDs.

### **-ELEMENTART STRUCTURES OF THE CONTEXT**

We find the following structures

Statistic of autism in the worldmi;around 75million people have autism spectrum disorder that is 1percent of the world’s population.1 in 100 children are diagnosed with autism spectrum disorder .The country with the highest autism rate in the world is the United Kingdom,whose rate is 700,07per 100k.About 1 in 36 children has been identified with autism disorder [ASD] according to estimates from CDS’s Autism and Developmental

Disorder. Globally, autism is believed to affect around 168 million children and adults, yet this number is likely much higher as many cases remain undiagnosed due to a lack of available resources and awareness. Autism is now a day at the centre of social discussions, knowing fully well that Autism is one of the mental handicaps that comes with notions like discrimination, stigmatisation, limitations, disadvantages and restriction from social life. World health organisation estimated already the epidemiological situation of Autism with about ten percent of the world population. In Cameroon, the law number 13<sup>th</sup> April 2010 on the protection and the promotion of persons living with an Handicap as "All possible limitation from full participation of a person by presenting a deficiency toward an activity in a given environment as such is considered an handicap person. Any body in a situation of being incapable of assuring by he or her all or part of necessities of an individual life or normal social life due to physical or mental deficiency, the case with Autism which is our research problem meanwhile Article 3 of the said law declared that the term person living with handicap is applicable to the following categories: Physical Handicap, Mental Handicap, Social Handicap and PolyHandicaps;

In Cameroon these laws encompass international Ratified conventions Regional norms and Domestic statutes. An analysis of these laws will help provide a better grasp of the legal framework both at the international, regional and national levels. The Universal Declaration of Human Rights 1948 [UDHR] a milestone documents in the History of Human Rights, has hitherto inspired the adoption of PWDs. It sets the foundation for the protection of these rights throughout the globe and particularly in Cameroon. Pursuant to Article 1 of the treaty [all human beings are free and equal and dignity and rights.

They are endowed with reasons and conscience and should act towards one another in a spirit of brotherhood. e and particularly in Cameroon. Pursuant to Article 1 of the treaty, all human beings are free and equal and dignity and rights. They are endowed with reasons and conscience and should act towards one another in a spirit of brotherhood ]. This is supported by Article 7 which provides that, All human beings are equal before the law and entitled without discrimination to equal protection of all the law, moreover, the 2006 convention on the Rights of persons with Disability [CRPD] is another ground breaking international norm of the protection of the rights of PWDs. Ratified on the 1<sup>st</sup> of October 2008, the convention is applicable in Cameroon by the virtue of Article 45 of its constitution.

An estimated 1.3 billion people experience significant disability. This represents 16 percent of the world population, or 1 in 6 of us. Some persons with disabilities die up to 20 years earlier than those without disabilities. Persons with disability have twice the risk of developing conditions such as depression, asthma, diabetes, stroke, obesity or poor oral health. Persons with disabilities face many health inequities. Persons with disabilities find inaccessible and unaffordable transportation 15 times more difficult than for those without disabilities. Health inequities arise from unfair conditions faced by persons with disabilities, including stigma, discrimination, poverty, exclusion from education and employment, and barriers faced in the health system itself.

### 1.1.2 Justification of Study

This study is important because it helps us understand how autistic children learn and think, especially in our local schools like La Marfee. Many teachers and parents do not know the best way to teach autistic pupils. Some people still believe wrong things about autism because of culture or lack of information. By studying one autistic pupil at La Marfee, we will find out how cooperative learning influences the cognitive capacity of autistic pupils. This study is needed because ;

- ❖ **It addresses the gap in inclusive educational practices** by exploring effective and adaptable teaching methods suited to autistic pupils.
- ❖ **It informs teachers, parents, and policymakers** with practical, research-based recommendations that foster a more supportive and inclusive learning environment.
- ❖ **It highlights the cognitive strengths and learning capacities of autistic children**, which are often overlooked due to their social or communication difficulties.
- ❖ **It challenges negative societal perceptions about autism**, especially in cultural settings where autism is stigmatized or misunderstood.

Through this research, we have as aims to contribute meaningful insights that will enhance both theoretical understanding and practical approaches to educating autistic pupils.

The right to education is fundamental and compulsory for all children, including autistic children. In Cameroon, several children living with disabilities, including autism, do not have access to social activities. Most autistic children are often not in school and may not have access to employment. According to the World Health Organization, out of every 10,000 children, at least 06 are autistic, which gives an estimate of 600,000 autistic children out of 10 million children of school age in Cameroon. It is distressing to note that it is often at the cost

of long individual battles conducted by parents that an autistic child is admitted into mainstream school. The non-inclusion in the mainstream schools of children with autism makes it difficult to achieve socio professional integration (Nuss, 2009). The teacher is the person responsible for awakening the student's potential to develop the physical, moral and cognitive abilities of the student for his socialization. To this effect, the teacher must understand the pupil to make him/ her capable of developing their cognitive.

ASD is a neurodevelopmental disorder that typically affects a person ability to communicate and interact with others [centre for diseases control and preventions 2015]. Most people with ASD also exhibit challenging or repetitive behaviors .Autism can but does not always affect an individual cognitive ability because Autism is a Spectrum disorder ,It affects each person differently and presents with varying degrees of severity according to the centre for diseases control and prevention [CDC ,2015] .One in every 68 children has ASD who is affected .the disorder affect people from various ethnic and socio economic background and it occurs in males five time more than in females.The exact cause of Autism is unknown .However certain factors increase the risk of Autism such as existing family history of it and children born to parents of an old age [centre for disease control and prevention 2015].Children with ASD experienced difficulties in their ability to communication and affectively interact with others [Jacklin & Farr 2005]. Approximately 30.50 percent of children with ASD are minimally verbal upon entering school [ Muchetti 2013]. Most experience impairments in receptive and expressive communication [Fleury et al 2014].

## **1.2. FORMULATION AND POSITION OF PROBLEM**

### **1.2.1. Theoretical Findings**

Theoretical concepts to explain the biological basis of autism have been developed. (Baron Cohen, 1985) proposed that a lack of Theory of Mind (ToM) was the central deficit found in autism. ToM is the ability to attribute mental states, such as beliefs, intents and desires, to oneself and others and to understand that others have beliefs, desires, intentions, and perspectives that are different from one's own. Typically developing children are thought to begin develop ToM at around the age of three (Baron Cohen, et al, 1985).

Restricted, repetitive behaviours, activities or interests have been associated with deficits in executive functions (Ozonoff, 1997). Some children and young people who are diagnosed with autism demonstrate relative strengths or special abilities, for example being

able to memorise by rote. (Frith, 1989) proposed that these patterns of relative strengths among difficulties can be explained by weak central coherence.

Baron-Cohen later proposed the 'extreme male theory' of autism (Baron-Cohen, 2004) which attempted to address the gender disparity in autism. Baron-Cohen argued that people with autism match an extreme of the male profile with an intense drive to systemise and a low drive to empathise.

In Africa, a child who does not evolve like all other children, who does not speak quickly becomes a great tragedy for the family. Misunderstood, it is often rejected, ostracized from social life and recluses in his family, indexed and charged with crimes against custom and ancestors. In Cameroon, Autism is likened to witchcraft, a curse; that's why autistic children are excluded and rejected; their parents are often indexed as authors of this disease. Also, because of beliefs, most autistic children, instead of going to the doctor, are more oriented towards traditional healers, also called "marabouts" for rituals (CameroVoice, 2010). In Cameroon, a few years back, we chained autistic children in rooms and locked them up for the belief that they held from the evil powerlike snake. In some families with autistic children, they are locked in bedrooms when visitors come, because they are a disgrace to the family. Autism is therefore a great suffering for families whose attitudes, practices and beliefs in relation to this disease are still influenced by traditions (Heider, 1958, TsalaTsala, 2009). Hence the interest in learning method that is adapted to their needs to behavioral change, as the successful integration of autistic children in ordinary schools depends largely on the learning method that suits the social challenges of attitude towards students with special needs, their way of understanding the differences in classrooms and their willingness to deal effectively with these differences (Bandier et al, 2010).

The attitude of teachers has generally been put forward as a decisive factor in the integrating character of the school (European Agency, 2003). Changing attitudes among individuals is a long and complex process, especially as regards the conception of so-called "mystical" diseases such as autism and albinism. This is reinforced by cultural biases such as autistic children are children "witches, snakes." Every child with autism is potentially comparable to a "witch child" (D'Haeyer, 2004). But being considered as a sorcerer child is first and foremost a charge widespread in the social rhetoric of exclusion and stigmatization that has a strong influence on teachers' attitudes (Degorge, 2009). Such attitudes develop resistance to behavior change.

Children with autism process sensory, motor and perceptual experiences differently to neuro-typical children. “The way in which they register, modulate and integrate environmental stimuli by means of seeing, hearing, and smelling, tasting, moving around or touching may be affected” (Koudstaal, 2005). Because their senses appear to be so sensitive, it hard for them to be in places with loud noise, strong smells, etc., such as in a supermarket. This could then result in unexpected, negative behaviour (Koudstaal, 2005) by the autistic child. Some autistic children will try to regulate or escape the sensory input by covering their ears with their hands, walking on their toes, flapping their hands or jumping up and down (Koudstaal, 2005).

Behavioural problems exhibited by children with autism are among the most challenging and stressful issues faced by parents. The problem behaviour that many children with autism display are significant barriers to effective social interaction as well as to educational placement and development (De Boer, 2009), but the undesirable and challenging behaviour of children with autism must be judged as a secondary consequence, rather than as a feature of autism. Difficult behaviour such as socially embarrassing actions, temper tantrums, aggression, destructiveness, screaming and running away are often associated with autism (De Boer, 2009). Challenging behaviour in most cases is a direct result of lack of understanding. Children with autism in general are resistant to change, because” sameness provides security”, order and predictability (Koudstaal,2005 ).

The research shows that young children with autism have a higher than expected incidence of upper respiratory infections and gastrointestinal symptoms, which cause a lot of discomfort in their bodies. This could also lead to excessive burping, constipation and loose bowel movements (Sadock & Sadock, 2003). The discomfort experienced and the lack of communication skills can also be a reason for showing disruptive behaviour. Furthermore, some children with autism have very fussy eating habits which restrict their diets; while others will compulsively eat anything, even materials like paper, and play dough (Sadock & Sadock, 2003).

### ***The concept of Attitude***

An attitude refers to an internal arrangement of the individual which determines his/her perception and behavior vis-à-vis an object or a situation (Tapia and Roussay 1991: 15). Strongly correlated with an opinion or a value judgment, attitude is descriptive and prescriptive, that is, it works as a behavior organizer, trainer of the action. Attitudes are

predispositions that cause a person to respond favorabl attitude involved in the drafting of opinions, beliefs, judgments an obidentification, all of which give it a regulatory function in behaviors and communications. Faced with inclusive education, teachers' attitude is ambivalent (Panchaud Migrone Lauper , 2001).

As a matter of fact, teachers' attitude is a factor that can determine the success or failure of inclusive education. Doré, (Wagner & Brunet 1996) highlight the emotional factor and reluctance to open schools. They also note that many researchers underscore the fact that teachers show a rather negative attitude to integration. This negative attitude is due to feelings of incompetence and ignorance of the disability on the part of teachers. In addition, (bless 1994) shows that the attitudes of teachers towards inclusive education vary according to the type of disability. If teachers are favorable to the integration of pupils with motor disabilities, they are clearly opposed to the idea of integrating pupils with behavioral or personality disorders. It is therefore important to analyze the attitudes of teachers towards the integration of autistic children in regular schools; since beyond conventions and laws, any positive attitude adopted by a teacher facing a pupil in difficulty is already a success in its integration, as (Lavallée 1990) points out. A negative attitude would lead to resistance to the integration of autistic children in regular schools.

For decades Autism Spectrum Disorder (ASD) was thought to be a rare disorder affecting about four children per 10 000 (Tanguay, 2000). The prevalence of ASD increased dramatically over the last few decades. Autism South Africa reflects that one in 100 individuals meet the criteria for diagnosis one out of 100 children in South Africa has an ASD. This means that every hour a child is born that will develop ASD in South Africa alone. This equates to approximately 7 665 autistic children born in South Africa in 2010. According to the Centre of Disease Control (2010), incidences of ASD have increased dramatically over the past two decades. Autism occurs in all racial, ethnic and socio-economic groups, and occurs on average four times more often in boys than in girls (Mash & Wolfe, 2005). Although autism is becoming a bigger reality for many families in South Africa and beyond, understanding of how it influences family functioning remains under researched.

(Bronfenbrenner's 1986) theory has had a particularly wide and significant influence in shaping my understanding of how different levels of the system in the social context interact in the process of child development. Understanding a family's ecology, such as who

makes up the family, what supports and resources they have, what they enjoy and what they struggle with is a critical piece of the designed intervention's meaningfulness and relevance (Jung, 2010). According to (Jung 2010) the focus has moved from supporting the child to supporting the family, and how support is provided is just as important as what supports are provided. In order for professionals to design an intervention plan, they need an understanding of what it is that fits families' lives. Professionals providing early intervention need an understanding of the family, its informal and formal resources and its interacting social networks. Understanding the family's ecology is as important to designing intervention as understanding the child's development (Jung, 2010).

In this chapter, I undertake a review of the literature that I considered relevant in shaping my understanding of the problem of how autism presents itself in children, as well the effects that autism has on a family's life. After reviewing the literature on the challenges that families experience whilst raising a child with autism, I focus on the different support structures that families install in their lives to help them cope with these challenges.

### **1.2.2. Empirical Finding**

Autism is a Pervasive Developmental Disorder (PDD) (American Psychiatry Association, 2000). The understanding of the pervasive developmental disorder includes a group of conditions in which there is delay and deviance in the development of social skills, language and communication, as well as unusual behaviours and interests (Carr, 2006; Mash & Wolfe, 2005). These disorders cause persistent dysfunction in a child's life (Sadock & Sadock, 2003). Furthermore, children with pervasive developmental disorders often exhibit intense particular interest in a narrow range of activities. They are often resistant to changes in their lives and are not appropriately responsive to the social environment. These disorders affect multiple areas of development and are manifested early in life. Included under this classification are Autism, Asperger's Disorder, Rett's Disorder, Childhood Disintegrative Disorder, and Pervasive Developmental Disorder Not Otherwise Specified (PDD-NOS) (Barlow & Durand, 2009). Should be aware of the voices of young people who have been given an autism diagnosis and of critical perspectives in regard to labelling (McLaughlin and Rafferty, 2014) (Runswick-Cole, Mallet and Humphrey and (Lewis, 2008) talk about other people's reaction to the label of autism, for example, beginning to view and treat the pupil in a certain way, and how this will affect the pupil. Pupils can be at risk of being defined by the diagnosis and expectations can be limited, both self-expectations and those of others. They suggest change at two levels : a change in language, from 'impairment' and 'disorder' and in

the way society attaches stigma and stereotypes to diagnostic labels. School leaders and staff working with children and young people (Timimi, 2016).

(Ravet, 2011) says that the debate about inclusion and the education of children who are diagnosed with autism is often characterised by “bipolar thinking, and moral posturing, and is obscured by misunderstandings and omissions. Ravet argues that the effective inclusion of children and young people who are diagnosed with autism requires practitioners to question two ‘dominant and contradictory’ perspectives : the rights based perspective, which considers the label of autism to be negative and exclusionary, and the needs based perspective, which considers the label of autism to be confirming, useful and inclusionary. She argues for an ‘in between’ integrative perspective which seeks to minimise negative labelling and exclusion by rejecting ‘autism as a disease’ metaphor.

Before discussing autism, I first focus on the other pervasive developmental disorders. Rett’s Disorder is a PDD that is characterised by normal development for at least five months, stereotyped hand movements, a loss of purposeful motions, diminishing social engagement, poor coordination, and decreasing language use accompanied by a deceleration in head growth (Carr, 2006). This disorder appears to occur exclusively in girls. In childhood disintegrative disorder, also known as Heller’s syndrome, development progresses normally for the first two years, after which the child shows a loss of previously, acquired skills. The loss is usually in two or more skills, which would be language ability, social responsiveness, play, motor skills, and bladder or bowel control (Carr, 2006).

Those diagnosed with ASD also include pervasive developmental disorder not otherwise specified (PDD-NOS), which is sometimes referred to as high-functioning autism, and Asperger’s syndrome, in which affected individual’s typically do not display the early language deficits inherent in autistic disorder (Volkmar, Lord, Bailey, Schultz & Klin, 2004). In this study, I use the terms, autism and autism spectrum disorder (ASD) interchangeably when referring to the spectrum of autistic disorders that include autistic disorder, PDD-NOS and Asperger’s syndrome .Autism seldom occurs on its own and the complexity of autism increases when secondary impairments are identified (Koudstaal, 2005). According to research on autism, it is possible that it may occur with any other “diagnosable physical, sensory or psychological impairment” (Koudstaal, 2005). This makes it difficult to separate children diagnosed with severe intellectual impairment from children with severe forms of autism.

Children with intellectual impairments usually show general delays in most areas of development, whereas a typical autistic profile would reflect relatively better developed motor skills as opposed to poorly developed language and social abilities (Koudstaal, 2005). Many children with autism also suffer from epilepsy and exhibit high levels of anxiety (Carr, 2006; Koudstaal, 2005). Conditions such as obsessive-compulsive disorder, attention deficit hyperactivity disorder, schizoid personality disorder and non-verbal learning disability, as well as Tourette syndrome, are sometimes confused with autistic spectrum disorders. Autism Spectrum Disorder (ASD) is a pervasive developmental disorder that is generally recognised and diagnosed between the ages of 18 months and three years (Twoy *et al.*, 2007). As articulated in the Diagnostic and Statistical Manual of Mental Disorders (American Psychiatric Association, 2000) typical problems observed in individuals who are autistic, include limited eye contact and the absence of appropriate facial expressions and gestures. Children with autism experience challenges in developing appropriate peer relationships and show a lack of emotional or social reciprocity.

Pervasive Developmental Disorder Not Otherwise Specified is the category that is used when there is a severe impairment in the development of reciprocal social interaction and communication, or stereotypic behaviours, interests and activities, but the full criteria are not met for a diagnosis of Autistic Disorder (American Psychiatric Association, 2000). Children with autism typically maintain restricted or repetitive behaviours and interests. They show inflexible adherence to non-functional rituals and some children maintain stereotypical and repetitive movement (e.g. flapping of hands), also known as 'stimming'. They are most comfortable with, and may insist on routine, whilst showing resistance to trivial changes (Mash & Wolfe, 2005; Carr, 2006).

According to (Hillman, 2006) no one behaviour serves as a definitive diagnostic indicator for children with autism as they present with a variety of symptoms across cognitive, emotional and behavioural domains, with language and non-verbal communication skills either absent or significantly delayed (Carr, 2006). Thus, autism is on a spectrum of disorders that affects each individual differently, and with varying degrees of severity. (Lorna Wing's 1995) triad of impairments is useful for explaining the difficulties children with autism experience difficulties in areas of development manifest as an impairment of social interaction, language and imagination or flexible thinking (Koudstaal, 2005; Mash & Wolfe, 2005; Carr, 2006), all combined to place tremendous influence on the cognitive capacitation of autistic students. Autism Spectrum Disorder (ASD). Autism

spectrum disorder is a lifelong neurodevelopmental condition whose core criteria are delineated in The Diagnostic Statistical Manual of Mental Disorder (5<sup>th</sup> ed; DSM-5: American Psychiatric Association, (APA, 2013). While earlier versions specified four separate disorders (autistic disorder, Asperger's disorder, childhood disintegrative disorder, or pervasive developmental disorder not otherwise specified), the DSM-5 collapsed the categorisations into one broad continuum of core symptoms. These symptoms are present from early childhood but may vary in intensity over time and the heterogeneity of persons with ASD is recognised across a continuum. According to WHO or World Health Organisation (2017) Autism Spectrum disorder or ASD refers to a range of conditions characterised by some degree of impaired social behaviours, communication, language and narrow of interests and activities that are both unique to the individual and carried out repetitively.

### **1.2.3. Statement of Problem**

To some Western Authors on the subject of autistic students like [Jacklinm et Farr, 2005], [Fleury et al, 2014] have focused more on the social abilities like communication and effectively interaction with others leaving out the learning method that has a significant impact on the cognitive capacity of autistic students, while authors on mental health in sub-Saharan Africa particularly Nigeria, Ghana and Ethiopia and those in Cameroon like Diana et [2020], Mvogo et al, [2018] and Njamnshi et al [2015] emphasize on the lack of awareness of mental disorders, lack of insufficient Psychiatrists, stigma and cultural barriers. This indeed is a great concern that must be looked upon.

To Field et al (2010) and Fleury et al (2014) Students with autism experience various other difficulties, as well, all of which affect their ability to learn as a typically developing child might learn. Autistic children experience deficits in imitational and observational learning. Children with ASD lack imitative skills, which affects their ability to learn skills by observing others. Because observation is an effective method of social learning for typically developing children, this places autistic students at a large disadvantage.

According to (Strogilos et al., 2018) Learners with autism can be taught to their interests and abilities, which will make them more successful in inclusive classroom settings. Differentiation of instruction is suggested for all Learners, and can include differentiation of the curriculum. Differentiation of the curriculum encourages teachers to teach to pupils' interests, which makes learning in an inclusive setting more beneficial for that pupils [Fleury et al, 2014] Autistic individuals often experience further cognitive difficulties on some

assessing executive function, it is assumed that impairments in executive functions include a set of mental top down regulation and control mechanisms [Miyae et Friedman,2012]. Poor academic performance is often noted for autistic children because their social abilities affect their capacity to learn within a classroom [Ostmeyer et Scarpa,2012].

Meanwhile the poor academic of these autistic students is coming from the teaching strategies that are applied to both the general education and Special education, Whereas the main problem of autistic learners is not the issue of inclusive education but rather it is the teaching strategy put in place which does not guarantee a good learning method for their cognitive capacity. According to Muchetti (2013), autistic learners spent most of their time at school by disengaging from learning activities as a result of lack of awareness by general education teachers of autistic learner's academic profile and the characteristics of these atypical learners. From the observation made during an internship at the Bilingual School Complex La Marfee Marie Claire Noah Etoudi during our internship, we found that the reasons why autistic learners were not performing well like the typically peers was not because of their social abilities as said by Ostmeyer and Scarpa (2012) nor imitation and observation learning as mentioned by (Field et al,2012) but instead it because of the learning methods that are not adaptable to the autistic students cognitive capacity.

According to (Mani Schoite & Van Berckelaer-Onnes,2013), a vast majority of children with ASD who are provided with appropriate education show improvements not only in academic learning and functional language but also in socialization, adaptive skills and communication. Most of the teachers that we interview have little or no knowledge about autism, they lack the learning strategies to implement that will be adaptable to all the learners skills, this again do not favour the cognitive impaired learners, (Reichardson, (2005), good learners are engaged and motivated to learn precisely because they know all the process and strategies of learning. While on the field of study, we found that the problem today in many of our schools is no more engaging learners with autism in mainstream classrooms as cited by (Lindsay, Proloux, Thomson & Scott, 2013), (Aida,2008) regarding the quality of teaching learning, a quality base line survey found that teaching should be planned and programmed according to the diversity of pupils. Despite growing recognition of inclusion education, many autistic children in Cameroon continue to struggle academically due to inadequate pedagogical gap in practical, classroom-based studies that explore the enhancing the cognitive abilities of autistic pupils.

This research seeks to address this gap by analysing the impact of cooperative learning on the cognitive capacity of an autistic pupil at La Marfee.

### **1.3. RESEARCH OBJECTIVES**

#### **1.3.1 Principal Research Objectives**

The Principal Objective of this work is to **find the effects of cooperative learning method on the cognitive capacity of Autistic Learner of BSC La Marfee Marie Claire Noah Etoudi.**

From the operationalisation of this principal objective, three specific hypotheses have been formulated as follows.

#### **1.3.2 Specific Research Objectives**

**SO 1:** To find that cooperative Learning approach put in place in the processes of learning has an influence on the cognitive abilities of autistic learners.

**SO 2:** To find out if Cooperative Learning method of the acquisition process has an influence on autistic learners' mental skills.

**SO 3:** To find out if cooperative Learning manner has an influence on the analytical proficiency of autistic learners.

### **1.4. RESEARCH QUESTIONS**

#### **1.4.1 Principal Research Question**

**What influence does cooperative learning methods have on the cognitive capacity of autistic pupils of BSC La Marfee Marie Claire Noah-Etoudi?**

#### **1.4.2 Specific Research Questions**

**SQ 1:** What are the cognitive strengths and challenges of the autistic pupils involved in cooperative learning activities,?

**SQ 2:** In what ways does Cooperative Learning influence the autistic pupil's academic performance,?

**SQ 3:** What challenges do teachers and peers face in including the autistic pupil in cooperative learning?

## **1.5. RESEACH HYPOTHESIS**

### **1.5.1 General Rsearch Hypothesis**

This study has a general hypothesis and three specific hypotheses. The general assumption is as follows: **The use of cooperative learning methods significantly influence the cognitive abilities of autistic pupils at La Marfee Marie Claire Noah Etoudi.**

### **1.5.2. Specific Research Hypothesis**

**RH 1:** Cooperative learning improves the autistic pupil's ability to interact and collaborate with peers.

**RH 2:** Cooperative Learning constributes positively to the development of the autistic pupil's cognitive skills. Of BSC La Marfee Marie Claire Noah Etoudi .

**RH 3:** Cooperative learning leads to improvements in academic performance in subjects like reading and mathematics.

## **1.6. INTEREST OF THE STUDY**

The result of this study or will be of significant importance to special educations, medical personnel, science and the society.

### **1.6.1 Personal Interest**

I undertake study on Autistic students to better understand their social life style, how they cop with their challenges in learning how to teach a pupil with autism.

### **1.6.2. Educational Interest**

This research work will continue to enrich other existing literature in this domain and will serve as a surplus scientific resource that will challenge the teachers and educators to give attention to the learning skills of autistic students using specialised learning method, this will serve as a great tool for special educators.

### **1.6.3 Medical and Professional Interest**

The knowledge of learning method and cognitive capacity of autistic students is very important in the medical field because it will help doctors and health professionals to come up with effective diagnostic techniques that are clear and specific for accurate diagnosis and

treatment of autistic patients. It will provoke them to research and develop effective follow up that address both the learning skills and cognitive capacity.

This research work will serve as a great research to pediatric Neurologists, since they are Developmental Pediatrician in Cameroon as the diagnosed of Autism will no longer be lightly taken. Thus maximum attention will be given to Autistic students and gradually reducing the prevalence of autism deficits.

In science this knowledge will contribute further research and understanding of autistic learning method and their cognitive capacitation. It will also lead to the development of new follow up and intervention that improve the learning method of autistic learners. Medical personnel will be more apt and to take into consideration the need for effective follow up and diagnosed of autism to ensure sustainable treatment.

#### **1.6.4. Social interest**

The family of autistic students will be educated on how to psychologically follow up ,know the learning skills method and the cognitive capacitation used ,the learning method that is adaptable to their cognitive capacitation thus thereby facilitating the recovery of process .This will equally break the negative barriers and believe in the society like belief that autistic children are bewitched children, evils children or children burn to die but to rather know that if early diagnosed and proper follow up these children will also contribute for the growth of their families and the society as large.

### **1.7. DELIMITATIONS [SCOPE]**

The study was delimited to one autistic pupil of class five BSC la Marfee Marie Claire Noah in Yaounde –Etoudi. The focus of the study was on the learning method and cognitive capacitation of autistic pupils. The study employs a qualitative approach and uses, observation, interviews, and document analysis as the main methods of data collection. It is delimited to the use of cooperative learning methods.

#### **1.7.1. Geographical delimitation**

This study was limited to the Centre Region in Mfoundi Division; precisely at La Marfee Bilingual School Complex Marie Claire Noah Yaounde 1-Etoudi, situated between Pharmacy Tongolo and Total Yannick.

## CHAPTER TWO: CRITICAL ANALYSIS OF KEY CONCEPTS AND LITERATURE REVIEWING

### 2.1. CRITICAL ANALYSIS OF KEY CONCEPTS

In this part of our work, we are going to explain step by step the following notion: learning method, cognitive capacitiation, autistics, students, and BSC la marfee.

Firstly,

- **LEARNING**

- Learning is a process that leads to a change, which occurs as a result of experience and increase the potential for improved performance and future learning [Ambrose et al, 2010]. JOHN DEWEY, the American Philosopher first popularised learning by doing. For DEWEY this meant learning emphasis on student's engagement, this approach ended up the traditional notion that learning happens through lectures and memorisation. Learning is a process that leads to change, which occurs as a result of experience and increase the potentials for improving the performance and future learning (Ambrose et al, 2010). According to Chomsky, Language is a natural object, a component of the human mind, physically represented in the brain and part of the biological endowment of the species [Chomsky, 2002] Learning is any change in behaviour resulting from behaviour [WOODWORTH].

- **Learning Methods**

Refers to the strategies and techniques used to enhance the educational experience of autistic children, adapted to their cognitive strengths and challenges. Structured teaching approaches such as the TEACCH method, provides autistic children with a predictable and organized learning environment that enhances their ability to acquire new skills. (Mesibov, Shea & Schopler, 2005)

- **Autism Spectrum Disorder (ASD)**

Autism Spectrum Disorder (ASD) is a neurodevelopmental condition characterised by challenges in social interaction, communication and repetitive behaviors. Autism is a single disorder but a spectrum of closely related disorders with a shared core of symptoms. (Frith, 2003)

### ➤ **Cognitive Capacity in Autism**

Cognitive capacity refers to the ability of an individual to process, store, and retrieve information, influencing learning and problem solving. Cognitive profile in autism are highly heterogeneous with some individuals exhibiting intellectual disabilities while others demonstrate exceptional abilities in specific domains such as memory, mathematics, or music. (Happé & Frith, 2006)

### ➤ **METHODS**

Methods are the specific tools and procedures you use to collect and analyse data e. g. experiments, surveys and statistical test, in shorter scientific papers where the aim is to report the findings of a specific study, (FOAD SPIRIT, 2010)

### ➤ **TEACCH:**

Is an evidence based service, training, and research program for individuals of all ages and skills levels with autism spectrum disorders (Marwick et al., 2005)?

Treatment and Education of Autistic and Communication Handicapped Children (TEACCH), Autism is a unique disorder, and there are many effective intervention methods/ Programs that have been suggested to reduce the negative effects of autism. According to a research published by National centre for Autism studies, the Treatment and Education of Autistic and Communication Handicapped Children (TEACCH) is an evidence-based service, training and research program for individuals of all ages and skills levels who have autism spectrum disorder (Marwick et al., 2005).

This approach targets three essential components that every autistic individual needs; physical organisation, scheduling, and teaching methods. The approach encourages teachers of autistic individuals to set up classrooms in particular ways so that numerous studies reported that the Treatment and Education of Autistic and Communication Handicapped children program has several efficacies in reducing the stress levels of children. Moreover, the implementation of TEACCH program provides an opportunity to standardize environments such as routines, scheduling, and establishing rules and expectations. Organized environments encourage individuals to show normal behaviors as well as positive social interactivity (Blume, 1996).

### ➤ **ABA**

Applied Behaviour Analysis is a therapy based on the science of learning and behaviour. It helps us to know how behaviour works, how behaviour is affected by the environment and how learning takes place. It is a flexible treatment

### ➤ **Braille System:**

Braille is a system of raised dots that can be read with the fingers people who are blind or who have low vision. It is a code learnt for reading and writing we used today, he drew inspiration from French army captain named Charles Barbier who developed a similar code. Barbier created a non verbal communication system, so his officers could read battle commands during the night without the use of candlelight. In the late 1800's, Louis Braille refined Barbier's system and created the foundation for today's Braille code

### ➤ **The Sun –Rise Program:**

A truly child centered approach for children and adults diagnosed with autism and other related disorder in which you will move with your child instead of going against him/her. This creates a deeply loving, deeply respectful learning environment enabling both you and your child to build a joyful connection together.

### ➤ **Montessori Method:**

It is a scientifically founded method of educating children founded on the belief that a child's education should be physical and academic.

### ➤ **PECS:**

The Picture Exchange Communication is augmentative and alternative communication system (communication pictures other than speech) that involves the physical exchange of pictures to communicate with another person for the purpose of requesting or commenting. It was originally developed to be used with preschool children with autism spectrum disorder and other related development disabilities.

## ❖ **CONCEPTS OF QUALITY EDUCATION**

### • **TEACHING METHODS**

Teaching methods consist of guiding and scaffolding, direct teaching with learning materials and pupil's engagements in dialogues and class tasks (Rigelman & Ruben, 2012).

Barrow and Leu (2006) mentioned that an effective teaching strategy means practising and asking questions to one other and repeating them in class.

Collaborative approach is one of the strategies which facilitates to meet learners, needs (Borko,2004; Drilling-Hammond,2010; Stoll, Bolam, McMahon,Wallace,& Thomas ,2006;Vescio,Ross,& Adams,2008) through a relationship where children receivedsupport and encouragement from their tutors (Kermizano, 2007).In a qualitative research ,Regelman and Ruben (2012) mentioned collaborations as a central for learning because learners feel safe to learn alongside their mentors and peers through this process.

- **Assessment and feedback**

Assesment is an intertgral part of teaching-learning process which facilitates solving noticing,representing,and responding to childrens literate behaviors,rednering them meaningful for particular purposes and audiences”(Johnston &Costello,2009;147).Based on academic teaching –learning ,World,Young and Risko (2011) refer to two forms of assessment such as formative and summative.The former is ongoing and aims at capaciuty building of learners while the lazttter takes place at the end of a program to evaluate learners performance.

- **Learning environment**

The classroom environment established by the teacher has a major impact on pupil's motivation and attitudes towards learning. In this respect,purposeful,task oriented and supportive (Kyriacou, 1998) classrooms generally facilitates learners learning.A safe and open environment facilitaytes to develop shared norms and values,makes students listen to understand;participate fully;respect others and ideas.(Kemizano,2007) along with classroom setting ,school environment contributes to the success or failure of learners in their reading performance.(Lerner, 1993) argues that learning competencies depends on positive interactions with school and home environment.

- **Classroom management**

Classroom can be organised in different ways, Aida (2008) says that the whole class approach facilitates to deseminate the same information to the whole class and to assess pupils where the members of a group can cooperate and support each other to do their tasks in different ways. However, classroom should be organizefd in a way where teacher, groupo and members of groups can exchange their teaching roles.

- **Teacher, s education**

According to (Rigelman and Ruben, 2012), all students deserve a teacher who can help them to be I dependent learners, (Bail & Cohen, 1999) suggest that teachers develop and improve their instructions through inquiring in order to positively influence student learning. Besides, teachers can experience powerful learning by examining student thinking, co-planing, co-teaching, and other forms of assistance in class (Rigelman and Ruben,2012). So experience plays an important role to bring effectiveness to teaching because expert teachers are thought to know effective ways of dealing with learners compared to less experienced ones (Rice,2010; Chuuga, 2013).

- ❖ **Cognitive capacitation**

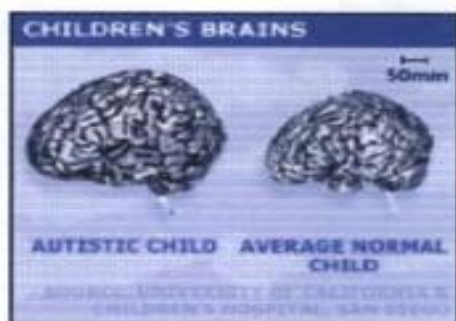
Cognitive Capabilities also known as cognitive capacities or abilities are the brain based skills needed in acquisition of knowledge, manipulation of information and reasoning. Dr Olenka Bilash at the university of Alberta defines cognitive capacity as the total amount of information that the brain is capable of retaining at any particular moment. According to Oxford Dictionary cognitive capacity is the process by which knowledge and understanding is developed in the mind. Child studies centering on theories of cognition.

Cognition is defined as the mental action or process of acquiring knowledge and understanding through thought, experience, and the senses. The brain is endlessly perceiving, processing, plaining, organizing and remembering –it is always active, cognition is thinking, and it encompasses the processes invoved in perception, knowledge, problem solving, jugement, language, and memory, [Kahneman, 2011]. Cognitive includes basic mental processes like sensation, attention and perception, it also includes complex mental operations such as memory, learning language use, problem solving, and decision making. Neuro-Cognitive is any form of cognition associated with the functioning of one or more specific areas of the brain. It is the neuroscience of cognition [Matlin 2005; Ascraft 2002].

- **Cognitive neuroscience**

Cognitive neuroscience is the developing of methods that enables us to undetrstand the neural basis of cognition [Anderson. 2015]. In order to understand how the brain and cognition relate we must look at the structure of the brain. The basic building block of the brain is the neuron. Process [Ashcraft 2002]. A neuron is a cell that is specialized for receiving and transmitting a neural impules [Aschraft 2002]. It is these building blocks that

are found in all brain structures [Kolb and Whishaw 1996]. Kolb and Whishaw [1996] estimate that the majority of these cells are directly involved in information and cognition. Research in neuro-cognition focuses primarily on the spinal cord and brain, in particular the top layer of the brain, the cerebral cortex, which is responsible for higher level mental. Learning by doing enable students to develop their problem solving skills. They could then clarify the learning and apply it in their future lives.



**Figure 1:** Autistic, s chid brain and that of an average normal child

When the disorder begins to manifest itself ,brain abnormalities appear in those affected. These brain abnormalities often occur before 30 weeks of gestation, (Halsey, Hyman & conference writing Panel, 2001). Infact ,it appears that abnormal cell migration between the third and fifth months of gestation can lead to cerebellar abnormalities recognized in people with autism (Picciotto et al, 2006). Futher more, a possible sudden, rapid head growth during infancy may be an early sign that autism is developing (Strock, 2004)

With observations that most of the people with Autism a Macrocephaalie, that is an increase in size of the skull.

Each region of the brain seemed not to be balance, the cervelet that intergrate the informations tactiles and the deep sensibility, ensure the orientation in the space, regulate the tonus, the coordination and the muscular forces, the limbique system that manages essentially the emotions and other cerebrales like the corticals regions, the calleux corps.

- **Cognition**

Cognition can be defined as the mental action or process of acquiring knowledge and understanding through thought, experience and the senses (Matlin 2005). In recent years, cognition and neuro-cognition have seen an increasing overlap in research. This has resulted in a new term being coined.

- **Cognitive Functioning**

Cognitive functioning can be define as a combination of three elements namely ; intelligence, cognitive skills of concernration and attention and also academic archievement (Biddle et Assare, 2011).

According to Carson et al. (2015), children at this age (11-12years) should begin to acquire and develop the ability to regulate their attention, thoughts, actions and emotions, and on occasion, suppress a dominant response to produce a more appropriate alternative.

- **Cognitive Flexibility**

These processes include : attention switching, attentional set shifting, mental flexibility, set shifting and Cognitive Flexibility (CF) is the ability to adapt and switch between mental processes to generate appropriate behavioural responses (Deak & Wiseheart, 2015). (Dajani & Uddin 2015). (Ionescu, 2012) defines CF as the ability to change perspectives spatially or interpersonally, which requires us to inhibit previous perspectives and tap into working memory to activate a different perspective. CF can also have referred to or discussed in the context of processes involved shifts in attention (Dajani & Uddin 2015). Mental set shifting (Diamond, 2013). These mental processes are required to process information, concentrate, pay attention and switch between mental tasks. CF allows the individual to perform competently to separate from a task, re-arrange a new response set, and apply this new response set to the task at hand (Dajani & Uddin, 2015).

(Diamond , 2013) explains that being cognitively flexible also involves the ability to be flexible, to adjust to changed demands, admit you were wrong, and to take advantage of sudden and unexpected opportunities. CF is critical for everyday language use, requires semantic knowledge (Deak, 2003), is vital in today's changing world and is essential for the adaptability and creativity that is needed to see things in new and different ways (Davidson et al. 2006).

- **Cognitive Science**

Cognitive Sciences is the scientific study of thought, language and the brain (Ashcraft 2002). Neuro-cognition is any form of cognition associated with the functioning of one or more specific areas of the brain. It is the neuroscience of cognition (Matlin, 2005 ).

- **Cognitive Neuroscience**

Cognitive neuroscience is the developing of methods that enable us to understand the neural basis of cognition (Anderson, 2015). In order to understand how the brain and cognition relate we must look at the structure of the brain. The basic building block of the brain is the neuron.

- **The Neuron**

A neuron, is a cell that is specialized for receiving and transmitting a neural impulse (Ashcraft, 2002). It is these building blocks that are found in all brain structures (Kolb & Whishaw 1996). (Kolb & Whishaw, 1996) estimate that the majority of these cells are directly involved in information and cognition. Research in neuro-cognition focuses primarily on the spinal cord and brain, in particular the top layer of the brain, the cerebral cortex, which is responsible for higher level mental process (Ashcraft ,2002).

- **The Cerebrum**

The cerebrum or cortex is the largest part of the brain that is associated with cognitive function. The cerebral cortex is divided into sections called lobes ; the frontal lobe, the parietal lobe, the occipital lobe and the temporal lobe. The frontal lobe is associated with executive function, reasoning, planning, speech, movement, emotions and problem solving. The parietal lobe is linked with attention, movement, orientation, reading, calculation, recognition and perception of stimuli. The occipital lobe is associated with vision and visual processing. Finally, the temporal lobe is linked with perception, recognition of auditory stimuli, memory and speech. Table 2.1 below illustrates the cognitive domain, sub domain, and tests that will be used to assess cognition in this thesis, and the part of the brain that is associated with cognitive function (Filley , 2011).

**Table 1:** Brain Structures and Functions.

| Brain Structure | Location                               | Primary functions                                                         |
|-----------------|----------------------------------------|---------------------------------------------------------------------------|
| Frontal Lobe    | Front part of the cerebral cortex      | Executive functions,decision making ,voluntary movement,speech production |
| Parietal Lobe   | Top middle part of the cerebral cortex | Sebsory processing ,Spatial orientation,body awareness                    |
| Temporal Lobe   | Side areas of the cerebral cortex      | Auditory processing memory ,language comprehension                        |
| Occipotal Lobe  | Back part of the cerebral cortex       | Visual processing                                                         |
| Cerebellum      | Below the occipal lobe                 | Coordination of movement,balance,posture                                  |

|              |                                             |                                                              |
|--------------|---------------------------------------------|--------------------------------------------------------------|
| Brainstem    | Base of the brain,connecting to spinal cord | Regulates vital functions (heart rate,breathing,digestion)   |
| Hippocampus  | Within limbic system,medial temporal lobe   | Memory formation,learning                                    |
| Amygdala     | Adjacent to the hippocampus                 | Emotional processing fear response,memory modulation         |
| Thalamus     | Centre of the brain,above brainstem         | Relays sensory and motor signals to the cortex               |
| Hypothalamus | Below the thalamus                          | Regulates hormones,body temperature,hunger,circadian rhythms |

**Figure 2 :** Regions of the Human Brain (Cambridge Cognition, 2015).

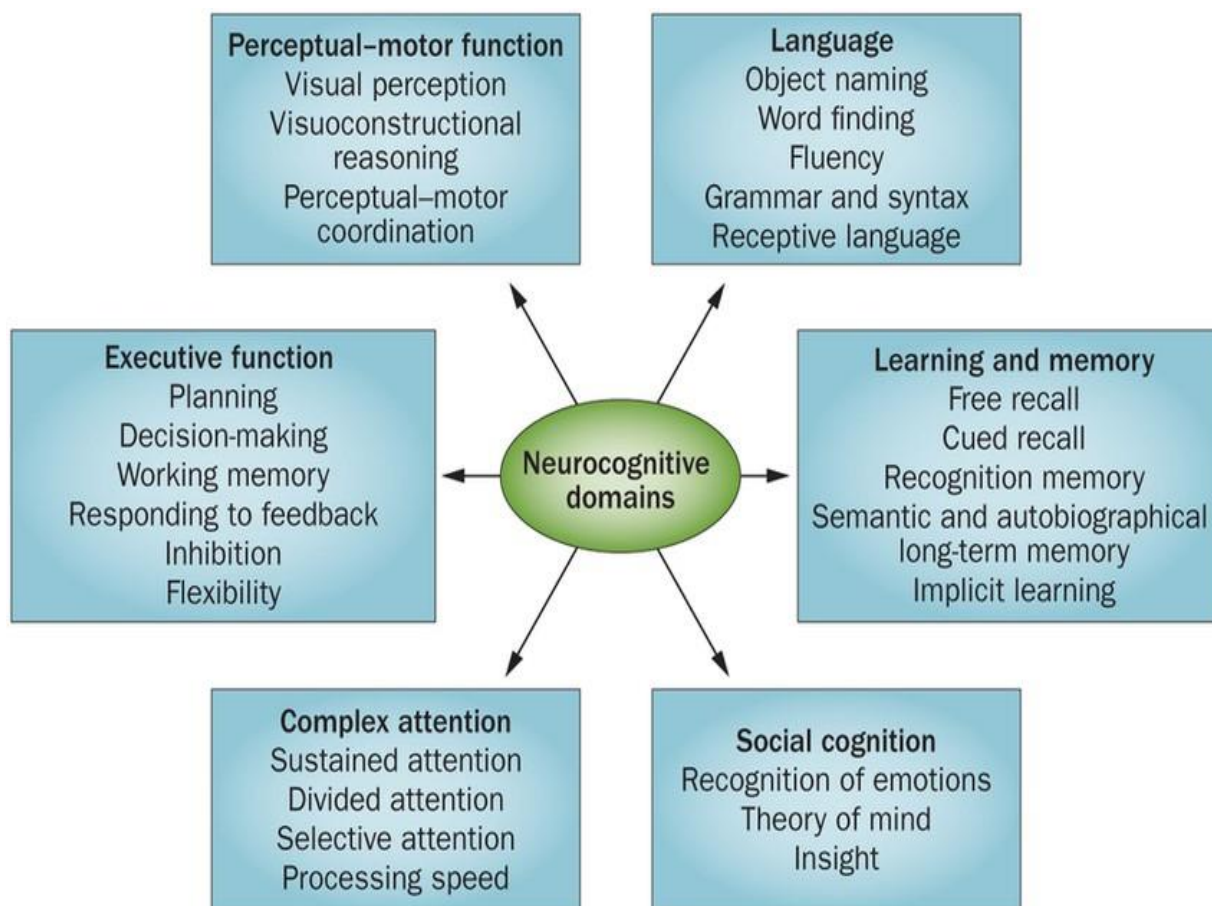
### ❖ The Cognition Family

When you ask the question what happens exactly in your brain ? Do you simply just answer the question ? Is there a train of thought ? Do you need to retrieve information from

Your memory ? What was your attention span during this process ? Were you aware of every single mental process that occurred in your brain ? By asking ourselves these questions we quickly realize that cognition and neuro-cognitive functioning encompasses a wide variety of higher mental processes. The term neuro-cognition or cognitive functioning is simply an umbrella term.

### ❖ Cognitive Functioning

**Figure 3** below illustrates the diversity of the ‘cognition family’.( Sachdev et al.,2014) defined six principal domains for cognitive functions ; perceptual-motor function, language, learning and memory, social cognition, complex attention and executive function, each with sub domains.



**Figure 3 :** Cognition Family,( Sachdev et al,2014)

All components in the cognition family are vital in the input, processing and output of information. There are four core components that are important in the development of a child, through adolescence and into adulthood (Diamond 2013 ; Munakata et al. 2012 ; Casey et al. 2008 & APA 2002). These are the components that give children the ability to pay attention, retain and manipulate information appropriately, process information and respond quickly and accurately and alternate between task conditions (Davidson et al. 2006). This thesis will, therefore, focus on the sub domains of (i) attention, (ii) working memory, (iii) flexibility and (iv) executive function during a critical period of development as children transition from childhood to adolescence. Working memory and flexibility are treated as separate constructs to executive function as the researcher aimed to examine specific aspects of cognition. Almost all executive function models do in fact include working memory and flexibility as sub components and not separate.

#### ❖ CAPACITY

In Oxford Advanced Learners Dictionary (1995:2) capacity is the mental or physical capacity ,power or skill to do something .As (heinle,2008) said in Collins build school

Dictionary of American English that ability is the quality or skill that you have which can make it possible for you to do something. (Kipfer, 1999) determined the meaning of ability as natural or acquired power in particular activity. She also defined it as aptitude, capacity, competency, comprehension, dexterity, endowment, facility, interlegency, might, potentiality, qualification, resourcefulness, skill, strength, talent and understanding.

## ❖ AUTISM

Autism Spectrum Disorder (ASD) is a pervasive developmental disorder that is generally recognised and diagnosed between the ages of 18 months and three years (Troy *et al.*, 2007). As articulated in the Diagnostic and Statistical Manual of Mental Disorders (American Psychiatric Association, 2000) typical problems observed in individuals who are autistic, include limited eye contact and the absence of appropriate facial expressions and gestures. Children with autism experience challenges in developing appropriate peer relationships and show a lack of emotional or social reciprocity.

Pervasive Developmental Disorder Not Otherwise Specified is the category that is used when there is a severe impairment in the development of reciprocal social interaction and communication, or stereotypic behaviours, interests and activities, but the full criteria are not met for a diagnosis of Autistic Disorder (American Psychiatric Association, 2000). Children with autism typically maintain restricted or repetitive behaviours and interests. They show inflexible adherence to non-functional rituals and some children maintain stereotypical and repetitive movement (e.g. flapping of hands), also known as 'stimming'. They are most comfortable with, and may insist on routine, whilst showing resistance to trivial changes (Mash & Wolfe, 2005; Carr, 2006). According to (Hillman, 2006) no one behaviour serves as a definitive diagnostic indicator for children with autism as they present with a variety of symptoms across cognitive, emotional and behavioural domains, with language and non-verbal communication skills either absent or significantly delayed (Carr, 2006). Thus, autism is on a spectrum of disorders that affects each individual differently, and with varying degrees of severity.

Autism Spectrum Disorder (ASD). Autism spectrum disorder is a lifelong neurodevelopmental condition whose core criteria are delineated in The Diagnostic Statistical Manual of Mental Disorder (5<sup>th</sup> ed; DSM-5: American Psychiatric Association, (APA, 2013). While earlier versions specified four separate disorders (autistic disorder, Asperger's disorder, childhood disintegrative disorder, or pervasive developmental

disorder not otherwise specified), the DSM-5 collapsed the categorisations into one broad continuum of core symptoms. These symptoms are present from early childhood but may vary in intensity over time and the heterogeneity of persons with ASD is recognised across a continuum.

According to WHO or World Health Organisation (2017) Autism Spectrum disorder or ASD refers to a range of conditions characterised by some degree of impaired social behaviours, communication, language and narrow of interests and activities that are both unique to the individual and carried out repetitively.

### ❖ PUPILS OR LEARNER

According to Synonym study, Pupil, disciple, scholar and student refer to a person who is the recipient of education or mentoring. A pupil is one under the close supervision of a teacher, either because of youth or of specialization in some branch of study: a grade – school pupil. A disciple is one who follows the teachings or doctrines of a person whom they consider to be a master or authority. A student is a person enrolled in a school or other educational institution.

#### ➤ The Types of Learners:

Students differ in their learning styles. Learning styles involve those who learn best by auditory means, those who learn best visually, and those who learn best by hands-on or tactile means. Others may learn best while working with peers, or in small or large groups, or in a more isolated situation. In many cases, students may require more than one learning style to fully grasp the concepts being taught. Teachers should take into account the characteristics of their learners when determining strategies to use, such as various learning styles; ways in which learners process information, and the use of multiple intelligence theory. Knowing your learners is critically important in successful lesson planning and arrangement of the learning environment, including grouping strategies.

**Table 2:** Types of learners, characteristics, and considerations for learning

| Types of learners | Characteristics       | Considerations                                                          |
|-------------------|-----------------------|-------------------------------------------------------------------------|
| 1) Kinesthetic    | Benefit from movement | Opportunities to physically engage in the activity in a variety of ways |

|                                         |                                                       |                                                                 |
|-----------------------------------------|-------------------------------------------------------|-----------------------------------------------------------------|
| <b>2) sensory engagement(high /low)</b> | May need more stimulation (music) or less stimulation | Consider the sensory input related to the space and environment |
| <b>3) Visual</b>                        | Visual (pictures;modelling)                           | Make sure the student can see what you want them to learn       |
| <b>4) Auditory</b>                      | Benefit from peer supported learning                  | Demonstrate and describe the skill that they should perform     |

Teaching and Learning; These are both complementary to each other, where quality teaching is essential for quality learning. However, teaching and learning should be interactive because one cannot take place without the other (Paul & Dylan, 1998). Teaching requires effort, competence and support and learning requires a combination of these elements. Beside, better understanding about learning facilitates better teaching.

### ➤ HISTORICAL EVOLUTION OF AUTISM

It is a complex neurobehavioral condition that includes impairments in social interaction and developmental language and communication skills combined with rigid, repetitive behaviors. Because of range of symptoms, this condition is now called autism spectrum disorder (Autism Spectrum Disorder Research, 2010) (Eugene Bleuler, 1911) a Swiss psychiatrist, originally used the term 'autism' to denote a state of social withdrawal (Bleuler, 1911). Autism as a diagnostic construct was proposed by Leo Kanner, an Austrian - American psychiatrist, in 1943. He described a group of 11 children, 8 boys and 3 girls, who were intellectually impaired and showed an extreme preference for aloneness from infancy (Kanner, 1943).

By the 1960s Kanner's 'infantile autism' had become a recognised diagnosis for what was considered a rare disorder which was primarily found in children with intellectual impairments.

In 1944 an Austrian Paediatrician, Hans Asperger, published a paper in which he described 4 children, all male. These children were without intellectual impairment but experienced social communication problems (Asperger, 1944). Verhoeff (2013), Solomon (2010), Silberman (2015) and Evans (2017) have all written accounts of the history of autism.

In 1960 Bruno Bettelheim studies therapy session with three children who have autism, In his findings, he claims the root problem with a child exhibiting autism is the coldness of their mothers.

Bernard Rimland in 1964 conducts research that disagrees with Bettelheim. He contended that neither his nor his wife's behaviour impacted whether their son has autism, he published seven books on autism, his being *Infantile Autism (The syndrome and its implications for a neural Theory of Behaviour)*.

In 1970 Autism becomes more well known and acknowledged. The Erica foundation started education and therapy for children they deemed Psychotics, many parents and providers confused autism with psychosis and mental retardation.

In 1977 Research on a pair of twins described autism as being primarily caused by genetics and biological changes in brain.

In 1980 Hans Asperger's work is translated to English. It is acknowledged by many in the medical and psychological community. Additionally, autism research begins to achieve significant momentum at this time. It becomes widely accepted that parenting plays no part in the causation of autism. Studies show other neurological challenges and genetic ailments often accompany autism.

In 1987 Dr Ivar Lovaas published the first study demonstrating the effects of intensive behaviour therapy on autism. While modern therapists do not endorse Lovaas method, the treatment that has become Applied Behaviour Analysis (ABA).

Dr. Hans Asperger, a German scientist described a milder form of early autism that later became known as Asperger syndrome (Strock, 2004). It was not until many years later that the Diagnostic and Statistical Manual of Mental Disorders reported autism as a disorder. The DSM-IV-TR (fourth edition, text revision) now lists five pervasive developmental disorders that are often referred to as autism spectrum disorders (Strock, 2004)

## **2.3. THE TYPES OF AUTISM SPECTRUM DISORDERS THAT AFFECTS STUDENTS**

### **2.3.1 Autistic disorder**

Autistic disorder also called "classical autism" "is the most common condition in a group of developmental disorders known as the autism spectrum disorders (ASD). Classic

autism is characterised by impaired social interaction, problems with verbal and non verbal communication, and unusual, repetitive, or severely limited activities and interests (National Institute of Neurological Disorders and Stroke, (2005)

There are three distinctive behaviors that characterised children with classic autism. These children have difficulties with social interaction, problems with verbal and non verbal communication, and repetitive behaviors or narrow, obsessive interests. The behaviors can range in impact from mild to disabling. Other common symptoms of classic autism include (Westling & Fox,2004; Deutch-Smith,2004; Heward,2006; Garguilio,2004)

Difficulty in expressing needs, uses gestures or pointing instead of words

- Difficulty in relating to and mixing in with others
- Does not respond to normal teaching methods
- Does not respond verbal cues
- Exhibits over sensitivity or under-sensitivity pain
- Exhibits physical over –activity or extreme under-activity
- Has no real fears of danger
- Motor skills are uneven
- Often exhibits tantrums

#### **2.4. PERVERSIVE DEVELOPMENTAL DISORDER, NOT OTHERWISE SPECIFIED (PDD-NOS)**

Pervasive Developmental Disorder, Not Otherwise Specified (PDD-NOS) is a developmental neurologic spectrum disorder, occurs in 10 to 12 of every 10,000 children. Children with PDD-NOS either do not fully meet the criteria of symptoms clinicians use to diagnose any of the four specific types of PDD above, and or do not also have the degree of impairment described in any of the above four PDD specific types. PDD-NOS will present similarly to the kids who have ASD (some people argue that these conditions should be combined as one), but will have a lesser degree of severe impairment. These kids are more likely to be verbal and have some degree of verbal or non-verbal effective communication, yet they must have the autistic features and a severe impairment in social interaction, communication or repetitive stereotype behaviour. This term is reserved for children with a severe impairment who do not fully qualify for any other autistic diagnosis, due to age of onset or combination of autistic features.

## 2.5. ASPERGER SYNDROME

In Asperger syndrome, a young child experiences impaired social interactions develops limited repetitive patterns of behaviour (Nemours Foundation, 2005). Motor milestones may be delayed clumsiness is often observed (U.S. National Library of Medicine, 2004a). However, people with Asperger Syndrome usually have fewer problems with language than those with ASD, often speaking fluently, though their words can sometimes sound formal or stilted. People with Asperger syndrome do not usually have the accompanying learning disabilities associated with ASD, in fact, people with Asperger syndrome are often of average or above average intelligence (National Autistic Society, 2005).

School-age children with Asperger syndrome exhibit a range of characteristics, with varying degree of severity. Diagnostic Syndrome of Asperger Disorder includes (Hallahan & Kauffman, 2006; Turnbull, & Wehmeyer, 2006); Friend, 2005; Westling & Fox, 2004; National Institute of Neurological Disorders and Stroke, 2005a; U.S. National Library of Medicine, 2004a; Mayo Clinic, 2004):

### **Social Skills**

- Has difficulty making friends
- Engages in one-side, long-winded conversations, without noticing if the listener is listening or trying to change the subject
- Displays unusual nonverbal communication, such as lack of eye contact, few facial expressions, or awkward body postures and gestures
- Doesn't understand the give-and-take of conversation or engage in "small talk"
- Seems egocentric or self-absorbed
- Can be extremely literal or have difficulty understanding the nuances of language, despite having a good vocabulary
- May speak in a voice that is monotone, rigid, jerky or unusually fast

### **Behavior**

- Show an intense obsession with one or two specific, narrow subjects, such as baseball statistics, train schedules, weather or snakes
- Likes repetitive routine or rituals
- May memorize information and facts easily, especially information related to a topic of interest
- May have clumsy, uncoordinated movements, an odd posture or rigid gait

- May perform repetitive movements, such as hand or finger flapping
- May engage in violent outbursts, self-injurious behaviors, tantrums or meltdowns and
- May be hypersensitive to sensory stimulation, such as light, sound and texture

Asperger Syndrome is a neurobiological disorder named for a Viennese physician, Hans Asperger, who in 1944 published a paper which described a pattern of behaviors in several young boys who had normal intelligence and language development, but who also exhibited autistic-like behaviors and marked deficiencies in social and communication skills (National Institute of Neurological Disorders and Stroke, 2005).

Concludingly, people with AS are quite capable of functioning in everyday life, but they tend to be somewhat socially immature and may be seen by others as odd or eccentric (Nemours Foundation, 2005). They have higher intelligence and communication skills than those with classic or more severe forms of ASD, but they display most, if not all of other characteristics of ASD, with their primary difficulties manifested in poor social interactions (Hallahan & Kauffman, 2006).

## **2.6. CHILDHOOD DISINTEGRATIVE DISORDER**

Childhood disintegrative disorder develops in children who have previously seemed perfectly normal. Typically, language, interest in the social environment, and often toileting and self care abilities are lost, and there may be a general loss of interests in the environment. The child usually with ASD (Yale Developmental Disabilities Clinic, 2006). An affected child shows a loss of communication skills, has regression in nonverbal behaviors, and significant loss of previously-acquired skills. Symptoms of Childhood Disintegrative Disorder may include (U.S. National Library of Medicine 2004)

- Loss of social skills
- Loss of bowel and bladder control
- Loss of expressive or receptive language
- Lack of play
- Failure to develop peer relationships and
- Impairment in nonverbal behaviors
- Delay or lack of spoken language

Childhood Disintegrative Disorder must be differentiated from both childhood schizophrenia and pervasive developmental disorder (PDD). The most important signs of childhood disintegrative disorder are loss of developmental milestones (U.S. National Library of Medicine, 2004). The child tends to have normal development through age of 3 to 4 and then over a few months undergoes a gradual loss previously established abilities listed above in Diagnostic Symptoms (e.g., language, motor, or social skills). The cause is unknown, but it has been linked to neurological problems (Yale Developmental Disabilities Clinic, 2006).

## **2.7. RETT SYNDROME**

Rett Syndrome (RS) is a neurological disorder seen almost exclusively in females, and found in a variety of racial and ethnic groups worldwide (International Rett Syndrome Association, 2005). An inability to perform motor functions is perhaps the most severely disabling feature of Rett syndrome, interfering with every body movement, including eye gaze and speech. Other diagnostic Symptoms of Rett Syndrome include (International Rett Syndrome Association, 2005; National Institute on Neurological Disorders and Stroke, 2005c):

- An early period of apparently normal or near normal development until 6-18 Months of life.
- Stereotyped hand movements
- Gait disturbances
- Compulsive hand movements such as wringing and washing follow the loss of Functional use of the hands
- Disorganized breathing patterns which occur when awake and
- Slowing of the rate of head growth become apparent

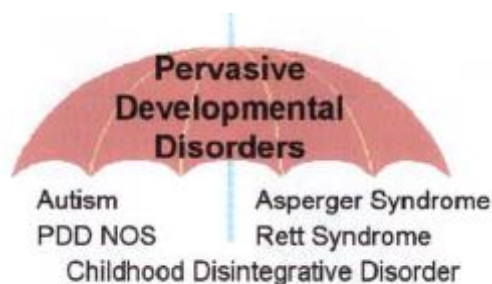
## **2.8. THE ETIOLOGY AND FACTORS OF AUTISM**

The etiology of ASD is complex and still largely not understood, though progress is being made in the identification of the genetic, neurobiological, and environmental factors involved (Chen, Penagarikano, Belgard, Swarup, & Geschwind, 2015). There is evidence that ASD is substantially heritable with heritability estimates ranging between 64 and 91% (Tick, Bolton, Happe, evidence of a recurrence rate of 20% in siblings of children with ASD (Ozonoff

Rutter, & Rijdsdijk, 2016). The genetic contribution to ASD is also supported by (et al., 2011) and a heightened prevalence of elevated autistic characteristics in family members of

individuals with ASD (Sucksmith et al., 2011). Risk factors for ASD are likely to be shared with those for other psychiatric disorders. For example, twins and family members of individuals with ASD have also been found to be at risk for other psychiatric disorders, such as ADHD, language disorders, depression and anxiety (Sucksmith et al., 2011 ; Tick, Colvert, et al., 2016).

While the exact cause of autism continue to be sought out, the presence of the disease has been known for many years. » In 1943, Dr Leo Kanner of the John Hopkins Hospital introduced the label early infantile autism into the English Language « (Strock,2004). Around the same time, Dr. Hans Asperger, a German scientist described a milder form of early autism that later became known as Asperger syndrome (Strock,2004). It was not until many years later that the Diagnostic and Statistical Manual of Mental Disorders reported autism as a disorder. The DSM-IV-TR (fourth edition, text revision) now lists five pervasive developmental disorder that are often referred to as autism spectrum disorders (Strock ,2004)



**Figure 4 :** Pervasive Developmental Disorder

These pervasive disorder,such as Rett syndrome,Childhood disintegrative disorder, and Asperger syndrome are characterised by varying degrees of impairment in communication skills, social interactions and restricted,repertive and stereotyped behaviors ''(Srock,2004).While there has been a developing understanding of the symptoms of the disorder ,there has also been an emerging insight into the causes of autism.Years ago, « It was believed that autism resulted from bad parent-child interactions » (Picciotto et al.,2006) .As knowledge about autism has increased,this idea has been replaced with more biological approaches.

Autism has a strong genetic basis, although the genetics of autism are complex and it is unclear whether ASD is explained more by rare mutations with major effects, or by rare multigene interactions of common genetic variants. Many genes have been associated with autism through sequencing the genomes of affected individuals and their parents. Autism may

be underdiagnosed in women and girls due to an assumption that it is primarily a male condition.

Autism does not stop its effects in the brain; the immune system of people with this disorder seems to be affected as well. Many neuroimmunomodulatory factors differ in individuals with or without autism. The profile of cytokines, activation of Leukocytes, and other immunological parameters are dissimilar in person with autism (Picciotto et al., 2006). Children with autism have 20% more B cells and 40% more natural killer cells than children without (Reuters, 2005).

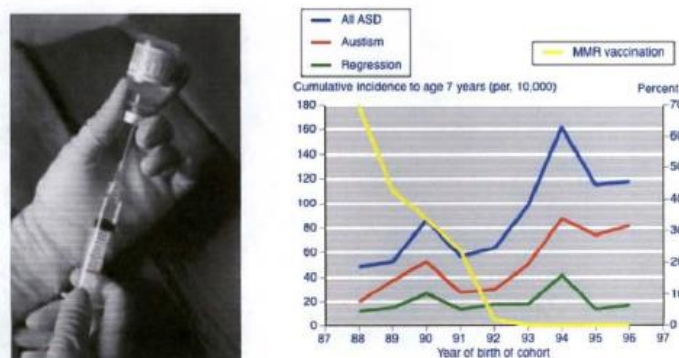
In a study by Dr. Judy Van de Water, the immune cells of children with and without autism were mixed with toxins and bacteria. In response to bacteria, cytokines, or the immune signalling proteins, were produced in lower levels in the group with autism, but the two groups did not react differently to toxins (Reuters, 2005). The low level of cytokine production in response to bacteria is deleterious to persons with autism and may account for the poor immune functioning of people with disorder. Research into the different immunological cellular components of people with autism is hoped to create a diagnostic blood test that can identify people with autism. With an early diagnosis, intervention and treatment can begin quickly for people with autism.



**Figure 5:** Cells of children with and without autism mixed with toxins and bacteria

### **Immunization Factor**

While genetic defects and brain abnormalities are the commonly accepted causes of autism, the possible adverse side effects of immunizations have received a lot of attention as a cause of autism. The vaccine for measles-mumps-rubella (MMR) has been implicated as a possible cause of autism (MoMA, 2006). However, many studies have refuted the claim that vaccines are the culprit (Fombonne & Chakrabati, 2001).

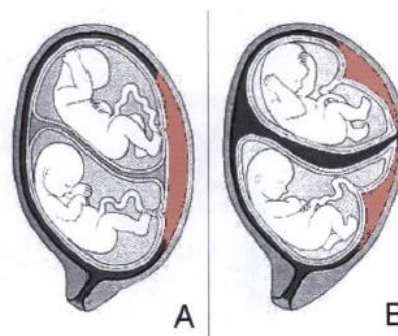


**Figure 6:** Graph shows cases increasing of autism after immunization has been stopped.

The graph above illustrates the increase in cases of autism and other autism spectrum disorders even after the cessation of the MMR vaccination. Evidence shows that MMR vaccination are helpful, rather than harmful to the children who receive them (Fombonne & Chakrabarti, 2001). By ruling out the vaccination theory, scientists can begin to focus on the more likely causes of autism, genetic defects.

## 2.9. THE GENETIC FACTORS

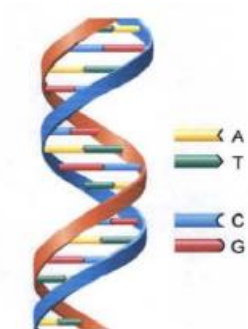
Alots of studies have been carried on Monozygotes and Dizygotes have been researching the genes responsible for Autistic disturbances. The monozygotes twins show a big relation link with Autistic syndrome while there exist a minimal with the dizygotes twins. (Picciotto et al ,2006)



**Figure 7:** Monozygotic twin (A) and dizygotic twin (B) (Picciotto et al ,2006)

In 1977, Folstein and Rutter demonstrated that there was a higher concordance rate among monozygotic twins than dizygotic twins. beside we have remarked that Autism is sharing some Chromosomic regions with other pathologies .There is no doubt that Autism researchers are not able to comfirm clearly what gene is or are responsible for Autism. Because monozygotic twins (A) share the same genetic make -up ,whereas dizygotic twins (B) are no more related than siblings, the research points to a genetic cause rather than an environmental

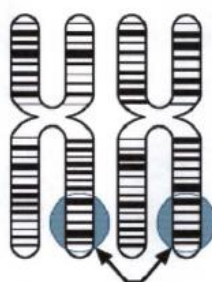
cause. With this information, geneticists have tried to understand the method of inheritance of this disorder.



**Figure 8:** Genes interacting with one or more environmental factors to produce autism by (Picciotto et al., 2006)

It is “Likely that multiple genes are interacting with one or more environmental factors” to produce autism (Picciotto et al., 2006). Thus, merely having the genetic code for autism does not guarantee that it will develop. Data collected from whole-genome screening in multiplex families (families with  $\geq 1$  affected family member) suggest that autism is caused by interactions of at least 10 genes (Muhle et al., 2004). Pinpointing the genetic source is difficult because environmental cause may be involved and because the exact clinical phenotype of autism remains exclusive. This variation in phenotype makes it difficult to find the exact genotype involved (Smalley, 1991). However, this has not stopped researchers from trying to locate the genes involved in autism.

By comparing the genomes of those affected by autism, the possible gene loci responsible for causing autism may be found.



**Figure 9:** Chromosomes 15 duplications (Muhle et al., 2004)

The “most consistently replicated linkage findings have been on chromosomes 7q, 2q and 15q (Santangelo & Tsatsanis, 2005).” The putative speech and language region, 7q31-q33 has been implicated in autism (Muhle et al., 2004). This could explain why children with autism have difficulty in learning and maintaining a vocabulary. Chromosome 15 duplications have been suggested as culprits in the search for the cause of autism (Muhle et al., 2004). The

GABA (A) receptor subunit and UBE3A genes on Chromosome 15q11-q13 as well as the oxytocin receptor at 3p25-p26 have variant alleles more often in the autistic population than in the nonautistic population (Muhle et al.,2004).

## 2.10. THE ENVIRONMENTAL FACTORS

It appears that certain environmental cues can trigger the onset of autism. The prenatal environment can greatly affect whether a child with a specific genetic composition will acquire autism.



**Figure 10:** Prenatal environment factor (Picciotto.,2006)

In one case-control study by Deykin and MacMahon, "Maternal reports and medical records of illness during pregnancy showed relative risks of 4.1 for influenza and 3.3 for rubella (as cited in Picciotto et al.,2006)." Chess et al (1978) examined a cohort of about 250 children with congenital rubella and found that 7% were later diagnosed with autism (as cited in Picciotto et al,2006). Rubella may play a large role in causing autism according to Deykin, MacMahon, and Chess et al. In a different epidemiology study by Hultman et al.(2002), a link between daily maternal smoking during early pregnancy and autism was reported (as cited in Picciotto et al.,2006). Further studies have not replicated the findings by Hultman et al ;therefore ,other factors may have confounded his results. In studies by Rodier and Hyman (1998), a link between autism and early in utero exposure to thalidomide at the time of neural tube closure in the fourth or fifth week of gestation was discovered (as cited in Picciotto et al,2006). Gestational exposure to valproic acid, as well as maternal infections of Cytomegalovirus, measles, mumps, or herpes may account for a small number of autism cases (Picciotto et al.,2006).

The prenatal environment, depending on the conditions plays a huge role in triggering autism. It has also been found that toxic exposure and teratogens in the environment may be linked to small number of autism cases (Muhle et al,2004). Microbial and chemical substances

appear to play a prominent role in initiating autism. Thus, genetic defects are largely involved, environmental cues contribute to the onset of this disorder.



**Figure 11:** Foetus in prenatal environment (Muhle et al.,2004)

### **2.11. BIOCHEMICAL FACTORS**

we have discovered that the people who are suffering from Asperger syndrome disorder are presenting disturbances at the level of the neurotransmitter. Infact serotonin, dopamine, adrenaline, noradrenaline and the betaendorphine are found generally in an abnormal level that is high in the blood of an Autist person.

In 1979, an American Zoologist by name Panksepp remarked a similarity between some behaviours of Autism and the people consuming opium. He also put as caused Betaendorphine that he finds in an excess in the urine of Autistic partient and proposed to fight against this phenomenon a deit with no casein and gluter. His Hypothesis is simple the excess of a cerebral Betaendorphine comes as a result of bad assimilation of certain foods, like the cereals and the casein products.

### **2.12. CHARACTERISTICS OF INDIVIDUAL WITH AUTISM**

Although the primary symptoms of autism are social,cognitive;and behavioural many people who have this mental disorder have physical ailments as well .In 30% of children with autism,the following physical problems may also occur;allergies,autism,epilepsy,digestive disorders,sleeping disorders,attention deficit/hyperactivity disorder,diabetes,heavy mental toxicity,and/or seizures (Picciotto et,2006).Autism may also be couple with sensory integration disorder.People with this disorder have trouble processing information from the proprioceptive,visual,vestibular,oral,auditory,and tectile sensory organs (MoMA, 2006).

Furthermore, people with autism may have persistent viral infections caused by poor immune functioning (MoMA,2006). Although it is often thought of as disease that affects the mental state, it is apparent that the disease is not limited to social, behavioural, and cognitive dysfunction. Autism can be very debilitating on all facets of life as explained below.

#### o **Behaviour**

Most human behaviour and understanding are learnt in the early years through a process of socialisation (Jordan ,R 2013).However ,a person with autism has problem with socializing.Therefore,much of this early learning is missing or takes a different and unusual form (Jordan,R 2013).U.S department of education describes a person with autism often associated with engagement in repetitive activities and stereotypes movements,resistance to environmental change or change in daily routines (as cited Kirk,S 2011) as well as lack of eye contact.A person with ASD do not share the same way of seeing or experiencing things .Rita Jordan (2013) said that when we see a child with autism behaving in a way that ,in another child would be clear example of aggression ,we should not read the behaviour too literally.Each behaviour of a person with ASD has its own meaning and function,no matter it may be considered as violent behaviour.Rita Jordan (2013) explained that instead of only focusing on minimalizing the occurrence of those inappropriate behaviours,we should work on understanding the behaviour,its meaning and function,so that we can prevent it in the future.

#### o **Social interaction**

Social interactions are defined as “abstract symbols in permanent movement”while language is more “static” but however no social interaction is exactly repeated and the meaning of social interactions is hardly ever explicit and there is a constant need to always analyse what one observing as a true meaning (Peeters,T 1997).A central problem in autism is the difficulty processing social information (Jordan,R 2013).A person with ASD lack of theory of mind ,which normally have developed in a 4-years old child without autism .Theory of mind is human being ability to understand the thinking and feelings of others (Kirk,S.2011).

Stephen M. Edelson (2019) said that the theory of mind refers to the notion that many individuals with autism do not understand that other people have their own plans,thoughts, and point of view that makes them having difficulty in understanding other people,s beliefs,attitudes and emotions.The lack of ability to understand that other people think

differently than them have caused problems in relating socially and communicating with other people (Eldeson,S 2019).According to Anita Woolfolk (2013) the deficit in theory of mind also causes them having difficulty in explaining their own behaviour.

Compared to typical children, children with autism spend less time in proximity to other children and are less likely to look at or talk to them(McGee et al.,1997).Bauminger and Shulman (2013) said that it's likely that social development will occur in children with autism,though this may be more dependent on the mediation of others,such as peers or adults, and they say that high functioning children with autism also show differential interaction patterns depending on whom they are interacting with,using more complex interaction with peers without autism (as cited in Conn,2014).

#### o **Communication**

People with autism constantly being faced with problems in communication and language.(Wolfberg,, 1999) explains that at the early development they struggle to engage in joint attention with other people which begins at the age of 9 months when infants normally initiate communication through eye contact,physical gestures and vocalizations to attract attention,express emotion and share social events with some manage to develop speech early in development but they appear to lose this capacity,while others fail to develop speech or never speak but may on occasion unexpectedly utter a word or phrase.He also mentions those who develop the capacity for speech show unusual feature such as echolalia where children repeat words and phrases they heard,either immediately or at some later time.

(Baron-Cohen, 1998) adds that people with autism who develops the ability to speak and to be excessively literal in their interpretation and use of language that relates to their lack of understanding of the nuances and subtle meanings of languages expressions such as in the case of idioms (as cited in Wolfberg,P1999).They also have problems with non verbal aspects of communication such as conveying and comprehending intent with gesture,facial expression,eye gaze and intonation of voice(Wolfberg, 1999).

Another characteristic of communication for a person with autism is mutism. Mutism is a condition where the person have difficulty with all forms of communication, not vocal alone and they cannot be made to talk even with extremely persistent efforts (Bishop, D & Mogford, K 2008). Another communication abnormality is noted by ( Karen 1943- 1946) which is the absence of the concept" yes" and its corollary, affirmation by repetition. According to ( Bishop & Mogford 2008) children without autism reveal that even though they

have an incomplete knowledge on how to deal with adults, s yes/no questions, they learn that response is required and it is not the case with children with ASD.

#### o **Sensory Sensitivity**

Another huge problem faced by a person with autism is sensory integration or as (Kirk , 2011) calls as sensory processing disorder. There are two kinds of sensory processing disorders, such as hypersensitive and hypersensitive. Hypersensitive is where an individual is especially sensitive to sensory input that leads him to experience sensory overload while hypersensitive is where an individual seems to be unaware of or slow to respond to a stimulus that would normally be expected to elicit a response ;sensory seeking ,in which an individual exhibits an unusual behaviour such as craving for, or intense interest in, certain sensory experiences (Neil et al., 2016).

### **2.13. THE CONSEQUENCES OF AUTISM SPECTRUM DISORDERS ON LEARNERS**

Students with autism experience various other difficulties, as well, all of which affect their ability to learn as a typically developing child might learn. Autistic children experience deficits in imitational and observational learning (Field et al., 2010). Although they often have superior visual processing skills, they also often process auditory and linguistic information at a rate much slower than their peers (Fleury et al., 2014). The previously mentioned impairment to their executive functioning system prevents them from being able to process multi-step directions, maintain the organization of their materials, and sustain self-motivation.

It is often extremely difficult for them to generalize information across settings and to see a situation from another person's perspective (Ostmeyer & Scarpa, 2012). Children with autism may fail to see "the picture . . . [but] can still see the individual puzzle pieces in the completed picture" (Frith, 1989,) as cited in (Jacklin & Farr, 2005). Rather than view the puzzle as a picture comprised of the individual pieces, as a typical child would, many autistic children will continue to focus on the individual puzzle pieces and not see the picture that has been created by putting them together.

Literacy skills are also affected by autism, because many autistic children are unable to progress past sight word recognition (Muchetti, 2013). Depending upon cognitive abilities, autistic children may be able to decode text but have problems understanding what they have read, because their reading comprehension capabilities do not match their decoding abilities

(Whalon & Hart, 2011). They also often have an inability to make inferences (Jacklin & Farr, 2005). As well, poor fine motor skills and poor visual-motor speed result in difficulties holding writing utensils, and even when they can hold a pencil their printing may be illegible (Fleury et al., 2014).

The combination of communicative, social, and behavioural impairments directly affects the chances of students with ASD excelling academically. Considering that schools are social environments, children with autism enter the educational system already at a disadvantage when compared to typically developing children. For this reason, supports need to be in place that will promote the success of students with autism both academically and socially. Numerous social, behavioural, and academic strategies can be implemented within both mainstream and special education classrooms, in order to assist students with ASD and contribute to creating positive experiences for them at school. Thus, our said study is aimed at finding the influence of learning method in the cognitive capacity/ability of autistic learners.

Autistic Students are children with developmental disability caused by differences in the brain. They often have problems with social communication and interaction or repetitive behaviours or interests. People with ASD may also have different ways of learning, moving or paying attention.

What qualifies someone as autistic is the deficits in the developing, maintaining and understanding relationships, for example from difficulties adjusting behaviour to suit various social contexts, to difficulties in sharing imaginative play or in making friends to absence of interest in peers. Literacy skills are also affected by autism, because many autistic children are unable to progress past sight word recognition (Muchetti, 2013). Depending upon cognitive abilities, autistic children may be able to decode text but have problems understanding what they have read, because their reading comprehension capabilities do not match their decoding abilities (Whalon & Hart, 2011). They also often have an inability to make inferences (Jacklin & Farr, 2005). As well, poor fine motor skills and poor visual-motor speed result in difficulties holding writing utensils, and even when they can hold a pencil their printing may be illegible (Fleury et al., 2014).

Individuals with ASD often engage in repetitive behaviours or routines (Fleury et al., 2014). Their struggles to cease these behaviours also contribute to their social discomfort. The existence of these repetitive behaviours in autistic individuals is attributed to the impairment of their executive functioning system. Executive functioning regulates an individual's

behaviour ; its impairment compromises an autistic individual's ability to self-regulate behaviours.

## **2.14.THE TREATMENTS OF AUTISM SPECTRUM DISORDERS**

There are structural programmes designed as 'treatments' for autism 'impairments'. Applied Behaviour Analysis (ABA) focuses upon the principles which explain how learning takes place, for example, positive reinforcement, when a behavior is followed by some sort of reward, the behavior is more likely to be repeated. An adult might use ABA to encourage a child to develop communication skills such as looking, listening and imitating. Alternative and Augmentative Communication (AAC) seeks to supplement or replace speech or writing for children who experience impairments in communication.

The Treatment and Education of Autistic and Related Communication Handicapped Children (TEACCH) is a method of structural teaching. A TEACCH classroom contains separate, defined areas for tasks, such as individual work, group activities, and play. There is a reliance on visual learning, which can be a strength for many children diagnosed with autism. Individual with ASD have difficulty with non-verbal communication, such as extracting information from other people, s faces as clues for meaning. (David et al , 2008) conducted a study using Simon Baron, s « Reading the mind in the eyes test. Subjects were to match the correct emotion with pictures of the area around the eyes to describe the expression of thought and feeling they saw.

Another area of difficulty for individuals with ASD is identifying people by their faces and keeping the faces apart.It is not uncommon for them to remember people by what they wear or what their games or other possession are instead of by their faces.The inability to recognise people can caused problems in all phases of daily life .Temple Grandin,1995), autism spokesperson,university professor,and autistic person,stated that unless she has seen people many times or they have distinct features ,she will not recognize or remember them.

### **1. The Treatment TEACCH of ASD**

Is an evidence based service, training, and research program for individuals of all ages and skills levels with autism spectrum disorders (Marwick et al.,2005)

Treatment and Education of Autistic and Communication Handicapped Children(TEACCH), Autist is a unique disorder ,and there are many effective intervention methods/ Programs that have been suggested to reduce the negative effects of autism .According to a research published by National centre for Autism studies,the Treatment and

Education of Autistic and Communication Handicapped Children (TEACCH) is an evidence-based service, training and research program for individuals of all ages and skills levels who have autism spectrum disorder (Marwick et al, 2005).

This approach targets three essential components that every autistic individual needs: physical organisation, scheduling, and teaching methods. The approach encourages teachers of autistic individuals to set up classrooms in particular ways so that numerous studies reported that the Treatment and Education of Autistic and Communication Handicapped children program has several efficacies in reducing the stress levels of children. Moreover, the implementation of TEACCH program provides an opportunity to standardize environments such as routines, scheduling, and establishing rules and expectations. Organized environments encourage individuals to show normal behaviors as well as positive social interactivity (Blume, 1996).

ABA: Applied Behaviour Analysis is a therapy based on the science of learning and behaviour. It helps us to know how behaviour works, how behaviour is affected by the environment and how learning takes place. It is a flexible treatment

## **2. Intergration Training**

Is an experimental procedure for reducing painful hypersensitivity to sound. It has proved beneficial for some people with neuropsychiatric disorder (Edelson & Rimland, 2001). reported that studies have shown several positive effects of Auditory Integration Training were provided to autistic children. One of the positives of Auditory Integration Training is that it improves the hearing acuity of autistic individuals.

Individuals who underwent the training have gained better hearing abilities. Another benefit of Auditory Integration Training is that it increases the attention span of autistic children, which helps them to focus more on tasks without becoming distracted. Additionally, this training decreases the sound-sensitivity of individuals who might find some sounds irritating and painful. The Auditory Integration Training (AIT) assists children to have a better speech and language skills, word recognition skills, and a noiseless life.

## **3. The Parent Training Programs**

Are programs that are designed to help parents to develop the skills necessary to manage their child, behaviour and developmental (Kaminski et al., 2008). according to a research published in the Journal of Abnormal Child Psychology, Parent Training Programs are very

effective methods for promoting skills in children with autism (Kaminski et al ,2008).The research shows that children whose families had received training from intervention specialists showed greater initiation and responsiveness skills when compared to other parents who did not receive training .Trained parents play crucial roles in developing the skills of autistic children as well as assisting intervention specialists.Importantly ,they can utilize their knowledge and skills to provide their children with the right and most effective resources

#### **4. The Peer-Mediated Intervention**

Is an approach in special education where peers of the target students are trained to provide necessary tutoring in educational ,behavioural ,and or social concerns (Chan et ..,2009) .A research on peer-mediated intervention procedures has shown that peer-mediated interventions are effective methods to improve the social skills of autistic children as well as their interactive abilities ( McConnell,2002).Peer –mediated interventions are designed to enhance the social interactions and skills of young children through interactions have an effective impact on the social behaviors and skills of autistic children .

Therefore, this approach can be applied to diversify the method of interventions as well as generate positive outcomes. Parents and babysitters are considered peers of autistic children, and consequently, they have the ability to mediate and enhance the social behaviors and skills of their children.

Concludinly,realizing and utilizing effective strategies would enable children and adults with Autism Spectrum Disorder to communicate with people around them ,learn,as well as live a rich life .Teachers and parents should be supported to use effective educational methods that can attract autistic students attention and engage them to learn and communicate .The aforementioned strategies aim to facilitate communication and build the vocabulary of autistic students ,increase self-expression,and improve their cognitive skills .The implementation of the strategies would enable students with autism to express their needs and emotions ,and encourage them to intract with their surroundings.According to Autism Speaks Organisation ,early intervention is very important for children who have autism (Speaks,2013).

Intervention specialists believe in early training because they have seen the significant impact of early interventionon the lives of autistic children. Additional trainings help autistic students to leran how to express their thoughts/feelings appropriately and how to interact with their peers. The experiences of peers-mediated interventions would develop skills/abilities of autistic students, and make them stronger and more social persons (UMBREIT, Ferro et al ,

2007.) Finally, cooperative –based intervention would sharpen the skills of autistic students and their parents to act and live rightly.

## **2.15. STUDENT/ PUPILS OR LEARNER**

According to Synonym study, Pupil, disciple, scholar and student refer to a person who is the recipient of education or mentoring. A pupil is one under the close supervision of a teacher, either because of youth or of specialization in some branch of study: a grade –school pupil. A disciple is one who follows the teachings or doctrines of a person whom they consider to be a master or authority. A student is a person enrolled in a school or other educational institution.

### **2.15.1. The Types of Learners**

Students differ in their learning styles. Learning styles involve those who learn best by auditory means, those who learn best visually, and those who learn best by hands-on or tactile means. Others may learn best while working with peers, or in small or large groups, or in a more isolated situation. In many cases, students may require more than one learning style to fully grasp the concepts being taught. Teachers should take into account the characteristics of their learners when determining strategies to use, such as various learning styles; ways in which learners process information, and the use of multiple intelligence theory. Knowing your learners is critically important in successful lesson planning and arrangement of the learning environment, including grouping strategies.

**Table 3:** Types of learners and their characteristics,

| <b>Type of learner</b>                  | <b>Characteristics</b>                                |
|-----------------------------------------|-------------------------------------------------------|
| <b>1) Kinesthetic</b>                   | Benefit from movement                                 |
| <b>2) sensory engagement(high /low)</b> | May need more stimulation (music) or less stimulation |
| <b>3) Visual</b>                        | Visual (pictures;modelling)                           |
| <b>4) Auditory</b>                      | Benefit from peer supported learning                  |

Teaching and Learning; These are both complementary to each other, where quality teaching is essential for quality learning. However, teaching and learning should be interactive because one cannot take place without the other (Paul & Dylan, 1998). Teaching requires effort,

competence and support and learning requires a combination of these elements. Beside, better understanding about learning facilitates better teaching.

## **2.16. THE SPECIAL EDUCATION**

Special Education is defined by the individuals with disabilities Education Act [IDEA], as specially designed instruction, at no cost to parents, to meet the unique needs of a child with a disability; [U.S. Department of Education, 2017]. According to (Turnbull & Turnbull 2015), special Education is a system of education that provides individualized instruction and support to persons at all ages with disabilities in order to help them reach their full potential.

(Kauffman & Hallahan, 2018) define special education as a set of services and supports that are provided to students with disabilities in order to help them access the general education curriculum and participate in school activities.

## **2.17. MENTAL DISABILITIES**

According to the American psychiatric Association [APA, 2013], mental disabilities also known as intellectual disabilities are characterised by significant limitations in intellectual functioning and adaptive behaviour which manifest during the developmental period.

In Africa, mental disabilities are often stigmatized and misunderstood. The African Journal of Disability [2018] notes that mental disabilities are often seen as a curse or punishment, rather than a medical condition requiring treatment and support.

## **2.18. CULTURE**

For the purposes of this study, I define culture as the way of life of a group of people and consisting patterns of values, beliefs, attitudes and behaviours that are learned and passed from generation [Mandell & Novak, 2005]. (Gauruba & Radithalo, 2008) also define culture as the set of practices by which meanings are produced and exchanged within a group. According to (Erasmus 2008), race is understood biologically in terms of genetic inheritance, descent and physical features, whereas culture is understood as behavioural characteristics as an expression of race.

### **Inclusive Education**

The term inclusive education has been defined by many scholars and experts in education. However, one of the most common descriptions that gives complete meaning to

the term inclusion is written in the Salamanca statement which states that; those with special education needs must have access to regular schools which should accommodate them within a child centered pedagogy capable of meeting these needs [UNESCO ,1994]. Inclusion is argued to be a remarkable phenomenon that allows all students to attain preliminary experience of the real world, which is beyond what they experience at home. This trending practice is expected to offer several benefits where students gain new knowledge, connections and attitudes that are not fully attained in a segregated educational system [Paramanik et al.,2018].

Additionally inclusive education is likely to assist in shaping a more suitable culture for citizens of the world since all children in school are learning about equality and the acceptance of human diversity [Paramanik et al ,..2018]The right to inclusive education is a universal right recognized by the international Bill of Human Rights.It applies to everyone including people with disabilities .In Cameroon ,there are ordinary schools for children known as valid and special schools for disabled children.The schooling of children with disabilities in mainstream schools is still very difficult.Thus the issue of inclusive education is neither the teacher nor the learner but knowledge for all children without discrimination (Emtcheu, 1998)

### **2.18.1. The Benefit of Inclusive Education**

Inclusion can benefit all students and staff within a school, positive attitudes toward autism will make inclusion more successful for a child with autism, and inclusion can teach all students how to have positive relationships with one another. Inclusion can be defined in many ways, but the premise behind most definitions remains the same in that inclusion ensures that all students are included in learning (Jung et al., 2019). Inclusion is an educational program practice that integrates all levels of learners in one classroom and is the “process of overcoming the barriers limiting the participation of all learners” (Meindl et al., 2020). Children should have access to inclusion, because the practice of inclusion can benefit all learners (Campbell ,2016). There are many different variations of the definition of inclusion, but, inclusion is allowing all students to learn in social environments together. Inclusion benefits all learners within a classroom by minimizing stereotypes while encouraging learning to occur between all peers. Stigma often follows students who have autism, and ensuring that students with autism are included within regular classrooms can increase the knowledge around autism, along with creating more positive attitudes toward it

(Anthony et al., 2020). Inclusion is beneficial for all students because classrooms “provide valuable academic resources and social learning opportunities” (Ge & Zhang, 2019)

Relationships can be made only when there is no stigma, and if a pupil with autism is to be fully included within the classroom, being socially exposed to other students is the best way to end possible stigma. Students with autism would benefit from being in an inclusive classroom because they will learn how to build social relationships, while also minimizing stigma so that peer relationships can be formed. There are many different definitions of inclusion, yet they all state that all students are included in learning. Inclusion can benefit staff and students within a school, create positive attitudes toward autism which can create more inclusive classrooms, and teach students how to have proper relationships with one another.

When learners with autism are in regular classrooms, there will be fewer stereotypes as children of all abilities interact, which can eventually build better relationships with peers (Rattaz et al., 2019). Peers hold an important role in showing a child with autism how to interact properly with others, and as those interactions continue, there is an improvement in social acceptance, interaction, and communication (Campbell, 2016). Learners learn from a young age how to be accepting of others, and research shows that social interactions can decrease stigma related to autism while improving knowledge of autism (Anthony et al., 2020).

Inclusion in a general classroom is a positive option for children with autism. Inclusion has often been a highly debated topic, and if schools are prepared students with autism should be able to be in inclusive settings. Most students on the autism spectrum are included within general classrooms, because they have the right to be taught in an inclusive classroom (Andre et al., 2019). Inclusion can benefit all children, including peers within the classroom. Inclusion of students with autism in the general classroom can minimize stigma against autism while students learn how to communicate appropriately with one another. Having a student with autism in a general classroom also reduces negativity associated with autism, and children will learn how to work with one another. (Anthony et al., 2020).

Inclusion is beneficial for all students because classrooms “provide valuable academic resources and social learning opportunities” (Ge & Zhang, 2019), which encourages all students to learn the same curricular outcomes while also learning from their peers in the form of group work. Students with autism who are in inclusive classrooms demonstrate “better cognitive and adaptive characteristics” (Rattaz et al., 2019), because they are able to observe

and practise interacting with their peers, and their peers are more likely to respond in a socially appropriate way (Vivanti et al., 2019). Inclusion can benefit not only students who are on the autism spectrum, but other students too.

## **2.20. LITERATURE REVIEWING**

### **2.20.1. Introduction**

For decades Autism Spectrum Disorder (ASD) was thought to be a rare disorder affecting about four children per 10 000 (Tanguay, 2000). The prevalence of ASD increased dramatically over the last few decades. Autism South Africa reflects that one in 100 individuals meet the criteria for diagnosis one out of 100 children in South Africa has an ASD. This means that every hour a child is born that will develop ASD in South Africa alone. This equates to approximately 7 665 autistic children born in South Africa in 2010. According to the Centre of Disease Control (2010), incidences of ASD have increased dramatically over the past two decades.

Autism occurs in all racial, ethnic and socio-economic groups, and occurs on average four times more often in boys than in girls (Mash & Wolfe, 2005). Although autism is becoming a bigger reality for many families in South Africa and beyond, understanding of how it influences family functioning remains under researched.

Bronfenbrenner's (1986) theory has had a particularly wide and significant influence in shaping my understanding of how different levels of the system in the social context interact in the process of child development. Understanding a family's ecology, such as who makes up the family, what supports and resources they have, what they enjoy and what they struggle with is a critical piece of the designed intervention's meaningfulness and relevance (Jung, 2010).

According to (Jung, 2010), the focus has moved from supporting the child to supporting the family, and how support is provided is just as important as what supports are provided. In order for professionals to design an intervention plan, they need an understanding of what it is that fits families' lives. Professionals providing early intervention need an understanding of the family, its informal and formal resources and its interacting social networks. Understanding the family's ecology is as important to designing intervention as understanding the child's development (Jung, 2010).

In this chapter I undertake a review of the literature that I considered relevant in shaping my understanding of the problem of how autism presents itself in children, as well

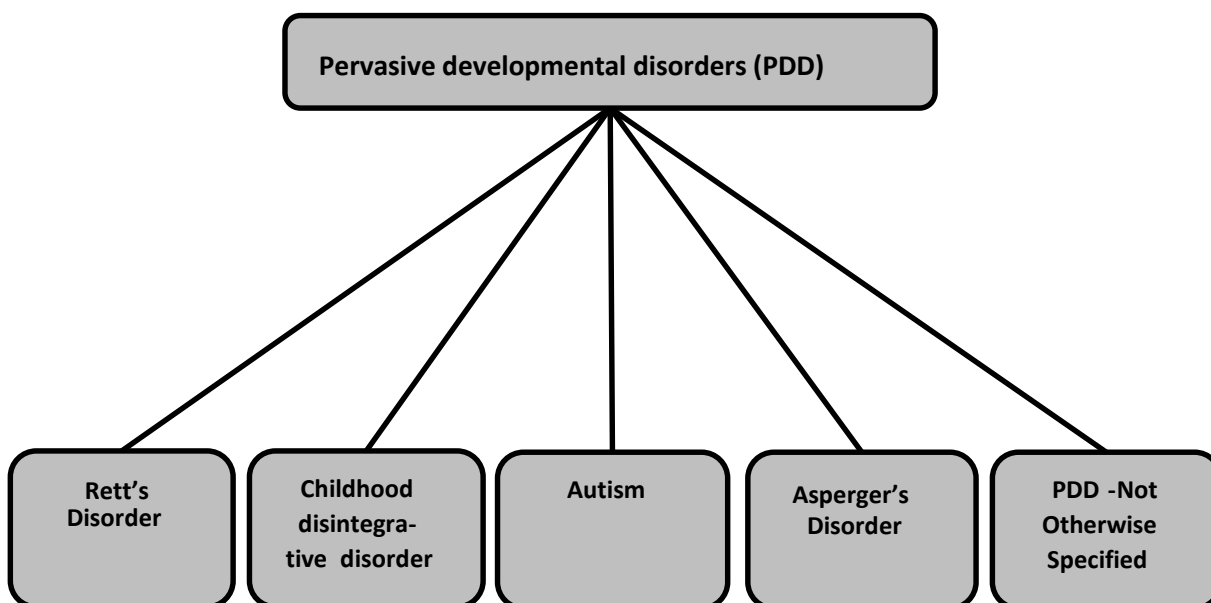
the effects that autism has on a family's life. After reviewing the literature on the challenges that families experience whilst raising a child with autism, I focus on the different support structures that families install in their lives to help them cope with these challenges.

### 2.20.2. Pervasive developmental disorder

Autism is a Pervasive Developmental Disorder (PDD) (American Psychiatry Association, 2000). The understanding of the pervasive developmental disorder includes a group of conditions in which there is delay and deviance in the development of social skills, language and communication, as well as unusual behaviours and interests (Carr, 2006; Mash & Wolfe, 2005). These disorders cause persistent dysfunction in a child's life (Sadock & Sadock, 2003). Furthermore, children with pervasive developmental disorders often exhibit intense particular interest in a narrow range of activities. They are often resistant to changes in their lives and are not appropriately responsive to the social environment. These disorders affect multiple areas of development and are manifested early in life.

Included under this classification are Autism, Asperger's Disorder, Rett's Disorder, Childhood Disintegrative Disorder, and Pervasive Developmental Disorder Not Otherwise Specified (PDD-NOS) (Barlow & Durand, 2009).

**Figure 12** illustrates the various conditions that are classified as PDD.



**Figure 12:** Classification of pervasive developmental disorders

**Source:** American Psychiatric Association (2000)

Before discussing autism, I first focus on the other pervasive developmental disorders. Rett's Disorder is a PDD that is characterised by normal development for at least five months, stereotyped hand movements, a loss of purposeful motions, diminishing social engagement, poor coordination, and decreasing language use accompanied by a deceleration in head growth (Carr, 2006). This disorder appears to occur exclusively in girls. In childhood disintegrative disorder, also known as

Heller's syndrome, development progresses normally for the first two years, after which the child shows a loss of previously acquired skills. The loss is usually in two or more skills, which would be language ability, social responsiveness, play, motor skills, and bladder or bowel control (Carr, 2006).

Those diagnosed with ASD also include pervasive developmental disorder not otherwise specified (PDD-NOS), which is sometimes referred to as high-functioning autism, and Asperger's syndrome, in which affected individuals typically do not display the early language deficits inherent in autistic disorder (Volkmar, Lord, Bailey, Schultz & Klin, 2004). In this study, I use the terms, autism and autism spectrum disorder (ASD) interchangeably when referring to the spectrum of autistic disorders that include autistic disorder, PDD-NOS and Asperger's syndrome.

### **2.20.3. Autism**

Autism Spectrum Disorder (ASD) is a pervasive developmental disorder that is generally recognised and diagnosed between the ages of 18 months and three years

(Troy *et al.*, 2007). As articulated in the Diagnostic and Statistical Manual of Mental Disorders (American Psychiatric Association, 2000) typical problems observed in individuals who are autistic, include limited eye contact and the absence of appropriate facial expressions and gestures. Children with autism experience challenges in developing appropriate peer relationships and show a lack of emotion or social reciprocity.

Pervasive Developmental Disorder Not Otherwise Specified is the category that is used when there is a severe impairment in the development of reciprocal social interaction and communication, or stereotypic behaviours, interests and activities, but the full criteria is not met for a diagnosis of Autistic Disorder (American Psychiatric Association, 2000).

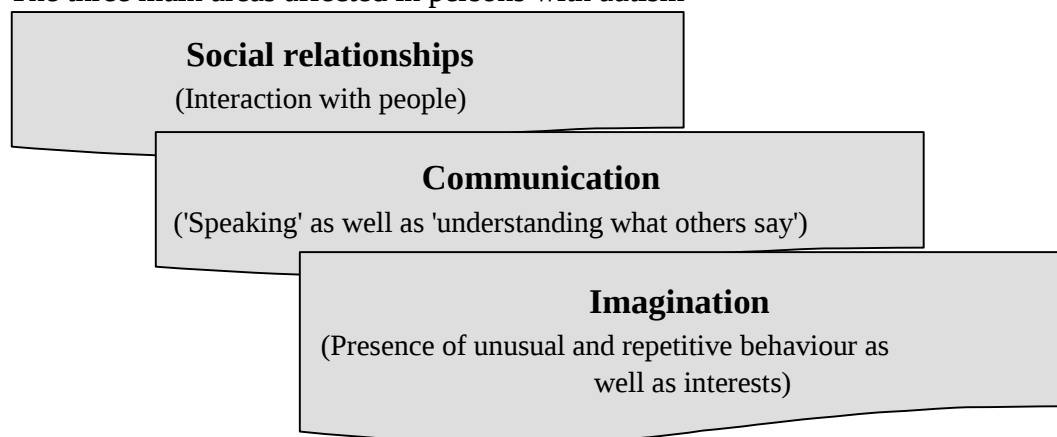
Children with autism typically maintain restricted or repetitive behaviours and interests. They show inflexible adherence to non-functional rituals and some children

maintain stereotypical and repetitive movement (e.g. flapping of hands), also known as ‘stimming’. They are most comfortable with, and may insist on routine, whilst showing resistance to trivial changes (Mash & Wolfe).

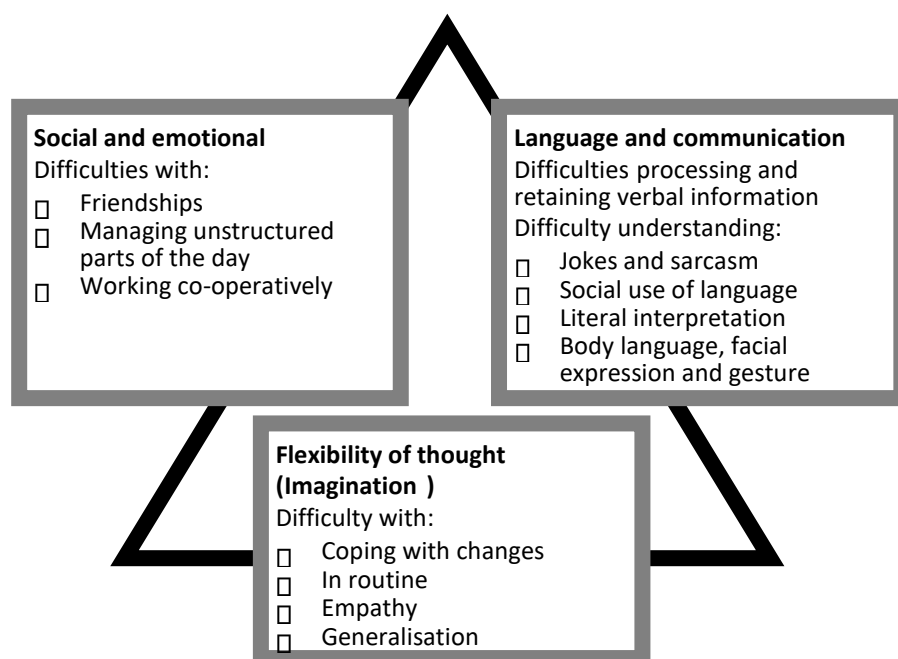
According to (Hillman ,2006) no one behaviour serves as a definitive diagnostic indicator for children with autism as they present with a variety of symptoms across cognitive, emotional and behavioural domains, with language and non-verbal communication skills either absent or significantly delayed (Carr, 2006). Thus, autism is on a spectrum of disorders that affects each individual differently, and with varying degrees of severity.

Autism is a developmental disability that typically appears during the first three years of life. It is the most common condition in a group of developmental disorders known as the Autism Spectrum Disorders (ASDs).

The three main areas affected in persons with autism



Autism is known as a ‘spectrum disorder,’ because the characteristics can be found across a wide spectrum or ‘range’-from a mild learning and social disability to a severe impairment, with multiple problems and highly unusual behaviour. The thinking and learning abilities vary-from gifted to average to severely challenged. One person might be able to attend a regular school, find a job and lead a fairly independent life. At the same time, this person may have difficulty in talking and mixing with other people. Moderately and severely affected children with autism will also vary tremendously. Some might do well in a supportive environment while others might not. Some children do not develop speech at all, while others may develop speech but still have difficulty in communicate.



**Figure 13:** Lorna Wing's triad of impairments

Source: [www.autism.org.uk](http://www.autism.org.uk)

#### 2.20.4. Characteristic features of autism spectrum disorder

The first characteristic of autism spectrum disorder is an impairment of reciprocal social interaction. Abnormalities in social behaviour that first appear in infancy include the absence of the use of social or emotional gestures. So, for example, pointing to objects to interact or to engage with another person or to share positive emotions such as pleasure and pride, are absent in such children. They also show little interest in peer relationships and show a lack of reciprocity in social relationships and empathy (Carr, 2006; Mash & Wolfe, 2005).

Children with autism fail to show the subtle signs of social relatedness to their parents and other persons and in some cases poor eye contact is a common characteristic (Mash & Wolfe, 2005; Sadock & Sadock, 2003). Autistic children furthermore experience difficulties relating to others or in initiating interaction in an ordinary and socially acceptable way. According to De Boer (2009), the social behaviour of children with autism typically is the deficit that people notice first. It is the absence of this skill that causes parents the most concern about their child, though it is the most difficult skill for parents to teach (De Boer, 2009).

Wing (1995) identified three typical manifestations of inappropriate social interaction in children with autism, namely aloof and indifferent behaviour, passive behaviour or active but

odd behaviour. Children who show aloof and indifferent behaviour appear to be unaware of others (Carr, 2006; Koudstaal, 2005; Mash & Wolfe, 2005). “The overall picture is that of being solitary and withdrawn” (Koudstaal, 2005, p.310). Many children may regard people as objects and are also inclined to engage with people in a mechanical manner, almost exclusively to meet their own needs. For example, they will take or pull a person’s hand, or pull or push any person to the preferred location or desired objects. However, some children are “self-sufficient and will not seek help or permission, and help themselves to whatever they want or desire” (Koudstaal, 2005).

Children with passive behaviour will accept social contact passively, show some pleasure, but will not initiate spontaneous approaches. Though they may attend to a wide range of activities, they will do so without showing any true interest in the activity and will move from the one activity to the next. These children find it difficult to occupy themselves meaningfully and, in extreme cases, will remain passive most of the time, especially during unstructured times, or will become engaged in repetitive stereotyped behaviour, e.g. spinning

These children will “approach others but in an odd, one-sided, bizarre or repetitive way” (Koudstaal, 2005). Their conversations are usually one-sided, and inappropriate questions are asked repetitively by them, though they pay little or no attention to the reply of the other person (Koudstaal, 2005). Koudstaal explains the reason why children with autism interact differently on the social level is because they experience severe problems in understanding the mental states of others. Children with autism, for example, do not understand that, if they break another child’s toys, it will hurt that child’s feelings. This condition is referred to as mind-blindness.

A second characteristic in the autistic child is impairment of communication and language. Language development in children with autism is usually delayed and the language of children with autism is characterised by a variety of pragmatic abnormalities, including pronominal reversal, echolalia, neologisms and speech idiosyncrasies (American Psychiatric Association, 2000; Carr, 2006; Koudstaal, 2005). “At the severe end of the spectrum, the ability or desire to communicate may be absent” (Koudstaal, 2005). Children who develop speech often use language in an over-formal, precise and adult-like manner. Vocal intonations may be odd and monotonous and speech delivery may be slow, fast or jerky (Koudstaal, 2005). Such children’s understanding of language is usually of a very literal and concrete nature, which contributes to varying levels of confusion, misunderstanding and anxiety (Koudstaal, 2005; Mash & Wolfe, 2005). Most autistic

children prefer to play on their own and to be occupied with one or more stereotyped and restricted pattern of interest. Some show a preoccupation with unusual objects such as string, sticks, bottle tops, and elastic bands, or, when they lay objects down, arrange such objects in exact lines, or according to shapes, colours or sizes (Koudstaal, 2005, p.314).

#### **2.20.6 Mental handicap**

According to the American Association on Intellectual and Developmental Disabilities (AAIDD,2002) has defined mental retardation (MR) as significant limitations both in intellectual functioning and in adaptive behaviour, which covers many every day social and practictical skills. Mental retardation is a genetic disorder manifested in significantly below average all over intellectual functioning and deficits in adative behaviour (Brregman,1991).

- The causes of mental retardation are numerous and include genetic and environmental factors. In atleast 30 to 50 percent of cases, physicians are unable to determine etiology despite thorough evaluation (Baird & Sadovnick, 1985). Diagnosis is highly dependent on a comprehensive personal and family medical history, a complete physical examination and a careful developmental assessment of the child. This will guide appropriate evaluations and referrals to provide genetic counselling, resources for the family and early intervention programs for the child (Rutter,2006).

#### **2.20.7. Causes of Mental Retardation**

Approximately 3% of the population has an intelligence quoptient (IQ) of less than 70, among whom a cause for the mental retardation can be established in less than half of all cases (Flint et al.,1995). A number of environmental, genetic or multiple factors such as poverty, malnutrition, maternal drug and alcohol use, as well as severe stimulus deprivation can contribute to MR (McLaren & Bryson, 1987).

- **Genetics conditions**

A number of single-gene disorders result in mental retardation. Many of these are associated with atypical or dysmorphic physical characteristics (Sultana et al.,1996). Such conditions include fragile X syndrome, neurofibromatosis, tuberclerosis and Noonan, s syndrome.

- **Prenatal Problems**

Mental disability can result when the foetus does not develop inside the mother properly. Moreover, prenatal causes include congenital infections such as cytomegalovirus,

toxoplasmosis, herpes, syphilis, rubella and human immunodeficiency virus, prolonged maternal fever in the first trimester (Stromme & Hagberg, 2007).

- **Perinatal Problems**

Perinatal causes involves late pregnancy (complications of pregnancy, diseases in mother such as heart and kidney disease and diabetes and placental dysfunction), during delivery (labour), severe prematurity, very low birth weight, birth, asphyxia, difficult and or complicated delivery and birth trauma, neonata (4weeks of life) septicaemia, severe jaundice, hypoglycaemia), Kolevzon, Gross & Reichenberg, 2007).

### **2.20.8. Learning Based Strategies In Inclusive Classrooms**

(Hart et al, 2011) claimed that the success of students with ASD in inclusive classrooms is influenced by the evidence-based strategies that teachers execute. The study of Dunst, Trivett, and Cutspec as cited in (Vakil et al., 2009) discussed the meaning of evidence-based strategies as those “that are informed by research, in which the characteristics and consequences of environmental variables are empirically established and the relationship directly informs what a practitioner can do to produce a desired outcome. (Hart et al, 2011) stressed the importance of teachers being exposed to an array of teaching strategies that have been informed by research ; it is then up to the teacher to make careful judgments on what strategy can be implemented based on the student’s unique learning style and levels of difficulty. These strategies must reflect student strengths, knowledge of their characteristics, meaningful participation, and social communication (Hart et al., 2011).

- **Priming method**

**Priming** is a beneficial technique that can be used by general education teachers to promote social communication among learners with ASD in inclusive classrooms.

Priming involves exposing the material to the student with ASD prior to the teacher delivering it to the whole class and the learner engaging with the material (Harrower & Dunlap, 2001). (Harrower et al, 2001) have comprised a literature review of evidencebased strategies that have been proven to be successful when promoting the inclusion of learners with ASD in inclusive classrooms. Their literature review provides an abundance of successful intervention strategies and one may argue that one or more of the options could be utilized to foster inclusion and success of children with ASD. However, more research is needed to examine the various levels of functioning for learners with ASD while particularly focusing on differences in intellectual and behavioural functioning (Dooley et al., 2001 ; Harrower et al.,

2001). This will help to provide children with ASD more advanced opportunities in inclusive classrooms (Harrower et al., 2001). An example of priming as discussed by Harrower et al. (2001) involves reading a story to the learner with ASD prior to reading the same story to the class. Priming is imperative in fostering an inclusive classroom, as it links individual instruction to whole-group instruction (Harrower et al., 2001). (Zanolli, Daggett et al, 1996) have conducted a quantitative research study that extended previous literature on the effectiveness of priming on students with ASD. Their results concluded that priming can increase social skills for learner with ASD, as they can be taught to successfully initiate conversations with their typically-developing peers along with minimal teacher support in inclusive classrooms.

#### ➤ **Peer tutoring**

Peer tutoring involves training typically-developing peers to interact with learners who lie on the ASD Continuum (Harrower et al., 2001). This strategy has also been proven to enhance social communication skills among students with ASD in inclusive classrooms. To initiate peer tutoring, the general education teacher would assign each student with a partner. Dupaul and Eckert's study (as cited in Harrower et al., 2001) claimed that one student would provide their partner with feedback, support, and instruction during work experiences. This strategy has been shown to be effective in promoting social skills and interactions among students with ASD (Banda, Hart, LiuGitz, 2010). (Banda et al, 2010) successfully extended previous literature on social skills training by verifying how direct instruction and peer training can be utilized together in inclusive classrooms, particularly during academic activities. Additionally, they have added their own research through the implementation of social skills training during academic activities rather than previous research that was geared towards play center activities (Banda et al., 2010). However, the results should be utilized as a starting point until the study has been replicated and further evidence has been established (Banda et al., 2010). The study of (Hundert & Haughton 1992) concluded that increased social interaction took place once peer tutoring was in effect but it was not sustained or transferred overtime in other settings ; therefore, one cannot generalize the results to extended periods of time and in various other settings.

#### ➤ **Peer support**

Peer Support involves the student with ASD to be paired with a typically- developing student for the sole purpose of improving social interaction skills. Odom and Strain's study

(as cited in Harrower et al., 2001) have found that peer support produced an increase in verbal skills and initiations of conversations when the teacher prompted social interaction between the student with ASD and typically-developing peers.

Correspondingly, the results from a quantitative study conducted by (Laushey & Heflin, 2000) argued that training typically-developing peers to support their peers with ASD in an inclusive classroom results in an increase of social skills among students with ASD. This study contributes to previous research by extending the training and support from peers to all students in the class rather than a selected number of students (Laushey et al., 2000). This maximizes the opportunities for the student with ASD to engage in universal practices of social behaviours (Laushey et al, 2000).

### ➤ **Cooperative learning**

Cooperative learning refers to a small group of students with different levels of abilities working together to solve a problem or accomplish a learning goal (Dugan, & Leonard, 1995). Kamps et al, 1992) have conducted a reversal design study in two classrooms to determine the effects of cooperative learning groups for students with ASD in inclusive classrooms. The results gained from the two experiments and teacher comments were favourable for students with ASD, as there was an increase in their social interaction skills and ability to work in groups (Kamps et al., 1992). The students with ASD spent more time interacting and it helped to increase the awareness of students and peers to one another (Kamps et al., 1992). The findings of Kamps et al. (1992) further support other research on the effects of cooperative learning groups for students with ASD (Dugan et al., 1995 ; Hart et al., 2011). These findings have a sharp correspondence to a quantitative study conducted by (Dugan et al. 1995), which claimed that cooperative learning can increase learning, social skills, and engagement of students with ASD. Thus, cooperative learning can be utilized as a strategy to not only increase social skills for students with ASD but to promote and foster an inclusive environment. The findings derived from the study of (Dugan et al. 1995) extends previous literature on the same topic by demonstrating that increased learning takes place for all students including those with ASD through cooperative learning groups rather than through teacher lectures or whole-class discussions. (Hart et al, 2011) further elaborated this point by highlighting that cooperative learning can help to enhance independence and initiations for students with ASD. This area of research is controversial, as most researchers

agree that more studies are needed to establish the value and conclusiveness of cooperative learning groups (Dugan et al., 1995).

## **2.21. EXPLAINING THEORIES OF AUTISM**

### **2.21.1. The Social Constructivist Theory of Vygotsky (1896-1938)**

What is generally referred to as the constructivist model of learning should actually be called the social constructivist model, to distinguish it from piaget's individual constructivist theorists developing an understanding that learning is a social experience rather than an individual one. They argued that the mind constructs knowledge through a process of active construction rather than acquisition. The Russian cognitive psychologist (Lev Vygotsky 1896-1934) is the most famous and the foundational theorists for this model.

Focussing his intellectual development studies on the social environment of the child, produced what became known as the developmental theory of social constructivism, whose key proposition was that children's cognitive development is influenced most by interaction with people, especially parents, other children, teachers and mentors in the child's social environment. He argued that it is the collaborative interactions between learners and members of their immediate society that enable learners to make meaning of their world in their cultural setting.

He wrote: In the process of development, the child does not only master the items of cultural experience but the habits and forms of cultural behaviour, the cultural methods of reasoning (Vygotsky, 1929). He argued, therefore, that knowledge is not a mental state but an experienced relationship within the cultural and social contexts that influence learning (Dewey, 1981). Within the social contexts, language was seen as a means for social coordination and adaptation and so learning was also understood as a process of what (Maturana & Varela 1987) characterised as human language also believed that individual learners need to personally make sense of ideas, concepts and skills of the culture in which they are immersed.

After examining many definitional concepts of learning method and the cognitive capacity of autistic learners, our wish now is to find out on how the various main psychological theories have treated these questions. This research work is interested in the cognitive capacity abilities of autistic learners of BSC la Marfee Marie Claire Noah Etoudi-Yaounde according to the learning method used. Theories of autism have tended to mirror the Zeitgeist of their times, and so with the dawn of the Cognitive Era came the search for more

cognitively based explanations through experimentation. The earliest, and most influential work of this kind came from researchers such as, Frith, Prior, Rumsey, and Hermelin and O'Connor who investigated cognitive abilities including perception, memory and language (these studies from the mid-60s were reviewed by (Prior, 1979). Early perceptual research suggested that autism involved a problem in this area. However, these studies produced mixed findings of both under- and oversensitivity to both visual and auditory stimuli (Prior, Gajago, & Knox, 1976). Additionally, these problems were not unique to autism because they were found in children with conditions such as developmental aphasia, blindness and deafness (Wing, 1969). It also seemed from (Frith's, 1971) work that problems of perception might stem from a more primary problem in selective attention (an argument that has recently been investigated as a deficit in expanding the attentional 'window', Mann & Walker, 2003).

At that time, memory research in children with autism suggested that their auditory memory was better than their visual memory (Hermelin & O'Connor, 1970; Prior, 1977). However, these differences seemed dependent on the specific demand characteristics of the tasks (with children with autism performing especially well on rote memory tasks) and also on an individual's intellectual ability, rather than having autism per se. Verbal memory was also highlighted as being different in autism when (Hermelin & O'Connor 1967) found that children with autism were not helped by semantic and syntactic clues. (Hermelin & O'Connor 1967) found that individuals with autism were no better at recalling related sentences than random word strings.

### **2.21.2. The Theory of Mind Hypothesis of autism**

In essence, this theory states that individuals with autism fail to "impute mental states to themselves and others" (Premack & Woodruff, 1978) and that this deficit manifests as inability to mentalise, or failure to take into account others' mental states. The most widely used test of Theory of Mind is the unexpected transfer test of false belief, which was devised by (Wimmer & Perner, 1983). In the task the participant watches a sequence of events, usually enacted by dolls. The story unfolds so that one doll has a belief about the location of an object that is incongruous with its real location. The participant then makes a judgement about where the doll will look, and in order to give the correct answer the participant has to infer the mental state of the doll (I think he thinks). (Baron-Cohen, Leslie, & Frith, 1985) found that 80 percent (16/20) of children with autism failed the unexpected transfer task and concluded that these children had a deficit in their theory of mind. These seminal results have been widely

replicated with that task as well as other tests of false belief, such as the deceptive box (Perner, Frith, Leslie, & Leekam, 1989).

(Happé 1994) however, stated that it was problematical for the Theory of Mind Hypothesis that 20 percent of autistic individuals actually passed tests of false belief, and so the deficit seemed not to be universal. There are at least three ways of explaining this: (1) passing a test of false belief requires multiple skills and although some individuals pass the test, they do so in a way that is very different from that of individuals without autism; if so, then passing or failing a test is not as important or revealing as the way in which the participant goes about tackling the test. The diametrically opposed position is that being able to pass a test of false belief is only possible for anyone who has a representational theory of mind; if this line of argument is followed, then the Theory of Mind Hypothesis of autism is untenable because it cannot account for the possibility that some individuals pass tasks when autism is identified as an impairment in theory of mind. (3) In between these two positions, it could be argued that the Theory of Mind Hypothesis may explain some of the cognitive impairments seen in autism, but that it does not fully explain all facets of the disorder.

In the face of the issue of universality, Baron-Cohen modified his theory by proposing that a theory of mind problem was in fact a delay rather than a deficit. To investigate this, Baron-Cohen (1989) used the more difficult second-order false belief task (I think he thinks she thinks), once again borrowing from a paradigm first developed by Perner and Wimmer (1985). Baron-Cohen (1989) found that 90 percent of typically developing children (mean chronological age 7.5) passed the test, as did 60 percent of the children with Down syndrome (mean verbal mental age of 7.5), but none of the children with autism passed (Mean verbal mental age of 12.2). Baron-Cohen concluded that although some individuals with autism may be capable of passing a first-order theory of mind task, they could not pass a second-order task and therefore did not have a fully representational theory of mind.

### **2.21.3. The Weak Central Coherence Theory**

Weak Central Coherence Theory (WCC, Frith, 1989, 2003; Frith & Happé, 1994 ; Happé, 1999) is a domain general process, and one of its key strengths is that it explains some of the non-social, as well as the social features of autism, such as the attention to acute detail that ranges from pedantry to obsession. The essence of the theory is that typically developing individuals process information by extracting overall meaning or gist. Frith and Happé suggest autism is characterized by weak or absent drive for global coherence. That is,

individuals with autism process things in a detail-focused or piecemeal way— processing the constituent parts, rather than the global whole.

However, Ropar and Mitchell (1999, 2001) discovered, in contrast to Happé (1996), that participants with autism were just as susceptible to visual illusions as controls. Ropar and Mitchell presented a variety of visual illusions to individuals with autism on a computer screen, and rather than asking if target elements were the same size or different they asked participants to use computer keys to adjust stimuli to be the same size. The degree to which participants systematically erred on the task served as a measure of susceptibility. Surprisingly, participants with autism were susceptible to the illusions to the same degree as participants without autism. (Milne et al. 2002) argue that findings like those of Ropar & Mitchell (1999, 2001) suggest global processing seems to be under attentional control in autism and that care needs to be taken before concluding that autistic individuals have a low-level perceptual deficit (Milne et al., 2002). Another explanation is that higher-order processing is merely optional in autism but mandatory in people without autism (Mottron, Dawson, Soulières, Hubert, & Burack, 2006) , raising the possibility that whether or not higher-order processing is triggered depends on the wording of the question. In support, (Brosnan, Scott, Fox, & Pye 2004) reported that individuals with autism succumb to visual illusions (Müller-Lyer illusion) when asked “which line *looks* longer”, but not when asked “which line *is* longer.”

### ➤ **Reduced generalization**

As an alternative to WCC, (Plaisted, 2001) argues that perceptual processes in autism are better explained in terms of reduced generalization. Plaisted states that superior autistic performance on the Block Design and Embedded Figures Task can be explained as reduced processing of the similarities that are held between stimuli and situations. For example, in the Embedded Figures Task, the target contains some elements in common with the overall picture and features that define it. Hence, finding the target among the other patterns will be easier if the differences are more salient.

The hypothesis that individuals with autism process unique features of stimuli relatively well and the common features poorly, gives rise to two complementary predictions. First, they should be better at difficult discrimination tasks in which the stimuli to be discriminated hold many elements in common and very few unique elements. Secondly, they should be poorer at tasks requiring the categorization of two sets of stimuli. This is because, according to

Plaisted's theory, individuals with autism are better at processing the difference between categories than shared category features.

Support for the first prediction comes from a perceptual learning task (Plaisted, O'Riordan, & Baron-Cohen, 1998a) and a conjunctive visual search task (Plaisted, O'Riordan, & Baron-Cohen, 1998b). In the perceptual learning task a neurotypical adult group showed the perceptual learning effect: they were better at discriminating between familiar than novel stimuli. The autistic adult group, however, did not show the perceptual learning effect and performed significantly better on the novel discrimination problem compared with the normal adults.

### ➤ **Hierarchization**

Mottron and Burack (2001; Mottron et al., 2006) offer an alternative account to WCC. Their starting point rests with the finding that individuals with autism process hierarchical stimuli differently than individuals without autism, in a way that cannot easily be explained by WCC theory (Mottron & Belleville, 1993). The stimuli in question were devised by Navon (1977) and have Stroop-like properties. For example, imagine a letter H composed of small letter Ss. In this case, the elements are incongruous with the global form of the figure. Navon discovered an asymmetrical Stroop effect in that participants were slower to respond when the target was the small letter (Ss), if the global form was incongruent (H) than if it was congruent (S); when the target was the larger letter, response time was not affected by the incongruity of the smaller letter. In other words, participants experienced interference from the global to the local, but not the reverse. This is known as global precedence (see Kimchi, 1992, for a review) or global advantage in that the global analysis takes precedence over local analysis. Mottron and Belleville (1993) recognized the value of hierarchical stimuli for testing predictions from the theory of WCC, which states that autism gives rise to detail-focused processing. Specifically, individuals with autism ought to show a reversal of the direction of interference : from local to global.

### ➤ **WCC Theory as it stands now**

The original WCC hypothesis was perhaps very general, but over time it has evolved and become better specified. The negative and mixed results from many studies have, in this way, helped to delineate the boundaries of the theory's scope of explanation. Frith's (1989) original idea has been challenged in three ways and the theory has evolved (in a very different way to the other two theories) to take these into account. Firstly, Frith's conception of WCC

as a deficit in global processing has been recast, instead, as superior local processing. Second, the WCC hypothesis has changed in such a way that it does not consider people with autism to either have a deficit or dysfunction (again unlike the two other cognitive theories), rather WCC is considered a cognitive style (Happé, 1999) . Importantly, these styles are biases: individuals with autism may be biased to attend to detail, but through eVort they may be able to extract overall meaning. Third, the explanatory power of WCC theory has changed: the theory no longer seeks to explain all aspects of autism, but rather is viewed as one part of cognition in autism (Happé & Frith, 2006) . This accords with the idea of autism being a multiple deficit.

The Weak Central Coherence theory is supported by numerous researchers, their initial work on central coherence focussed on perceptual processes (see Mitchell & Ropar, 2004, for a review of the autism visuospatial literature). Weak Central Coherence Theory (WCC, Frith, 1989, 2003; Frith & Happé, 1994; Happé, 1999) is a domain general process, and one of its key strengths is that it explains some of the non-social, as well as the social features of autism, such as the attention to acute detail that ranges from pedantry to obsession.

The essence of the theory is that typically developing individuals process information by extracting overall meaning or gist. Frith and Happé suggest autism is characterized by weak or absent drive for global coherence. That is, individuals with autism process things in a detail-focused or piecemeal way processing the constituent parts, rather than the global whole. According to this theory, the central coherence ability enables one to see the pig picture to understand context and to use context to draw meaning. (Morgan, M, Maybery, M, & Durkin, K. (2003) Weak central coherence, poor joint attention, and low verbal ability, autistic people tend to focus on the detail rather than the whole context. . (Frith ,1989) proposed that these patterns of relative strengths among difficulties can be explained by weak central coherence.

As special educators, we understand that it is very difficult for autistic learners to apprehend the learner's objectives like the ordinary learner due to the fact that their central coherence ability do not permit them to perceive the picture as a whole and not in details as they do (Happé, F., & Frith, U.,2006) the weak coherence account detail-focused cognitive style in autism spectrum disorders. As special educator ,we then see why most of the autistic students have difficulties in learning with the methods used in inclusive classrooms like the project based learning where they will have to discover a problem and provide the solution

to the problem, the autistic learners lack the capacity of treating globalised information due to the fact that they perceived things.

## **2.22. FOUNDATIONAL MODELS OF AUTISM SPECTRUM DISORDER**

A Model is a conceptual structure that represents a way of thinking of or understanding relationships involved in a process. It postulates on the relationships involved, the principles that underpin those relationships and the structural and cultural dynamics responsible for causes and effects of what happens in the models. For example, the BPIP model helps us to understand relationships between learning, how it happens and how we can facilitate it. If we can facilitate learning efficiently, as postulated by this model, then we are utilising best practice pedagogy. This important idea will be considered further, after discussing the major foundational models of learning.

### **2.22.1. The Empty Vessel Model**

One of the earliest theories of learning was founded on the belief that effective instruction takes place when a teacher transfers or transmits objective knowledge to the learner. This is why this conceptualisation of learning was popularly referred to as the transmission model of learning and the process as the transmission mechanism. According to the transmission model of learning, the learner played no active role in the learning process and was simply a passive recipient of knowledge. The model was thus often characterised by the metaphor of a 'sponge' that simply absorbed whatever liquid was poured onto it.

Examples of teaching guided by the transmission model around in the early catholic church, around 500 AD, within its churches, monasteries, schools and even universities through to around 1500 AD. In the churches, parishioners sat quietly while the priest literally filled them with the word of the gospels. In turn, the monks taught in schools where again, transmission of information to passive learners was the *modus operandi* (Monroe, 1925). This model guided instruction throughout the Western world for many centuries. For example, in a study of teaching and learning in the USA from 1890 TO 1990? Cuban (1993) noted that teachers talked and students were directed to listen and take down notes in order to learn.

### **2.22.2. The Blank Tablet**

This model is attributed to John Locke (1632-1704), who theorised that the mind of a child before it receives the impressions gained from experience is a blank tablet. According to Locke, the child's blank state (*tabularasa*) received impressions from the child's own experiences. This model originated from the work of Aristotle who as a student of Plato

proposed that knowledge is found, not inside people's minds, but outside, using their senses. This gave rise to the empiricism model of learning, that is, the theory that knowledge comes only or primarily from sensory experiences.

Following Aristotle's model, Locke proposed that the way to help children learn was to design instances which gave them experiences (Monroe, 1925). This model gave birth to the scientific method which is characterised as a method of inquiry in which knowledge is gained through a systematic methodology of experimentation and thus know the truth. It followed, therefore, that exposing key questions, and thus the truth. It followed, therefore, that exposing learners to different experiences would enable them to develop understanding and expertise in different areas of knowledge. This premise gave birth to the discipline –based liberal arts education taught in many universities.

To the extent that the tabula rasa model provided for experimentation, questioning and observation on the part of the learner, it represents a significant departure from the completely non-participatory nature of the transmission model. Because it introduces the idea that stimuli experienced by a child influence the child's learning or behaviour, it can be seen as a humble precursor to the behaviourist model.

### **2.22.3. The Behaviourist Model.**

The behaviourist model of learning is attributed to American behaviourist and social philosopher, Burrhus Frederick Skinner (1904-90). In his seminal book, *Science and Human Behavior*, Skinner (1953) postulated that learning occurs through a process of events happening at the same time, with one being the stimulus and the other the conditioned response. He focused primarily on the relationship between the environment and behaviour, and saw learning as the result of forming connections between stimuli from that environment and related responses.

It was similar to the learning by conditioning theory, developed by Russian physiologist Ivan Pavlov (1849-1936) on his work with dogs; and even closer to Edward Thorndike's (1874-1949) theorisation that for children to learn, we should structure learning environments that send specified stimuli designed to produce the desired learning. It was Skinner, however, who developed and popularised the behaviourist model in educational contexts. In the behaviourist model, motivation to learn was driven by rewards and punishments (Bransford, Brown and Cocking, 2000). This theory was foundational to several

behavioural instructional models in education, such as that developed by Gagne (1977), which consisted of the following nine steps;

- ✓ Gaining attention
- ✓ Expectancy; Informing the learner of the objective
- ✓ Memory retrieval; stimulating recall of prerequisite learning
- ✓ Presenting stimulus materials
- ✓ Providing learning guidance
- ✓ Ethical performance
- ✓ Providing feedback
- ✓ Assessing performance
- ✓ Enhancing retention and transfer to the job.

Skinner (1974) argued that since it was not possible to fully understand the inner processes of learners using the scientific method, the best way to know their thinking and to influence their learning was through observing and working with cause-and-effect relationships (that is, their behaviour) in which the children were involved. Thus, the behaviourist did not distinguish between thinking and behaviour.

#### **2.22.4. The Cognitive /Individual Constructivist Model**

The cognitivist model of learning postulated that the way people think influences their behaviour, and therefore thinking is distinct from behaviour. Rather than focusing on the relationship between the environment and behaviour, the cognitivist model focused on the relationship between the learner and the environment. Its central proposition was that individual learners, current levels of knowledge, experiences and skills have a profound impact on the way they make meaning of the environment and therefore what they learn from their interaction with the environment.

One of the founding fathers of cognitivism was the Swiss psychologist Jean Piaget (1896-1980), to whom is attributed the cognitive developmental theory. This theory postulated that every individual passes through four successive stages of intellectual development, namely; sensori-motor; 0-2 years; preoperational; and concrete operational. Piaget (1923) expressed the belief that humans are naturally curious about their environment and constantly explore it in their attempts to make sense of it as they internalise knowledge (that is, learn) across these stages. He believed that individuals need to construct meaning of words for themselves and, accordingly, his theory became the first model of constructivist model, as learning was internalised and not socially driven.

Piaget based his understanding of cognitive development on observations of children and adolescents whom he studied as they solved problems he set them in natural situations (Piaget, 1923). He concluded that learners construct new knowledge from their experiences through two processes, which he called assimilation and accommodation. Piaget (1954) said that learners approach learning with an existing schema and when they interact with new experiences and ideas, they organised the new information and add it to their existing schema in a process of assimilation. However, when information cannot be absorbed into the existing schema because it contradicts the learner's existing way of thinking through a process of accommodation by which they open up and accept the new experience. Learners thus raise their way of thinking from a lower-level schema to a higher-level schema. These two processes—assimilation and accommodation—led to what Piaget called adaptation, that is, the basic life process of accommodation by which they open up and accept the new experience.

### **2.23. CHALLENGES THAT TEACHERS FACE IN INCLUSIVE EDUCATION**

Through multiple research-based studies, it has been proven that inclusive education for students with ASD can lead to higher levels of student engagement in social situations, increased social support, social networks, and higher levels of educational competence in comparison to students with ASD involved in special education classrooms (Lindsay, Proloux, Thomson & Scott, 2013; Chandler-Olcott & Kluth, 2009; Eldar, et al., 2010; Vakil, Welton, O'Conner & Kline, 2009). However, despite these benefits, teachers find it challenging to include and support students with ASD in inclusive classrooms. Multiple qualitative research studies have been conducted to determine the obstacles teachers are faced with when trying to include and support students with ASD in inclusive classrooms (Eldar et al., 2010; Lindsay et al., 2010; Smith & Smith, 2000).

Data was collected through semi-structured interviews and the results indicated that teachers reported experiencing challenges with understanding and managing behaviour of students with ASD, barriers with social structures in school policy, lack of training, support, and resources (Lindsay et al., 2013; Smith et al., 2000).

Moreover, teachers reported challenges in creating that lack of time inhibited them to adequately support a student with ASD and meet the demands of planning and fostering an inclusive classroom (Lindsay et al., 2013; Smith et al., 2000). The success of creating an inclusive classroom largely depends on the principal's attitude and dedication towards the project (Eldar et al., 2010).

If teachers do not feel supported, they will feel too much pressure due to the overwhelming responsibilities to establish an inclusive classroom alone (Eldar et al., 2010). Graydon's study (as cited in Eldar et al., 2010) claimed that the principal plays the leading role to effective school practices, which is reflected when they create the school's philosophy. In order to achieve successful inclusion, the principal must display positive behaviours that embrace inclusion, acceptance, and success of most severe childhood disorder with the most complex developmental patterns (Newsome & Hovanitz, 2006). Caring for a child with autism can be challenging, extremely demanding and a severe stressor on family life (Gray, 2006). Such stressors could be the result of the ambiguity of the diagnoses, the severity and the duration of the disorder and the child's lack of adherence to social norms (Bristol, 1984).

## **2.24. CHALLENGES THAT PARENTS FACE WHILE RAISING A CHILD WITH AUTISM**

Many research studies on autism focus on the challenges that parents face whilst raising such children (Bristol, 1984; Gray, 2006; Newsome & Hovanitz, 2006; Sivberg, 2002). This is because autism is considered by many as the most severe childhood disorder with the most complex developmental patterns (Newsome & Hovanitz, 2006). Caring for a child with autism can be challenging, extremely demanding and a severe stressor on family life (Gray, 2006). Such stressors could be the result of the ambiguity of the diagnoses, the severity and the duration of the disorder and the child's lack of adherence to social norms (Bristol, 1984). Studies on parents wellbeing shows that parents who have a child with autism report higher levels of parental stress and psychological distress than parents of children without autism (Sivberg, 2002) and parents of children with other neurodevelopmental disabilities (Pottie & Ingram, 2008). Several factors have been proposed to account for the higher levels of stress of parents with a child with autism, including the uncertainty surrounding autism diagnosis, the long-term prognosis of individuals with autism, the stressful nature of autistic symptoms and associated behaviour problems, and the lack of public understanding of and tolerance for the behaviour of children with autism (Hartley, Barker, Seltzer, Greenberg, & Bolt, 2010). The findings of such studies show that most parents experience intense confusion during the period before they receive an official diagnosis.

Although the quest to help their child may alleviate some negative feelings, the stress increases when parents realise that there is no cure for autism (Altieri & Von Kluge, 2009). Hartley *et al.* (2010) have also found that parents of children with ASD experienced a

prolonged period of vulnerability to divorce which, in part, is attributed to the constant high level of parenting demands and stress and subsequent lack of attention to one's spouse when raising a child with autism. The significantly higher prevalence of divorce among parents of children with autism (22,53%) than among parents of children without a disability (13,81%) (Hartley et al.,2010) is evidence of the high levels of stress that these families are experiencing.

Many research studies on autism focus on the challenges that parents face whilst raising such children (Bristol, 1984; Gray, 2006; Newsome & Hovanitz, 2006; Sivberg, 2002). This is because autism is considered by many as the most severe childhood disorder with the most complex developmental patterns (Newsome & Hovanitz, 2006). Caring for a child with autism can be challenging, extremely demanding and a severe stressor on family life (Gray, 2006). Such stressors could be the result of the ambiguity of the diagnoses, the severity and the duration of the disorder and the child's lack of adherence to social norms (Bristol, 1984).

To establish an early diagnosis, the primary caregivers of the child, usually the parents, play a vital role. Learning that their child has ASD can lead family members to experience stress, burnout, helplessness, and depression, negatively affecting family harmony and making it difficult to accept the diagnosis (Akbec & Kalayci, 2016; 2010; Kaya, 2017).

Families providing care for individuals with ASD can experience emotional and informational gaps and struggle with depression, confusion, obligatory sacrifices, and marriage problems (Arslan, 2020). After receiving a diagnosis of ASD for their child, parents begin to develop various concerns about their child's future. Stress and anxiety increase in family members, and as the child's behavioural problems become evident in social settings, a decrease in social relationship begins, and loneliness emerges. On the other hand, according to the findings of various studies, some families try to develop themselves more to support their children's problems and find happiness in small things (Foo et al., 2015; Yassibas, 2015).

A meta-analysis study conducted by Green et al. (2013) also identified that parents of children with ASD experienced problems such as stress, lack of support services, to overcome these challenges. Although various studies provide information to practitioners and researchers about support and intervention services for families of individuals with ASD.

Caregivers of children with ASD may experience burnout symptoms due to stress. In a study conducted by (Tuncel, 2017) with mothers of children diagnosed with ASD

,significant differences were found in emotional burnout levels according to the degree of autism and the rate of autism symptoms.In a study conducted by (Valenti et al.,2014),therapists providing care to children diagnosed with ASD,who were selected as participants,were reported to experienced more intense burnout than those providinding care out this field.

In Cameroon most often men do abandoned these children to their wives claiming that the children are not theirs ,this due to the lack of knowledge about autism; because in the African society most communities still consider these autistic children as evils ,some claimed it is the punishment of the gods to the men or women for their crimes by so doing bringing shame to the families where most of them end up locking up these children in rooms.Some schools donnot accept pupils with autism spectrum disorder and the few specialised schools available are too expensive for most of these parents,these caused them to enrolled their children in mainstream schools also known as inclusive schools where most of the learning methods adapted to their skills.

## CHAPTER THREE: RESEARCH DESIGN AND METHODOLOGY

### 3.1 RECALL OF THE ELEMENTS OF THE PROBLEMATIC

This chapter outlines the research design and methodology employed to investigate the impact of cooperative learning methods on the cognitive capacities of an autistic pupils at La Marfee BSC; It details the research design, participant selection, intervention specifics, data collection instruments, data analysis procedures and ethical considerations.

#### 3.1.1 Recall of Research Question

**PQ :What influence does cooperative learning methods have on the cognitive capacity of autistic pupils of BSC La Marfee Marie Claire Noah-Etoudi?**

#### 3.1.2 Research Questions

**SQ 1:** What are the cognitive strengths and challenges of the autistic pupils involved in cooperative learning activities,?

**SQ 2:** In what ways does Cooperative Learning influence the autistic pupil's academic performance ,?

**SQ 3:** What challenges do teachers and peers face in including the autistic pupil in cooperative learning?

### 3.2 HYPOTHESIS OF RESEARCH

According to (Anapama, 2018) the research process begins and ends with a research hypothesis because it is the core of the procedure of research and so as a consequence gives a relationship between the variables in the research process. So given our point of focus which is our research.

This study has a general hypothesis and three specific hypotheses. The general assumption is as follows: **The use of cooperative learning methods significantly influence the cognitive abilities of autistic learners as observed in the case of the class 5 autistic pupil at La Marfee Marie Claire Noah Etoudi.**

#### 3.2.1. Specific Research Hypothesis

**RH 1:** Cooperative learning improves the autistic pupil's ability to interact and collaborate with peers.

**RH 2:** Cooperative Learning contributes positively to the development of the autistic pupil's cognitive skills. Of BSC La Marfee Marie Claire Noah Etoudi .

**RH 3:** Cooperative learning leads to improvements in academic performance in subjects like reading and mathematics.

### 3.3. VARIABLES OF STUDY

Our General Hypothesis is combined of two variables:

- The Independent Variable (I V): Learning Method
- The Dependent Variable (D V): Cognitive Capacity of Autistic Students/Pupils

### 3.4. THE DEPENDENT VARIABLE (IV): LEARNING METHOD

The operationalisation of the dependent variable gave us various modalities, while the operationalisation of each modality produced indicators and the operationalisation of indicators gave place to indexes.

#### MODALITY 1: Memory

- **Indicator:**
- ❖ Short term and long term memory,
- **Center of Interest:**
- ❖ Ability to recall instructions or content,
- **Tool Used: Classroom observation**

#### MODALITY 2: Attention

- **Indicator:**
- ❖ Duration and intensity of focus,
- **Center of Interest:**
- ❖ Time spent on task, reaction to distractions,
- **Data Tool Used :Observation, Teacher interview**

#### MODALITY 3: Problem Solving ability

- **Indicator:** Logical reasoning, sequence handling
- **Center of Interest**
- ❖ Ability to solve exercises,
- ❖ Apply steps to tasks,

- **Tool Used** :Document analysis and cognitive task,

#### **MODALITY 4 :Comprehension**

- **Indicator** : Understanding of oral and written instructions
- **Centre of Interest** :Follows instructions ,grasps meaning of lessons
- **Tool Used** : Observation, Teacher interview
- **MODALITY 5** : :Follows instructions ,grasps meaning of lessons

#### **Indicator :Skill acquisition**

- **Centre of Interest:**
  - ❖ Reading
  - ❖ Maths and
  - ❖ Writing
- **Tool Used** :
  - ❖ Evaluation on sheets
  - ❖ Lesson plans

### **3.5. THE INDEPENDENT VARIABLE (DV): COGNITIVE CAPACITY/ABILITIES OF AUTISTIC LEARNERS/STUDENTS.**

It has five modalities namely

#### **MODALITY 1: Teaching Approach**

- **Indicator:** Type of method used
- **Center of Interest:**
  - ❖ Cooperative learning,
    - **Tool Used**
  - ❖ Classroom observation
  - ❖ Teacher interview

#### **MODALITY 2: Instructional Materials**

- **Indicator:**
  - ❖ Used of visual auditory
- **Center of Interest:**
  - ❖ Use of pictures

- ❖ Use of sounds,
- ❖ Use of objects or gestures,
- **Tool Used**
- ❖ Observation

### **MODALITY 3: Pupil engagement**

- **Indicator: Participation during activities**
- **Center of interest**
- ❖ Willingness to engage
- ❖ Behavioural
- **Tool Used:** Classroom observation

### **MODALITY 4: Adaptation Strategies**

- **Indicator :Personalisation of content**
- **Centre of Interest :** Use of pupils's interests
- **Tool Used:** Observation and interview

### **MODALITY 5 :Evaluation on methods**

- **Indicator :** Formative or summative assessments
- **Centre of Interest:**
  - ❖ Type of feedback given
  - ❖ How progress is measured
- **Tool Used :** Interviews

**Table 4 :** Synoptic Table of Variables, modalities, indicators and centres of interest of the General Hypothesis.

| <b>G H</b>                                                                         | <b>VARIABLES</b>                 | <b>MODALITY</b>                                        | <b>INDICATORS</b>                              | <b>INDICE</b>                                  |
|------------------------------------------------------------------------------------|----------------------------------|--------------------------------------------------------|------------------------------------------------|------------------------------------------------|
| Cooperative Learning Method has significant influence on the cognitive capacity of | <b>IV</b><br><br>Learning Method | <b>Modality 1 :</b><br><br>Cooperative Learning method | -Peer interaction<br><br>-Group responsibility | -Peer interaction<br><br>-Group responsibility |

|                                                                                   |  |                                                                |                                                           |                                                                |
|-----------------------------------------------------------------------------------|--|----------------------------------------------------------------|-----------------------------------------------------------|----------------------------------------------------------------|
| autistic<br>students/pupils<br>of BSC La<br>Marfee Marie<br>Claire Noah<br>Etoudi |  |                                                                |                                                           |                                                                |
|                                                                                   |  | <b>Modality 2 : -</b><br>Traditional method                    | --Teacher<br>Centered<br>-delivery<br>-Individual<br>work | -Lectures<br>-Note taking<br>-repetition<br>-based<br>learning |
|                                                                                   |  | <b>Modality</b><br><b>3 :Visual /auditory /</b><br>kinesthetic | -Ues of senses<br>in learning                             | -Classroom<br>observation                                      |
|                                                                                   |  | <b>Modality :4:Adaptation</b><br>Strategies                    | -Use of pupils's<br>interests                             | -Observation<br>and<br>interview                               |
|                                                                                   |  | <b>Modality 5 :</b><br>Evaluation<br>methods                   | -Formative or<br>summative<br>assessments                 | -Type of<br>feedback<br>given                                  |

| <b>GH</b>                                                                                                                                            | <b>VARIABLES</b>                                          | <b>MODALITY</b>                               | <b>INDICATORS</b>                               | <b>INDICE</b>                                          |
|------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------|-----------------------------------------------|-------------------------------------------------|--------------------------------------------------------|
| Coperative Learning Method has significant influence on the cognitive capacity of autistic students/pupils of BSC La Marfee Marie Claire Noah Etoudi | <b>DV</b><br><br>Cognitive abilities of autistic learners | <b>Modality1:</b><br>Memory                   | - Short term and long term memory,              | -Ability to recall instructions or content,            |
|                                                                                                                                                      |                                                           | <b>MODALITY 2:</b><br>Attention               | - Duration and intensity of focus,              | - Time spent on task, reaction to distractions,        |
|                                                                                                                                                      |                                                           | <b>MODALITY 3:</b><br>Problem Solving ability | -Logical reasoning, sequence handling           | -Ability to solve exercises,<br>-Apply steps to tasks, |
|                                                                                                                                                      |                                                           | <b>MODALITY 4</b><br>:Comprehension           | -Understanding of oral and written instructions | -Follows instructions ,grasps meaning of lessons       |

In this chapter, the research design and methodology for the current study are presented and discussed. The chapter commences with an introduction to the research paradigm that was selected for the study. The researcher then proceeds to describe the research process and the specific data collection methods that were considered suited to generating relevant data to respond to the research questions. The data processing techniques,

methods of establishing data interpretation, as well as ethical issues are explained. The chapter concludes with a summary of what was discussed in the chapter.

### **3.7. INTRODUCING THE RESEARCH**

This qualitative research study is situated in an interpretivist paradigm. Qualitative research methods allow for certain phenomena to be explored in greater depth. They enable the researcher to examine a selected phenomenon from the perspectives of those involved (Patton, 2002).

According to (Merriam, 2009) qualitative research is distinguished from quantitative research by its search for meaning and understanding. In qualitative research, the researcher is the primary instrument of data collection (Merriam, 2009).

(Silverman, 2010) argues that qualitative studies place emphasis on the subjective world of people and the understanding of human experience. In this study, the learning method of autistic student and the cognitive capacitation of autistic students in la marfee BSC marie Claire noah through the strategies put in place for follow up of autistic students in an inclusive classroom. In order to investigate the learning method structures and the cognitive capacitation of autistic students; the case of autistic students in la Marfee Marie Claire Noah, an interpretive qualitative research process was undertaken.

(Silverman, 2010) explains that the aim of the interpretive paradigm is to understand the nature of the participants' setting, what their lives are like, what is happening to them and what their understanding of the research problem is. An interpretivist paradigm was appropriate for researching parent's experiences in raising a child with autism as I planned to focus on their lived experiences as parents of a child with autism. My understanding of reality is that "multiple realities" are socially constructed by individuals (Merriam, 2009). Gaining insight into participants' unique experiences and meanings attributed to such experiences is the defining characteristic of the basic interpretive paradigm (Merriam, 2009). Hefferon & Gil-Rodriguez (2011) emphasise the importance of researchers having developed the following interviewing skills : active listening, asking open ended questions, and the ability to gain trust and rapport. Oxley (2016) talks about practicing 'deliberate naivety' during the interview.

### **3.8. RESEARCH DESIGN**

According to Merriam (1998), a research design resembles a focused guide for carrying out an inquiry. The research design or map is a logical plan for getting from an initial set of questions towards answers or conclusions to these questions

(Merriam, 1998). However, in qualitative inquiry, the term design poses a paradox. On the one hand, it involves planning for certain broad contingencies to emerge, without an indication of exactly what will be done (Merriam, 1998) (Patton, 2002). The challenge was to figure out an appropriate design and the most useful research methods for this specific situation (Merriam, 1998; Patton, 2002), which was to gain access to parents' worlds to study and make meaning of the type of support that they experience in their daily lives with raising their child with special needs.

I decided on a case study for the research design. In (Merriam, 2009) the author defines a qualitative case study as an intensive, "holistic description and analysis of a single entity, phenomenon, or social unit" or "bounded system" (Henning, *et al*, 2004). The definition stipulates that case studies are intensive and comprise detail, richness, completeness and variance.

(Merriam, 2002) argues that the case study is a valuable tool for understanding human behaviour in depth. By concentrating on a single phenomenon or entity, the researcher aims to uncover the interaction of significant characteristics of the phenomenon. In the three cases investigated in this study, the significant factors would be those that interact and support the families, for example other members of the extended family, friends and professional services. The case study focuses on "holistic description" and explanation (Merriam, 1998). The case study can be further defined by its special features. Qualitative case studies are characterised as being "particularistic, descriptive and heuristic" (Merriam, 1998).

Particularistic means that case studies focus on a particular situation or phenomenon. The case is important for what it reveals about the phenomenon and for what it might represent. This specificity of focus makes it an especially good design for practical problems – for questions, situations or puzzling occurrences arising from everyday practice (Merriam, 1998,). "Case studies concentrate attention on the way particular groups of people confront specific problems, taking a holistic view of the situation" (Shaw, 1978 cited in Merriam, 1998). But, situations and context differ for people. The support that families who raise a child with developmental disabilities receive and have access to are not the same. It is influenced by factors such as culture, race, societal issues and class. Therefore, the case study research design was expected to facilitate gaining a deeper understanding of the support that each specific family was enjoying.

According to (Baxter & Jack, 2008) Qualitative case study is an approach to research that assists in the investigation of a phenomenon within its context using different sources of data (Baxter & Jack, 2008). This ensures that the research question is not being explored through one perspective, but rather a variety of perspectives to ensure multiple aspects of the research topic are explained and understood. The main duty of the researcher is to collect the data and interpret the information to discover patterns and themes (Hancock & Algozzine, 2006).

Given my research purpose and the questions that I have, a qualitative approach is suitable for this study, as my goal is to gain an in-depth understanding of the situation under investigation from the viewpoints of the participants' rather than my own. From this kind of approach, I can anticipate to receive a rich database of information that can be beneficial to add to the existing literature on the learning method of students with ASD in inclusive classrooms. A qualitative approach has been adopted in this study, as it provided extensive information that has been analyzed to adequately represent the area being researched. A qualitative research study encapsulates the "...[V]oices of participants, the reflexivity of the researcher, a complex description and interpretation of the problem, and its contribution to the literature or a call for change" (Creswell, 2013, p.44).

The strength of using a case study as the research design is that it offers insights and illuminates meanings that expand the readers' experience and readers can learn vicariously from an encounter with the case through the researcher's narrative description (Merriam, 2002).

### **3.9. THE RESEARCH AREA**

#### **3.9.1. Geographical Location**

BSC la Marfee Marie Claire Noah-Etoudi is situated at the Centre Region, Mfoundi Division -Yaounde one inbetween Total Yannick and Pharmacy Tongolo. The choice of this area was because it is an inclusive center for all types of learners also because of the high number of autistic pupils who are schooling in the said institution.

#### **3.9.2. Presentation of the Structure**

This school is a bilingual school made up of two sections, mainly the Anglophone and Francophone sections, the Anglophone section runs from pre nursery to nursery two and primary from elementary six and the Francophone section running from pre maternel to grande section and the primary from sil to CM2. The school is headed by:

- The founder and the president of the school is His Majesty Mr Yannich Noah
- The vice president is Mr Abib Seck
- The Director
- The General Coordinator
- The Coordinator to the Anglophone section
- The Discipline Master
- Financial Manager
- The bursar
- Twenty-three (23) Teachers and a
- Sport Teacher

### 3.9.3. The School History

Created in 1972 by Marie Claire Noah, as a result of the union between Zacharie Noah and Marie-Claire Perrier on September 30<sup>th</sup> 1937 through which a world tennis star was put to birth by name Yannick Noah. Been a footballer, Zacharie Noah, a professional footballer sustained a fracture on the leg and decided to returned to his village Etoudi-Yaounde. While arriving their village Etoudi-Yaounde, she taught as a teacher in Fustel primary and in Yaounde technical high school.

Later, she noticed that the European immigrant's children in Cameroon were not having a school in Yaounde, she then decided to create a school that her husband proposed the appellation "la Marfee" this is how "la Marfee" saw the day on the 26<sup>th</sup> October 1972.

The school started as a kinder garden that Marie Claire Noah a dynamic woman that she was accompanied by the husband managed the school. But by 1988, the Kindergarden became the nursery school of la Marfee with four classrooms (pre-maternelle-grande section). At the time, the staff was made up of one headmistres, four teachers and one nursery assistant.

La Marfee from one classroom to four classrooms then, eleven classrooms in 2007 and twelve classrooms in 2011. From May 14<sup>th</sup> 2021, we witnessed an extension of the Anglophone primary section followed by an increased numbers of staff that left from 4 to 34 people today. The school has grown today to be one of the best in the city if not in the country due to its modern facilities like the buildings, the security, good follow up of learners, extra modern sporting activities with the policy of sport and studies, ONE CHILD-ONE SPORTING DISCIPLINE, the sports discipline offers by the institution include; **Tennis, Basketball, Taekwondo, Dance, Swimming, Plasticwork, Painting, Football** and

**Drawing**,blessed with these modern infrastructure,and with inclusive education practiced,there is a high demand from all types of parents,be it typical children,children with disabilities, making it one of the reason why we spotted it as our research site.

#### ❖ **Population and Sample:**

Under this hading, we will begin by presenting the study population before looking at the sample itself.

#### ❖ **Study Population**

The study population can b defined as a set of people or objects located in space or time, and on which the observations relate. It is therefore a gathering of all the cases which correspond toa determined set of character considered. In the case that concern us, the choice of our study is focused on the autistic learners schooling in BSC la Marfee Marie Claire Noah-Etoudi for the school year 2023 to 2024 .However, the study focuses on one autistic pupil currently in class 5 ,who has been integrated into a mainstream classroom setting using cooperative learning techniques.

#### ❖ **Target Population**

The target population is that which includes all the individuals meeting the general criteria of study.The target population is a group of all the cases having common chracteristics and from which the results will be generalized.Creswell (2012) defines a target population as groups of individuals with which common defining characteristics that the researcher can identify and study (Creswell,2012) defines the target population of study as the complete collection or universe of the entire element we are interested in a particular investigation.

Our target population is all the autistic learners enrolled in a mainstream school like the case of La Marfee Marie Claire Noah Etoudi where we carried out our study.

#### ❖ **Accessible Population**

It is a subset of the target population available to the researcher and from which the researcher can extract his sample. In this case, it concerns Pupils from the ages of 8 and above who are enrolled into an ordinary school or mainstream schoolat BSC La Marfee Marie Claire Noah -Etoudi

#### ❖ **Study Sample**

The sample is a small representative group drawn from a large group called the “population”.In terms of qualitative research ,there is no precise rule concerning the size of the sample,because the latter will vary according to whether one wants to know ,the object of the research.According to the author ,in qualitative research ,it is not so much the number of

subjects that counts as the quality of the data collected. All the school children diagnosed with ASD constitute our parent population. From this parent population we chose all the learners schooling at BSC la Marfee Marie Claire Noah Etoudi. So the characteristics respect the objectives that we set ourselves at the start. Thus, our sample is composed of three (03) learners from each level, that is level one, level two and level three respectively schooling at BSC la Marfee Marie Claire Noah Etoudi – Yaounde.

### 3.10. PARTICIPANTS SELECTION CRITERIA

The participating students were selected from a list of names classes who are attending an inclusive school at LA MARFEE MARIE CLAIRE NOAH BILINGUAL SCHOOL COMPLEX autistic children. To access the list, written permission for access was sought from the director of the institution YAOUNDE- ETOUDI.

- **Firstly**, you had to be a learner from the age of 9 upwards
- **Secondly**, the learner must be schooling in BSC la Marfe Marie Claire Noah Etoudi Yaounde
- **Thirdly**, the learner should must have been diagnosed with ASD

**Table 5:** Overview of the Participant

| Participant Number | Pseudonym | Year group | Education Health and Care Plan | Age when 'Diagnosed' | Date of interview | Place of interview |
|--------------------|-----------|------------|--------------------------------|----------------------|-------------------|--------------------|
| 1                  | Ali       | 9          | yes                            | Primary school       | 22.9.2023         | school             |

### 3.11. SAMPLE AND SAMPLING TECHNIQUES

According to Amin (2005), a sample is a portion of the population whose results can be generalized to the entire population. Sampling is the process of selecting elements from a

population in such a way that the sample elements represented the population. Sampling means selecting a given number of subjects from a defined population.

Lodicao (2006) defined a sample as a smaller group selected from a larger population that is representative of a larger population.<sup>3</sup>

According to Kenton (2022), a sample refers to a smaller manageable version of a larger group. It is a subset containing the characteristics of a larger population. Samples are used in statistical testing when the population size is too large for the test to include all possible members or observers. A sample should represent the population as a whole and not reflect any bias towards a specific attribute.

In this study, the sampling technique used is the purposive sampling technique. Purposive sampling is a non-probability sampling technique where the researcher selects participants based on specific criteria or characteristics relevant to the research question or objective. This technique is also known as judgmental, selective reasoning or subjective sampling.

### **3.12. DATA COLLECTION**

Case studies require “multiple methods of data collecting” in order to truly capture the case in some depth (Henning, *et al*, 2004,). This study incorporated methodological triangulation using three qualitative methods of data collection, namely semi-structured interviews, observations and reflective journals. Triangulation technique is used by qualitative researchers to ensure that the data is rich and comprehensive (Creswell, 2007; Parker, 2005).

#### **a- Qualitative interviewing**

The primary method of data collection is interviewing. Qualitative interviewing is also known in qualitative literature as personal interviewing or semi-structured interviewing. Semi-structured interviewing is devoted to asking open-ended questions that offer participants the opportunity to respond in their own words and to express their unique personal perspective (Patton, 2002). (Kvale 2010) has defined semi-structured interviewing as “an interview with the purpose of obtaining descriptions of the life world of the interviewee with respect to interpreting the meaning of the described phenomena”. An interview is a way of constructing knowledge through interaction with the participants.

By means of the semi-structured conversation the researcher is allowed the opportunity to question and gain insight into the experiences of the interviewee without being overly directive, which may restrict the participant's responses (Parker, 2005). The research interview might be an enriching experience for participants because the interviewer shows an interest in them; is sensitive to their feelings; and attempts to understand their experiences (Kvale, 2010).

An interview guide was used during the semi-structured interviews. An interview guide provides topics or subject areas within which the interviewer explores, probes and asks questions that will elucidate and illuminate that particular subject. Thus, the interviewer remains free to build a conversation within a particular subject area, to word questions spontaneously, and to establish a conversational style, but with the focus on a particular subject that has been predetermined (Patton, 2002). One advantage of semi-structured interviews is that they are as "task-orientated as structured interviews and as adaptable as unstructured interviews" (DiCicco-Bloom and Crabtree, 2006). The interview guide that was designed is attached as Appendix D.

According to Merriam (1998), the goal of qualitative interviewing is to capture how those being interviewed view their world and to capture the complexities of their individual perceptions. The interview was constructed in such a way that the questions tapped into the influence of learning method and the cognitive capacitation of autistic learners of BSC La Marfee Marie Claire Noah Etoudi. (Appendix D).

The interviews were conducted in the comfort of the participants'. Both teachers from each level were interviewed. The interviews were approximately 45 minutes long. With consent from the participants, (Appendix C). Notes made by the interviewer during the interviews were used to ensure that the interviewer's understanding of what the interviewees were conveying was accurate.

## **b) Observations**

The second method used for data collecting is observation. "Through direct observations, the inquirer is better able to understand and capture the context within which people interact" (Patton, 2002,). According to Patton (2002), "understanding context is essential to a holistic perspective". Patton (2002) argues that first-hand experience with a setting and the people in the setting allows an inquirer to be open, discovery orientated and

inductive because, by being on-site, the observer has less need to rely on prior conceptualisations of the setting.

For this study, the three learners' everyday activities, such as the class work activities, attitudes in classrooms, group work [social interactions], observed. Having worked in the school' for the last couple of years, my presence in the school was perceived as a normal occurrence. This allowed me the opportunity to pay close attention to the interaction between the autistic students and the teachers and peers family members and to the role that their support was playing within the family. The goal of the observations was to "facilitate moving beyond the selective perceptions of the teachers about the autistic learners in the class and the behavioural skills of the three pupils in the classrooms and on the playing grounds with their peers and to allow the opportunity to see things that may routinely escape conscious awareness among the participants" (Patton, 2002).

### **c) Reflective journal**

The third method that was used was reflective journals. Both teacher and parents of eachchild were asked to keep a reflective journal. The aim of the reflective journals was to allow the teachers and parents the opportunity to reflect on the behaviour of each learner in school and at home and to add any additional information that was not explored during the interviews. The template for the reflective journal (see Appendix E). The participants completed the reflective journals and back to the researcher.

After the data had been collected, the process of data analysis took place (Boeije, 2010). In qualitative research the process of data collection and analysis is a dynamic process and changes may therefore occur during the process (Taylor & Bogdan, 1998).

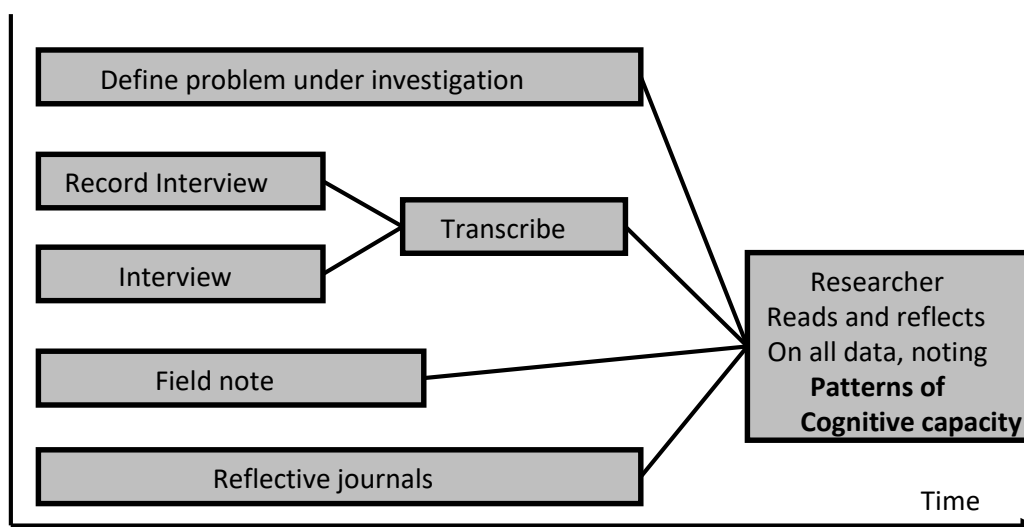
### **3.13. DATA ANALYSIS (Gibbs, 2007)**

Argues that data analysis implies that data is somehow transformed from a substantial amount of qualitative data to refined interpretations thereof. The qualitative data were analysed according to the Thematic Content Analysis process (Creswell, 2007). Thematic content analysis entails a descriptive representation of data. If the analysis is carried out satisfactorily, it will portray the thematic content of transcripts, and other texts. The researcher groups and extracts common themes from the texts in order to give expression to the harmony of voices across participants (Creswell, 2007).

As the aim of the study was to understand the learning method and the cognitive capacitation of autistic student's frame of reference of teachers and school, peers, families

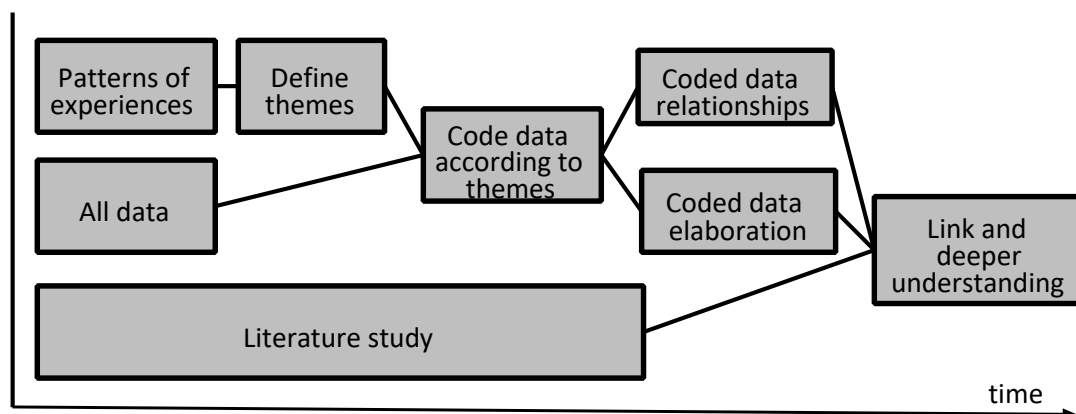
and from different cultural groups regarding the cognitive abilities that they were observed while teaching children with autism, thematic content analysis was useful in picking up unities across participants. This was achieved through a step-by-step process outlined by Creswell (2007).

Firstly, as illustrated in **Figure 14**, the recordings of the interviews were transcribed, and patterns of experiences were noted from the transcripts. To form a general understanding, all the data were accounted for by repeatedly reading and reflecting on the transcripts, reflective journals and field notes while keeping the research problem in mind.



**Figure 13:** Data Analysis phase 1

Secondly, as illustrated in Figure 15, the researcher included themes from the data. The data were coded according to relationships between one and more of the themes. The next step involved elaboration, which is the process of focusing on the finer distinctions of the themes.

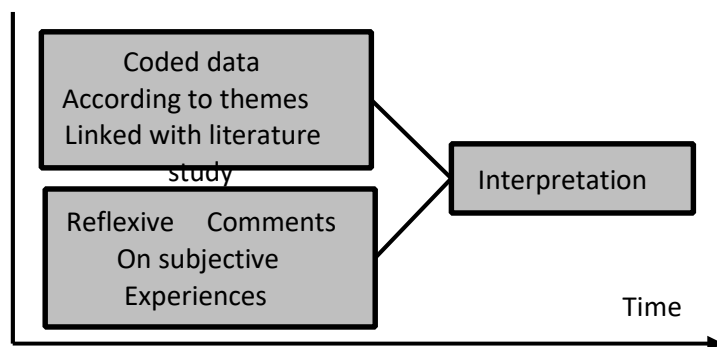


**Figure 14:** Deeper understanding of the learning method

The themes were linked with information from the literature study in order to gain a deeper understanding of the learning method and the cognitive abilities of autistic learners.

The final step was interpretation, which involved interpreting the data according to the thematic categories derived from analysis, including reflexive comments on how subjective experiences may have influenced data collection and analysis, as illustrated in Figure 16. Data collection and analysis commenced in parallel.

Transcriptions and analysis were done solely by the researcher.



**Figure 15:** Data Analysis phase 3

A research process informed by the importance of validity and reliability in qualitative research was followed. This was to enhance the trustworthiness of and the accurate reflection of the participants' thoughts and perceptions, thereby lending credibility to the research findings. Qualitative methods need to ensure trustworthiness of the findings.

### 3.14. TRUSTWORTHY AND CREDIBILITY OF DATA

Findings occur as the researcher says they did (Creswell, 2007). I ensured that the participants were not forced in any way and that they had every opportunity to express their true feelings.

The interviews were audio taped and transcribed ensuring accuracy of the data collected. To ensure that the results of the data analysis accurately reflected the essence of interviews, the participants had an opportunity to comment on the extent to which the themes extracted accurately reflected the theme of the interviews and their reflective journals. According to (Cresswell, 2007) this is referred to as respondent validation and is a method used to improve the thoroughness of qualitative research methods.

Furthermore, this study incorporated “methodological triangulation” using three qualitative methods of data collection which increased the trustworthiness and credibility of the data collected (Creswell, 2007). Triangulation facilitates validation of the data through verification across more than two sources. It refers to the application of several research methodologies in the study of the same phenomenon (Creswell, 2007).

### **3.15. REFLEXIVITY**

According to (Bloor et al, 2006), reflexivity refers to an awareness of the self in the research situation and the role the researcher plays in constructing that situation.

Reflexivity is the process whereby researchers are ‘conscious of and reflective about’ the ways in which their methods and own subject position might impact on the psychological knowledge which is the end product of the research process (Langdridge, 2007). of questions to encourage a reflexive approach to research .

The researcher’s own views, beliefs and biases are often raised during the research process, and thus care was taken when interpreting and collecting the data. An important requirement for the qualitative researcher is to have a critical awareness of the self. I was therefore aware of how I might project my own subjective views onto the research, particularly because of working in the family’s homes before. I was also aware of how I was experienced by participants and consistently ensured that the meaning of the information shared was not changed.

Because I had been in close contact with the participants for about two years and their teachers and parents, I as the researcher, was approaching the pupils as an insider, which could have impacted on the depth of disclosures made by participants. Because the participants view me as an insider, it is possible that I, made the participants feel more comfortable about disclosing information, which enabling me to gather comprehensive and rich data.

### **3.16. ETHICAL CONSIDERATION**

Ethics form a vital part of qualitative research as it involves “collecting data from people, about people” (Creswell, 2009,). Ethical considerations should therefore be an essential part of the planning and implementation of the research process (Mertens, 1998). This provides a framework that guides research into being non-harmful to participants and respect of their status as human beings (O’Leary, 2010). As I was allowed into the world of

the participants, I had to protect them, develop trust with them, promote integrity and guard against misconduct (Creswell, 2009).

Sound ethical conduct is of vital importance when research is conducted on sensitive topics. The population for the study was not confined to my cultural group only. As such, I had to be culturally sensitive and was well informed about the different cultures in order to behave in a respectful way when accessing these settings. I adhered to the ethical obligation to ensure personal competence and adequacy in undertaking this study. I made counselling sessions available with a counselling psychologist who is experienced in working with autistic children to counsel participants who might require counselling after having engaged in this research.

Ethical clearance was obtained from the Department of Specialized Education-University of Yaounde one before embarking on this research study. Organisational clearance was obtained from the director of BSC La Marfee Marie Claire Noah Etoudi for me to use the organisation's name in the thesis.

All the participants were reminded that their participation was voluntary and that anonymity and confidentiality would be maintained. They were informed of their right to withdraw from the study at any stage and it was explained that confidentiality would be maintained by means of keeping all records of their participation (the interview recording, field notes, reflective journals and the signed consent form) locked away at all times and that it would be destroyed after the research was completed. Documents and recordings will be destroyed at the end of the research process. As confidentiality and acknowledgement of privacy are of the utmost importance, participants were also assured that they would be anonymous.

### **3.17 SUMMARY**

In this chapter the research process utilised to conduct this study has been described. This commenced with a description of qualitative research. I described the research design and I justified the choice of data collection methods. The data analysis techniques that allow for the categorisation of data collected during this study were explained. To conclude this chapter and ethical considerations were discussed. The following chapter is focused on expanding on themes derived from data categories, to be followed by a detailed discussion of the findings of the researcher.

## CHAPTER FOUR: PRESENTING THE DATA

### 4.1 INTRODUCTION

This chapter is organized into several sections. It begins by describing the context of the study and the characteristics of the participant. It then presents and analyses the results gathered from multiple data sources. The themes that emerged during the analysis are subsequently discussed and interpreted in the light of existing literature and frameworks. This comprehensive approach provides insight into the effectiveness of cooperative learning in enhancing the cognitive abilities and classroom participation of children with autism, especially in inclusive educational environments. This chapter responds directly to the research questions and objectives set out in chapter one:

- How does cooperative learning affect the cognitive capacity of an autistic pupil?
- What specific cognitive and social behaviors are enhanced through cooperative learning activities?
- What challenges are encountered in implementing cooperative learning with autistic learners?

While researchers have collected extensive data quantifying the numerical measurable influence of learning methods and the cognitive capacity of autistic learners. This study made use of methodological triangulation using three qualitative methods of data collection, namely semi-structured interviews, observations and reflective journals, to ensure that the account was rich, and comprehensive (Creswell, 2005). A descriptive representation of data was produced by means of Thematic Content Analysis (Creswell, 2007). The step-by-step process outlined by (Creswell, 2007) was followed. First, all the data were accounted for. The recordings of the interviews were transcribed, as were the other field notes. By repeatedly reading and reflecting on the transcripts, reflective journals and field notes while keeping the problem under investigation in mind, common themes could be extracted from the texts. The study investigates the influence of learning method on the cognitive capacity of autistic students in La Marfee Marie Claire Noah-Etoudi. Data was collected through a semi Directive Interview guides.

To (Kluth, 2010), to have a successful inclusive classroom for a learner with autism, it would be beneficial for teachers to teach to a child's interests and strengths. For students with autism to be socially engaged within an inclusive classroom, teachers could provide choice for

students by allowing them to choose assignments that match their personal abilities and interests (Andre et al., 2019), while still having the opportunity to converse with their peers about the topics at hand. Teachers are encouraged to differentiate within inclusive classrooms, in order to ensure that all students are being taught to the best of their abilities, because it “can be fruitful to encourage interests of autistic children” (Wood, 2018) so that those children can be engaged and successful in their learning.

It has been proven that inclusive education for students with ASD can lead to higher levels of student engagement in social situations, increased social support, social networks, and higher levels of educational competence in comparison to students with ASD involved in special education classrooms (Lindsay, 2013). (Chandler-Olcott et al., 2009). (Eldar et al., 2010) (Kline, 2009). The study investigates the influence of learning method on the cognitive capacity of autistic students in La Marfee Marie Claire Noah-Etoudi. Data was collected through a semi Directive Interview guides.

## **4.2 CONTEXT OF THE STUDY**

### **4.2.1 The School Environment :La Marfee**

La Marfee is a private inclusive primary school in Yaounde, Cameroon .Known for its dedication to integrating children with special educational needs, the school provides a nurturing environment that encourages participation from all learners regardless of ability. With a relatively small class size, La Marfee ensures individualized attention and promotes pedagogical strategies tailored to each child’s learning needs. The school supports inclusive through with some few staff ,who are experienced in managing pupils with neurodevelopmental disorders such as autism spectrum disorder (ASD). The school philosophy is grounded in inclusive educational principles, emphasizing respect, cooperation, and cognitive engagement. Classroom settings are designed to facilitate interaction among learners through group work, peer tutoring, and shared responsibilities.

La Marfee follows the national curriculum of Cameroon but adapts content delivery to meet the specific needs of its diverse pupils this through regular teacher training ,flexible teaching approaches, and the use of differentiated instruction methods are part of the school’s strategies to cater to children with learning differences.

### **4.2.2 The Classroom Setting**

The study was conducted in class 5 the made up of 18 ppils aged between 9 and 10 years.The class is inclusive,with three children officially identified as having special educational needs, including the autistic pupil who is the focus of this study.The teacher in charge holds a background in special education and has over five years of working experience with autism.The classroom is organized into learning corners and collaborative stations that promote interaction.Pupils are seated in groups of 4 or 5, and the seating arrangement changes weekly to foster peer relationships and cooperation.Visual supports, routine charts and behaviour prompts are posted through out the classroom to aid comprehension and structure.Teaching resources include both traditional materials (books,chalkboard,paper) and modern tools (flashcards,storyboards, and manipulatives).

### **4.2.3 Profile of the Autistic Pupil**

The subject of this study is a male pupil,referred to in this thesis as “Ali “ (a pseudonym to protect confidentiality),aged 9 .Ali was diagnosed with autism spectrum disorder at the aged of 6.His diagnosis was confirmed by a pediatric neurologist at the Yaounde by the Central Hospital ,based on DSM-5 criteria, with notable characteristics including communication challenges,repetitive behaviors and restricted interests.Ali joined La Marfee two years prior to this study.At the time of the study ,he could speek in short sentences but had limited reciprocal conversation skills.He often avoided eye contact and showed difficulty initiating or maintaining interactions with peers.However ,he demonstrated strong visual memory ,a keen interest in puzzles and patterns,and a remarkable ability to complete certain tasks independently when given clear instructions.Ali individualized education plan (IEP) targets include improving social interactions,enhancing communication skills,and developing cognitive flexibility through cooperative tasks.His parents are actively involved in his education.

### **4.2.4 Socio Cultural Background**

Ali comes from a bilingual (French – English ) middle – income family residing in Yaounde.His parents are both employed and have a basic understanding of autism.Although initially influenced by traditional beliefs attributing his condition to supernatural causes,they gradually embraced a biomedical explanation after consultations with professionals.

The community where Ali lives with his parents still holds mixed beliefs about autism. While the school promotes inclusion, some peers and community members express scepticism or pity toward autistic children.

### **4.3 DATA COLLECTION OVERVIEW**

This section presents a summary of the data collection process used to investigate how cooperative learning impacts the cognitive capacity of the autistic pupils, Ali, at La Marfee. Given the qualitative nature of the study, multiple data sources were used to ensure triangulation and enhance the reliability of the findings. The primary tools included structured classroom observation, semi-interviews with relevant stakeholders (teacher, parents and peers).

#### **4.3.1 Data Collection Tools**

##### **a) Classroom Observation Grid**

A structured observation grid was designed to capture Ali's behaviour and cognitive engagement during cooperative learning sessions. The focused on several key areas: attention span, task initiation, task completion, verbal communication, non-verbal cues, peer interaction, and signs of emotional regulation. Observations were carried out over a period of six weeks, with two 45-minute cooperative sessions recorded per week.

##### **b) Semi Structured Interviews**

Interviews were conducted with the following participants:

- The class teacher, who offered insights into Ali's academic progress and his response to cooperative learning.
- Ali's parents, who provided information on his behaviour outside school and overall development.
- Two selected peers who frequently worked with Ali during group activities.

The interview guide included open-ended questions aimed at exploring perceptions of cognitive change, observed changes, and the nature of social interactions. Each interview lasted between 30 – 45 minutes.

##### **c) Field Notes**

Through out the data collection period, detailed field notes were recorded by the researcher. These notes captured contextual information not easily captured by observation

grid, such as classroom atmosphere, emotional expressions, spontaneous interactions, and reactions from other pupils. Field notes helped contextualize behaviors and supported interpretation during data analysis.

#### 4.3.2 Timeline of Data Collection

Data collection spanned eight weeks, organized as follows:

| Week       | Activity                                                                                  |
|------------|-------------------------------------------------------------------------------------------|
| Week 1     | Introduction of the study ,consent procedures,familiarization with classroom environment  |
| Week 2 - 3 | Baseline classroom observations and initial interviews                                    |
| Week 4 - 7 | Focused observation of cooperative learning sessions,ongoing field note recording         |
| Week 8     | Final interviews,debriefing,validation of observational interpretations with the teacher. |

All observations were conducted in th naturalistic classroom setting during regular class hours to maintain ecological validity.The sessions observed included mathematics, language , and sciece activities designed to promote cooperative work among pupils.

#### 3.3.3 Ethical Considerations

The study adhered to ethical research practices consent was from Ali's parents, the school administration,the teacher,and peer participants.Anonymity and confidentiality were ensured through the use of pseudonyms.We took care to ensure that the presence of an observer did not disrupt regular classroom activities.

#### 4.4 PRESENTATION OF RESULTS

The section presents the raw and catergorized data gathered from classroom observations, interviews and field notes, focusing on how cooperative learning influenced the cognitive engagement of the autistic pupil,Ali.The data are presented thematically ,beginning with behavioural descriptions during cooperative learning sessions,followed by findings related to cognitive engagement,and finally insights gathered from interviews.

#### 4.4.1 Observations during Cooperative learning sessions

Observations were conducted during structured group activities in mathematics, language arts, and science. Each sessions involved mixed – ability groups of four to five pupils, including Ali, working collaboratively to solve tasks under the supervisin of the teacher. Three sessions are presented here to illustrate Ali’s behaviour and cognitive engagement in various learning contexts.

##### **Sessions 1: Mathematics Group Activity (Week 2)**

##### **Task: Solving word problems involving basic operations**

##### **Group Members : Ali ,Edima,Kiven, and Fotso**

At the beginning of the sessions, Ali appeared hesitant and remained quiet as the group began to discuss the problem .He sat with his head lowered, avoiding eye contact. Edima asked him to read the problem aloud, but he did not respond. After about five minutes, the teacher approached and gently prompted Ali to participate. He pointed to the problem and whispered, “Add... two and three.” This was the correct operation. Kiven repeated the answer aloud and praised Ali.

As the session progressed ,Alio became more engaged. He used his fingers to count and helped check group answers. He did not initiate conversation but responded correctly when prompted. He smiled slightly when the teacher congratulated the group. Notably, he stayed with the goup throughout the session witjhout wandering or showing signs of distress.

**Field Observation”:** Ali did not initiate discussion but remained with his group throughout the session. He responded when directly addressed. Showed signs of concentration and problem-solving ability”.

- **Session 2: Language Arts –Story Construction (Week 4 )**
- **Task : Create a short story using a set of random words**
- **Group members: Ali, Toh, Lafon;Alima and Atem**

This sessions required more expressive language. Initially ,Ali displayed repetitive hand movements and stared at the table. Alima invited him to choose one word from the cards (“lion,” “forest,” “scared,” “night”) Ali touched the card “forest” and looked at the teacher. Alima integrated his choice into the group’s story. When Toh asked, “What happened to the lion in the forest?” Ali responded, “He sleeps in the tree.” The group laughed lightly, and Atem

clapped,saying,"That is good"Ali looked at him and smiled,a rare display of social reciprocity.

Throughout the task,Ali contributed at least three simple sentences and corrected the group once when a story detail was inconsistent.His verbal participation was limited but meaningful.

➤ **Field Observation:** Ali showed increased verbal output compared to earlier sessions.His utterances were simple but relevant.Positive peer response seemed to encourage his contributions.

- **Session 3: Science Experiment-Water Cycle (Week 6 )**
- **Task: Build a model of the water cycle labels and explanations**
- **Group members: Ali,Kiven,Fotso and Edima**

This activity involved both tactile and visual tasks.Ali was observed taking the lead in placing labels (e.g."evaporation,"condensation").He arranged the arrows in the correct direction after looking at the chart provided.When Kiven placed a label incorrectly,Ali moved it and said,No,this goes here."

His confidence was notable in this sessions.He did not use complete sentences often,but he used gestures and keywords to guide the task.The group accepted his direction and encouraged him .he showed signs of satisfaction,smiling when the teacher praised the model.

➤ **Field Observation:** High engagement .Ali used visual strengths effectively.Peer interaction was fluid.He demonstrated cognitive understanding and leadership."

These sessions demonstrate a progressive improvement in Ali's cognitive engagement and social interaction during cooperative tasks.His responses were more accurate and spontaneous over time, and he became increasingly confident in both verbal and non-verbal communication.

#### **4.4.2. Cognitive Engagement of the Pupil**

This section analyses the cognitive behaviors exhibited by Ali during the cooperative learning sessions,focussing on specific dimensions such as attention,memory,problem-solving,language use,and executive functioning.Data were collected through repeated observations, supported by field notes and teacher feedback.

### ❖ **Attention and Task Focus**

Ali initially displayed short attention spans and frequent self – stimulatory behaviors (e.g., hand flapping, finger flicking). However, during structured group activities, particularly those involving tactile or visual materials, Ali showed notable improvement in sustained attention.

- **In math sessions**, Ali maintained task focus for up to 15 – 20 minutes when actively engaged in problem- solving.
- **In science**, when working with physical models or images ,he remained focused through out the 45minutes sessions with minimal redirection.

The presence of peers seemed to enhance his alertness. He often mimicked peer behaviors (e.g., watching others write before starting his own task) and responded to group rhythm.

➤ **Teacher’s comment :**”When he is in group, he seems more alert. Alone, he drifts off quickly. The group helps him stay focused”.

### ❖ **Memory and Recall**

Ali demonstrated strong visual memory. He easily remembered sequences, patterns, and the positioning of objects or words. For instance, during a vocabulary matching task, he correctly recalled where each word card had been placed after a brief exposure.

He was also able to repeat key facts or instructions after hearing them once, especially if they were accompanied by visual cues.

- During the water cycle activity, he recalled the names and order of stages (evaporation, condensation, precipitation) and correctly associated them with images.
- However ,verbal Memory was less robust. He needed repeated verbal prompts to retain longer sentences or abstract concepts.

### ❖ **Problem – Solving and logical Thinking**

Ali’s problem – solving skills were notably enhanced in cooperative contexts. He was more likely to attempt solution when working in a group than when working alone. His preferred strategies included:

- Counting with fingers or using tangible aids.
- Pointing to visuals when he could not verbalize an idea.
- Using trial-and – error until he found the right answer.

While he did not often articulate his reasoning ,his solutions were frequently correct,suggesting internal logical processing.

- **Field Observation:** “Ali does not always explained how he reaches conclusions,but he usually choose the correct answer.He responds faster when others are working nearby.”

### ❖ **Language Use and Communication**

Language use remained one of Ali’s primary challenges.His verbal contributions were typically brief,consisting of one to four- word phrases.However,his receptive language (understanding instructions and stories) was stronger than his expressive language.

- He responded accurately to direct questions.
- He used gestures,facial expressions,and pointing when he lacked words.
- He repeated words after peers,often improving articulation over time.

In cooperative settings,he spoke more frequently and initiated interaction occasionally,particularly when encouraged by peears or the teacher.

### ❖ **Executive Functioning**

Executive functioning includes abilities like planning, sequencing, self-monitoring, and task completion.Ali showed emerging abilities in this domain:

- With visual cues, he could follow multi-step instructions.
- He began organizing materials and reminding peers of task steps (e.g.,”we forgot this;”during project).
- He completed tasks more consistently in group settings,especially when roles were clearly defined.

In summary, Ali’s cognitive engagement improved significantly during cooperative learning.His visual and tactile strengths were more visible in group settings,and he appeared motivated by peer presence.Although language and executive functioning remained areas of need,his participation and task performance demonstrated clear progress,indicating the positive influence of the cooperative learning method.

#### 4.4.3 Interview Data from Teacher, Parents and Peers

This section presents key themes and insights delivered from semi-structured interviews with Ali's class teacher, his parents and two classmates. Their perceptions help triangulate the observational data and provide a holistic view of Ali's cognitive and social engagement during cooperative learning activities.

##### ❖ Key Points from Interview:

###### ▪ Cognitive Participation:

"At first, Ali was passive in class. But when I introduced cooperative learning, he became more interested. He doesn't always talk, but he listens and contributes in his own way."

###### ▪ Classroom Behavior:

"Group work helps him focus. He stays in one place longer, and he is less likely to get up and walk around."

- "Language is still a barrier. He struggles to express complex ideas. But his peers help him, and he is learning to ask for help."

The teacher emphasized that cooperative learning helped reduce Ali's isolation and enhanced him to benefit from peer modelling and social cues.

##### ❖ Parents' Perspective

Ali's parents were initially skeptical about inclusive education but now support the approach after seeing improvements in his behaviour and academic engagement.

##### ➤ Key Points from the Interview:

###### ▪ Home Behavior:

"Before, he played alone all the time. Now, he tries to involve his little sister in games. He even shares his toys sometimes."

- **Cognitive Improvement:** "He asks questions about things we see outside. He is more curious than before."

- **School Experience:** "He talks about his classmates more. He mentions names and tells us about when they did. It is new for us".

- **Expectations and Hopes:** "We hope he will continue like this. We just want him to learn, even if it is slower. We don't want him to feel rejected".

His parents described the transformation as gradual but meaningful, especially in social awareness and communication.

#### ❖ **Peers' Perspective**

Two of Ali's peers Edima and Kiven, were interviewed, both of whom had participated in group tasks with him regularly. Their testimonies offered valuable insight into how classmates perceive and support Ali.

##### ➤ **Key Points from interviews:**

- **Inclusion:**

Edima: "At first, he didn't talk. But now he smiles when we talk to him. He helps us with the drawings and remembers where we put the words".

- **Cooperation:**

Kiven: "He is good at counting. When we make mistakes, he points and says, No. He helps us even if he doesn't say many words."

- **Support:**

Edima: "We like to work with him. He doesn't fight or shout. We just wait, and he answers."

Their responses suggest that Ali is accepted as a team member, and that peers adjust their communication styles to include among pupils reinforces the effectiveness of cooperative learning.

These interviews affirm that cooperative learning supports not only cognitive gains but also emotional and social development for children with autism. The triangulation of perspective provides a richer understanding of the positive impact observed in Ali's learning course.

Students with autism experience various other difficulties, as well, all of which affect their ability to learn as a typically developing child might learn. Autistic children experience deficits in imitational and observational learning (Field et al., 2010). Although they often have superior visual processing skills, they also often process auditory and linguistic information at a rate much slower than their peers (Fleury et al., 2014). The previously mentioned

impairment to their executive functioning system prevents them from being able to process multi-step directions, maintain the organization of their materials, and sustain self-motivation.

It is often extremely difficult for them to generalize information across settings and to see a situation from another person's perspective (Ostmeyer & Scarpa, 2012). Children with autism may fail to see "the picture . [but] can still see the individual puzzle pieces in the completed picture" (Frith, 1989) as cited in (Jacklin & Farr, 2005, 202). Rather than view the puzzle as a picture comprised of the individual pieces, as a typical child would, many autistic children will continue to focus on the individual puzzle pieces and not see the picture that has been created by putting them together.

Literacy skills are also affected by autism, because many autistic children are unable to progress past sight word recognition (Muchetti, 2013). Depending upon cognitive abilities, autistic children may be able to decode text but have problems understanding what they have read, because their reading comprehension capabilities do not match their decoding abilities (Whalon & Hart, 2011). They also often have an inability to make inferences (Jacklin & Farr, 2005). As well, poor fine motor skills and poor visual-motor speed result in difficulties holding writing utensils, and even when they can hold a pencil their printing may be illegible (Fleury et al., 2014).

The combination of communicative, social, and behavioural impairments directly affects the chances of students with ASD excelling academically. Considering that schools are social environments, children with autism enter the educational system already at a disadvantage when compared to typically developing children. For this reason, supports need to be in place that will promote the success of students with autism both academically and socially. Numerous social, behavioural, and academic strategies can be implemented within both mainstream and special education classrooms, in order to assist students with ASD and contribute to creating positive experiences for them at school. Thus, our said study is aimed at finding the influence of learning method in the cognitive capacity/ability of autistic learners.

Autistic Students are children with developmental disability caused by differences in the brain. They often have problems with social communication and interaction or repetitive behaviours or interests. People with ASD may also have different ways of learning, moving or paying attention.

What qualifies someone as autistic is the deficits in the developing, maintaining and understanding relationships, for example from difficulties adjusting behaviour to suit various

social contexts, to difficulties in sharing imaginative play or in making friends to absence of interest in peers. Literacy skills are also affected by autism, because many autistic children are unable to progress past sight word recognition (Muchetti, 2013). Depending upon cognitive abilities, autistic children may be able to decode text but have problems understanding what they have read, because their reading comprehension capabilities do not match their decoding abilities (Whalon et al., 2011). They also often have an inability to make inferences (Jacklin & Farr, 2005). As well, poor fine motor skills and poor visual-motor speed result in difficulties holding writing utensils, and even when they can hold a pencil their printing may be illegible (Fleury et al., 2014).

Individuals with ASD often engage in repetitive behaviours or routines (Fleury et al., 2014). Their struggles to cease these behaviours also contribute to their social discomfort. The existence of these repetitive behaviours in autistic individuals is attributed to the impairment of their executive functioning system. Executive functioning regulates an individual's behaviour ; its impairment compromises an autistic individual's ability to self-regulate behaviours.

#### **4.3. AN INTERVIEW GUIDE**

In quality research ,developing the interview guide is often referred to as a fairly straightforward process (Merriam ,1998) refers to it as a list of questions that the researcher intends to ask in an interview. According to (McCracken, 1988), first ensures that the investigator covers all the terrain in the same order for each respondent .

#### **4.4. PRESENTATION AND ANALYSIS OF PARTICIPANTS RESPONSES**

The first theme is that of project based learning. The one of the learning methods as far as the competences based approach has been implemented in Cameroon, Ali, Nadine and Ethan are not left aside since that part of the mainstream classrooms. This is a teaching method in which students gain knowledge and skills by working for an extended period of time to investigate and respond to an authentic, engaging and complex questions and problem. The targeted skills in a project based learning are; Social problem solving and joint attention ,Peer negotiation and compromise, functional communication skills .

The data on the three learner's responses concerning the project based learning are displayed in the table 4.1

**Participant Ali:** "The 9years old in class 2 la marfee ,we learned to produce a house,I sometimes feel no one understand me ,am scared to talk because I will say mistakes"

I Ali knew that there was something different, I knew it was probably nothing and that. But like before I started playing basketball in the club; it was a very nice club and I get why they did it and everyone who was autistic, disability, and they all put us, every Thursday we would have breakfast and we would talk and that, it was, it was, like a, a nice time and we would miss French so we were quite happy with that, laughs . . . And in Year class 4 I was like, okay, so I'm a little bit different and that's why they've done this and I think . . .

Teachers should continue to implement differentiation for students, and should meet with families to communicate about appropriate practices for students with autism. Students may benefit from being taught to their interests and abilities, and teachers should ensure that they have training on autism. Teachers often implement differentiation, along with many good teaching practices and accommodations that benefit all learners. When including students with autism in a general classroom, students have indicated that they like when the teacher creates support plans that are unique to their personal needs (Cavendish et al, 2018).

Differentiating learning can include being a multi-modal teacher because it is important for all students, and it is important for teachers to provide visual and auditory instruction to ensure that all students are able to receive instruction, especially if there are learners with autism (Connor & Cavendish, 2018).

When teachers diversify the curriculum for children who have autism, there are more positive attitudes toward the teacher and the inclusive classroom from the student with autism (Larcombe et al., 2019). Students with autism also state that having more time to complete assignments, having access to another room for test taking, receiving notes prior to learning, and being able to use technology is beneficial for learning (Accardo et al., 2019). Students with autism also thrive on receiving individual affirmation from a teacher, and are more engaged in class when a teacher praises them individually (Andre et al., 2019). Teachers have already been implementing many forms of personalized differentiation for students, and should continue to do so for the benefit of all students.

Prior to a child with autism being enrolled within an inclusive classroom, it would be in the best interest for the teacher, support staff, parents, and child to meet. The relationship between a student with autism and the teacher is more beneficial and positive if the teacher gets to know the student and their needs (Rudy, 2020). Teachers may find it useful to ask students for their input of what supports they want, or what they find to be effective (Accardo et al., 2019). Often teachers learn about students by reading their educational records, but if a

teacher wants to learn more about a child with autism, it may be best to ask that student or their family to provide what works for them (Kluth, 2010).

Families are able to share what teaching procedures are most effective for that child, too (Kluth, 2010), which will make planning for that learners easier on the teacher. Effectively collaborating and communicating with families can better prepare a child for inclusion within a classroom (Rattaz et al., 2019). Communication can create better understanding between school and family, and can create a clear vision of what education is to look like for a child with autism. Prior to a student with autism being enrolled in a classroom or school, it would be beneficial for the student, family, and teacher to meet in order to make the transition into an inclusive classroom more successful.

Children with autism can be taught to their interests and abilities, which will make them more successful in inclusive classroom settings. Differentiation of instruction is suggested for all students, and can include differentiation of the curriculum (Strogilos et al., 2018). Differentiation of the curriculum encourages teachers to teach to students' interests, which makes learning in an inclusive setting more beneficial for that student. To have a successful inclusive classroom for a student with autism, it would be beneficial for teachers to teach to a child's interests and strengths (Kluth, 2010).

For learners with autism to be socially engaged within an inclusive classroom, teachers could provide choice for students by allowing them to choose assignments that match their personal abilities and interests (Andre et al., 2019), while still having the opportunity to converse with their peers about the topics at hand. Teachers are encouraged to differentiate within inclusive classrooms, in order to ensure that all students are being taught to the best of their abilities, because it "can be fruitful to encourage interests of autistic children" (Wood, 2018) so that those students can be engaged and successful in their learning.

Teachers need training to have increased knowledge and understanding on how to ensure that a student with autism is part of a successful inclusive classroom. Training for teachers is crucial, because many teachers feel under.

## CHAPTER FIVE: DISCUSSION OF THE FINDINGS

### 5.1. INTRODUCTION

This chapter is focused on answering the research questions, and discussing and interpreting the themes that emerged in the study. This is followed by a review of the strengths and limitations of this study and recommendations are made for possible future studies. I conclude with my reflections on the process. The study explored the learning method and the cognitive capacity of autistic pupils; the case of autistic students of BSC La Marfee Marie Claire Noah: In line with the research objective, the following findings were substantiated;

#### ➤ Research Hypothesis:

**The learning method significantly influence the cognitive capacity of autistic learners of BSC La Marfee Marie Claire Noah Etoudi**

This study has a general hypothesis and three specific hypotheses. The general assumption is as follows: **The use of cooperative learning methods significantly influence the cognitive abilities of autistic pupils at La Marfee Marie Claire Noah Etoudi.**

#### 1.5.2. Specific Research Hypothesis

**RH 1:** Cooperative learning improves the autistic pupil's ability to interact and collaborate with peers.

**RH 2:** Cooperative Learning contributes positively to the development of the autistic pupil's cognitive skills. Of BSC La Marfee Marie Claire Noah Etoudi .

**RH 3:** Cooperative learning leads to improvements in academic performance in subjects like reading and mathematics.

This chapter highlights the research findings and their significance in relation to the literature. Based on the data collected and conclusions that were drawn from the present study, the implications for the educational community, medical sector and for myself as a teacher and researcher are discussed. Specific recommendations for teachers and educational administrators have resulted from these findings and are presented to help cultivate more learning strategies and responsive pedagogy in regards to Autistic learner within an inclusive

educational context. In order to advance future literature and enrich learning experiences for learners with ASD in inclusive classrooms, areas for further research are identified and discussed.

## 5.2. OVERVIEW OF KEY FINDINGS AND THEIR SIGNIFICANCE

The findings that emerged from the interviews and previous studies reveal significant cognitive ,behavioral,and social improvements in the autistic pupil Ali , as a result of the cooperative learning strategy. These findings are discussed in relation to relevant theories and prior studies. The objective of the study was to determine the effects of the **cooperative learning method on the cognitive capacity of an autistic pupil named Ali** in five at La Marfee Marie Claire Noah. Our study addressed the gap by using a qualitative case study approach and applying cooperative learning strategies to assess how they influence Ali's abilities in attention, memory, language, executive functioning and social cognition.

**Participant-Ali :** To this pupil with autism in a general classroom,, he has deficit at the executive function ,he has difficulties in organising his ideas,organised things associated again with failing symbolisation which, words and sentences with no meaning, deficits in communicating « according to Boilot what is conceived well is announced clearly and the words to say it arrive simply » , here ,we observed in student Ali difficulties in restituting knowledge Focussing his intellectual development studies on the social environment of the child, (Vygotsky,1981) produced what became known as the developmental theory of social constructivism, whose key proposition was that children's cognitive development is influenced most by interaction with people, especially parents ,other children ,teachers and mentors in the child's social environment. He argued that it is the collaborative interactions between learners and members of their immediate society that enable learners to make meaning of their world in their cultural setting.

### 5.2.1. Enhanced Attention and Classroom Engagement

Ali demonstrated improved attention span and classroom participation during cooperative tasks. These results align with (Bandura's ,1977) social learning theory, which posits that behaviors are learned through observation and interaction. Cooperative learning ,by providing peer models and structured tasks, enabled Ali to sustain attention and reduce disruptive behaviors. The findings showed that cooperative learning activities enhanced Ali's attention span and engagement. Before the intervention, Ali was often disengaged or

distracted during frontal teaching sessions. However, when structured group tasks were introduced, especially those using visual supports and predictable routines, Ali became more attentive and responsive.

This aligns with (Field et al, 2010), who observed that cooperative learning fosters increased attention and task persistence in learners with autism, particularly when roles and expectations are clearly defined. Peer modelling and repetition within group settings provide autistic learners with structure and motivation to remain on task.

### **5.2.2. Memory and Cognitive Processing**

The findings highlighted Ali's enhanced visual memory and cognitive recall during group activities, confirming theories by (Mottron et al, 2006) and (Frith 1989), who argue that autistic learners process visual information more effectively. Cooperative learning tasks that incorporated visual aids and repetition helped reinforce memory and information retention. Ali demonstrated stronger short-term visual memory and better task sequencing after participating in peer learning activities. For example, during group reading and matching games, he could recall story details and associate images with corresponding actions. This progress confirms (Fleury et al. 2014), who found that cooperative learning combined with visual supports enhances working memory and processing in pupils on the autism spectrum. In Fleury's study, memory improvement was linked to the use of task repetition, scaffolding, and peer-assisted guidance, which were also present in Ali's classroom environment. The findings suggest that when cooperative learning is intentionally adapted for autistic pupils, it strengthens cognitive flexibility and retention.

### **5.2.3. Executive Function and Problem- Solving**

Ali exhibited increased ability to organize, plan, and complete multi-step tasks within group settings. This improvement in executive functioning supports the view of (Harrower & Dunlap, 2001), who found that structured peer engagement enhances cognitive autonomy among autistic learners. Ali's ability to plan, sequence, and self-correct during academic tasks improved through cooperative group structures. In math group work, he learned to follow a set of steps collaboratively, and later apply similar logic independently. This supports the work of (Fleury et al, 2014) that executive functioning—such as initiation, inhibition, and goal-directed persistence—can be improved through group-based strategies involving scaffolding and shared responsibility. The group settings allowed Ali to observe strategies used by peers, internalize them, and gradually transfer them to independent work. This aligns with

Zone of Proximal Development proposed by Vygotsky, where learning is most effective when scaffolded by more capable peers.

#### **5.2.4. Language and Communication**

Ali's expressive language improved in the context of group activities. According to (Vygotsky's 1978) socio-constructivist theory, language develops through social interaction. Cooperative learning created opportunities for meaningful dialogue, promoting verbal expression and the use of gestures. Ali began using complete sentences, initiating dialogue, and even asking peers for help during group tasks. (Field et al, 2010) similarly found that when autistic pupils are engaged in structured peer interaction, language expression improves due to modelling, turn-taking, and contextual conversation. Cooperative learning fosters these communicative dynamics, creating safe spaces for autistic pupils to use and develop their verbal skills.

#### **5.2.5 Increased Social Awareness and Confidence**

While the primary goal was to improve cognition, Ali also gained confidence and social understanding through positive group experiences. He learned to wait for his turn, respond to his name, and even initiate greetings- behaviors not frequently observed before the intervention. These results echo those of (Field et al, 2010), who emphasized that cooperative learning fosters not only cognitive but also social-emotional skills among learners with autism.

### **5.3 CONCLUSION**

This study concludes that cooperative learning is an effective strategy for supporting the cognitive development of autistic pupils. The method facilitated improvements in attention, memory, communication, executive functioning, and social interaction. By leveraging peer support and structured routines, cooperative learning allowed Ali to actively participate in classroom activities and express his abilities more fully.

In the Cameroonian context, where inclusive education is still evolving, these findings suggest that cooperative learning offers a practical and culturally adaptable approach to meeting the needs of learners with autism. It improves both academic growth and social inclusion, contributing to a more equitable education system.

### **5.4 RECOMMENDATIONS**

Based on the implications for the educational community and for myself as a researcher and aspiring teacher, the present study points specifically to several

recommendations for school and board administrators, teachers, and professional development. The following recommendations are outlined below :

1. Having more support in the classroom and access to a wide-range of resources are crucial components in developing a classroom environment that will help pupils with ASD succeed. Consequently, funding for the educational sector is essential in providing more resources and meeting the demand for extra support within the classroom and beyond the classroom walls. If the needs of the students are not being met then it is up to the Ministries of Education to provide the support that is needed. Autism specialists and consultants can help teachers by providing them with additional strategies, training, and a deeper understanding of the student. Extra support in the classroom can help alleviate some challenges for teachers by giving them the opportunity to have more time and less work. Administrators of schools should further enforce inclusion and help to support teachers by providing them with adequate resources, training, and support personals.

2. Pre-service teacher education programs should heavily discuss all disorders across the ASD Continuum. For instance, low-functioning Autism should be emphasized in the same way that high-functioning Autism is widely discussed. Also, these programs should provide a central focus on strategies to help students with all forms of Autism in order to foster equity and help all students achieve greater success.

3. It is imperative that teachers gain adequate training that will allow them to feel competent in their abilities when working with students with ASD. Consequently, teachers will put forth their best effort to help motivate pupils with ASD and Create a successful learning environment. Therefore, the Ministry of Education should place an emphasis on offering more courses and workshops that deal directly with Autism in order to give teachers the opportunity to expand their knowledge and feel more inclined to teach pupils with ASD. As an incentive, the Ministry of Education could over subsidize Additional Qualification courses for teachers who want more expertise in working with pupils with ASD

Based on the findings,the following recommendations are proposed:

#### **5.4.1 To Teachers**

- Adopt cooperative learning methods in inclusive classrooms to enhance participation and cognitive development.

- Use visual aids and structured roles to support autistic learners within group tasks.
- Engage in continuous training on autism and inclusive teaching strategies.

Educators can initiate strategies within their classrooms to cultivate the social skills of autistic pupils. Because many children with autism have limited imitation skills and are unable to pick up on social cues, social interactions literally need to be taught to them (Jacklin & Farr, 2005). Social skills are most effective for pupils with autism when they are taught within the natural environment in which their demonstration is expected. This approach recognizes that many autistic pupils have an inability to generalize skills across various settings (Fleury et al., 2014). For that reason, pupils with ASD may also not transfer social skills learned outside school (e.g., playground, home) to a specific situation within school (Ostmeyer & Scarpa, 2012). Teaching social skills that are appropriate within school will be most effective when taught within a school environment. Peer models and tutors are often successful in helping to increase social skills in pupils with ASD. Even if a school-wide program is not available, classroom teachers can use a similar approach and initiate their own peer modelling program that is individualized for the children's needs. Engaging pupils in playful imitation games and using strategic classroom computer applications are practical strategies that can be implemented within schools to enhance the social skills of pupils with autism.

#### **5.4.2 To School Administrators**

- Promote a school –wide inclusive culture by integrating cooperative learning into curriculum planning.
- Provide teaching materials and time for collaborative planning and reflection among staff.
- Involve families in supporting group-based learning for special needs pupils.

#### **5.4.3 To Future Researchers**

- Conduct longitudinal studies to measures long-term cognitive effects of cooperative learning.
- Explore how cooperative learning interacts with other developmental disorders.
- Test this approach in other linguistic,cultural and rural settings in Cameroon.

### ➤ Academic Strategies

While behavioural strategies have been applied to aid in decreasing undesirable behaviours, educators can also implement formal academic strategies to accommodate pupils with ASD in reaching their academic potential. Some strategies are as simple as using technology to present learning material in a different way. Because individuals with ASD are visual learners, they typically respond well to using computers and iPads. Along with the integration of technology, adapted shared reading programs, detailed instruction, and structured learning environments are just a few strategies that can be used in the classroom.

- The benefits of using computer applications for teaching social and behavioural skills to children with ASD have been articulated ; however, computers can also be useful tools for teaching academic skills. Computers can be used in the same manner as iPads to engage students. Informed use of computers can also be highly motivational for students with autism (Jacklin & Farr, 2005). In (Jacklin et al, 2005) research, a teacher noted the benefit of using computers with autistic pupils because they provide a “visual impact on what they are learning” . For participating students with autism in (Jacklin & Farr’s 2008) study, the use of the computer was also seen as a break from traditional methods of learning, and provided the additional support necessary for those more traditional methods to be successful. Using the computer reduced, for a time, the amount of stress that the students experienced, because they were not challenged with the task of using the social skills that are required for human interactions. The computer also gave the students a sense of predictability that they may have been unable to get from humans, therefore giving them a sense of confidence and self-control when completing academic activities.

- Adapted shared reading activities are emerging as a second way to enhance the literacy skills of pupils with autism. Shared reading is a method in which an adult reads aloud to a student while engaging that pupils in interaction through the use of questions and discussion (Muchetti, 2013). Shared reading activities can be modified to meet the individualized needs of pupils with autism. When the amount of text is shortened, while maintaining the theme, plot, and important elements, age-appropriate literature can be used (Fleury et al., 2014). (Muchetti ,2013) conducted a study to examine whether teacher-led shared reading activities with modified text, visual supports, and objects affected student engagement and the reading comprehension of autistic children with limited verbal communication abilities. Four children with autism between the ages of six and eight years participated in shared reading activities with trained classroom teachers. pupils engagement

and reading comprehension increased for all four participants during the intervention phase, as compared to the baseline phase. These outcomes are promising because they illustrate that children with autism can be engaged in early literacy activities that have been adapted to meet their needs, and that they can enhance their reading comprehension abilities in the process. Because reading comprehension is an issue for many autistic pupils, adapted shared reading activities are methods that classroom teachers can implement to develop their literacy skills.

- To compensate for the executive functioning deficits often experienced by individuals with autism, it is necessary to break down tasks into manageable components that can be taught in several steps (Fleury et al., 2014). As a third strategy, detailed instruction is important for pupils with autism to acquire new academic skills. Visual supports and verbal prompting are often used, and then gradually phased out, as pupils learn each step individually. When teaching academic content, teachers need to provide “clear explanations of the skill or task sequence, modeling, guided practice, and multiple opportunities to independently practice and apply the learned knowledge” (Fleury et al., 2014). When skills are taught incrementally, pupils have a better chance of successfully learning and eventually being able to execute the learned skills independently.

- As a fourth strategy, establishing structured learning environments has been proven effective for creating conditions that will enhance the academic development of students with autism (Muchetti, 2013). studied teaching strategies in a special education school located in the Netherlands, in order to determine what methods were most effective in promoting academic knowledge acquisition. The participants were 89 pupils, 45 of whom were autistic, and their teachers. Over a period of two years, the pupils participated in repeated standardized testing and the teachers completed surveys. Manti et al. discovered that the provision of structure was the strongest factor influencing the academic attainment of the pupils who had ASD. This result underlines the importance of well-structured educational environments because they help to decrease disruptive behaviours, anxiety, and confusion for pupils with ASD, therefore increasing their academic performance. (Fleury et al, 2014) reiterated the importance of this approach: “Being able to anticipate and understand activities, schedules, and expectations improves students’ ability to appropriately participate and respond to classroom demands”. Teachers can establish consistent routines for their students, which will reduce the unknown and alleviate anxiety. Creating written schedules will also support autistic students who struggle with organizing their own schedules.

- Using technology as a learning tool, implementing adapted shared reading activities, applying detailed differentiated instruction, and creating structured learning environments are

strategies that can improve the academic performance of students with ASD. All of these strategies are practical and may not take a lot of preparation to implement. Attention to these initiatives greatly increases the chances for pupils with autism to excel academically.

### **5.1. IMPLICATIONS**

Based on the data collected and conclusions that were drawn from the present study, there are three implications for the educational community and for myself as a researcher that are discussed below.

### **5.2. IMPLICATIONS FOR THE EDUCATIONAL COMMUNITY**

Based on the data that emerged from both interviews and related literature, it is safe to say that having the appropriate support within the classroom and from the outside community can prove to be beneficial not only for teachers but for pupils with ASD who are integrated in inclusive classrooms. The experiences presented in the findings of this study provide some insights into the types of strategies teachers are implementing to effectively support pupils with ASD. The two participants in the present study appeared to successfully integrate pupils with ASD in their classrooms and this could stem from their background knowledge attained through special education courses, having appropriate resources, dealing with program consultants, and having support personnel in the classroom. It is important to note that not all teachers have these positive experiences, as some teachers and schools are not adequately prepared to meet the complex needs of students with ASD. Consequently, teachers who experience a lack of resources, support, strategies, and knowledge of the disorder will find it more challenging to attain a positive outcome and they will not feel inclined to put forth their best effort when including students with ASD.

Most pre-service teacher education programs include some information regarding ASD and how to work with these students, but they may fail to go in-depth regarding the different forms of ASD and strategies that can be implemented for each form of Autism. Additionally, the information heavily focused on high-functioning Autism and not low-functioning Autism. In an inclusive classroom, teachers may find themselves working with low-functioning students or students with other forms of Autism that are different from high-functioning.

### **5. 3. IMPLICATIONS FOR THE RESEARCHER**

After listening to the experiences of both participants when including students with ASD and analyzing the data from related literature, I have understood the significance of reaching out for support from other teachers, parents, and program consultants in order to expand my knowledge about different strategies that I may not have known about and to help gain a deeper understanding of the pupils with ASD to plan accordingly. It is imperative to build a positive relationship with parents/guardians in order to help keep routines consistent between the home and school environment. Thus, these factors are significant to help alleviate the challenges associated with pupils with ASD. Based on the findings from the present study and previous literature, pupils with ASD gain in all domains if teachers embrace inclusion, employ effective strategies and are adequately equipped to put forth their best effort. Each pupils with ASD is unique and progresses differently in an inclusive classroom, as this is heavily dependent on the pupil's characteristics and the severity of the disorder. However, inclusion can have lifelong positive effects on all students despite the severity of the disorder and as a researcher and teacher I take pride in that. Taking the initiative to expand professional development by keeping up-to-date with current research regarding inclusion and pupils with ASD can prove powerful in enhancing competency and shaping developing pedagogy when working with pupils with ASD.

### **5.4. AREAS FOR FURTHER RESEARCH**

As previously stated, the goal of this research project was to examine how learning methods influence the cognitive capacity of autistic pupils in their classrooms and to gain insights for my own developing pedagogy. The findings of this study have demonstrated that there are similarities and some differences that exist within the literature. It must be acknowledged that, due to a small sample size, the findings of this study cannot be generalized across other educators or other classroom settings that include pupils with ASD. Consequently, more studies need to be conducted with a larger sample of participants in order to establish stronger correlations between teacher challenges, beliefs, and practices. This will yield more information on how to provide successful learning experiences for pupils with ASD.

Aside from the questions that were explored in the present study, there are other questions that have emerged from this research which are areas to consider for further study. Further studies need to be conducted with a central focus on the academic outcomes verse the social outcomes when students with ASD are being educated in inclusive classrooms.

Furthermore, new research should focus on the types of strategies that can be implemented in an inclusive classroom in order to reduce challenging behaviour and increase self-regulation skills. Future studies should also emphasize all areas of Autism, as studies tend to focus on solely pupils with high-functioning Autism. It would be beneficial to have research on effective strategies that can be used for students with low-functioning Autism, as these pupils could also be integrated in an inclusive classroom. Further studies should also consider the physical environment of the classroom and how this could be adapted to help further support pupils with ASD.

### **5.5. CONCLUDING COMMENTS**

It is significant to note that in order for teachers to effectively plan for and support students with ASD in their classrooms there needs to be a support structure in place and this should include administration, Autism specialists and consultants, staff, and parents. Collaboration between teachers and support personnel can prove powerful in helping students with ASD achieve greater success. Teachers should expand their developing pedagogy by learning about effective strategies to help further support pupils with ASD and how these strategies can be tailored to meet the needs of the pupils. By taking the initiative to get to know the pupils, teachers could implement strategies and use trial and error to determine what works best for the pupils. It is imperative that teachers acknowledge the strategies that can be integrated in the learning environment and strategies that are geared towards all levels of development (social, behavioural, academic). When all of these elements are taken into consideration and established within the school then teachers can be better prepared to overcome challenges and work effectively with pupils who lie on the ASD Continuum.

Pre-service teacher education programs should adequately prepare aspiring teachers to work with students with ASD by offering a course that is specifically geared towards all forms of Autism and offering evidence-based strategies and resources that could be implemented in the classroom to help these pupils thrive in all aspects. More funding is needed to ensure teachers are adequately equipped with the knowledge, support and expertise to meet the needs of students with ASD and maximize their potential. It would be highly beneficial if school administration would offer more support within the classroom and beyond the classroom, appropriate training, adequate resources and professional development opportunities to help increase teacher competence when working with students who lie on the ASD Continuum.

It would be valuable to conduct research in other areas in order to draw stronger correlations between studies and to discover new insights. Future research should focus on other areas across the ASD Continuum and strategies to ensure positive behavioural outcomes and academic success. Additionally, there is a need for more research regarding the adaptations that can be made to the learning environment in order to help maximize learning opportunities for pupils

## **5.6. STRENGTHS AND LIMITATION OF THE STUDY**

### **5.6.1. Strengths of the Study**

This study possesses several noteworthy strengths:

- ❖ **In depth Exploration of a Real-Life Case**

**The use of a qualitative case study design allowed** for a comprehensive and context-rich analysis of the cognitive changes in an autistic pupil, Ali, following the application of cooperative learning.

- ❖ **Relevance to the Cameroonian Educational Context**

The setting of the study –a mainstream classroom at La Marfee Marie Claire Noah– enhanced the practical value and transferability of the findings to other Cameroonian schools seeking to implement inclusive education.

- ❖ **Contribution to Underexplored Research Fields**

In Cameroon, research on autism and inclusive pedagogy remains scarce. This study provides foundational insights that can inform future educational practice and policy.

- ❖ **Data Triangulation**

The combination of interviews, classroom observations and document analysis ensured a robust and credible data set, increasing the validity of the results.

- ❖ **Theoretical and Global Alignment**

Findings were interpreted through the lens of internationally recognized theories and studies, including works by (Field et al., 2010) and (Fleury et al., 2014). This provided both scholarly depth and external validation.

### **5.6.2. Limitation of the Study**

Despite its contributions, the study faced certain limitations which were;

- ❖ **Single Participant Scope**

Focussing on autistic pupil Ali limited the generalizability of the results. Ali's developmental profile may not reflect the experiences of other children on the autism spectrum.

❖ **Limited Observation Period**

The relatively short duration of the intervention restricted the possibility of assessing long-term cognitive development or behavioural change

❖ **Resource Constraints**

The study was conducted in a school with limited specialized resources for autism intervention. Access to trained staff or diagnostic tools was minimal which may have impacted the implementation quality.

❖ **Potential Researcher Bias**

As in most qualitative inquiries, the researcher's interpretations and presence could have influenced the pupil's behaviour or the responses of the interviewees, despite efforts to remain neutral.

❖ **Cultural and Communication Barriers**

Understanding and interpreting certain behaviors in Ali may have been hindered by language limitations or cultural misunderstandings regarding autism within the school and family setting.

One of the strengths of this study was that the specific learners were all enrolled in a mainstream school. classrooms family who were given the opportunity to let others hear their stories. The data collected through this study provided valuable insight into the learning methods that autistic learners families are enjoying whilst schooling with their peers. Secondly ,teachers, family, friends and professionals could be made aware of such learners' needs for support through this study.

These autistic children were enrolled at BSC la marfee marie Claire noah Etoudi where they benefit studies and extra scholar activities.

Time constraints governed the completion of this thesis. If more time had been available, the researcher would have liked to observe social interaction with family and friends and conduct follow-up interviews with the three students. Inclusion in a general classroom is a positive option for children with autism. Inclusion has often been a highly debated topic, and if schools are prepared pupils with autism should be able to be in inclusive settings. Most pupils on the autism spectrum are included within general classrooms, because they have the right to be taught in an inclusive classroom (Andre et al., 2019).

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## ANNEXES

Date du jour : vendredi le 13 septembre 2024  
 Épreuve : Dictée et Questions 1/20 durée : 1h00 min  
 Dictée : la poule (1pt)  
La poule de Sadi, nippa le riz avec ses poussins  
don la poule de la ferme.

Questions (4pt)

NB : sur la base de ta dictée, de ce que tu as appris et de toutes autres ressources en français pour répondre aux questions posées.

I. Compréhension du texte 1

1- Propose un autre titre à ta dictée : mon texte (1pt)  
 2- Réponds par Vrai ou Faux  
 - D'après la dictée, la mère poule et ses petits sont dedans la ferme : Faux (1pt)

II. Grammaire 2

Observe bien ta dictée, lis en silence, puis relève :

a) un nom propre : Sadi (1pt)  
 b) un nom commun : poule (1pt)  
 c) un article : sa (1pt)

2- Écris un nom commun d'un animal domestique : \_\_\_\_\_ (1pt)

III. Vocabulaire 1

1- Voici les mots relatifs aux repères temporels : aujourd'hui ; demain .  
 utilise ces mots pour compléter les phrases suivantes :

1- Demain nous irons à la ferme. (1pt)  
 2- Aujourd'hui, la poule picore le riz avec ses poussins. (1pt)

IV. Conjugaison

1- Réponds par Vrai ou Faux : une action qui se passe maintenant est au présent.

Date du jour : Vendredi le 12, septembre 2014

Épreuve : Mathématiques : Exercices (1/10)

Exercice 1 2/2pts

Donnée : 20 min

Trace : a) une ligne courbe :

b) la droite  $(E)$  :

c) la demi-droite  $[a, b)$  :

d) le segment de droite  $[a, b]$  :

Exercice 2 2/2pts

Dans la ferme de Sauti, il y a 32 poussins gris et 27 poussins blancs. Calcule le nombre total de poussins dans cette ferme.

59

Exercice 3 1/12pts

Place ces mesures : 28 m, 105 mm dans le tableau de conversion ci-dessous

| m  | dm | cm  | mm |
|----|----|-----|----|
| 28 |    |     |    |
|    |    | 105 |    |

Exercice 4

14pts

Soit effective :

a)  $32 + 27 =$

b)  $51 - 45 =$