

**GHANAIAN TEACHERS' BELIEFS ABOUT
GIFTEDNESS AND GIFTED EDUCATION TEACHING
STRATEGIES IN MATHEMATICS AND SCIENCE**

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Acceleration, Accra, Attitudes, Conceptions, Culture, Differentiation, Ghana, Gifted Education, Giftedness, Heterogeneous, Homogeneous, Inclusive Education, Junior High School, and Knowledge, Mixed Ability Grouping, Single Ability Grouping, Strategies, Streaming, Teachers' Beliefs.

Abstract

While many developed nations have advanced in creating and providing gifted education, Ghana remains one of the African nations that pays limited attention to the needs of the gifted. Improving opportunities for the gifted is important in all economies, particularly in developing nations in Africa where wealth has mainly relied on natural resources and less on intellectual achievements. There has been little research on how to address the needs of gifted students in Ghana. As classroom instructional practices depend to a considerable extent on the beliefs and knowledge that teachers hold, an understanding of these beliefs in Ghanaian culture is necessary if the needs of gifted learners are to be addressed. Hence, this study aimed to investigate mathematics and science teachers' beliefs about giftedness and what strategies they advocate in developing gifted students' talents. This investigation was informed by Sternberg's (1993) "The Pentagonal Implicit theory" and by Gagné's Differentiated Model of Giftedness and Talent [DMGT] (2004, 2005, 2010). The concept of giftedness was framed by the definition of Subotnik, Olzewski-Kubilius, and Worrell (2011).

A qualitative instrumental case study was employed to elicit science and mathematics teachers' beliefs, drawing on data from semi-structured interviews. Ten teachers were interviewed from six junior high schools, including four public and two private in the Greater Accra Municipality of Ghana. The interview data were complemented with teachers' lesson plans and related student works. The raw interview data were transcribed and coded using Saldaña's (2016) coding methods.

This included ‘initial coding’, ‘values coding’, grouping codes into categories or propositions, identifying patterns, and finally, recognising themes.

Pre-determined codes drawn from published literature (a priori) on effective pedagogical approaches of gifted education practices were applied to interview data and data from teachers’ lesson plans to document the strategies that teachers believed were appropriate for gifted students.

Data analysis revealed that in general, teachers held naive beliefs about gifted students and their development. Ghanaian teachers identified four out of the five criteria of Sternberg’s (1993) Pentagonal Model but showed no recognition of his Productivity criterion. However, the findings disclosed also that teachers attributed giftedness to spiritual and supernatural factors. Teachers’ beliefs about the identification of giftedness were grounded in students’ IQs and high achievement in test scores as indications of giftedness characteristics. Regarding beliefs about teaching strategies, there was little evidence of the use of recommended approaches such as critical thinking, problem solving and inquiry skills to challenge gifted students’ potential for learning beyond the traditional curriculum.

Teachers’ beliefs reflected a lack of relevant knowledge about giftedness and what strategies are appropriate to support gifted students. This was attributed to the absence of gifted education principles in pre-service and in-service education. Respondents rejected the idea of providing for gifted students with special services, such as differentiation and acceleration in the mixed ability classroom given the risk of equity and elitism challenges. The majority of participating teachers advocated mixed or heterogeneous grouping, whereby gifted students supported struggling students to understand new concepts. As a consequence, selecting students for separate classes or groups based on capabilities may be a consideration depending on the

subject matter for supporting gifted students. Apart from such assumptions, gifted individuals are valued or treasured by participating teachers. Furthermore, there was acceptance that gifted students are important for the economy and should be supported.

Findings also suggested that those teachers with advanced qualifications other than teachers' training held positive beliefs about gifted students compared to their colleagues with only teacher preparation qualifications. The findings of this study suggest that if gifted students are to receive appropriate support in Ghana, major curriculum reform to enable inclusion practices is necessary. Furthermore, improved pre-service and in-service teacher professional development concerning gifted education is required.

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Glossary

Acceleration	This is referred to as Grade-skipping, which permits students to skip one or more grades (Davis & Rimm, 2004).
Attitude	An attitude is an object based on the scale ranging from positive to negative (Ajzen, 2001).
Beliefs	These refer to concepts that are used to describe the structure of the mental states which motivate a person's actions (Zheng, 2009) and are often based on evaluative judgement (Pajares, 1992).
Curriculum Compacting	This is “an instructional technique that is specifically designed to make appropriate curricular adjustments for students in any curricular area and at any grade level” (Reis & Renzulli, n.d, p. 2).
Curriculum Differentiation	This is “the process of modifying or adapting the curriculum according to the different ability levels of the students in one class” (UNESCO, 2004, p.14).
Differentiation	This denotes the effective strategic practices that are adequately challenging and essential to meeting all students' diverse needs toward the provision of varied learning experiences within the mainstream classroom (Coleman, 2001).

Giftedness	This is defined by Gagné (2004) as “the possession and use of untrained and spontaneously expressed natural abilities (called aptitudes or gifts), in at least one ability domain, to a degree that places a child at least among the top 10 percent of his [or her] age peers” (p. 120).
Implicit Theories	Implicit theories are referred to as ‘common sense’ beliefs or tacit knowledge” relating to a specific concept that exist within individuals’ minds which are used to judge the views of social communications (Kim, 2015, p. 1).
Knowledge	This is referred to as a conscious proposition which is either true or false and can be rejected or accepted (Griffin & Ohlsson, 2001) and is also based on facts (Pajares, 1992).
Multipotentiality	This refers to individuals who excel across numerous fields of endeavour (Achter, Lubinski, & Benbow, 1996).
Mindset	Ways of thinking that can be grouped into two categories fixed and growth mindsets based on individuals’ views (Dweck, 2006).
Mastery model	Mastery model (known as growth mindset) is the impact of environmental factors, beliefs about intelligence, motivation and mental state (Dweck, 2006).
Subject Acceleration	Process which allows a student to proceed after

adequately mastering the content and progressing in a subject area at a rate that matches the student's level of ability and performance (NSW Department of Education and Training, 2004).

Teacher's beliefs

Formed during the process of a teacher's professional training (Zheng, 2009). One also assumes that beliefs stem from life experiences as well.

List of Abbreviations

AMA	Accra Metropolitan Area
BECE	Basic Education Certificate Examination
CHC	Confucian-heritage cultures
CRDD	Curriculum Research and Development Division
DMGT	Developmental Model of Giftedness and Talent
EFL	English as a Foreign Language
FCUBE	Free Compulsory Universal Basic Education
GES	Ghana Education Service
IE	Inclusive Education
IQ	Intelligence Quotient
JHS	Junior High School
MoE	Ministry of Education
NAGRAT	National Association of Graduate Teachers
NHMRC	National Health and Medical Research Council
NSECHR	National Statement on Ethical Conduct in Human Research
TTC	Teacher Training College
TVET	Technology and Technical and Vocational Education, Training
UNESCO	United Nations Educational Scientific and Cultural Organisation
UCC	University of Cape Coast
UEW	University of Education, Winneba
WASSCE	West African Senior Secondary Certificate Examinations

Statement of Original Authorship

The work contained in this thesis has previously not been submitted to meet the requirements for an award at this or any other higher education institution. To the best of my knowledge and belief, the thesis contains no material previously published or written by another person except where due reference is made.

[QUT Verified Signature](#)

Allotey Gladys Ami

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Chapter 1: Introduction

1.1 Introduction

Many countries in the developed world are well advanced in developing and providing special programs for their gifted students. Giftedness for the purpose of this study is considered to be exceptional ability in one or more spheres such as the intellectual, creative, artistic, or leadership spheres. Significant research has been done on this topic (e.g., Gagné, 2004, 2005, 2010; Gardner, 1999; Renzulli, 1999, 2002, 2005; Sternberg, 2007; Sternberg & Davidson, 2005; Subotnik, Olzeweski-Kubilius, & Worrell, 2011) which has informed practice. However, the story in many developing countries like Ghana for example, is quite different. Tremendous progress had been made in Ghana's education since independence from British domination in 1957 as in other developing nations in Africa (Deku, 2013; Gidraph, Ndungi, & Mungai, 2013), but very limited attention has been given to gifted education.

It is important that African nations invest in appropriate gifted education practices that can shape the youth for the future as oppose to developing the future for the young gifted. That is, investing into human capital development through appropriate education of gifted students can boost the entire system of education in society (Yakavets, 2014). The role of human capital and the concept of education for the gifted are closely linked and hence, vital assets for economic wealth (Shavinina, 2009; Yakavets, 2014). It is not surprising that the current Government of Ghana, President Nana Akuffo-Addo has made all high schools free in the Sub-region.

The role of teachers in identifying gifted students and providing for their social and academic needs is vital to ensure gifted students flourish and contribute to the

developing economies (Miller, 2009; Starko, 2008). Teachers act as important role-models in mentoring and nurturing students in the classroom. The effectiveness of teachers' practices are likely to be influenced by their beliefs and understanding of the concept of giftedness (Miller, 2009).

The purpose of this study was to explore junior high school teachers' beliefs about giftedness and what they believed should be implemented to support gifted students in Ghana.

This chapter provides an overview of the educational system in Ghana as a context for this study. The research program is described and its significance argued.

1.2 Background

The Republic of Ghana is a sovereign country and a unitary constitutional democratic nation, spanning a land mass of about 238,535 square kilometres. Ghana shares boundaries with the following countries, La Côte d'Ivoire, Burkina Faso, Togo and the Gulf of Guinea (UNHCR, 2005). It gained independence from British colonial rule in March, 1957. Ghana has an estimated population of 28 million people (World Bank, 2016) made up of diverse ethnic groups. Administratively, it is divided into ten regions and its capital is Accra. Accra has a projected population of 2.5 million people with three major ethnic groups including, the Akan, Ga-Dangme and the Ewe (World Urbanization Prospects, 2018). It would be relevant to make some comments about the economic standing of Ghana. The World Bank Economic Outlook reported that Ghana's total GDP growth for 2017 was approximately 6% and about 5.9% was spent on education. The GDP compares for example with Australia (5.2%), South Africa (6%) and Finland (7.2%) (Gusev, 2017). The economy of Ghana is in transition from one dependent on the exploitation of rich resources to one involved in technology

manufacturing. As the capital of Ghana, Accra is known to contribute highly in education, making it the economic centre of the country and central business city with manufacturing industries (Ministry of Local Government and Rural Development and Environment, 2016) compared to other regions of Ghana.

1.2.1 Structure of Educational System in Ghana

Education in Ghana changed significantly after colonial settlers made their way into the former Gold Coast, now the Republic of Ghana. It was originally an informal type of education in which children were brought up and educated in the culture and traditions of the community (Adu-Gyamfi, Donkoh, & Addo, 2015). After colonisation by the Europeans, a more formal school-based education system was introduced. This form of education was geared towards the elite class, satisfying the aims of the European colonists who migrated to settle in Ghana (Adu-Gyamfi et al., 2015).

At the start of the 21st century, a new educational reform was proposed with the focus of providing free universal primary education by 2015. The government of Ghana subsidizes school fees and provides food and school uniforms to all children in the public schools (Adu-Gyamfi et al., 2015). The language of instruction is officially English but students can study in any of the eleven major local languages, with French as an elective course through to at least the eighth grade within the high school setting.

Currently, Ghana operates a 6-3-3-4 system of education, six years of primary education, three years of junior high school, three years of senior high school and four years of university education (Adu-Gyamfi et al., 2015). There are both public and private schools in the education system. The total number of schools in Ghana, per type of school and sector are shown in Table 1.1.

Table 1.1

Total Number of Schools per Type and Sector in Ghana

Sector	Kindergarten	Primary	Junior high school	Senior high school	Vocational training schools	teacher training colleges
Public	13,505	14,112	8,818	535	133	38
Private	5,973	5,742	3,618	293	163	0
Total	19,277	19,854	12,436	828	296	38

(Ministry of Education, 2013, p. 9)

1.2.2 Junior High School Education in Ghana

As this study focused on junior high school teachers, a brief overview of Junior High School Education is provided. In the Junior High School Education, students take compulsory courses including English Language, French, Mathematics, Integrated Science, Social Studies, Religious and Moral Education, Ghanaian Language (depending on the region the student is schooling), Vocational Skills (Home Economics), Technical Drawing and more recently Basic Design and Information Communication Technology [ICT] (Adu-Gyamfi et al., 2015). A student will choose to continue with either the Vocational Skills or Technical Drawing at Grade Eight when registering for the Basic Education Certificate Examination (BECE). Starting from age fourteen students can choose various streams at Senior High School level, based on individual performance in the BECE. Others can also join the General Education and Technical Vocational and Agricultural Training Stream. Students can also enter an apprenticeship with some support from the Government of Ghana (Adu-Gyamfi et al., 2015).

1.3 Ghana's Policy on Inclusivity and Gifted Education

The government of Ghana provides infrastructure for education, but parents pay for facilities such as electricity and water with other support from benevolent societies who also assist in providing water for schools. Education in Ghana has gone through several reforms since independence. These reforms have shaped the educational system over the years (Adu- Gyamfi et al., 2015). Successive Governments have put in place policies that attempt to ensure education for all children in Ghana (MoE, 2016). An example is the Free Compulsory Universal Basic Education (FCUBE) and Inclusive Education (MoE, 2016).

Inclusive education focuses on areas including accessibility, quality, management, science, technology and Technical and Vocational Education and Training (TVET) with a major focus on inclusion. Inclusion is defined broadly as embracing students from various linguistic and cultural backgrounds and those with special needs (Ministry of Education, 2016).

Inclusive education in Ghana appears to have a different focus when compared to Western ideas about inclusive concept. For example, a case study examined the success of inclusive education in Ghana using educators from two regions (Opoku, Agbenyega, Mprah, Mckenzie, & Badu, 2017). Findings revealed that although inclusive education in the Ghanaian context is defined as a system accessible for all students, it primarily addressed the needs of students with disabilities to ensure quality and fairness in educational management for these children. Indeed, it seemed that from the work of Opoku and associates (2017), Ghana's inclusive education in practice does not provide opportunities for gifted students, because the Ghanaian system does not in practice recognise gifted students and does not provide for their development despite policy frameworks.

In general, inclusive educational policy defines the government plan for education and this policy is based on the Salamanca Statement and Framework for Action (UNESCO, 1994). The policy provides guidelines for the education for all children including those with special needs. The inclusive educational policy strategic plan maintains that the different educational needs of every child must be addressed. It also addresses issues relating to the following (Ministry of Education, 2016):

- Persons with Intellectual Disabilities
- Gifted and Talented Persons
- Persons with Physical Disabilities
- Persons with Special Learning Disabilities
- Persons with Autism
- Persons with Attention Deficit Disorder
- Persons with Hyperactivity Disorder

Although the inclusive education policy provides guidelines for persons with disability, the emphasis is on students with physical disability (Opoku et al., 2017). However, this study is mainly concerned with the second point, gifted and talented persons. Deku (2013) indicated that gifted students are the most vulnerable within Ghana's inclusive education system. For the purpose of this study, giftedness, according to Subotnik, Olzewski-Kubilius and Worrell (2011), is defined as the manifestation of achievement that is evident at the highest level of the talent distribution compared to aged peers. This study focused on students in the domain of science and mathematics. A more detailed discussion is provided in Section 2.4. Currently, teachers' beliefs and knowledge of giftedness rely on experience, because there is no pre-service teacher education and no in-service programs related to gifted education in Ghana (Deku, 2013). The identification of, and education for the gifted is

often left in the hands of classroom teachers. In 2013, a study by Prosper Deku investigated teacher nomination of gifted and talented students in Ghana. He found that teacher knowledge of the concept of giftedness was inadequate to help identify gifted children (Deku, 2013). Deku concluded in his study that teachers are not sufficiently prepared in the subject.

Inclusivity in Ghana can probably be considered as inclusivity by default, meaning that all students are included in the school system. However, this does not mean that each individual's diverse needs are catered for. Although education in Ghana is inclusive, it does not really reflect inclusivity. As a result, both the gifted and those with learning disabilities often go through the school system unnoticed and are likely to be denied the desired services, either for their disabilities or giftedness (Chimhenga, 2016; Deku, 2013; Ngara, 2017; Oswald & Villiers, 2013; Smith, 2006).

In summary, the education of Ghana's gifted students is largely a neglected area (Deku, 2013) as found in many developing countries (Mafa, 2012; McLeskey, Rosenberg, & Westling, 2010; Oswald & Villiers, 2013). Students with physical disabilities tend to receive more attention in special education provisions compared to their gifted counterparts (Deku, 2013; Ngara, 2017; Smith, 2006). This might partly stem from the myths about giftedness, with the view that gifted individuals can achieve their potential without any significant support (Colangelo, Assouline, & Gross, 2004). Hence, my motivation for this study is to understand better teachers' beliefs about giftedness to inform practices in Ghana.

1.4 Teaching in Ghanaian Junior High Schools and the National Curriculum

True inclusivity for society's mainstream schools is important but ensuring flexibility in a national curriculum is essential. According to Ainscow (2013), inclusive education (IE) is potentially capable of providing for all students' special education needs.

In Ghana, there are both public and private junior high schools. Public schools are made up of two divisions: the mainstream schools attended by the majority of students, and the special education schools which cater for students with severe physical and mental disabilities. The private schools operate under Ghana Education Service (GES) with the same curriculum prescribed by the Ministry of Education. While these private schools facilitate IE, there are no exclusive special schools in the private sector. Private schools are run by the Ghana National Association of Private Schools (GNAPS) formed in 1972 and they answer to the GES in accord with the 1992 constitution which mandates how private schools are to operate.

According to UNESCO (2016), a good quality curriculum needs to be inclusive irrespective of students' background and ability by assisting all to meet their capabilities and potential. Such a curriculum recognises students' diversities and supports teachers to lead, provide assistance and encouragement for all students to achieve their utmost potential. In this regard, teaching is dependent on the teacher and the roles he/she plays to deliver the curriculum to the students in an engaging manner. The curriculum designed for teachers need not be rigid, so that teachers can have enough flexibility to modify and adjust it to their style of teaching.

A previous study assessed the mode of teacher preparation in Ghana for inclusive education (Abgenyega & Deku, 2011). Their results indicated that the curriculum and

assessment provisions are “essentially prescriptive and rigid”, providing inadequate space for teachers to make modifications that are likely to match students’ diverse needs (p. 10). Abgenyega and Deku (2011) noted that teachers are only concerned with completing the curriculum as planned by the IE policy. They argued that the inclusive component of Ghana’s education policy does not actually reflect the inclusivity that students are expected to experience.

In Ghana, a study was conducted by Deku and Vanderpuye (2017) with 120 teachers selected from 35 inclusive schools. The study employed a questionnaire to investigate the perspectives of teachers concerning Ghana’s inclusive education. Their findings revealed that the curriculum and the overall training of teachers do not enhance inclusion. Teachers noticed that inclusive education programs were unsuccessful because students did not receive relative and specific instruction within the inclusive classrooms. They found that the teachers’ abilities to deliver an appropriate curriculum for inclusivity were inadequate. Deku and Vanderpuye (2017) contended that the curriculum was not flexible enough to accommodate suitable modifications by teachers. The authors recommended that all teacher education institutions must address the appropriateness of curriculum accommodation and modifications in instructional curriculum and this should form aspects of their core programs. Inclusivity should ideally embrace all students’ potentials in mainstream classrooms, yet inclusivity is inconsistent in Ghanaian classrooms (Deku & Vanderpuye, 2017).

The discussion of the previous studies indicated that teachers’ beliefs about inclusive strategies is essential; so taking this into account, this thesis may evoke thoughts about how vital teachers’ beliefs are, during both pre-service and in-service teacher education. Teachers’ beliefs about the provision of effective giftedness

strategies and gifted education could assist stakeholders to develop flexible curricula and pedagogical practices that can meet all students' needs in the regular classrooms. While the curriculum is not the end in itself (UNESCO, 2016), strategies such as curriculum differentiation, curriculum compacting and content-based acceleration are paramount for teachers in teaching and learning. Following from the discussion above, it can be assumed that there is no literature concerning Ghanaian teachers' beliefs about giftedness strategies for effective gifted education practices and that this study will be of benefit for its exploration of these concepts.

1.5 Pre-service Teacher Preparation for Inclusive Education in Ghana

Today's mainstream classrooms are becoming diverse with students from various backgrounds attending school (Sternberg, 2007; Subotnik et al., 2011). The definition from UNESCO (2009) aims at embracing students' diversity by "increasing their participation and reducing exclusion within and from education" (p. 1). It is possible that inclusive education can adequately provide for students' pedagogical needs, without marginalisation (Ainscow, 2013).

Ghana's inclusive education policy has gone through multiple reform initiatives towards the provision of access, quality and equal education. These include the 1961 Education Act, followed by Free Compulsory Universal Basic Education which was launched in 1996 based on the Salamanca Statement of Action (UNESCO, 1994). Among these reforms, teachers are at the forefront of actioning the change brought about by reform, and pre-service teacher preparation cannot be ignored by any country in achieving the desirable quality of education (Deku & Vanderpuye, 2017).

In Ghana, both Universities and Teacher Training Colleges (TTCs) are responsible for the provision of pre-service teacher preparation. Often those from

lower socio-economic backgrounds enrol into a TTC as they cannot afford to go to Universities (Agbenyega & Deku, 2011). Currently, there are 38 public and three private TTCs which were upgraded in 2004 to deliver diploma programs instead of the former 3-year post-secondary ‘Certificate A’.

1.5.1 The Structure of Teacher Education

Today, Ghana’s teacher education involves two years of internal full time study and students take one year to complete a professional placement by studying via a ‘distance model’ under the mentorship of classroom in-service teachers. The core units for pre-service teacher education include English and Ghanaian languages, basic science and agricultural science, basic mathematics, physical education, education studies and cultural studies with limited components of inclusive education (e.g., Abgenyega & Deku, 2011). The supervision work of the TTC is exercised under the responsibility of the Ghana Education Service (GES). Qualified teachers are posted to teach in both primary and junior high schools. Junior high school teachers teach based on their specialised areas although during teacher shortages they are expected to teach all subject areas. The primary school teacher often teaches all subjects in a class. Concerning university-level teacher education, University of Education, Winneba (UEW) and University of Cape Coast (UCC) are the only public universities that are responsible for awarding teaching diplomas, undergraduate and graduate degrees after pre-service teacher education. During the final year, trainees from UEW spend their training outside campus for practicum in a chosen school for professional skill development before graduating. They are supervised by UEW lecturers (Amedeker, 2005). According to Abgenyega and Deku (2011), UCC is currently reviewing its practicum procedure. Both UEW and UCC teach core units in education including

basic mathematics, science education, social studies and language to enable the teachers teach in the primary and the junior high schools.

1.5.2 Teachers' Beliefs and Inclusive Education Provisions in Ghana

Teachers' perceptions concerning inclusive education in Ghana are of concern by Ghanaian researchers since the establishment of the Education Strategic Plan. The Ministry of Education's Strategic Plan (ESP) 2010-2020 detailed that within the inclusive education provisions, all teachers and pupils shall have access to quality educational resources that support pedagogical practices (MoE, 2016). A study analysed the impact of pedagogical practices associated with culture and post-colonial inclusive education using 21 pre-service teachers in Ghana (Abgenyega & Deku, 2011). Findings revealed that students' various learning styles and their diverse needs in pedagogical practices are not valued. The findings support the idea of further exploring Ghanaian teachers' beliefs about the topic in question. Researchers are recommending a multifaceted approach to inclusivity that can possibly reflect and provide for the diverse needs of all students.

Furthermore, a similar study was conducted by employing a qualitative questionnaire concerning how teachers perceived inclusive education, especially teaching in the mainstream classrooms with 120 teachers in Ghana (Deku & Vanderpuye, 2017). The researchers found that teachers viewed themselves as insufficiently prepared to teach in an inclusive setting. Moreover, Avoke and Avoke (2004) were of the view that the universities' preparation of teachers mostly emphasised assessment and teaching techniques which are not aligned with the needs of students with disabilities.

Equality as a tenet is not actually prevailing in Ghana's inclusive education system. It can be seen that in general, teacher preparation in Ghanaian universities and TTCs offers one or two unit models on special education courses. However, they do not have specific programs that can prepare teachers for high-ability student development or to provide for these students' diverse needs. As a consequence, these gifted students are potentially marginalised as teacher education courses focus on teaching methodology and assessment. Courses that include strategies for inclusive education practices that cater for academically gifted students are non-existent.

1.6 The Study Context

The study was conducted in the Greater Accra Region of Ghana, located in the southern part of the country. Accra is the regional capital for the Greater Accra Region and is also the capital of Ghana. Also known as the Accra Metropolitan Area (AMA), this location is a suitable choice for the study because it is well equipped with infrastructure and facilities that support education and it is more culturally diverse than other regions because it is the capital city. The AMA has quality junior high schools with teachers from diverse cultural backgrounds. It covers a total land area of 3,245 square kilometres (Central Intelligence Agency, 2013) and a population of 2,475,208 people (World Urbanization Prospects, 2018). The three dominant ethnic groups of Ghana are the Akan, Ga-Dangme and the Ewe (World Urbanization Prospects, 2018). Christianity is the major religion of Accra, constituting 83% of the population, whilst 10.2% are Muslim and 4.6% have no religion (World Urbanization Prospects, 2018). There are over 2,500 public primary schools, 3,000 private primary schools, 1,000 public junior high schools, 1,300 private junior high schools, 50 public senior high schools and one college of education (Ministry of Education, 2013).

Gender plays an important role in Ghanaian society particularly in relation to STEM. Historically women have had well defined gender roles where women are expected to perform unpaid domestic labour rather than work for an income, which limits their independence (Amu, 2005). Consequently, gifted females are not appropriately supported in co-educational locales to participate in STEM areas compared to gifted males. This situation is not restricted to only Ghana. Kerr and Nicpon (2003) articulated that in coeducational settings, gifted boys are more likely to be recognised as gifted for STEM programs compared to gifted girls (Kerr & Nicpon, 2003). That is, in mathematics, girls attribute failure to inadequate ability to perform, leading to their lack of self-confidence to engage in STEM disciplines. Unlike girls, in identification processes, boys may not perform as required if they envisage losing peer acceptance (Ryckman & Peckham, 2015). Thus, gifted boys deliberately become underachieve to retain their social status in identification processes if they believe that the environment is unsupportive with academic achievements. This suggestion shows that teachers rely on this traditional view to identify gifted students for STEM programs.

Furthermore, Sadler, Gerhard, Hazari and Tai's (2012) work about high school students' interest in a STEM career, suggested that effective classroom instruction with scientific skills are key in developing high achievers and the gifted potential into talent..

Researchers are concerned about gender fairness. Dori et al. (2018) proposed that fostering gender-fairness using open ended questions to assess gifted students scientific cognitive skills with equal support for both gifted males and females evades gender inequities because gifted females are less represented in educational programs. In Ghana, support for gifted students' education has not yet caught the education

authorities' consideration and there are no programs instituted for identifying and supporting the gifted (Deku, 2013). Although the Government of Ghana has established the Science, Technology and Mathematics Education (STEME) clinics for junior high schools, selection of students is solely based on teachers' observations and strategies (Deku, 2013) but not gearing towards the appropriate recommended multifaceted approaches by advocates. In general, women participation in leadership roles has been discouraged in Ghana though. This is changing in government political leadership structure.

The map of Greater Accra Region showing the study location is shown in Figure 1.1.

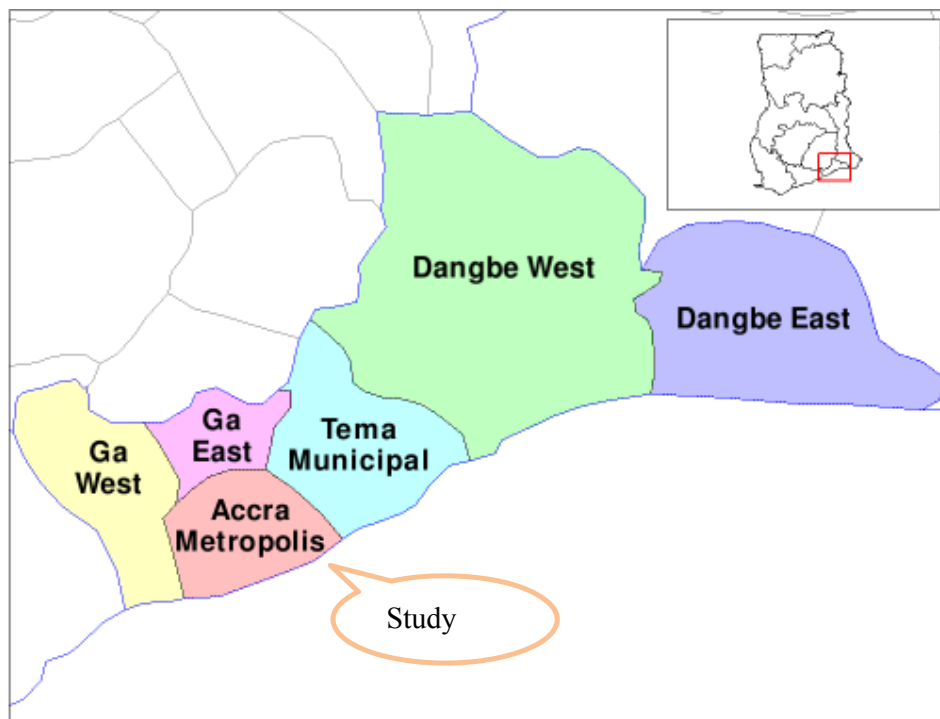


Figure 1.1 Map of Accra Metropolis (Wikimedia Commons, 2006)

1.7 Research Problem

Beliefs are significant in shaping teachers' classroom instructions (Fives & Buehl, 2016; Kagan, 1992; Miller, 2009; Pajares, 1992; Zheng, 2015). Individual beliefs

frequently act as a filter, and guide teachers' pedagogical techniques. This is achieved by framing teachers' ideas for classroom practice (Fives & Buehl, 2016; Griffin & Ohlsson, 2001). Beliefs also impact on teachers' professional development (Pajares, 1992; Zheng, 2015). In this regard, teachers' beliefs, regarding the conception of giftedness, can influence the development of gifted students (Miller, 2009; Starko, 2008). Understanding teachers' beliefs systems can assist in improving their professional education (Miller, 2009; Pajares, 1992; Starko, 2008; Zheng, 2015).

Teachers' reflections on the concepts of giftedness are based on their own in-depth beliefs, knowledge and understanding. These are often derived from their personal experiences (Mafa, 2012; Ngara, 2017; Sternberg & Arroyo, 2006). The Ministries of Education in Africa argued that teachers should adequately plan classroom instruction and do their best to meet the diverse needs of students with special needs (Ngara, 2017; Sternberg & Arroyo, 2006). Deku (2013) claimed that pre-service teachers are often not sufficiently prepared for gifted education during teacher education or professional development. Consequently, teachers' beliefs are usually confounded with stereotypes and myths about giftedness, as has been noted in other contexts (Carman, 2011; Moon & Brighton, 2008). However, teachers with positive beliefs about giftedness and a passion for teaching the gifted have positive relationships and can help improve students' learning outcomes (Watters, 2010). In such instructional environments, both teachers and students notice teaching and learning as more collaborative, interactive and student centred.

The practices teachers employ in some schools in South Africa and Zimbabwe, for example, include curriculum differentiation and subject acceleration for the gifted (Manyowa & Ncube, 2013; Oswald & Villiers, 2013). According to VanTassel-Baska and Hubbard (2016), providing and developing a suitable curriculum differentiation

contributes to a successful gifted education program. However, this may depend on the teachers' beliefs and knowledge about the concept of giftedness. Other possible practices include curriculum compacting and grade skipping (Manyowa & Ncube, 2013; Oswald & Villiers, 2013). Although these practices are key ingredients that are likely to maximise students' learning outcomes (VanTassel-Baska & Hubbard, 2016), it is evident that providing for the needs of gifted students is practically very difficult. Classroom differentiation is particularly difficult in Africa due to overcrowded classrooms which often consist of more than fifty students (Manyowa & Ncube, 2013; Oswald & Villiers, 2013). The aforementioned strategies might also be determined by the degree of alignment that is expected with a national curriculum and the flexibility teachers have to modify the curriculum. So far, the discussion on effective strategies regarding gifted education practices and whether the Ghanaian national curriculum is flexible is uncertain, and this study will investigate this further.

1.7.1 The Aim of the Study

The aim of this exploratory research is to investigate teachers' beliefs about giftedness within the Ghanaian educational system. The study's focus is on junior high school mathematics and science teachers. The reason is that students in the junior high schools are in a preparatory stage for senior high school education. Gifted students at this period may go through depression, boredom and other emotional problems particularly if their needs are not served (Ford, 2010; Kroesbergen, Hooijdonk, Viersen, Marieke, Middel-Lalleman, & Reijnders, 2016; Neihart, 1999; Subotnik, Olzeweski-Kubilius, & Worrell, 2011). Also, they may become truant or stop schooling. Teachers' beliefs about students they see or label as gifted during this period will shape their beliefs about giftedness and gifted students' needs. The outcomes of this project will contribute to fostering gifted educational practices in Ghanaian junior high schools.

By investigating teachers' beliefs we can determine if teachers are adequately prepared to provide challenging learning experience for gifted students. We can also understand how teachers feel about the concept of giftedness, and whether their knowledge is adequate in identifying gifted students. Finally, by examining teachers' beliefs, we will know if adequate programs and opportunities are available for teachers to implement in the classrooms.

1.7.2 Research Questions

There is little or no research about teachers' beliefs on giftedness and classroom practices in Ghana. Therefore, the main purpose of this study is to investigate teachers' beliefs about giftedness and how these beliefs foster their classroom instructional practices.

The study's focus will be guided by the following two questions:

1. What beliefs do teachers in Ghana hold about giftedness?
2. What strategies do teachers in Ghana suggest should be put in place to further gifted education in Ghana?

1.8 Significance of the Study

It is widely accepted in the field of gifted education that there are economic imperatives in fostering the countries talent for economic and social benefit (Shavinina, 2009; Yakavets, 2014). That is, giftedness is not only linked to innovations, but also connected to economy and public policy, and it is significant to prioritise it among the government peak agendas (Shavinina, 2009) to enable active economic modernisations in society.

Raising awareness about giftedness is one of the significant ways of promoting gifted education in Africa (Chimhenga, 2016; Deku, 2013; Manyoma & Ncube, 2013;

Mpofu, Ngara, & Gudyanga, 2007; Ngara, 2017; Ngara & Porath, 2004, 2007; Oswald & Villiers, 2013). Unfortunately, many recent studies on gifted education in Africa fail to acknowledge previous studies, a practice that would allow for a follow up of the challenges that have been raised (Deku, 2013; Ngara, 2017; Ngara & Porath, 2004, 2007). For example, a lack of teacher knowledge about giftedness and appropriate interventions as described by Deku (2013) has not yet been followed up.

This study is likely to provide information for the government of Ghana to assist in developing teachers' knowledge of gifted education through international scholarships. For example, the former president of Zimbabwe, President Mugabe set up a Presidential Scholarship fund tenable at Fort Hare University in South Africa to sponsor the education of exceptionally gifted but economically disadvantaged students (Ngara, 2017; Ngara & Porath, 2004, 2007).

Importantly, one major aspect of this study is its economic significance. Mathematics and science are seen as important contributions to economic development (Smith & Watson, 2018; Subotnik, et al., 2011), and the focus of the study's investigation will be based on classroom mathematics and science teachers beliefs about giftedness. Many countries in East Asia such as Hong Kong and Singapore have few resources, but have built strong economies through intellectual innovation and creativity (Agénor, Canuto, & Jelenic, 2012). Enhancing opportunities for gifted students is important in all economies especially in developing countries where wealth has mainly relied on natural resources and less on intellectual achievements. The fundamental point here is that promoting gifted education is essential for all economies, hence the need to ensure that all children meet their potential as articulated in inclusivity policies. Currently, Ghana remains one of the African nations that have not yet commenced formal gifted education programs (Deku, 2013). More research

needs to be conducted not only to fill a gap but also to offer policy makers appropriate knowledge on gifted education. The results would provide researchers and presumably teachers, administrators and policy makers the requisite concepts that are essential to aid the understanding of some issues relating to gifted education in Ghana. This study will also extend the relevant information that could lay a solid foundation for future research in gifted education.

1.9 Personal Experience after Graduate Education

This research is grounded in the researcher's belief that all Ghanaian students, both male and female, should have equal opportunities for education in mathematics and science subjects within the schools. It may be the case that external challenges can influence a student education positively or negatively. The passion and interest in researching into this particular area was stimulated by the researcher's personal situation such as being a teacher and a parent.

As a mathematics and science female teacher, I have spent more than a decade educating children with gifts and talents in mathematics and science in the mainstream classrooms. The Ghanaian inclusive education curriculum has not specifically involved teachers and students in this area. However, as a parent of academically gifted children, I have come to know the challenges concerning learning that are brought about by a student ability to learn and the social-emotional barriers which gifted individuals encounter. This has triggered my interest in this topic since there is a general lack of understanding around gifted children in Ghanaian classrooms.

1.10 Overview of the Thesis Document

In this chapter, the brief history of Ghana's education system as well as the current structure of education has been discussed. It was argued that Ghana is not currently

offering appropriate support for its gifted students although it has been stated in policy that it will provide for all students including those from diverse backgrounds. It was also asserted that the focus of inclusive education in Ghana seems to direct attention mostly on students with disabilities, while the gifted only receive little or no specialised programs within the mainstream inclusive classrooms.

Chapter Two considers the construct of beliefs and how teachers' beliefs impact classroom practices. It offers brief information about the characteristics and relationship between beliefs, knowledge and attitudes. Theories and research on teachers' beliefs and attitudes about giftedness and their implications for classroom instruction will be elaborated. The nature of giftedness including definitions and models/ theories will be discussed. Discussion about the varying global conceptions of giftedness, their similarities and differences, and their implications for classroom instructional practices will be included.

Chapter Three also considers methodology and methods that are relevant for this project. A qualitative instrumental case study approach was employed using semi-structured interviews and document analysis. Individual interviews were conducted with ten junior high school mathematics and science classroom teachers from six junior high schools, mainly four public and two private. Interview transcripts were analysed using an inductive coding procedure as well as Saldaña's (2016) framework of analysis to identify codes and categories of teachers' beliefs about giftedness and advocated giftedness strategies.

Chapter Four reports on the results and findings of Research Question One (teachers beliefs about giftedness) while Chapter Five reports on Research Question Two (Strategies). Chapter Six discusses the study's results and findings of the data gathered by comparing with the two research questions, and interpreting them in

relation to the literature. Chapter Seven presents the study's limitation, contribution to theory, future research directions and recommendations for practice.

Chapter 2: Literature Review

2.1 Introduction

Giftedness is perceived differently across diverse cultures (Reis & Renzulli, 2009; Sternberg, 2007). Gagné (2005, 2010) argued that giftedness can be conceived as a potential that can be developed into talent with appropriate levels of support. This process of talent development is influenced by interpersonal factors, environmental factors and chance. It is therefore imperative for teachers to understand the concept of giftedness if they are to better serve students' diverse needs because these notions about giftedness are likely to influence the decisions they make in the provision of services for the gifted. Teachers are the stakeholders most firmly involved in educating gifted students (Subotnik, Olzewski-Kubilius, & Worrell, 2011; Sanders, Wright, & Horn, 1997). Gifted students' progress can be affected by teachers' beliefs and practices (Miller, 2009; Starko, 2008). Beliefs and practices can produce both positive and negative outcomes in cognitive, social, academic and affective domains (Davis, Rimm, & Siegle, 2014). To understand how giftedness is conceptualised within various cultures around the globe, the first task is to understand the construct of beliefs and how teachers' beliefs influence pedagogical practice.

The rationale of this chapter is primarily to review literature about teachers' beliefs on giftedness and how it influences classroom practices. The chapter will not only look at beliefs but also other characteristics of beliefs and their impact on classroom practices. It will also focus on the discussion of beliefs about giftedness across the globe and how giftedness is conceptualised in different cultures.

This chapter is divided into three sections. Section 2.2 will examine beliefs and belief constructs, Section 2.3 considers teachers' beliefs and impact on giftedness, Section 2.4 elaborates on the history of definitions and attempts to document the range of characteristics accepted by theorists or scholars in the field. Section 2.5 investigates research that has explored teachers' conceptions of giftedness from multiple cultures. Section 2.6 investigates differences in researchers' beliefs about giftedness. Section 2.7 discusses the effects that teachers' beliefs have on their classroom practices. Section 2.8 briefly explores the literature on strategies recommended to support the gifted. Section 2.9 concludes the chapter.

2.2 Beliefs, Knowledge and Attitudes

This section will address the definition and characteristics of beliefs, knowledge and attitudes of teachers and their influence on teacher outlooks on giftedness. It will also consider teachers' belief development and the relationship between beliefs and knowledge.

2.2.1 Beliefs and Knowledge

According to Zheng (2009), 'beliefs' are paradigms that are used to describe the structure of mental states which motivate a person's actions. Pajares in his 1992 paper defined belief "as an individual's judgment of the truth or falsity of a proposition" (p. 316). The meaning derived from new knowledge is filtered through existing beliefs. Although new concepts can only be developed through experiences, existing ideas act as a filter and frequently alter new concepts to be more consistent with prior beliefs (Griffin & Ohlsson, 2001). This suggests that when new experiences align with prior beliefs, they will be more readily accepted as knowledge. Some beliefs are socially constructed, while others are constructed individually (Griffin & Ohlsson, 2001).

Teachers' professional development and classroom practices are influenced by their beliefs (Zheng, 2015). Zheng (2015) explained that teacher preparation at college is influenced by teachers' previous school experiences. Similarly, their instructional activities are influenced by their training and belief systems. However, if training does not successfully address or challenge existing beliefs, practices may be implemented in ways that reflect teachers' experiences as learners (Zheng, 2015). According to Pajares (1992), it is important to explore teachers' beliefs because most of the beliefs they hold are likely to contribute to their effectiveness in classroom practices. Pajares is of the view that despite some studies which regard the relationship between teachers' beliefs and practices as complex, other studies consider this relationship to be simple.

A review on teachers' beliefs and practices with regard to policy reform detailed that teachers' instructional practices are shaped by the beliefs they hold (Fives & Buehl, 2016). These authors noted that teachers' beliefs are useful concepts because beliefs act as a filter, guiding teaching processes and framing teachers' perceptions and enactment of reform messages. According to Zheng (2015), previous studies on relationships between teacher beliefs and practice have not been able to sufficiently address the complexity of teachers' beliefs; rather, they focused on exploring the relationship of consistency or inconsistency between beliefs and practices. Pajares (1992) detailed that the study of beliefs and attendant attributes is a challenge resulting from a lack of understanding. He suggests that beliefs should be explicitly defined in research studies. He detailed that it is important to study beliefs in conjunction with other concepts rather than in isolation to ensure clarity of conceptualisation. For example, in discussing beliefs, knowledge warrants equal discussion to understand the concept of beliefs.

Knowledge can be defined as a conscious proposition which is either true or false and can be rejected or accepted (Griffin & Ohlsson, 2001). For example, one can assert we use mathematics in our daily activities. This assertion can either be accepted when found to be true or rejected depending on whether the individual has relevant knowledge and can judge its truth value. Knowledge and beliefs illustrate different cognitive characteristics (Griffin & Ohlsson, 2001). The researchers noted that whereas knowledge signifies a proposition, a belief denotes a truth-value that is related to an idea. For Pajares (1992), knowledge is defined based on facts whilst beliefs rely on evaluation. The discussion above suggests that there are indeed distinctions between the concepts of knowledge and beliefs. Knowing what occurs in a school and understanding the content in books are some examples of knowledge (Pajares, 1992). Pajares (1992) proposed that teachers mostly teach their subject areas in accord with the values they hold on beliefs and knowledge.

For Griffin and Ohlsson (2001), a belief is held in support of knowledge but the two constructs are different. This supports Pajares' suggestion that a belief is a truth-value related to knowledge. The above discourse suggests that knowledge and belief appear to be two sides of the same coin. Following from this background, the discussion will be on the development of teacher beliefs (Section 2.2.2), attitudes and beliefs (Section 2.2.3) and relationship between beliefs and knowledge (Section 2.2.4).

2.2.2 Development of Teacher Beliefs

This section seeks to examine literature on how beliefs are formed. Due to a lack of relevant research on the formation of beliefs about giftedness, Zheng's (2009) work, regarding teaching English as a Foreign Language, was used to review literature in this section. A study conducted by Zheng (2009) about pre-service teachers' beliefs and

practices regarding teaching English as a Foreign Language (EFL), presents a multidimensional idea of teachers' beliefs. His findings indicated that teachers' beliefs are formed by their education in a foreign language, their previous language learning experience and classroom practices. These resulted in the development of teachers' beliefs during the process of professional training. A debatable issue is whether these formed beliefs are resistant to change, or develop to become a dominant part of a teacher's classroom behaviour (Zheng, 2009). This research suggests that development of beliefs is a dynamic process because beliefs that individuals form can change from positive to negative or vice versa over the course of time.

2.2.3 Attitudes and Beliefs

Interestingly, the discussion in literature relating to teacher attitudes focusses on the anxiety that teachers express regarding teaching gifted students. Although this Ghanaian study on teachers' beliefs about giftedness is not about attitudes of teachers, a brief discussion about the construct and development of attitudes may provide more depth about the understanding of beliefs. Generally, attitudes can be understood as an individual's summary of assessments and can be determined on an interval from positive to negative (Ajzen, 2001). In this discussion, it is significant to examine whether teachers' attitudes and beliefs have some relation with giftedness.

Ajzen (2001) explained that attitudes are constructed based on beliefs. However, Ajzen (1989) indicated that the attitudinal concept does not just link to beliefs, but rather it is a function of beliefs. This argument is consistent with Griffin and Ohlsson's (2001) study which detailed that a belief grounded in knowledge may assist in serving affective and social functions. This presupposes that a person's beliefs will shape his/her attitude toward other individuals or a situation. Discussion in the next section will consider the relationship between beliefs and knowledge.

2.2.4 Relationship between Beliefs and Knowledge

People hold different views about the concept of beliefs, some view it as integral part of knowledge (e.g., Griffin & Ohlsson, 2001; Pajares, 1992; Zheng, 2009; 2015), and others see it as a component of attitudes (e.g., Ajzen, 2012). Whether beliefs are viewed as aspects of attitudes or knowledge depends on an individual's theoretical position.

A previous study examined 120 participants in Chicago to explore the relationship between teachers' beliefs and knowledge about approaches of teaching science, and whether teachers' beliefs affect their future knowledge acquisition in the subject matter (Griffin & Ohlsson, 2001). The authors concluded that beliefs and knowledge are dissimilar concepts although they relate to each other. They found that individuals rejected knowledge in order to substitute their beliefs, but sometimes were eager to alter their beliefs with enough supporting knowledge. This suggests that both beliefs and knowledge are interrelated. Knowledge constitutes the accumulated reservoir of information held by a person whilst beliefs are a person's response to this knowledge.

A study involving 728 teachers was conducted in China to explore the factors that accounted for the enactment of inquiry-based science teaching and learning (Szymanski & Shaff, 2013). The investigation was based on teachers' level of knowledge, beliefs and attitudes towards science teaching. The authors found that teacher beliefs and attitudes towards an inquiry-based learning model (and their application) were neither negative nor positive. Despite teachers' number of years of experience in teaching science, there was no significant variation in implementing inquiry-based learning. They concluded that for primary teachers in China, to

implement an inquiry-based model of teaching science, attitudes, knowledge and beliefs need to be considered.

2.3 Definitions and Nature of Giftedness

Giftedness is a contentious concept with diverse formal definitions and theories. This section explores definitions, conceptions of giftedness, models and theories of giftedness.

According to Kaufman and Sternberg (2008), giftedness is a label and whether a person is gifted or not will depend on the criteria that exist within that person's circumstance, location or culture. However, there is no single acceptable set of criteria for defining giftedness. In common usage, the term 'giftedness', meaning 'exceptional ability', has been attributed to Francis Galton (1869) in his book *Hereditary Genius*. Some scholars define giftedness from a quantitative perspective, including achievement testing, standardised testing and performance testing. Intelligence Quotient (IQ) has mainly been used as a measure to determine who the gifted individuals are, yet, giftedness goes beyond this. Using quantitative methods to define giftedness involves a cognitive mode of testing using aptitude or achievement test results. Others use a qualitative lens, taking behaviour and individual character traits into account. A qualitative approach employs a process of studying the intricacies of an individual's behaviour (Subotnik et al., 2011). This flexible assessment of giftedness relies on profiling, anecdotes and subjective reports.

Researchers do not seem to agree on whether a consensus on defining giftedness is necessary (Borland, 2005; Cramond, 2004). Nevertheless, the debate on a definition continues to dominate the field. For example, Subotnik et al. (2011) reviewed literature on definitions of giftedness and found that at different stages of human development,

elements of psychological and social factors influence the manifestation of giftedness. Subotnik and colleagues go on to argue that gifted individuals are different when compared to others due to their unique abilities. These abilities manifest in different stages of individual's development. Educators have varying views about giftedness, and this will be discussed in the next section.

In brief, there are a number of definitions of giftedness proposed by researchers. Many of these definitions are used to inform educational practitioners for the provision of relevant services.

According to Renzulli (2002), the multiple definitions of giftedness can be categorised based on their conservativeness and liberality, but the common demarcation between the two is the restrictiveness of the definition. For example, in the conservative definition domain, an IQ test defines a limited number of the population as gifted. An example of this kind of definition is Terman's (1925): "the top 1% level in general intellectual ability, as measured by the Stanford-Binet Intelligence Scale or comparative instrument" (p. 43). For Litster (2004) and Renzulli (2002), such definitions of giftedness are exclusive and conservative because they ignore alternative types of abilities including leadership, athletic abilities and artistic abilities, limiting the definition to just the most intellectual or cognitive aspects of giftedness.

Relating giftedness to high IQ has been considered as a harmful myth in the conceptualisation of giftedness due to the narrow-mindedness of this approach (Borland, 2009). Matthews and Folsom (2009) argued that identifying giftedness based on IQ tests may lead to misidentification of students for gifted programs, as this type of identification does not take into account those with abilities or talents in areas such as sports, language, music and culturally relevant exceptionalities. Borland

(2009) indicated that using IQ tests to identify giftedness is conservative because it only takes into account those that are academically gifted. In support of Borland's assertion that IQ is not the only measure of giftedness, Cramond (2004) explained that to offer a single definition of giftedness may indicate the end of exploring the truth in our culturally diverse society. Although, Cramond (2004) did not specifically clarify the meaning of this statement, presumably, she meant that society would have to rely on each culture to decide on a precise definition of giftedness, and other cultural perspectives would be ignored. The current spread of definitions for giftedness permits the representation of different views, including the consideration of varied abilities that contribute to giftedness. According to Sternberg and Zhang (1995), one criterion is whether an individual's specific gifts are valued by that society at a particular time in history (Diezmann, 2002). These definitions are inclusive of factors other than IQ as a measure of giftedness. This suggests that definitions of giftedness can extend beyond narrow definitions to embrace cultural considerations.

In more liberal definitions, a broader approach to the definition of giftedness is assumed and equating giftedness directly to a high IQ is criticised (Renzulli, 2002). Two examples of such definitions are those developed by Renzulli (1999, 2005) and Gardner (1999). For instance, Renzulli's Three-Ring Conception of Giftedness defines the concept in terms of the interaction among the traits of task commitment, creativity and above-average ability. These represent subjective qualities rather than objective dimensions (Renzulli, 2005). Gardner (1999) defines giftedness as the "biopsychological potential to process information that can be activated in a cultural setting to solve problems or create products that are of value in a culture" (p. 33). This suggests that giftedness is presented as an ability to develop and create ideas that are valuable to society.

In the context of this study, the definition below is adopted. The lack of a common definition of giftedness is an issue which Subotnik et al. (2011) have attempted to address by developing a comprehensive definition that they proposed would be useful across all domains of human performance:

Giftedness is the manifestation of performance or production that is clearly at the upper end of the distribution in a talent domain even relative to that of high-functioning individuals in that domain. Further, giftedness can be viewed as developmental, in that in the beginning the potential is the key variable; and in fully developed talents, eminence is the basis on which this label is granted. Psychosocial variables play an essential role in the manifestation of giftedness at every developmental stage. Both cognitive and psychosocial variables are malleable and need to be deliberately cultivated. (p. 7)

Although this definition touches on performance and excellence, it does consider the different values that certain cultures may attribute to gifted individuals; for example, in Africa, learning multiple languages is valued and may be valued among the Australian Indigenous cultures as well (Munro, 2011). The debate around giftedness and the ensuing paradigm shift will allow educators to tolerate a broader population of gifted students and provide for their diverse needs. To expand the concept of giftedness as it appears in literature, the discussion will now focus on models of giftedness.

2.3.1 Models of Giftedness

A model draws on theoretical assumptions to represent the essential elements of a concept (Kaufman & Sternberg, 2008). Within the field of gifted education, multiple models have been proposed (Kaufman & Sternberg, 2008). A study conducted in the US using past theories and models proposed four waves of giftedness models

(Kaufman & Sternberg, 2008). The waves include: domain-general models, domain-specific models, system models and developmental models.

According to Kaufman and Sternberg (2008), in the domain-general models, an individual possesses some traits that are applicable across every area of ability. These models are widely used, however, as giftedness is usually equated with a high IQ, the models only cover a limited number of the gifted population.

For Tapper (2012), the domain-specific models of giftedness denote an achievement in a specific area only. An example of this is Brody and Stanley's (2005) Talent Search Model, where the word 'gifted' was replaced with 'precocious' in order to stress the inadequacy of the domain specific models where giftedness is shown in a specific domain. Thus, a gifted person can show brilliance in one domain but not in all domains. In contrast to experts who excel in one domain, it is worth noting that the term multi-potentiality is frequently used in psychology to describe individuals who excel across numerous fields of endeavour (Achter, Lubinski, & Benbow, 1996).

The system models of giftedness assume an approach in which giftedness is considered as a system that relies on psychological components acting together (Kaufman & Sternberg, 2008). A typical example is Sternberg's (2009) Wisdom, Intelligence and Creativity Synthesised model (WICS). As this model identifies multiple traits and intelligences that contribute towards giftedness, rather than just looking at one domain, it is regarded as a system model. Also, the Actiotope Model of Giftedness designed by Ziegler (2005) places much emphasis on individuals' actions in relation to their environment.

The developmental models emphasise that giftedness is not a static concept, but rather it is dynamic because it changes over time. In developmental models, both internal and external factors operate together to foster gifted behaviour. Gagné (2004)

defined giftedness as “the possession and use of untrained and spontaneously expressed natural abilities (called aptitudes or gifts), in at least one ability domain, to a degree that places a child at least among the top 10 percent of his [or her] age peers” (p. 120). Gagné (2010) also distinguished giftedness from talent. This theory describes how giftedness is developed into talents. The Developmental Model of Giftedness and Talent (DMGT) suggests that external influences such as parents, homes, schools and activities can transform ‘gifts’ into ‘talents’ with the aid of learning and practising. According to Kaufman and Sternberg (2008), a good model should have several assessment types to protect against misidentification, should not only consider one’s intellect, and should take into account varying skills and environmental factors. Although Gagné’s DMGT fulfils most of these requirements, how to enforce this model and to what degree the assessment is measured is unclear. Among the numerous issues in the area of giftedness coupled with the considerable number of definitions and models, every individual seems to have varying implicit beliefs or conceptions about giftedness. This will be discussed in the next section.

2.3.2 Implicit Theories of Giftedness

According to Kim (2015), implicit theories are referred to as “common sense beliefs or tacit knowledge” (p. 1) relating to a specific concept that exists within individuals’ minds and are used to judge interactions among people. Implicit theories are not only viewed to be fixed over time but also are impacted by the traditions of cultures, expectations and norms (Kim, 2015). Implicit theories of giftedness are useful especially in conceptualisation of giftedness for identification purposes and for informing policy makers and practitioners of gifted education in the provision of services for the gifted (Sternberg & Zhang, 1995). This section will look at implicit theories because of its relevance to this study.

Every person has unconscious implicit theories (beliefs) of giftedness according to Sternberg and Zhang (1995). Zhang and Hui (2003) noted that implicit theories of giftedness do not only inform practitioners of identification processes but also direct unique procedures for nurturing the gifted. Sternberg and Zhang (1995) suggested a geometric analogy “The Pentagonal Implicit Theory of Giftedness” to test similarities within the conceptualisation of giftedness across cultures (p. 39). They identified five criteria which they arranged on the vertices of a pentagon. The first criterion, Excellence, depicts an individual’s superiority in comparison to their peers in a certain area. The second criterion is Rarity, denoting an attribute that is seen to be ‘rare’ when compared to peers. The third criterion is Productivity, which states that the criteria that are used to assess the individual as superior must have at least a potential to lead to productivity (Sternberg & Zhang, 1995). Demonstrability is the fourth criterion and can be determined through at least one valid examination. The fifth criterion is the Value of the individual’s performance in their domain area that has the likelihood of benefiting society. This is relative to specific cultures and also is restrictive as only those with skills that are valued would be relevant (Sternberg & Zhang, 1995). Although the Pentagonal Implicit Theory of Giftedness serves as a framework used to identify the gifted for gifted programs, what a specific society views as valuable would potentially determine who is superior (Sternberg & Zhang, 1995).

To judge and determine the effectiveness of the Pentagonal Implicit Theory of Giftedness across cultures, Sternberg and Zhang (1995) conducted a quantitative study using two groups in Connecticut comprised of 24 students from a University and 39 parents of gifted students. This study examined schools’ identification processes for selecting gifted students through reports from participants concerning the criteria used. Using criteria based on the Pentagonal Implicit Theory, the authors used multiple

regression analysis and concluded that findings were consistent with the theory and that people often consider making judgements with the measure of the five elements of the model.

Another study was undertaken in China's Central Teachers' University using 189 pre-service teachers comprising 74 males and 115 females to examine these pre-service teachers' beliefs to compare them against the model (Zhang & Hui, 2003). The authors concluded that the Chinese participants' evaluation of the Pentagonal Implicit Theory of giftedness considered three of the criteria, Productivity, Value and Excellence, to be attributes of giftedness (Zhang & Sternberg, 1998). This suggests that Rarity and Demonstrability were not given much recognition as giftedness characteristics. The above discussion regarding similarities and variations among Hong Kong, US and China may mean that the process used in labelling and identifying the gifted may differ across cultures. There is no mention in the literature of any comparisons made about Africans' implicit theories of giftedness. According to Sternberg (2007), whether an individual is judged as gifted should not depend only on models and definitions but also on the values of an individual's culture. Educators need to consider the cultural origins of their students. Based on Sternberg's suggestion, cultural conceptions of giftedness will be discussed in the next section.

2.4 Teachers' Beliefs and Impact on the Conceptualisation of Giftedness

Following from the examination of the relationships between beliefs and knowledge, it becomes imperative to look at teachers' beliefs about giftedness.

An investigation was carried out to examine five science teachers' beliefs about giftedness and classroom practices in Korea using a qualitative case study (Kim, Kwon, Kim, & Choe, 2005). Findings revealed that teachers' beliefs about education

for the gifted are linked with belief networks. For example, STEM teachers may consider that gifted students excel in STEM subjects. This suggests that the beliefs teachers hold about giftedness can be related to knowledge of the subject matter. Thus, if teachers have naïve beliefs about giftedness, it may affect their classroom instruction. Practices such as acceleration and differentiation will be overlooked.

As part of the initial phase of a Giftedness and Talent project (NRC/GT), conducted by the US National Research Centre, a national disproportionate, stratified random sample of 434 primary grade teachers was used to probe their beliefs and practices regarding giftedness in young children (Moon & Brighton, 2008). The survey revealed that teachers agree with the idea that the potential of talent (otherwise known as giftedness according to Gagné (2009)), is present in all cultural, racial and ethnic groups, and that giftedness may be manifested in multiple ways across varying groups. This finding is consistent with the study of Sternberg (2007), which stated that giftedness exists in all cultures. Moon and Brighton's (2008) results also indicated that primary grade teachers hold traditional beliefs about giftedness (gifted students can learn on their own; they do not need extra support) which shape how they regard students from cultural minorities, non-native English speakers and students who possess other exceptionalities. The authors explained that these teachers' beliefs about giftedness had an impact on the kind of social, academic and program interventions they recommended for gifted students.

Extending these previous studies, the researcher will find out whether teachers in Ghana have similar or dissimilar beliefs on conceptions of giftedness. Research on teachers' beliefs about giftedness in Ghana is limited and this study will serve as a preparatory ground for future inquiry into practices that support gifted students.

Drawing on a theoretical framework of stereotyping, which involves a person's knowledge and judgment about a group, Carman (2011) asked pre-service and in-service teachers to imagine a gifted person and to write a paragraph describing that person. Analysis involving both qualitative and quantitative methods revealed a range of personality characteristics such as: eccentricity, difference, diligence, shyness, seriousness, and sense of humour. Eighty-five percent of the pre-service teachers had imagined their gifted person as Caucasian. The researcher posited that teachers with more experience hold less stereotypical views than those with less experience. However, this study indicates that both experienced and inexperienced teachers may not be well informed about the conceptions of giftedness. Carman (2011) proposed that educators with less background knowledge about giftedness hold more stereotypical opinions about the gifted than those with greater experiences. The researcher of the current project suggests that this argument is not different in Ghana.

Teachers' views are often diverse. For example, a study was used to interview ten teachers about their conceptions of giftedness in the US (Kaya, 2015). Kaya's (2015) analysis showed that teachers' conceptions about giftedness differ and this is consistent with findings by Speirs Neumeister, Adams, Pierce, Cassady and Dixon (2007), that teachers in general have diverse conceptions of giftedness. Further, Kaya (2015) found that teachers' conceptions of giftedness relied greatly on their professional preparation and previous experience. Teachers' beliefs and views about the diverse nature of students and how they execute instructional practices are determined by their conceptualisations of giftedness. This indicates that teacher professional preparation with exposure to giftedness is essential as it enables teachers to recognise the features of gifted students by developing a good conception of giftedness. The study found that teachers' beliefs and their understanding of giftedness

impact on their identification decisions and practices. Although teachers are aware that gifted students are diverse (ethnic, gender, socio-economic backgrounds), they lack adequate knowledge of giftedness. Kaya (2015) concluded that teacher education and teachers' prior experiences are vital for conceptions of giftedness. The study suggested that teachers rely on their own beliefs to understand the idea of giftedness. Consequently, it is important to investigate teachers' beliefs if effective change is to be implemented. Teachers having a limited knowledge about giftedness and how to support gifted students appear to be common themes in the literature.

2.5 Malleability of Giftedness

Malleability of giftedness refers to the flexible, dynamic nature of giftedness, which often contributes to the view that giftedness is developmental. Of concern are beliefs that giftedness is a fixed entity, a position challenged by Dweck's (2006) "mastery model" (growth mindset). An individual's mindset, according to Dweck, reflects the beliefs regarding their competencies and qualities, such as intelligence (manifestation of giftedness). Individuals vary in their mindset, with some having a fixed mindset and others with a flexible mindset that accepts growth or change. This includes the impact of environmental factors, beliefs about intelligence, motivation and mindset. Dweck's (2006) explanation on growth mindset was geared towards mastering a certain area to achieve extraordinary results. However, it is important to have a change of mindset to achieve fulfilment and success within developmental stages of an individual's life. Whereas some teachers believe that IQ can be developed, which is consistent with a growth mindset; an individual with a growth mindset attempts to achieve mastery. Like giftedness, some teachers believe that personal qualities can be developed, learnt or nurtured. In this regard, failure is viewed as just feedback about performance but not a judgement of a person's personality, value or potential. With a fixed mindset, a

person's ability will be doubted, which in turn undermines resilience in learning. However, with a growth mindset, competencies can be developed and a person can demonstrate perseverance and willingness to work.

According to Yeager and Dweck (2012), a growth mindset improves individuals' attitude towards task commitment. Nevertheless, when a person accepts intelligence to be fixed and unalterable, that individual begins to view such challenges as intellectual deficits. The paradigm shift from the traditional "mystery model" (fixed mindset) of giftedness in support of the "mastery model" (growth mindset) is regarded as developmentally progressive as it is more open and consistent with the changing nature of an individual's development. A fixed mindset would imply that giftedness (or intelligence) is a fixed attribute that is endowed on a person at birth. Rejecting this perspective would mean accepting Gagné's (2004, 2005, 2010) perspective that whatever a person is born with is malleable and will change depending on the environmental and social circumstances. Dweck's (2006) mindset model seems consistent with those discussed earlier in this chapter. Many researchers have formulated models of giftedness, such as Gagné's Differentiated Model of Giftedness and Talent (DMGT), Renzulli's Three-Ring Conception of Giftedness, Dweck's Mindset Model, the Pentagonal Implicit theory of Giftedness and Ziegler's Actiotope Model of Giftedness. These models come from varying perspectives on giftedness; yet, they share one common concept: the importance of considering individual beliefs about giftedness. Though their terminologies differ (e.g., mindsets, conceptions, implicit theories, reasoning theories, constructs, perceptions) they all converge at a confluence of a single characteristic of human attributes known as 'beliefs' (Fang, 1996; Pajares, 1992; Zheng, 2009).

The complex nature of beliefs about giftedness makes it difficult to quantify unless through high quality research (Sternberg & Zhang, 1995). Rather than using the expressions such as ‘conceptions of giftedness’, this current study has chosen to refer to it as beliefs or theory based-reasoning of giftedness (Miller, 2009). The premises adopted by Miller (2009) in his investigations into teachers’ cognitive opinion of giftedness in gifted education are that the concept of giftedness (beliefs about) and what giftedness means is constructed through “theory-based reasoning” (p. 65). It seems to mean that individuals’ beliefs are strongly associated with a certain premise. That is, they hold certain major ideas about the concept of giftedness and that information is linked to other personal attributes of the phenomenon. Individuals then build up a complex picture with respect to that phenomenon (Miller, 2009). Miller’s study applies some complex tools to identify teachers’ beliefs which include a ‘theory-Drawing Task’ or cognitive map. A cognitive map/ mental map/ concept map is a kind of mental illustration that assists a person in acquiring, coding, storing, recalling and decoding ideas about the positions and characteristics of a phenomenon (Miller, 2009). In his investigation, Miller indicated that the participants are building some construct of a gifted person through an illustrative image of a gifted person. In his inquiry, Miller found that characteristics of giftedness are not defined in the same way by all classroom teachers and that many teachers hold traditional views regarding the attributes of giftedness, such as reliance on IQ. Miller found no significant relationship between the number of years of teacher training and beliefs about giftedness.

2.6 Cultural Conceptions of Giftedness

Formal definitions of giftedness predominantly stem from western literature with few formal attempts to define the phenomenon from in particular African perspectives. This section highlights the multiple conceptions of giftedness from a

western perspective which may influence how teachers respond to individuals considered in their culture as exceptional.

According to Renzulli (2002) the definition of giftedness is typically based on valued abilities; however, western cultures typically conceive giftedness based on tests of intelligence (Renzulli, 2002). Intelligence is a complex and multifaceted concept, and it cannot be truly measured by taking a test. Both intelligence and giftedness are two unique concepts, but most cultures use them interchangeably (Cocodia, 2014; Sternberg, 2007). Examining conceptions that relate to only intelligence may mean that certain cultures' interpretations of what it means to be gifted may be overlooked. Therefore, it is necessary to discuss both intelligence and giftedness in this section.

It is important to note that conceptions of giftedness are not necessarily aligned with geographical boundaries. Sternberg (2007) examined the dimensions of giftedness and talent across the globe based on a theoretical framework of "successful intelligence" (p. 161). He argued from his theoretical concept of "successful intelligence" that "individuals are gifted if they have the abilities needed to reach their own goals within their sociocultural context" (p. 161).

The effect of culture on classroom instruction must not be overlooked. It denotes an important area to consider in educating students. A study by Holloway (1988) analysed the conceptions of ability and effort between Japan and the United States. Holloway (1988) found that in Japan, effort was recognised as a basis for achievement, whereas in the United States there is little focus on effort. In Japan, competition among students is not encouraged but those who are conscientious are encouraged to excel to the best of their ability. Other findings were that the two nations' views on how motivation affects effort and achievement vary. Japanese home culture accepted task engagement thereby promoting interpersonal relations. This implies an emphasis being

placed on group work among gifted students, and thus as they interact and share ideas by working together as a team, they learn to tolerate others' views, leading to social relationships. However, according to Holloway (1988), avoidance of significant assessment of performance is endorsed to restrict authoritarian forms of controlling in Japanese home culture. The above review indicates that a nation's culture plays a unique role in the development of a person's ability.

Following from the above study, Hess and Azuma (1991) reviewed the cultural variations between teachers' instructional support for students' dispositions in Japan and the United States. Findings indicated that enhancing equal formal education between the school and the home cultures dispositions are necessary. Placing students in relatively different cultural classroom practices poses challenges. Hess and Azuma (1991) explained that after a few years of Japanese students' education in the U.S., they encountered problems with school curriculum and teacher-peer relations. The study also found that the U.S. culture valued individuals' autonomy and initiative, which contributed to group learning. They concluded that some schools in the United States had established micro-cultures beyond the school and community in which educational provisions are highly valued by building on effective educational cultures. However, such extraordinary cultures cannot be achieved by only the effort from government reforms or curriculum modifications, but rather, extreme determination by all stakeholders in education.

As an example of the role of culture in conception of giftedness, Bevan-Brown (2011) investigated the concept of giftedness from Maori, Navajo and Australian Indigenous cultural perspectives, and discussed the similarities and differences between Indigenous and Western concepts of giftedness. The researcher found that the concept of giftedness is shaped by specific cultures and these would vary from group

to group. This finding is important in the proposed study as it will focus on teachers' beliefs about giftedness in the Ghanaian cultural context. It is posited that while Western ideas of giftedness may be applied in the Ghanaian context, these ideas may not necessarily fit the Ghanaian cultural understanding of giftedness. Within Accra, there are different ethnic groups which share a common set of cultural beliefs, but there is also diversity in terms of implicit beliefs about ability or giftedness. Accra is developing with "Western" society values and thus, some of these beliefs will be different to cultural groups and their beliefs associated with agriculture, fishing, dancing, drumming, language and respect for elders and educational authorities. Attention now turns to examining literature that explores giftedness conceptions in the diverse cultural contexts across the globe.

Today's era of globalisation is promoting the pathway for cultural integration rather than separation. For example, a study by Nguyen assessed the variation between Western and Eastern beliefs about giftedness. It found that in Western countries giftedness was initially considered to be denoted by innate ability, while Eastern conceptions promoted effort and hard work (Nguyen, 2011). Upon discussion, Nguyen (2011) came to the conclusion that a combination of "both hereditary and environmental factors" (p. 51) are contributors to giftedness. The study noted that, to ensure effective gifted education strategies, several factors need to be considered to enable students to realise their gifts and talents and become committed. For Nguyen (2011), today's society is full of inter-cultural exchanges of knowledge. Therefore, it might be essential to acknowledge and adapt both Western and Eastern ideas to enhance gifted education practices that will benefit society.

There are many ways in which giftedness is conceptualised and possibly understood within various cultures. Sternberg (2007) proposed that individuals often

use their own conceptions when attempting to identify gifted individuals. In doing so, they overlook the richness of diverse cultures and may miss students who are actually gifted.

2.6.1 Western Conceptions

Western cultures are those found in the United States, Europe, Australia and New Zealand. This section will synthesise literature about the concepts of giftedness from Western countries.

A study of Finnish teachers' conceptions about giftedness was undertaken using both qualitative and quantitative methodologies (Laine, Kuusisto, & Tirri, 2016). The views of 212 elementary school teachers were explored through a questionnaire such as an invitation to write definitions of giftedness based on the teachers' beliefs. Laine et al. (2016) identified four main conceptions of giftedness, namely, giftedness was multidimensional, giftedness was observed as difference from others, giftedness was identified as being fixed, and finally, the individual characteristics of gifted students were described in terms of personal strengths and personality attributes, such as open mindedness and independence. The researchers indicated that although the quantitative aspect was used to measure teachers' attitudes toward gifted education, items provided were not sufficient to enable teachers to offer adequate information on the topic. The qualitative aspect of Laine et al.'s (2016) research was also used to explore teachers' views on mindset, that is, whether teachers believed giftedness could be developed or was fixed. The findings revealed some inconsistencies in teachers' beliefs about conceptions of giftedness indicating that 54% of the teachers had a growth mindset about giftedness, 30% had a fixed mindset and 16% had a mixed mindset. According to Laine and associates, teachers' responsibilities in identification of gifted students have been intensely questioned. In practice, it appears teachers have

difficulty recognising the characteristics and talents of students from cultural, linguistic and ethnic minority groups (Laine et al., 2016).

Aspects of cultural intelligence held by different cultures in society are the contributing factors to giftedness. A review of literature by Cocodia (2014) analysed the notion of culture and intelligence by drawing on implicit and explicit theoretical frameworks. He explored perceptions of intelligence and culture, and identified that within Western society, a substantial number of subcultures exist, reflecting different languages with their associated diverse cultural values. A study in Southern California (Clayton & Birren, 1980) investigated the construct of wisdom using multidimensional scaling. The authors found that the demonstrable traits of wisdom include practical skills, affective perceptions, experience and cognitive abilities and these have evolved into the modern-day conception of giftedness. These cultural conceptions are critical to consider when determining how gifted students are identified. Giftedness is viewed as integrating separate systems of intelligence in Western cultures. This includes intrapersonal, interpersonal and characteristics of behaviours which are attributes of giftedness (Clayton & Birren, 1980).

Lee's (1999) study showed that gender has an impact on teacher nomination of gifted students, and that teachers can more easily imagine a gifted student being a boy than a girl. In a phenomenographic study of 16 Australian primary school teachers who had nominated children for a gifted program, Lee (1999) concluded that gendered conceptions of giftedness were a reality and that girls were directly disadvantaged due to the seven conceptions of giftedness guiding teachers' attitudes.

In another dimension of gender variation, Hyde and Mertz (2009), in their review of data in the United States and other nations, discussed the gender variations in mathematics. Their analysis showed the correlation between boys' and girls'

achievements in the United States. That is, many males compared to females were scoring above the 95th or 99th percentile range. However, they found no correlation in other nations. This and the above discussions showed that gender differences exist in schools.

In general, Western cultures have varying beliefs about giftedness. For example, giftedness is viewed as a multidimensional phenomenon where gifted individuals have high levels of intellectual, social and interpersonal ability. The Western society also considers giftedness as both fixed and developmental. Gendered giftedness also exists and girls are directly disadvantaged when taking into consideration the typical conceptions of giftedness. Within the Western society, both pre-service and in-service teachers may not be well informed about the concepts of giftedness. It could be inferred from the above discussion that with regard to conceptions of giftedness, the Western society is likely to make a broader historic conceptualisation in literature because their beliefs of the concept of giftedness seem comprehensive. Following from this section is the discussion of Australian Indigenous conceptions which may be of benefit to this study should there be some similarities or variations regarding educational implications in other cultures.

2.6.2 Australian Indigenous Conceptions of Giftedness

Studies about Australian Indigenous views on giftedness have been conducted by several researchers including Gibson and Vialle (2007) and Chaffey, Bailey and Vine (2003). Their research was conducted in direct collaboration and consultation with key Indigenous communities. The findings of their research suggested that any conceptualisation of giftedness from an Australian Indigenous viewpoint must integrate intellectual gifts that are inherent in their cultural world views. Their findings

also revealed that the Indigenous conceptions of giftedness include high performance in linguistic intelligence, spatial intelligence, interpersonal intelligence and naturalistic intelligence. According to Gibson and Vialle (2007), knowledge for Indigenous Australians is a privileged phenomenon in their communities, but it is viewed as a manifestation of maturity; that is one gets wiser as one gets older. Thus, accessibility to knowledge is offered as one matures and through this an individual has control over a secret language. The researchers asserted that this conception of giftedness is not the same when compared to Australian mainstream culture where giftedness is viewed as an academic achievement. Children from minority cultures who are categorised as “gifted” may not be recognised within the mainstream academic definitions of talent and may not be acknowledged.

Chaffey et al. (2003) carried out a study to determine the effectiveness of dynamic testing as an approach for identifying giftedness in Australian Indigenous populations. This procedure was comprised of a test-intervention-retest set-up to address challenges regarding gifted students. They conducted the research using 79 Indigenous children. Chaffey and colleagues found that the technique was capable of identifying gifted students. They revealed that most of the children were underachievers but could not be seen. However, the device was able to identify the students’ gifts. Although the conceptions of giftedness are not clearly stated, it is presumed that Chaffey et al.’s (2003) investigation assumes an Australian mainstream conceptualisation of giftedness. The identification of gifted Indigenous students seems to be a major issue concerning underachievers when considering Australian Indigenous giftedness.

2.6.3 Asian Conceptions

The Asian continent has many different cultures and belief systems. According to Cocodia (2014), concepts of intelligence vary across the continent. Das (1994) reported a study of East Asian notions of intelligence and stated that in the Hindu and Buddhist beliefs, cultural conceptions play a unique role. According to Das (1994), Hindus describe intelligence as an eternal self-reflection in the body of discernment. For Das (1994) and Singh (2012), Buddhism is generally described as the highest level of perfection. Intelligence has a great significance in Hinduism and shares similar views with intelligence within the Buddhist tradition. Such tradition includes leading a good life and exhibiting behaviours such as resilience, unselfishness, honesty, cognitive effort, perseverance, comprehension, recognition, trustworthiness and decision making (Das, 1994; Singh, 2012). Das (1994) noted that the viewpoints of Buddhism describe intelligence as the process of conceptualising knowledge. Intelligence is assumed to be pure and true, and it is acquired through both individuals' organs and their senses (Das, 1994; Singh, 2012). In Buddhist beliefs, intelligence in its cleanest form is not temperamental (Das, 1994). Singh (2012) explained that intelligence can be categorised into three different levels: good intelligence; low intelligence and bad intelligence. Whereas good intelligence is constructive and leads to excitement and prosperity, bad intelligence is unhelpful. Persons with a low level of intelligence are not able to view beyond the present while an intelligent individual moves beyond the present by distinguishing between the realisation of present and permanent. To Singh (2012), intelligent individuals are equated to adults while low intelligent people are regarded as children. Thus, all children are considered as having low intelligence, but some individuals may be intelligent and will not be an adult and not all adults are intelligent. Both Das (1994) and Singh (2012) argued that the

conceptualisation of intelligence can only occur when the individual is able to cross a desirable stage. This can cause some problems because it is difficult to measure and determine whether the individual has given up completely his/her temperamental and selfish beliefs.

Confucianism is a cultural heritage and a system of social and ethical philosophy that guides the behaviour of individuals (Yang, 2001). Confucianism mostly emphasises morality as a vital component of intelligence that contributes to personal development. In the Confucian-heritage cultures (CHC), conformity to social norms is vital. The system avoids anything that does not conform to accepted cultural norms or threatens the stability of the social structure (Phillipson & Cheung, 2007). For example, labelling students as gifted is perceived from a Confucian perspective to undermine the social structure. Confucian tradition believes that education needs to develop the individual's ability in order to reach their highest potential (Phillipson & Cheung, 2007). Thus in general, a negative concept of giftedness prevails in CHC countries such as China, Hong Kong, Taiwan, Japan and South Korea. Traditionally, most of these countries hold the belief that all children have similar potential and can achieve the same expert skills based on hard work, perseverance and diligence. As a result, some of these countries hold a strongly egalitarian view of gifted education (Phillipson & Cheung, 2007). The fundamental point is that, the strong tradition of collectivism lays emphasis on collective achievements of the group rather than the individual.

Confucian ideologies concerning the 'nature versus nurture' concept of giftedness are increasingly becoming a consideration in research. Wu (2006) reviewed the educational ideology of Confucianism relating to learning and achieving with emphasis on nurture over nature in developing individuals. Findings indicated that

both traditional and contemporary beliefs in China often ascribed relevance to nurture more than nature. According to Wu (2006), this was due to the impact on Confucian philosophies regarding the mode of learning and fulfilment models. The author concluded that the meaning of ‘gifted’ in Confucian beliefs is one who achieves at the highest level, irrespective of any innate ability or ‘gift’. Following from this, if a student is not gifted, they should at least be talented in some way. Wu (2006) analysis concerning the theoretical beliefs of Confucianism and whether a person is gifted based on nurture or nature is highly debateable. The reason is that the Confucian ideology does not only rely on wholly innate ability but demands extreme effort in learning to accomplish and equip one with a high level of confidence to lead and manage others. Therefore, it can be concluded that in the Confucian philosophy, everyone is unique and capable of possessing at least a form of talent; meaning that everyone could be considered to be gifted as realised in the CHC cultural group.

Knowledge of gifted students’ behaviour in relation to their peers is important because teachers can use the information to better provide for students’ diverse needs. A Vietnamese study looked at Confucian values such as “harmony based on ethical conduct, conservativeness, social responsibility and self-control” and associated degrees of moral reasoning (Nguyen, Jin, & Gross, 2013, p. 230). The investigation seeks to assess the similarities and variations between Vietnamese intellectually gifted adolescents (180 students) and those who were not recognised as gifted (174 students). Findings indicated that although both sides validated harmony as a conduct of ethics, the gifted students seemed more outgoing compared to their non-gifted peers (Nguyen et al., 2013). The authors also found that the gifted students demonstrated maximal degrees of shared societal duty as they were ethically behaved and contributed to society’s economic development. Nguyen and colleagues concluded that the

Vietnamese gifted students did not only exhibit extreme levels of self-discipline but also moral cognitive traits which are indications of Neo-Confucianism. These findings indicate that gifted students vary from their non-gifted counterparts in terms of intellectual capabilities and appropriate moral conduct.

Irrespective of the CHC's collectivism and egalitarian views about giftedness, gifted students and gifted education, there has been an overwhelming improvement due to globalisation and adaptation of the Western ideas of giftedness. Participating in the knowledge economy may mean that a member nation should not overlook globalisation, taking into account the continuous expansion and integration of giftedness concepts enshrined in Asian cultures. For example, a study analysed eleven notions of giftedness and effective practices of gifted education in Asia which included CHC group and India, Indonesia, Malaysia, Singapore, Philippines and Thailand). Findings revealed that Asian gifted education has been broadened during the last five decades due to the adaption of Western conceptions of giftedness strategies and gifted education, as well as cross-border cultural knowledge (Chan, 2018). For example, the diverse Asian cultures have broadened their conceptions of giftedness to incorporate effort, hard work and diligence (Chan, 2018) by employing Renzulli's (1978) three-ring conception and Gardner's (1983) Multiple Intelligence models. These efforts placed much emphasis on the provision of appropriate inclusive gifted education curricula and programs; enrichment, grade-skipping and subject acceleration based on equal education for all.

Acceleration is often applied in primary schools, junior high schools and enrichment in secondary schools with a specific consideration on the domain specific model in Science, Mathematics and Technology (STEM). This shows that the contrasting views between the Eastern and the Western concepts of giftedness cannot

be easily determined (Nguyen, 2011). Currently, the need to integrate Creative Art and neuroscience to enhance the shift from STEM to STEAM is the focus (Chan, 2018). In these cultures, giftedness encompasses eminence of performance and potential toward the development of the mind, body and soul as enshrined in Buddhist religion. The Eastern notion of giftedness is on hard work and perseverance resulting in lifelong benefits (Nguyen, 2011). Giftedness can be regarded as an enhancement of globalisation and with STEM/STEAM progressive and flexible implementation, shows an indication that domain specific knowledge is unique. If policy is consistently reviewed and teachers are provided with the requisite knowledge then this will likely promote true inclusivity. The reason is that understanding students' capabilities and providing for their relevant opportunities in a specific domain such as STEM/STEAM may offer teachers the needed self-efficacy to deal with the gifted. This may enhance the provision of suitable giftedness programs to meet the learning needs in the diverse, mixed ability or heterogeneous classrooms. Whether these ideas about Asian views on giftedness and gifted education strategies regarding domain specific knowledge in STEM/STEAM are employed in Ghana's classrooms, and whether the individuals are given the opportunity to realise their potential within the inclusive education classroom setting is unknown and this study will investigate it further.

A study was carried out to explore individuals' notions about culture and intelligence (Cocodia, 2014). The analysis revealed that history, culture and intelligence are intertwined. Cocodia detailed that certain South East and East Asian cultures share similarities due to their historic migratory patterns. In as much as these similarities exist, there is a distinctive difference among these Asian cultures. The similarities may stem from the fact that religion acknowledges perfection as an aspect of intelligence, although it is not necessarily measurable. However, culture and

religious affiliations which change over time dictate the individuals' behaviour and therefore differences emerge. Differences include language, religion, ethnicity, customs, beliefs and/or lifestyle.

Nations such as Singapore, Korea and Thailand share some cultural similarities while Vietnam and the Philippines differ considerably (Bresnan, 2018). This is because Singapore, Korea, and Thailand are all primarily non-Christian nations. The people of the Philippines are mainly Christian, while the Vietnamese are influenced by multiple Buddhist attitudes, values and beliefs about giftedness (Bresnan, 2018). As languages, religion, beliefs, cultural considerations and ways of life can differ from one Asian culture to another; conceptions about giftedness may also vary. Thus, what one group may hold as giftedness may not be valued as giftedness in another culture (Sternberg, 2007; Bevan-Brown, 2011).

It has been discussed that religion in Asia recognises perfection as a feature of intelligence but one that cannot be measured. Asian conceptions of intelligence include cognitive, social skills and knowledge, which are developmental (Cocodia, 2014). In general, conceptions of giftedness are viewed in Asia as facets of capabilities, and thus, multifaceted. Others include personal attributes such as open-mindedness. The review now considers cultural conceptions of giftedness from African perspectives, specifically with reference to Zimbabwe, South Africa, Kenya and Ghana.

2.6.4 African Conceptions

There are various views about cultural conceptions of giftedness across the globe and that of Africa is no exception. A study was conducted in Zimbabwe (South Africa) which examined the culture of Shona (an indigenous culture in Zimbabwe) and its teachers' beliefs of giftedness (Ngara & Porath, 2004). The study interviewed sixteen

teachers who are knowledgeable in the Shona culture (Ngara & Porath, 2004). Findings revealed that giftedness was viewed as a rare concept endowed to the individuals who exhibit extraordinary achievement even in difficult situations. Giftedness is also conceptualised as “ability to succeed, solve problems”, show creativity, possess interpersonal relationships and display spirituality (Ngara & Porath, 2004, p. 189); which Sternberg (2007) would identify as “successful intelligence” (p.161). When values are constantly held, conceptions of giftedness within Shona culture will not be different. Subsequent to Ngara and Porath’s (2004) research, a comparative study was carried out in Shona and Ndebele cultures about conceptions of giftedness. The study used a survey data sampled from Zimbabwe (Ngara, 2006). Ngara’s (2006) findings were that conceptions of giftedness in Shona and Ndebele cultures of Zimbabwe are similar. Both groups recognised giftedness as expertise that emerges in the context of individual participation within the community. This is similar to Ghanaian society, as expert skills are taken into account in community contexts. This is where individuals demonstrate their special abilities.

The outcome of the study showed that cultures within the same geographical location are likely to show similarities in their conceptions of giftedness. That is, the different cultures have similarities, but these similarities are seen within Zimbabwe where the study was conducted. However, according to Sternberg (2007), conceptions of giftedness vary across cultures. Ngara detailed that in assessing gifted students, it is essential to consider their cultural context because the same students who may be viewed as gifted may not be observed as such in another culture. For example, because Ngara’s (2006) study was conducted in South Africa, the results may not be generalised to other nearby countries because even within South Africa there are similarities and differences.

In the Western cultures, gender differences emerged (Section 2.6.1) in STEM areas. Similarly, Ghana and other African nations' cultural tribes exhibited corresponding gender differences in STEM areas. Kabote, Niboye and Nombo's (2014) work in Tanzania-East Africa, examined the gender disparities in mathematics and science achievements in primary schools. Analysis revealed that girls' performance in both subjects was relatively low, particularly in rural areas due to inadequate female teachers as role models.

In developed countries, nurturing individual ability is a national concern. Unlike Western and Asian nations, in Africa the needs of the gifted are often ignored (Maree, 2018; Ngara, 2017). A review of gifted education in Africa revealed that there is an inadequate set of criteria to identify the gifted and a lack of suitable national guidelines to provide for effective special gifted education practices. It is evident that in South Africa, teacher preparation institutions do not offer teachers the required training modules and programs to sufficiently deal with the gifted. Moreover, most African nations view gifted education as a Western ideology and that the focus should specifically be on education for all (Maree, 2018; Ngara & Porath, 2004). This claim, however, does not seem practical as we are in an era of globalisation. African nations need to think 'outside the box' by crossing borders in order to participate in the knowledge economy. Nguyen's (2011) study proposed that a separation of Eastern and Western ideologies of giftedness is not ideal in a globalised, contemporary society (Nguyen, 2011).

According to Maree (2018), teachers in Africa used to exploit the gifted by using them to explain and discuss tasks to struggling students (Maree, 2018). Maree also found that only a limited number of African schools accommodate the diverse needs of the gifted to a greater extent, because the gifted are generally not offered the

opportunity in special education provisions. Yet, in South Africa, at least the MoE acknowledges the application of differentiation in classroom instruction and this shows a sign of accommodating the gifted (Maree, 2018; Oswald & Villiers, 2013). Maree (2018) believed that a shift from the emphatic objective process to integrate qualitative and quantitative assessments for gifted identification procedures, especially for career counsellors, is crucial. For Maree (2018), this process will provide relevant opportunities for the gifted. Failure to provide for these students' diverse needs may contribute to massive unemployment issues (Maree, 2018), as gifted individuals can be job creators or innovators.

A study conducted in Kenya by Munro (2011) on the successful identification process for giftedness used in relation to Kenyan adolescents showed that the aptitudes and characteristics related to gifted knowledge are believed to be culturally inherent. Kenyan cultures embrace practical intelligence as a form of giftedness. Munro (2011) found that cultures vary in the processes of knowing, thinking and valuing. He added that to identify gifted potential, the sociocultural context of the students' necessities need to be considered to understand the most significant interactions that surround cultural life in a specific environment. The culture in Kenya has similarities to that of Ghana; however, there is no research relating to these findings in Ghana. The proposed study will fill this gap.

2.6.5 Summary

This section suggested that there are similarities among cultural groups' conceptions of giftedness. Cognitive skills, exceptional competencies, talents, and affective skills are viewed as relevant descriptors of giftedness. Other indicators include verbal accuracy, decision-making, perceptual skills, problem solving skills and making

inferences as significant characteristics of giftedness. Nevertheless, there are differences in cultural conceptions. Confucian tradition expects the individual to seek not only academic knowledge but also to cultivate oneself (Cocodia, 2014). With this assertion, Cocodia (2014) means that the individual is expected to develop other aspects of personality traits, such as physical, social, creative and emotional characteristics; seeking only intellectual knowledge is inadequate in Confucian ideologies. Research reveals that the Indigenous views of giftedness conflict with that of the Western cultural views due to the nature of categorisation of giftedness itself, and how giftedness concepts are formed and defined. Many Western cultures tend to associate a prominent level of social ability with intelligence and Asian and African cultures value social intelligence as well. Considering the above discussions, it can be suggested that there is no single conception of giftedness that works for all cultural environments. Therefore, a global discussion on the cultural conceptualisation of giftedness must be approached in a multidimensional manner to embrace all cultures. Quite apart from the discussions concerning cultural views about giftedness in society, the appropriate pedagogical approaches required to support gifted students in mathematics and science within the regular classrooms will follow.

2.7 Effective Pedagogical Approaches of Gifted Education

This section discusses effective pedagogical approaches that are advocated for teachers in supporting gifted students' learning. The discussion will consider topics including, curriculum approaches integrated into the general curriculum (Section 2.7.1); pedagogical approaches to curriculum differentiation (Section 2.7.2); acceleration/grade skipping (Section 2.6.3); streaming (Section 2.7.4); and finally, forms of grouping (Section 2.7.5). The section concludes with a summary (Section 2.7.6).

2.7.1 Curriculum Approaches and General Curriculum

First, a quality curriculum model is important in promoting effective pedagogical practices concerning giftedness and gifted education (VanTassel-Baska, 2013). Brighton and Wiley (2013), in their work that examined ‘Pull-out Programs’ in gifted education, detailed that good education is defined by appropriate curriculum.

Considering curriculum approaches warranted for the gifted, Robinson, Pope, Beal, Fusarelli and Manfra’s (2013) work on curriculum analysis was based on a series of data drawn from interviews of fourteen teachers, ten students, eight administrators and leaders of the curriculum, as well as six observations of classroom practices. Data was organised around mathematics, science, English, social and natural science and two interdisciplinary programs in North Carolina’s public schools. The study sought to assess the appropriateness of curriculum benefits for gifted students using comparative analysis as a framework. Their analysis revealed that pedagogical approaches could help in addressing gifted students’ special needs. Other findings, including advanced content knowledge, higher order thinking and processing, and a combination of disciplines, were critical pedagogical approaches and effective curriculum for developing the gifted. Robinson et al. (2013) concluded that by applying modern theory and linking the curriculum with the subject matter could assist in addressing challenges confronting gifted students.

Additionally, critical thinking approaches and Socratic discussions are useful in gifted education. Alexander (2008) defined ‘Socratic discussion’ as “a pedagogy which exploits the power of talk to shape students’ thinking and to secure their engagement, learning and understanding” (p. 92). For example, open-ended questions and varied hands-on activities can motivate children’s involvement. With VanTassel-Baska (2013), when students are deeply engaged in classroom pedagogy, it sparks the

power of student-teacher interactions, critical thinking and building insights of higher-order content knowledge for effective transfer of learning.

Brighton and Wiley (2013) strongly recommended the integration of advanced-level curriculum for the gifted. This strategy is an accelerative approach needed to supplement students' learning with more complex activities. However, teachers with advanced content knowledge in their subject areas are crucial. In addition to the above discussion, Callahan, Moon, Azano, and Hailey (2015) drew on data using over 200 curriculum documents. Callahan et al. (2015) suggested that integrating advanced level curricula with effective pedagogical approaches will ensure efficient learning outcomes, and forms "the heart" of appropriate gifted education programs (p. 137). These authors were concerned about the limited studies associated with appropriate learning units for pedagogical curricula interventions. The discussion implied that to ensure improvement of gifted students' learning experiences, the integration of higher-level content knowledge with the regular instructional curriculum is vital.

Despite these recommendations, researchers of gifted education in the US concluded that teachers frequently ignore advanced content knowledge and application approaches in STEM areas (Hyde & Mertz, 2009). Teachers focused on minor level skills to enable all students to pass tests and this is necessary to address such concern.

2.7.2 Pedagogical Approaches for a Differentiated Curriculum

Among researchers and theorists in gifted education, there exists a general opinion that in the instructional classrooms, teachers are expected to differentiate the curriculum to meet all students' varied needs (Brighton & Wiley, 2013; Gagné, 2005, 2010; Tomlinson, 2013). Differentiation in this situation denotes the approach required to offer adequate learning experiences, which are capable of challenging appropriate

students' diverse ability needs in pedagogical classrooms. That is, moving gifted students above grade levels and linking instruction to match individual students' capability levels (Brighton & Wiley, 2013). The most widely cited approach to differentiation draws on the work of Maker (1982). In this model, she advocates adjustments for the regular curriculum to include a focus on process, content knowledge, product and the individuals' environment to meet the gifted individual's varied needs. For example, processes that incorporate higher order thinking skills and content that is integrated and abstract. That is, extension of the regular curriculum is key to challenge students with enriched programs (Maker, 1982).

The aim of differentiating the curriculum, according to Tomlinson (2013), is to help gifted students understand and apply what they have learnt across other subject areas of learning. Differentiation is also the basis that allows gifted students to accomplish tasks of challenging levels while focusing on the main ideas of the subject in question (Tomlinson, 2013). This advocate of differentiation has detailed that curriculum differentiation and pedagogy are highly recommended as approaches capable of meeting all students' learning needs, "strengths and preferences" (p. 191).

Brighton and Wiley (2013) and Tomlinson (2013) are of the view that it is important to integrate content knowledge through differentiated learning experiences. Additionally, program pacing within the mainstream classroom to match students' diversity is fundamental (Brighton & Wiley, 2013; Robinson et al., 2013). Special programs defined for gifted students are also appropriate pedagogical approaches to challenge and develop students' differing abilities (Robinson et al., 2013). The curriculum differentiated model benefits the gifted, as it offers meaningful learning experiences (Robinson et al., 2013; Tomlinson, 2013). Differentiation also supports the use of multiple pedagogical approaches in addressing differences and motivating

enthusiasm in students of differing abilities. The pedagogical model also assists in providing “curriculum compacting, interest centres, learning contracts, and independent study” (Tomlinson, 2013, p. 296). This argument showed that gifted students’ levels of abilities, strengths and interest are incongruent, and potential development should correspond with individuals’ capabilities, rigor and eagerness.

In spite of the benefits recommended by proponents of curriculum differentiation, some teachers are not in favour of its application in regular instructional classrooms. Archambault, Westberg, Brown, Hallmark, Emmons, and Zhang’s (1993) research examined 7,300 third and fourth grade teachers in both public and private schools in the US. The study reported that sixty-one percent of the respondents have never had any training toward the development of gifted students. Additionally, attempting to meet all students’ diverse needs in the instructional classroom, the researchers noted that only a small number of teachers applied slight differentiation approaches with the general curriculum based on irregular periods. In this context, this study will investigate if Ghanaian teachers differentiate the curriculum to meet all students’ special needs or whether there are other approaches that they use.

2.7.3 Acceleration/Grade Skipping

This section discusses acceleration, including grade skipping and subject acceleration. According to Davis and Rimm (2004), gifted students’ special needs vary and can be met using a range of programs, such as advanced content knowledge and integration of the general curriculum in mainstream classrooms (Brighton & Wiley, 2013). Acceleration is a program that refers to the structural approach that allows a student to skip one or more grades (Davis & Rimm, 2004). The authors believed that this

structure could quicken the accelerant's content knowledge with the integration of established curriculum provisions at a younger age compared to the normal. According to Colangelo and Davis (2003), this structure aims to accommodate gifted students' abilities and learning prerequisites. Davis and Rimm (2004) categorised two types of acceleration. First, a 'delivery service structure' that permits early entry to kindergarten through to university. Second is the subject based acceleration or grade skipping. With the second structure, students learn the content knowledge faster and in a minimal period. Students move to higher grades for one or more subjects where they have demonstrated exceptional performances. The subject-based acceleration can occur in 'pull out programs'/part time classes (Brighton & Wiley, 2013). Gifted students require expert teachers with advanced content knowledge, and a gifted coordinator who directs and supports both the accelerant and the teacher (Brighton & Wiley, 2013). This will enable a positive outcome for students who skip one or more grades (Davis & Rimm, 2004).

A study reviewed the effects of acceleration on gifted students' academic, emotional and social well-being (Neihart, 2007). The analysis revealed that acceleration could benefit the gifted in their academic experiences. Being moved to a grade commensurate with a student's ability helps to improve students' self-esteem, and eradicates boredom as it prevents repetition of material (Davis, Rimm & Siegle, 2014). Nonetheless, the model may have negative impacts on accelerants who skipped grades indiscriminately based only on high IQ performance (Davis et al., 2014; Neihart, 2007).

Despite the benefits, some educators hold negative beliefs about acceleration. A study conducted in the Netherlands, sought 334 teachers' opinions from 31 secondary schools, about acceleration in gifted education (Hoogeveen, Hell, & Verhoeven,

2005). They found that teachers identified a range of challenges associated with the maturity of the gifted. That is, grade skipping may spark social problems among the gifted, especially if they are not sufficiently mature to cope with difficulties relating to association with older peers. The study concluded that teachers are concerned about the social and emotional effects of acceleration. The process does not negatively affect gifted students even when accelerated multiple times (Hoogeveen, Hell, & Verhoeven, 2012). The non-accelerant rather faces several challenges (Hoogeveen et al., 2012). The challenge is whether the Ghanaian school system allows students to skip grades, as teachers may have negative beliefs towards acceleration.

2.7.4 Streaming

Streaming is the process of grouping able students according to their ability, helping to improve the academic skills of highly able students in separate classes, and stimulating struggling students to improve their academic capabilities (Pattinson, 1963). The work of Johnston and Wildy (2016) and Pattinson (1963) found that streaming is appropriate for accommodating individual differences in pedagogical classrooms. Studies have shown that streaming is widely practised in Australia (Johnston & Wildy, 2016; Pattinson, 1963).

Although widely practised, streaming is controversial. A study examined the impacts of streaming in Australian secondary schools, arguing that streaming is an “academic disadvantage” to students in the lower streams (Johnston & Wildy, 2016, p. 53). The study also found that streaming compromises students’ discrimination and minimises classroom cross-cultural communications (Johnston & Wildy, 2016). Further, Johnston and Wildy (2016) noted that the effects of streaming on individual development differs, and is relative to the context of implementation. An alternative Australian study focused on streaming application in mathematics with high school

teachers at years 7-10 in the Victoria region (Forgasz, 2010). The study examined the criteria for selecting separate classes for streaming purposes, teachers' beliefs about equity issues, modification of the curriculum and instructional approaches. Results revealed that teachers' views about streaming were fair and consistent. Curriculum differentiation and instruction for gifted students were highly endorsed. However, findings revealed that such instructional approaches may reduce or weaken the low ability students for future possibilities in mathematics. This signifies a limitation in streaming for such students to engage in the subject. Unlike Johnston and Wildy's (2016) study, Forgasz (2010) did not recognise parallel factors related to equity in gender, socio-cultural and ethnicity or indigenous effects on streaming. This finding shows that the impact on streaming relies on the subject matter content and mode of application.

A review by another Australian researcher about the influence of grouping students by performance, disclosed that grouping of all kinds, whether streamed classes or groups, is underpinned by the "self-fulfilling prophecy effect" (Sullivan, 2011, p. 41). That is, teachers' beliefs and expectations of students' achievements are prime. Sullivan (2011) argued that if a teacher believes that a gifted student can achieve highly and provides the required instruction, the individual can learn. Nonetheless, if the teacher believes the student is a low achiever, the needed instruction would not be offered and the student in question would not learn to progress academically (Sullivan, 2011). This argument indicated that teachers' beliefs and expectations about students in streaming and other groupings can impact on gifted students' achievement. This is relative depending on the teacher's advanced subject matter knowledge to boost their own self-efficacy for teaching advanced content in instructional classroom approaches. It is uncertain whether Ghanaian schools practise streaming or any other

grouping strategy and whether equity issues are prevailing in classroom instruction, and therefore, will be explored further in this study.

2.7.5 Structural Forms of Groupings

This section discusses the varied forms of groupings in the regular classroom. Brighton and Wiley (2013) described the need to incorporate general curriculum programs with cluster groupings, such as heterogeneous/mixed ability and or homogeneous groupings, to meet all students' needs. A previous study about differences in mixed ability and homogeneous ability groupings drew on data regarding proficiency in readers (Poole, 2008). The study found that struggling students encountered the same problems in both mixed ability and homogeneous groupings (Poole, 2008). The struggling students were stigmatised and frequently interrupted, which resulted in low participation. Poole's (2008) findings conflicted with those of Saleh, Lazonder and Jong (2005). These authors focused on how ability grouping affects students in the mainstream classroom, drawing data from students who participated in an instructional science programme. The study suggested that in mixed ability classes, low ability students perform better and are inspired to learn. The average ability students achieved better in homogeneous groupings, while students with higher abilities demonstrated simultaneously robust learning outcomes in both groups (Saleh et al., 2005).

Matthews (1992), in a study of 15 gifted sixth and eighth graders, found that cooperative learning in mixed ability groups tended to frustrate peers in the group. Some gifted students found it challenging to explain and discuss concepts with their peers who were not ready to listen. Moreover, some gifted students would consider

taking on the whole responsibility of the task to ensure quality outcomes in the group's work (Matthews, 1992).

Peer tutoring refers to the process where gifted individuals are employed as academic coaches or trainers in a one-on-one context. Both the tutor and the tutee benefit from this experience, by developing their self-confidence (Matthew, 2002). A study analysed the gifted and the non-gifted achievements on two pedagogical approaches including comprehension and analogy. It combined qualitative data on peer tutoring using 24 peer tutors and 24 control students with corresponding ability (Judy, Alexander, Kulikowich, & Wilson, 1988). Analysis indicated that students who received direct instruction achieved more highly than those who were in the control group based on the comprehension task. Gifted students achieved well in all measures compared to the non-gifted while the tutored students also performed correspondingly well compared to those trained by teachers. Further, error analysis occurred concerning the multiple choice on the comprehension task showing diverse response pattern for the gifted with direct instruction. Findings of the qualitative analysis on peer tutoring disclosed that tutors used congruent pedagogical approaches that they learnt, which were highly efficient rather than the inquiry teaching (Judy et al., 1988). This suggestion entails that peer tutors believed in the application of pedagogical approaches that they are familiar with, and they rate these strategies as more resourceful compared to analytical/investigative processes due to their inadequate knowledge and skill to implement and share with non-gifted peers. This suggests that in the pedagogical classrooms teachers rarely employ inquiry approach in teaching the gifted. The findings showed the significance of peer tutoring when well managed in the instructional classrooms.

Matthew (2002) detailed that it is important to ensure that acquisition of new materials in subject areas for the gifted are balanced, in particular, when transitioning to a higher-grade level. Matthew (2002) found robust evidence that instruction using the peer tutoring approach with the gifted, benefited gifted students as well as developing their self-efficacy. He found that the approach eliminated boredom and improved academic, social and leadership skills for gifted students. Also, it develops positive learning habits and is an efficient approach for meeting all students' multiple learning needs. Whether Ghanaian teachers adopt this approach in attempting to develop the gifted is uncertain and will be examined in this study.

2.7.6 Summary

Teachers in general often face challenges concerning how to provide for, and meet all students' ability levels in the instructional classrooms. Teachers can be confused by the variety of effective pedagogical approaches recommended by advocates in support of gifted students' development in society. It is necessary to find out what teachers believe about gifted students to identify relevant classroom practices. This current study has explored teachers' beliefs toward curriculum approaches to general curriculum, pedagogical approaches to curriculum differentiation, acceleration/grade skipping, streaming and forms of grouping. Due to limited research in the area as discussed in the literature review, effects of teachers' beliefs on giftedness towards classroom mathematics and science practices will be discussed in Section 2.8. Finally, the chapter will conclude with a summary in Section 2.9 and a discussion of the two research questions in Section 2.10.

2.8 Effects of Teachers' Beliefs on Giftedness towards Classroom Practices

Teachers' beliefs are shown to be consistent and powerful constructs that influence instructional practices (Brighton, 2003). Classrooms are becoming more diverse in terms of background culture, language proficiency, ethnicity, and with varying levels of competencies (Brighton, 2003; Sternberg, 2007). Teachers are expected to address the learning needs of all students in their classrooms, including the gifted, but this poses some challenges to teachers regarding the provision for gifted students' diverse needs. Instructional practices must be more aligned to address students' diversity to enhance the provision of adequate challenges for all students.

Brighton (2003) conducted qualitative research that explored 48 middle school teachers' beliefs to address academic diversity. Teachers, administrators and students were interviewed about their beliefs of giftedness concerning the school context (Brighton, 2003). Brighton's (2003) work revealed that teachers' beliefs conflicted with the philosophy of differentiation which is a problem because such views are not helpful in promoting giftedness.

The following are some of the explanations of her findings. Teachers held beliefs about grading and assessment which were difficult to change. Brighton's (2003) research indicated that teachers' beliefs and the effects of these beliefs in relation to teachers' classroom practices are a complex issue. Other findings highlighted how difficult it is to change preconceived understandings and pre-existing beliefs of teachers. These findings support the assertions of Ajzen (2012), Fang (1996), Kagan (1992) and Zheng (2009, 2015), that teachers hold predetermined beliefs which accounted for their inconsistencies in belief systems. According to Brighton (2003), teachers who were identified to possess positive beliefs were more open to new processes than their colleagues with negative beliefs. Hence, the internal factors of

teachers' beliefs, self-efficacy towards innovation were influential factors in their willingness to change their instructional practices. Teachers can address a diverse classroom of multiple academic needs when appropriately trained.

An investigation was carried out in the US using twenty-seven experienced teachers which explored their beliefs about giftedness and identification of gifted students (Speirs Neumeister, Adams, Pierce, Cassady, & Dixon, 2007). Speirs Neumeister et al.'s (2007) analysis discovered that experienced teachers persist with a narrow view about giftedness and gifted students' diverse needs. The authors concluded that inadequate or naïve conceptions of giftedness can produce deficiencies in educating the gifted, as students who may require enriched educational prospects or differentiated programs may be deprived of appropriate educational avenues necessary for their diverse needs. A further study examined teachers' views concerning gifted students in Indiana (Szymanski & Shaff, 2013). The findings suggested that teachers held inadequate beliefs about giftedness. Both in-service and pre-service teachers are not sufficiently trained toward the provision of gifted students' learning needs. Teachers apply their personal beliefs to replace their inadequate knowledge about giftedness. Szymanski and Shaff's (2013) findings showed that teachers reported similar experiences to those found in Speirs Neumeister et al.'s (2007) study. However, Brown, Renzulli, Gubbins, Siegle, Zhang, and Chen (2005), suggest that most teachers believe in multiple procedures to determine giftedness in students. Researchers in gifted education argued that teachers of gifted students need adequate time to be committed, resilient and perseverant in developing students' talents (Subotnik & Jarvin, 2005).

Kagan's (1992) work reviewed research about teachers' beliefs and implications to pedagogical practices, and cited correlations between mixed ability grouping and

peer support. This impacts positively on ethnic and gender relations with non-gifted peers on school tasks. Poole's (2008) analysis of two mixed ability grouping practices focused on proficient readers citing a contrasting view. The analysis suggested that struggling students were quiet and disruptive, and exhibited the same characteristics in homogeneous classrooms. Although educators expressed a diversity of beliefs about giftedness, teachers may not be sure about how these beliefs can be put into practice, or how to use them as required (Subotnik & Jarvin, 2005). Indeed, just discussing the issue does not necessarily mean that educators will change their models and put new techniques into practice. It has been suggested in this review that teachers' conscious or unconscious assumptions and biases can greatly impact their beliefs and practices with respect to identifying and developing giftedness.

2.9 Chapter Summary

In this chapter, the literature review explored the following issues: beliefs and the beliefs construct and how beliefs are developed. Other considerations include the discourse regarding the nature of giftedness such as definitions, models and theories of giftedness; cultural conceptions of giftedness; beliefs and attitudes of teachers towards the gifted, and effects on classroom instructional practices. The findings from the review suggested that there are many definitions and models of giftedness. Some theorists see giftedness as fixed while others view it as malleable and therefore developmental. These developmental models emphasise the changing nature of giftedness. In this proposed research, teachers' beliefs and how they influence pedagogy are critical for the investigation because it will help to understand how teachers in Ghana approach giftedness. The literature has also explained that teachers showed naive beliefs toward the provision of diverse students' needs, and a lack of identification of the gifted. The proposed research will explore whether these findings

are consistent in Ghana. Although teachers' conceptions about giftedness have been researched in many parts of the world, there is little research conducted on conception of giftedness in Ghana, particularly, how beliefs help to shape instructional classroom practices.

In the West African sub-region, research into gifted education has been overlooked. Consequently, limited information exists on how teachers understand giftedness or what conceptions or beliefs they hold about gifted students. Moreover, whether teachers in Ghana have a fixed or growth mindset concerning giftedness is uncertain. The evidence cited above shows how important beliefs are in framing teachers' approaches to teaching gifted students and how their beliefs influence classroom practices. More research is needed to inform policy and practice for improved education for the gifted. Following from the above, it could be deduced that teachers' beliefs about conceptions of giftedness and their training have become one of the issues needing further research.

2.10 Research Questions

Teachers' beliefs about the characteristics of gifted students are key to exploring Research Question One. There is little or no research regarding teachers' beliefs and gifted education practices in the Ghanaian education system (Deku, 2013), where gifted education is not given adequate attention. Teachers' beliefs and practices about approaches that are generally recommended for supporting gifted students, including differentiation, inquiry learning, critical and creative thinking, accommodation for individual differences, ability grouping, acceleration and streaming (Archambault et al., 1993; Gentry et al., 2011; VanTassel-Baska & Hubbard, 2016; VanTassel-Baska, Avery, Stuck, Feng, Bracken, Drummond, & Stambaugh, 2003) were examined in teachers' lesson plans to address Research Question Two. That is, whether teachers

are well informed and employing these strategies to effectively provide for students' diversity in the Ghanaian inclusive classroom, was examined and reported accordingly. Therefore, the main purpose of this study was to investigate teachers' beliefs and how these beliefs foster their classroom instructional practices in mathematics and science. The study focus was guided by two research questions:

1. What beliefs do teachers in Ghana hold about giftedness?
2. What strategies do teachers in Ghana suggest should be put in place to further gifted education in Ghana?

Chapter 3: Research Design

3.1 Introduction

The purpose of this chapter is to explain and justify the methodology and methods used for this study. This includes details of participant selection, data sources, data collection procedures and strategies for data analysis. The procedures and methods used in this investigation have enabled the research questions of this study stated below to be addressed.

1. What beliefs do teachers in Ghana hold about giftedness?
2. What strategies do teachers in Ghana suggest should be put in place to further gifted education in Ghana?

The chapter is presented in three parts, comprising methodology (Section 3.2), methods (Section 3.3), limitations (Section 3.4) and procedures for ensuring research quality (Section 3.5). A discussion of ethical research procedures is presented in Section 3.6.

3.2 Methodology

Although both quantitative and qualitative approaches and combination of these can be used to study teachers' beliefs, this study has employed a qualitative methodology to generate rich contextualised data. Qualitative research involves an interaction with a phenomenon and making sense out of the discussions, observations, activities and behaviours that the target participants bring into the study (Denzin & Lincoln, 2011). A qualitative researcher employs comprehensive approaches including studying objects in their natural states. Creswell (2015) argues that qualitative approaches to

research are appropriate when complex problems need to be explored to “obtain a deep understanding” of a phenomenon being studied (p. 19). A qualitative approach ensures “inductive thinking” and this enables the researcher to think iteratively about data gathered from participants (Johnson, 2011, p. 11). Studies have shown that learning becomes the sole task in an inductive approach as it provides both the researcher and the object of study with in depth information and understanding that can help build a bridge between them (Creswell, 2012, 2013; Johnson, 2011; Silverman, 2016). This implies that the researcher and the participant become informed about the views concerning the topic for the discussion through asking and answering questions which are used for meaning making.

Teachers’ beliefs reside in their minds (Sternberg & Zhang, 1995, 1998), and thus, this study requires a methodology that relies on an in-depth understanding of participants’ views which constitutes the vital information. To understand the implicit beliefs about giftedness, this approach was needed to explore the topic of gifted education because it has helped to solicit implicit beliefs of teachers that cannot easily be uncovered using a quantitative technique. Interpretation of participants’ responses was based on constructivist epistemology. The next section contains a brief discussion of constructivist assumptions.

3.2.1 Constructivist Paradigm

The epistemological assumptions of qualitative research are based on a constructivist paradigm. Constructivism is the belief that knowledge is formed through interaction or experience with participants (Crotty, 2003). From an epistemological standpoint, there is no one accepted truth but truthful knowledge is noticed and documented through the interaction with participants (Johnson, 2011). Thus, in this study it was assumed that the conceptions of giftedness are unique to individuals, that is, beliefs

are subjective and not amenable to quantification. Individuals' beliefs are developed through interactions with others in activities such as attending lectures, seminars, forums and through experience. This study sought to elicit these individuals' perspectives through an interactive approach by relying primarily on interviews. Creswell (2013) indicated that researchers often depend on participants' views because their opinions cannot be seen but are developed through contact with them. Beliefs about giftedness are constructs of the human mind and hence each individual constructs his or her own conception of giftedness differently.

Individuals' constructs depend on a person's unique experiences and this indicates that "each one's way of making sense of the world is as valid and worthy of respect as any other" (Hatch, 2002, p. 58). Since this research focuses on personal beliefs about giftedness, a constructivist approach that acknowledges diversity of beliefs has the propensity to bring out the range of beliefs teachers hold about giftedness. This helped the researcher to understand, interpret and make meaning of participants' responses. The next section seeks to examine the case study approach that was used for this study.

3.2.2 Case Study

A case study is an approach to understanding a phenomenon in relevant situations involving individuals' thoughts, and integrating these views for meaning making and interpretation. At least three major approaches to case study have been proposed (Merriam, 1998; Stake, 1995; Yin, 2014). Stake (1995) identifies three important characteristics of case study. First, a case study is used when the issue is of a distinct interest to the researcher. Second, in a case study, an individual can choose to study a phenomenon with the belief of illuminating issues surrounding such concept. Third, a case is usually bounded, precise and functional. The focus of this research is about

teachers' beliefs of giftedness and this is the central interest of the researcher. Yin (2014) suggests the use of case studies for exploring how and why type of questions with the intention of establishing causal relationships. This view is supported by Harrison, Birks, Franklin, and Mills (2017) who suggested that case study design can help in exploring, assessing and explaining multifaceted issues because it can assist in addressing the how, why and what questions.

An analysis of case study approaches by Yazan (2015) detailed that there are divergent views about Stake's and Yin's approaches to case study methodology. According to Yazan (2015), Stake's case study methodology allows for changes to be made during the process of the study and that the researcher can respond to events and findings as they unfold. In contrast, Yin's (2014) methodology uses precise procedures to record data and only minor changes can be made after the start of data gathering. Subsequently, if major modifications are necessary during the conduct of the study, the researcher needs to begin right from the initial conceptualisation and redesign the study's approach.

Lincoln and Guba (1985) argued for flexibility in qualitative methodology. They advocated that the design of a qualitative study should be adequately flexible to allow for the provision of useful changes. On the other hand, Merriam's (1998) qualitative case study approach appears to be closer to Stake (1995) than Yin (2014) because she believes in constructivists' standpoints of qualitative case study (Yazan, 2015). However, Stake's (1995) more flexible approach to data collection would appear more appropriate to uncovering teachers' beliefs (Boblin, Ireland, Kirkpatrick, & Robertson, 2013; Yazan, 2015). McLeod (2010) suggested that, although findings cannot be generalised in case study research, results can spark researchers' interest to repeat the

study and find out whether similar results can be shown. Given this analysis, Stake's (1995) case study methodology was suitable for this study.

Stake (1995), in defining case studies, distinguishes between three types, the collective, intrinsic and the instrumental. The collective type is used when at least three cases are involved in the research. For an intrinsic case study, the interest is not only to understand the overall issues relating to the case but to learn about a specific case. However, in an instrumental case study, the chosen case does not only advance insight of the phenomenon of interest but also offers understanding of the issue (Stake, 1995). This implies that a broad understanding of the phenomenon, and an in-depth understanding of the issues or problems associated with the topic. As the intention of this study was to illuminate a particular issue, namely teachers' beliefs, it aligns with an instrumental case study as defined by Stake (1995). In this research, an instrumental type will be appropriate. The case focusses on teachers' beliefs and reported practices about giftedness and the teaching of gifted students.

This kind of case study application will assist in learning and understanding teachers' beliefs (Stake, 1995), and the teaching strategies used for teaching gifted students. Teachers' beliefs and their teaching strategies differ; and hence they are challenging to quantify because they reside in the minds of individuals (Kim, 2015; Skott, 2013). As such, every participant's view may increase our understanding of the case study. According to Stake (1995), issues lead us in designing our research questions and enable us to think of the context with regards to the issues about the case and the type of strategies that are the best fit for the study. In this project, the researcher sought to understand what different beliefs teachers have about the phenomenon of giftedness and what they say should be done to support gifted students.

Data for case studies generally are derived from multiple sources. The limitation of this study is that there are only interview data and limited documents. Although, classroom observation would provide complementary data, contextual constraints to time precluded this source of data. Nevertheless, flexibility as suggested by Stake (1995) in this study has been applied because participants were revisited to seek further clarification. It may also imply that follow up data could be sought through email correspondence, and the researcher in this current study followed up through email with two teachers for clarification. As Yazan (2015) argues, Yin (2002, 2014) tends to be more post positivist, especially in his explanations on case study design which seeks to attribute causality. Stake's (1995) case study, grounded in constructivist approaches, provides richer data concerning the feelings, beliefs and behaviours of individuals in a context unencumbered by pre-existing theories for this study.

3.3 Methods

The following sections describe the broad research design. This discussion is followed by details of participants, data sources, data gathering methods and analysis procedures. Considerations of the study's limitations, ensuring research quality and ethics are also described. The timeline is also outlined.

3.3.1 Research Design

In case studies, researchers use research designs based on data such as interviews, documents and observation, followed by coding and data analysis to help answer research questions (Stake, 1995). This study relies primarily on interview data because the practicality of collecting other data such as classroom observations on site in Ghana within a feasible timeline was not possible.

Interviews were conducted face-to-face, and teachers' documents (teachers' lesson plans) were collected to provide insights into their intended strategies and beliefs.

3.3.2 Research Site

The boundaries of this case study are defined by geographical location, context and time. The geographical encompasses the metropolitan area of Accra, which is in Ghana. Accra is the capital of Ghana and there is access to internet facilities. Most schools are adequately equipped with computers which enabled follow-up with participants. The case involves the beliefs that junior high school teachers, $N=10$ hold concerning giftedness and gifted education strategies in the Ghanaian school system. The study was conducted over a period of three months in 2018, with mathematics and science teachers.

3.3.3 Participants and Sampling

Participants comprised junior high school mathematics and science teachers in Accra, Ghana. The researcher has a background in teaching science and hence has pre-existing insights into the culture of mathematics and science teaching. In addition, mathematics and science are seen as important contributions to economic development. Building national capacity in these areas begins with the cultivation of talent in schools.

In this study, purposive sampling was used. A purposive sample is a non-probability sample that is selected based on characteristics of a population and the objective of the study (Palinkas, Horwitz, Green, Wisdom, Duan, & Hoagwood, 2013; Patton, 2015). This technique was used to identify and recruit ten junior high school classroom mathematics and science teachers in the Accra Municipality.

In this study, the teachers were invited to respond to a series of what, why and how questions about their beliefs of giftedness and gifted education strategies, as well as their thoughts on how to effectively address the needs of gifted students.

There are several steps in selecting participants for a particular study. In this study, the following steps were used. The first step was to develop criteria to recruit participants through a check list that contained a number of criteria such as years of participant teaching experience, age, gender, location of highly experienced mathematics and science teachers, novice mathematics/science teachers, teachers both close to Accra or in remote schools, have taught a gifted child in mathematics and science in the last two years or have never taught a gifted child in mathematics or science. The selection criteria revealed the cultural and professional background of each teacher and enabled the researcher to choose a diverse range of participants which would result in a diverse range of data to answer the research questions. Thus, the selection criteria were used to define and identify the type of teacher who was relevant or showed consent to participate in the study.

Approval to conduct the research was obtained from relevant educational authorities who nominated 13 potential sites conveniently located in Accra. Invitations were then sent to these schools requesting volunteer participants. A copy of the selection criteria was included in the invitation.

In the second step, I met mathematics and science teachers in the thirteen nominated schools through a brief presentation in the various schools to identify potential participants who were willing to participate. The purpose was to provide information to enable teachers to give consent to participate. The third step was to consider convenience and access to those who had volunteered, and forty-eight volunteers were obtained. As schools were preparing for promotion examinations,

some teachers were busy with their examination questions. Thirty-eight of the teachers were only available in the first week of October and these participants were excluded. This reduced the number of potential participants to ten. The ten teachers were from six junior high schools, specifically four public and two private schools. Private schools are under the supervision of the Ghana Education service using the same curriculum designed by the Ministry of Education. Private school teachers' views about giftedness and gifted education strategies were comparable with teachers from the public junior high schools. Participants' consent forms were distributed to each of the teachers. The face-to-face interviews started a week after and lasted for six weeks.

A follow up interview for clarification of the concept about spiritual beliefs of giftedness which needed explanation was scheduled with two teachers in the two weeks following the initial interviews. Patton (2015) suggested that follow up interviews enabled the researcher to illuminate previously raised ideas on the topic for the discussion. Although this process of getting participants could have been a challenge as teachers are often reluctant to participate in research, this was not the case in Ghana. Schools were contacted through the Ministry of Education (MoE) and the Ghana Education Service (GES).

In summary, ten teachers, $N=10$, were recruited from six junior high schools (four public and two private) out of thirteen nominated junior high schools. Furthermore, since the investigation involved face-to-face interviews, the selection of ten participants was reasonable and manageable for a sole-researcher's study within the time and resource constraints of a master's degree.

3.3.4 Data Sources

Data sources for this study included interviews, teachers' lesson plans on mathematics and science and sample students' tasks on mathematics and science. These sources of data helped in answering the research questions as multiple perspectives emerged. There is a general educational policy as discussed in Section 1.1 that focusses on inclusive education. Although that policy incorporates gifted education, (see Sections 1.3 and 1.4) there are no guidelines on how support for gifted students should be achieved. Before the start of the interviews, I sought the consent of the schools to undertake the study with mathematics and science teachers. Access to participants was through face-to-face introduction and a brief presentation.

3.3.4.1 Interviews

Interviews of approximately 45-60 minutes were conducted through a face-to-face approach and in the English language. According to Patton (2015), interviews assist in obtaining the types of information that cannot be noticed or measured directly. In this research, the investigator wanted to know the beliefs that exist in the mind of teachers. Patton (2015) suggests that the best option is to ask individuals questions regarding how they think, and feel and their intentions about the phenomenon to be investigated. The difficulty of access the internet and the high cost of access in Ghana compelled the researcher to use a face-to-face interview as it is less expensive and more efficient in this study context. The interviews were conducted on a one-on-one basis to gain an in-depth understanding of each participant's responses. The study employed unprompted semi-structured interviews because specific types of information were required from the participants (Merriam, 1998). Appendix A includes a range of initial and final interview questions with a discussion of the interview protocol. Research questions included some demographic information (i.e. age, gender) about the

individuals. A ten minute follow-up interview was negotiated with two participants to clarify some points for further information and further, emails were also used to clarify information given and to show appreciation for their time.

3.3.4.2 Data from Documents

Merriam (1998) classified documentary data sources into three categories, namely “public records, personal documents and physical materials” (p. 113). However, for the rationale of this study, the focus was on personal documents. Documents, such as teachers’ lesson plans in mathematics and science and students’ workbooks, revealed how teachers accommodate the needs of gifted students. These documents contributed data on the individual teacher’s beliefs, experiences, attitudes and worldviews, therefore making them a reliable source of data. However, the data were determined by the individual teacher as the sole decision maker of what was deemed to be significant to him/her (Merriam, 1998). Although document sources such as curriculum guidelines and school policy documents are relevant, lesson plans were the most informative documentary source for this study, as they were authored by the interviewees themselves. In Ghana, lesson plans are usually detailed outlines of specific lessons.

According to Merriam (1998), teachers’ lesson plans may contribute to a qualitative study. A lesson plan may be a written document developed by teachers which details what is to be taught and learnt, how students’ learning needs are catered for and the teachers’ knowledge and beliefs about what is to be taught, and how to put these and other ideas into practice in the regular classroom (Merriam, 1998). The intent was to acquire information about the research topic to be examined. Lesson plans were readily available for this study as a source of data. According to research, all written documents, provided they are available for the study, are credible (Merriam, 1998;

Stake, 1995). The validity of teachers' lesson plans was assured in the study area because they are often monitored and assessed by administrators or heads of every school.

There are advantages and disadvantages regarding the use of documents within which lesson plans form a part. A problem with document use is that many documentary items have not been explicitly developed for research and may be inadequate for the investigator to understand certain issues from the study's standpoint. Issues about how accuracy and consistency of the documents can be determined, but for Merriam (1998), even with public documents there exists certain "built-in biases" of which the investigator may be unaware (Merriam, 1998, p. 125).

Despite the issues above, lesson plans have shown to be useful in probing teachers' beliefs about differentiation strategies (Megay-Nespoli, 2001). Teachers' lesson plans served as the major documentary data source for this current research in their own right: they are informed by the general curriculum of the Ministry of Education-Ghana; served as a guide for classroom pedagogical approaches; directed the teacher to remain focused and assisted in evaluating classroom teaching and learning. As a consequence, teachers' lesson plans significantly aided this investigation. Furthermore, findings from the teachers' lesson plans were not only used to corroborate the interview data for consistency, but also offered an insight into what teaching strategies teachers suggested should be put in place to further giftedness and gifted education strategies in Ghana. Findings emerging from the lesson plans were used to clarify and explain how participating teachers conceptualised and discussed their pedagogical approaches in the Ghanaian junior high classrooms. For instance, some participating teachers expressed that they applied the SPICE model as a "holistic" approach (Section 5.4.2), in teaching gifted students but this was not evident

in their lesson plans, and hence, teachers' lesson plans were a relevant source of data in addressing Research Question Two.

Quite apart from using teachers' lesson plans to address Research Question Two, findings from the lesson plans evidently supported the interview data in general to answer Research Question One. For example, findings from participating teachers' lesson plans were used to validate the belief found in the interview data about giftedness being a rare concept and that gifted students are "not many" (Section 5.4.1), which clearly assisted in answering Research Question One. The belief from the interview data about using high test scores or numerical outcomes to establish who are gifted students was clarified by the findings from the teachers' lesson plans which listed questions in the evaluation column, and were used to assess all students on the material taught. Overall, teachers' lesson plans aided clarification in addressing the two Research Questions and therefore, an indispensable source of data for this research.

3.3.5 Data Collection

This section provides more details about the data generation procedures. It considers the varying processes for gathering data from participating teachers using face-to-face interviews and documents. Documents used included teachers' lesson plans in mathematics and science as well as students' tasks in mathematics and science.

3.3.5.1 Interviews

The study used unprompted semi-structured interviews. An interview guide containing the list of the interview questions was composed (Patton, 2015). The questions were written in the interview guide before the start of the interview process. When all recording devices and participants were ready, I greeted and asked permission from

each participant before beginning each interview. Initial questions included participants' demographic profile. For example, how long have you been in the teaching profession? What subject do you teach? What is your qualification? (See Appendix A). All interviews were conducted at participants' convenience specifically at their school libraries. These were recorded to ensure that data were saved for analysis. Merriam (1998) proposed that it is important to write everything the investigator can remember immediately after every interview to assist in monitoring the data gathering process, and this assisted the researcher to monitor the approach of data collection during each interview. All interview data were transcribed verbatim, meaning that paralinguistics were also transcribed in the initial stage. However, these were removed along with some speakers' overlapping explanations during coding and categorisation of data, to enhance effective flow of the organised phrases of patterns and themes. However, participating teachers' grammar was not corrected in order to maintain authenticity during member checking.

Although each of the interviews lasted for about 45-60 minutes, the technique for one-on-one interviewing allowed more flexibility for the participating teachers, making it easier for them to fit the interviews into their schedule. Two participants were asked to sit for a 10 minute follow-up interview for clarification using the same techniques as described above.

3.3.5.2 Lesson Planning

Teachers' lesson plans offer further understandings on the goals and pedagogical approaches for projects and lessons across units (Tofel-Grehl & Callahan, 2016). However, this can be achieved through appropriate understanding of curriculum goals or teaching visions and reasons for teaching the curriculum subjects (Berkvens, Akker, & Bugman, 2014). Teachers interpret curricula implement lessons based on their

considerations and understandings of what is important in education. Khoza's (2016) work drew on case study probed postgraduates students' teachers from twenty South African universities understanding of the curriculum and interpretation. Thus, knowledge of the students, their vision of the purpose of education, and in-depth knowledge of the subject content of the curriculum guides lesson planning in ways that suit the context (Solomon, 2009).

To obtain lesson plans from participating teachers, the researcher consulted each teacher after the interview and the lesson plans were retrieved via negotiation. Lesson plan types included both mathematics and science lessons taught by the teachers interviewed. Ten lesson plans were collected for this study, which was one lesson plan per participating teacher. The majority of the lesson plans were a combination of mathematics and science whereas the other two lesson plans were not combined. Lessons in the plans differ depending on where they are in the cycle of learning. For example, by introducing new material, providing re-enforcement of recently introduced new material and preparing for examination of the material. These variations of the teachers' lesson plans enabled the researcher to garner a true representation of participating teachers' classroom mathematics and science teaching and learning strategies. Within teachers' lesson plans, their beliefs about giftedness were shown in their planning, highlighting whether they provided learning experiences that were enough to challenge all students' abilities in the Ghanaian junior high mainstream classrooms.

3.3.6 Data Analysis-Inductive Coding

There are several processes of analysing qualitative data, but these are dependent on the nature of the topic to be investigated. A qualitative approach can be both inductive and deductive. Deductive technique examines implications with data by moving from

generalisation to specific using social theory while inductive approach moves from the specific to general (Palinkas et al., 2013; Patton, 2015; Thomas, 2006). In this study, data collected were analysed using both inductive and deductive coding approaches. An inductive technique is the process of summarising data including those from interview recordings, documents and transcribed text (Palinkas et al., 2013; Patton, 2015; Thomas, 2006). This allows the researcher to establish a relationship between the proposed research questions and participants' responses by identifying codes, categories and themes within the data gathered (Thomas, 2006). According to Johnson (2011) and Saldaña (2016), this method enables the researcher to learn and understand the subjective views of participants' responses in a cyclical manner, making inductive technique more flexible (Johnson, 2011; Liu, 2016; Thomas, 2006), and hence, appropriate for this study.

The intricate nature of analysing qualitative data on beliefs demands a considerable amount of decision making by the researcher about the data gathered. This requires the use of systems of analysis (Chen & Leung, 2015; Skott, 2013). These identify patterns and themes that assist in boosting a study's validity, especially when data gathered are organised and presented for analysis in a "consistent and comparable way" (Chen & Leung, 2015, p. 283). This process enables the researcher to locate, learn and understand participants' perspectives about the case (beliefs of giftedness) that are connected to the research questions.

Deductive coding was necessary to explore teachers' knowledge of specific giftedness strategies. The focus was to test a set of expectations concerning the use of well-defined strategies for teaching gifted students.

3.3.7 Coding the Interview Data

An inductive coding process, as suggested by Saldaña (2016), was used in coding the interview data for this research. All interview recordings were first transcribed verbatim before commencing coding. In analysing the responses relating to participants' beliefs about giftedness, the researcher developed thoughts about the gathered data by reading and coding teachers' beliefs to identify the segments of multiple meanings.

Saldaña (2016) has provided step by step procedures comprising initial coding (used for the basic, 'open' stages of coding) and values coding (what teachers value to be their beliefs of giftedness). These were used to identify the major codes concerning attitudes, values and beliefs. Saldaña's (2016) sequential methods of coding which begins with a cyclic process of comparing "data to data, data to code, code to category, category to category, category back to data" (p. 68), were used to analyse the data produced for this study and were employed in an iterative manner. Thus, qualitative data were analysed in a cyclical way. These sets of beliefs were categorised to reflect participants' constructs. The transcribed data were presented in a table with three columns: one for the text; one for the initial codes; and one for comments on emerging assumptions/propositions such as categories and subcategories. Following this process, it was necessary to determine the patterns by which the trends in the data were repeating with regards to the interview transcripts and teachers' planning. This represented the second cycle coding as proposed by Saldaña (2016).

In the second cycle coding, suitable patterns were generated by combining and grouping codes with similar meanings. The researcher considered grouping codes in accordance with their commonalities, differences and contradictions. The hierarchy of headings was detailed from categories to subcategories and then codes. Thus,

according to Saldaña (2016), some codes within the first cycle were deleted, whereas others were incorporated into other subcategories. Within this process, categories were reduced to a manageable number. For example, Creswell (2013) illustrated this in a study using the method of “lean coding” to reduce 25-30 categories to “five or six themes” (p. 185). The coding process was illustrated on a matrix and rearranged in an orderly manner and compared with related items and varying categories within the initial coding.

Following this, the next step was to reorganise and refine the remaining categories and develop a proposition for including them. As the process was iterative, it became necessary to return to the interview transcripts to look for more related data that can fit into the new categories, identifying patterns and re-checking the data as this helped the researcher to stay close to the continuous data analysis.

3.3.7.1 Coding Data from Lesson Plans

Teachers’ lesson plans that were gathered were then analysed and allocated in categories that describe instructional practices, including the types of strategies used in teaching and assessing students from diverse background. Unlike the interview data where an inductive approach was used for analysis, teachers’ lesson plans were analysed by adopting a deductive approach which in the first instance relied on pre-determined codes such as a priori. These developed codes were drawn from published literature on effective practices in the teaching of gifted students (Archambault, Westberg, Brown, Hallmark, Emmons, & Zhang, 1993; Gentry, Steenburgen-Hu, & Choi, 2011; VanTassel-Baska, Avery, Stuck, Feng, Bracken, Drummond, & Stambaugh, 2003; VanTassel-Baska & Hubbard, 2016). During this process, the researcher looked for evidence of strategies, such as “advanced work”, “higher order

thinking procedures”, “specific differentiation strategies”, “homogeneous flexible student grouping”, “acceleration strategies”, “independent learning”, from the published documents (see Appendix B). In other words, the researcher used a checklist of specific strategies that have been recommended for gifted students and mapped the teachers’ lesson plans against the list and these were considered for coding.

3.3.7.2 Data Analysis Summary

Following from the emergent codes, categories and subcategories were generated through synthesis of the coded data to produce themes. According to Saldaña (2016), theming entails the production of a phrase or sentence that determines what a set of data is composed of, and refers to the process of reflecting on participants’ meaning making and outcomes. It became necessary to organise the themes and locate where each belongs, as this ensured synthesis and progress towards a full data analysis with themes emerging from categories. The synthesis of these themes was used to explain how teachers conceptualise and discuss their beliefs about giftedness. The summaries of these sets of data (corroborated themes) were used to address the research questions.

3.4 Limitations

Acknowledging limitations in a study helps to increase the integrity and frankness of the research and then forestall unpleasant surprises and frustrations on the part of the researcher. The following limitations have been identified, but are not limited to accessibility, which may include working around inopportune time periods. The study’s inability to use a larger sample rather than ten teachers was a limitation. However, this did not preclude the production of useful findings. The researcher’s inability to observe participants’ classroom practices was a limitation. It meant that the study only investigated reported rather than actual classroom strategies and methods

by which teachers are providing for students' diverse needs. The interviews are actually 'inter-subjective' as the researcher's self-constructs and beliefs about giftedness and gifted education play a role in data generation and interpretation. Further studies that employ observation approaches could assist in substantiating teachers' practices both in the junior high and senior high school mathematics/science classrooms across the country.

3.5 Ensuring Research Quality

This section addresses strategies to ensure rigour and quality of the study. Lincoln and Guba (1985) detailed that the trustworthiness of a study's analysis needs to be taken into consideration. There are four procedures to consider when carrying out a qualitative study. These include credibility, transferability, dependability and confirmability. First, for this study to be credible, rich information was gathered from participants during face-to-face interviews and teachers' lesson plans with evidence of students' works to enhance data triangulation. According to Creswell (2015), member checking with participants also helps in judging the accuracy of the study's credibility.

The second consideration is transferability, and this indicates the degree of appropriateness about findings to other related contexts concerning the topic of investigation. For this aspect, detailed descriptions of the research design were provided to readers for comparison. Dependability is the third consideration and this ensures that the study's findings are consistent. To achieve this in the current study, every process of the research report regarding the techniques and analysis have been presented.

Fourth is confirmability. As this process shows whether the researcher has been biased during the study procedure, chapter discussion of the results were articulated to include the researcher's decision about data collection and analysis and how each decision was arrived at in the methodology section. The researcher did not attempt to manipulate the ideas presented by participants or impose any prior information on the outcomes. Thus, information provided by participants was expressed but not that of the researcher's, and the voices of participants were incorporated in direct quotes during transcription. In this regard, the six schools within which data were garnered were given pseudonyms for names, including Sly Junior High, the Ga Hill, the Deer Dragon, Fountain Valley, Mokobi and Jordan to preserve anonymity among the schools.

Triangulation is also necessary. Triangulation is the process by which qualitative researchers corroborate and establish validity for case studies through several data sources (Stake, 1995). Stake (1995) suggests that using several perspectives in case study enhances the study's validity because these multiple views within the investigation will permit triangulation and trustworthiness of the study. [Thus, "data source triangulates" when using varying data sources (p. 112)]. Employing at least two data sources in a case study/an investigation, is likely to promote the understanding of how knowledge contributes to the study's findings. Member checking as suggested by Creswell (2015) also improves the credibility of the study. In September 2018, the researcher arranged to meet each participant at a place convenient for them to validate their responses, as a member checking task. However, only five teachers were available for this member checking task, and this was done on individual basis where the researcher provided the opportunity for each teacher to read and clarify their own

interview transcripts from the researcher's laptop. Each teacher was asked to check if what had been transcribed were their true responses from the interview sections.

3.6 Ethics

Ethics is essential in human research because of privacy issues and concerns about ensuring justice and equity in dealing with participants. Soliciting information from participants demands that such information is treated with confidentiality (Creswell, 2012). Ethical approval was sought by the researcher from Queensland University of Technology, Human Research Ethics Committee (HREC) (approval number 1800000339) and approval for the study was obtained from the junior high school administrators and school coordinators through Ghana's MoE. The National Statement on Ethical Conduct in Human Research (NSECHR, 2015) contains several guidelines made in accordance with the Australian Government National Health and Medical Research Council (NHMRC) that needs to be followed by the researcher as well as the research participants. This assisted in ensuring research merit and integrity. To ensure ethical behaviour, the following guidelines of the NHMRC were acknowledged by the investigator. They are: provision of justice, beneficence to participants, respect for participants, and informed consent on how participants' opinions will be presented.

Provision of justice and beneficence to participants: Before interviewing teachers for the study, the researcher obtained written permission from the relevant authorities (e.g., MoE in Ghana). This enabled the researcher to gain the express permission from the school administrators and school coordinators before proceeding to interview teachers. Also, the consent of Metropolitan Director of Education in Accra, the General Secretary of Ghana National Association of Private Schools (GNAPS) as well as the coordinators and administrators was sought regarding the selection process during the study. The semi-structured interview was carried out with

further permission from each participant, and then followed by a brief presentation through an information sheet that was attached to the final interview questions provided two weeks prior to the face-to-face interviews. The information sheet included the precise study purpose, risks, processes, methods and the benefits involved in the research. This ensures participants are clear about how their opinions were presented (NHMRC, 2015).

Respect for participants and informed consent on how participants' opinions were presented: Criteria for selection and recruitment processes were clearly described to participants. They were informed that their participation in the interviews was voluntary and that they can choose to withdraw from the study by a set date. They were assured that their decision to participate would not influence their program evaluations, nor was there any risk beyond their normal activities. Further, they were guaranteed that all annotations and responses would be treated confidentially. Participants were informed that their information such as social security numbers, addresses and codes would not be requested in this study and they would remain anonymous. They were notified about how their views would be presented, as well as the context and purpose of engaging them in the research. Participants were alerted regarding information about how data would be stored, their rights, and the researcher's ethical responsibilities.

3.7 Chapter Summary

This chapter has proposed and justified the qualitative methodology and methods that were adopted in the research. Stake's (1995) instrumental case study approach was followed because of its flexibility. Consistent with a qualitative methodology, constructivism was used to guide the study's analysis and interpretation of data. In

Chapter Four, findings of the analysis of the data gathered on the ten respondents' constructs about what they valued to be their beliefs about giftedness and the kind of giftedness strategies participants advocated to support gifted students in the Ghanaian junior high school system, will be discussed. Synthesis of the summaries concerning those findings from the interview data for the ten teachers and their lesson plans will be used to address the two research questions. Chapter Five presents the interpretation of the interview results in relation to the literature. Chapter Six finally considers the conclusions, implications and limitations of the research.

Chapter 4: Ghanaian Teachers' Beliefs about Giftedness

4.1 Introduction

This study addressed two research questions:

1. What beliefs do teachers in Ghana hold about giftedness?
2. What strategies do teachers in Ghana suggest should be put in place to further gifted education in Ghana?

This chapter presents findings addressing Research Question One. Findings related to Research Question Two are addressed in Chapter Five. Before presenting data relevant to each of these questions, profiles of the participants (Section 4.2) and their professional experiences (Section 4.3) are provided. Key findings related to Research Question One follow in Section 4.4.

4.2 Participants

In a case study, it is important to provide some contextual details (Poulis, Poulis & Plakoyiannaki, 2013). Hence, in this section, details of both the schools from where the participants were selected and the participants' profiles are provided.

4.2.1 Background Context

As discussed in Chapter 3, Government and Independent educational authorities were contacted concerning the selection of participants and nominated schools as potential research sites for the study. A purposeful selection technique (Palinkas, Horwitz, Green, Wisdom, Duan, & Hoagwood, 2013; Patton, 2015) was employed to identify

and recruit ten teachers from six out of thirteen nominated junior high schools in the Accra Municipality. Characteristics of these schools and participants are presented in Table 4.1. Pseudonyms are used for both names of schools and participants.

As mentioned in Chapter 3, three mathematics and science teachers from private schools, and seven mathematics and science teachers from public schools, who met the selection criteria (Section 3.3.3), were interviewed (Table 4.1). There were five male and five female respondents selected, and these teachers had at least two years of teaching experience. The criteria for selecting respondents assisted in providing a range of professionally trained mathematics and science teachers that had diverse views about gifted education practices.

A brief profile of each participant is provided in Table 4.1. All participants had a Bachelor's degree in education, with the exception of Daniel who only had a teaching qualification. Julie holds a diploma and B.Ed. in Basic Education, as well as M.Ed. in TESOL. Koldy holds a Master's degree in Educational Psychology, in addition to his professional teaching qualifications. Daniel and Julie teach only mathematics and Sweetie teaches only science. The remaining seven participants teach both mathematics and science. Details of these participants are shown in Table 4.1. The participating teachers were from diverse cultural groups; however, in Ghana these cultural groups have similar general beliefs.

Table 4.1

Demographic Profile of Participating Junior High School Teachers

Pseudonyms/ Demographic	Subject	Type of School	Qualification	Teaching Experience (years)	Age Range
Koldy (m)	Math/ science	Private	MPhil Psychology/Inc. and teacher Edu. * * Inclusive education	4	30-40
Frank (m)	Math/ science	Private	Teacher Education Dip. Psychology and Social Foundations & Inclusive Education	10	30-40
Sweetie (f)	Science	Public	Teacher Education Dip and B.Ed. Basic/Inc. Education, Bachelor of Arts (Geography and Human Resource	10	30-40
Rose (f)	Math/ science	Public	Teacher Education, Dip and B.Ed. in Basic/Inc. Education	19	40-50
Julie (f)	Math	Public	Tr. Edu. Dip& B.Ed. Basic/Inclusive Education, M.Ed. in TESL. **	21	50-60
Joe (m)	Math/ science	Public	Teacher Education, B.Ed. Accounting,	17	40-50

Joan (f)	Math/ science	Public	Teacher Education, B.Ed.-Basic/Inc. Edu in Basic Education	14	40-50
Geo (m)	Math/ science	Private	Teacher Education, Dip in Accounting	6	30-35
Daniel (m)	Math	Public	Teacher Education *	27	50-60
Beauty (f)	Math/ science	Public	Teacher Education, Dip and B.Ed. Basic/Inc. Education	18	40-50

Note: ‘f’ denotes female teachers and ‘m’ is used for males. Also, ** indicates having higher qualifications, and * shows Teacher Education qualifications. Inc. denotes Inclusive, Tr. Means Teacher and Edu means Education.

4.3 Teachers’ Prior Exposure to Gifted Education

The researcher asked the participating teachers about their pre-service teaching experiences in response to approaches of catering and providing for gifted students’ special needs in mathematics and science. Eight of the teachers responded that during their pre-service teacher education, they were mostly introduced to methods of teaching students and accommodating those with disabilities, with the major focus being high achievement in national examination by the majority of students. However, two teachers noted that they were not specifically provided with specialised skills for teaching the gifted. For example, Julie noted, “in Ghana, teacher education programs focused on methods of teaching all students including those with disabilities to enable them perform highly in tests and not precisely how to teach the gifted”. Geo broadened this view by responding that, “the gifted are few and we were not given special education programs about how to cater for their needs but we did a few general education courses”.

When teachers were asked to describe some of the programs that were offered during their teacher education, all the participating teachers emphasised four significant areas. However, these areas according to the teachers did not specifically include inclusive practices and programs that cater for academically gifted students. These can be categorised as: emphasis on methodology and assessment; knowledge of special education/students with disabilities; advanced content knowledge; and catering for individual differences.

Knowledge of methodology and assessment: When teachers were asked about how successful their professional preparation towards the provision of students' diverse needs, all the teachers believed that their pre-service education emphasised on measures of assessing all students using the same material and application of methodology in order to meet all students' learning needs. Joe noted that, "using the same material to assess students' performance enabled the teacher to know who are good and with the more methods of teaching you can meet all students' needs." Rose remarked that, "...using more methods in teaching students both the good and the struggling students you can meet their learning needs". Indeed, this Ghanaian school system does not appropriately support teachers to provide for gifted students' diverse needs although their learning needs are dissimilar. Daniel described:

With Ghanaian teacher training, there is no programs designed to prepare teachers to teach and provide for every student learning needs, and I think it will be difficult to do that because we did not learn that. We were taught a lot of methods to teach all students and examine the students after teaching a topic... we all use these methods in our classrooms. I think in doing this you meet their needs. The issue is that I am a mathematics teacher and if for example, I decide to offer for each students' learning needs one by one, it will be difficult for me to finish my syllabus and most of my students are likely to fail in the BECE... [Basic Education

Certificate Examination]. This will affect my professional career because it will look like I did not prepare the students well. Teachers' training officers... [teacher education experts] need to prepare preservice and in-service teachers about how to provide for the gifted learning needs, so curriculum developers are expected to include it in the syllabus for us to follow when teaching the gifted. (Daniel, July 16, 2018, at 11:00 am)

Daniel's views indicate that teacher education did not prepare them for gifted education precisely and providing for gifted students' differing needs was a challenge. All the teachers were prepared to use several teaching methods for instruction with the view of meeting the learning needs of all students, including the gifted, and to enable students' high achievements in national test. That is, teacher education focused on application of methodology for teaching students and assessment. However, using these processes in meeting the gifted students' learning needs was a challenging task for participating teachers, due to their inadequate professional skill about gifted education.

Knowledge of special education /students with disabilities: Teacher knowledge about inclusive education arose in the discussion as a program designed for students with disabilities compared to gifted students. The interview data revealed that teacher education programs' emphasis was on special education with a major focus on students with disabilities. There was no program units planned for teachers to learn about accommodation for the gifted. Thus, courses which include approaches for inclusive education practices that cater for intellectually gifted students are not in existence. Joe expanded this belief by highlighting:

During my teacher training ...I had the chance to learn about general education and at most two courses of special education on how to cater for students with disabilities and how to teach them. But there was no

programs like how to cater for the geniuses or teach them. (Joe, July 18, 2018, at 10:00am)

This proposition showed that teacher education focused on orchestrating students with disabilities in inclusive education as disclosed by Opoku and associates (2017) work on inclusive education in Ghana, compared to gifted students.

Advanced content knowledge: Knowledge about the subject matter emerged as a critical determinant specifically towards the development of gifted students. Seven of the teachers believed that in teaching the gifted, advanced content knowledge was the only appropriate determining factor towards the progress of gifted students. However, Maker (1982), Tomlinson, (2013) and VanTassel-Baska (2013) suggested that the general curriculum needs to include a more abstract content knowledge, processes and learning outcomes to integrate with recommended giftedness strategies when teaching the gifted. This implies that the content /subject matter should not be delivered in isolation but needs to be combined with effective giftedness processes and not only the application of a difficult concept of the subject matter. It appeared that teacher education in Ghana did not adequately prepare teachers for gifted education programs and participating teachers believed that teaching gifted students only involved the teaching of advanced subject matter knowledge, a naïve belief. Geo broadened this view by stating that, “these brilliant students, teaching them difficult things in mathematics and science enable them to pay attention in class”. Contrasting this view, one teacher noted that, “if you depend on teaching them difficult things in the subject, the majority of the students will not understand the concept”. Expanding the belief of advanced content knowledge in relation to giftedness, Julie highlighted that, “for me, advanced subject matter knowledge is first when developing gifted students’ abilities”. This notion suggests that gifted students’ development relied on advanced content knowledge and with application of several methodologies, each

student's learning needs including the gifted, will be addressed. That is, the use of different processes may meet all students' potential. This belief is a naïve view and contradicts inclusive education philosophy according to UNESCO (2016).

Catering for individual differences: How teachers provided for individual differences emerged in the discussion. Teachers were asked how they were taught to cope with teaching for students' ability differences during pre-service education. Eight teachers expressed that their teacher education was not precisely aimed at coping with individual differences. Thus, teachers were not taught how to specifically cater for students with diverse needs as Ghana's inclusive education (IE) focused on developing the academic domain of students. Hence, teachers should address the academic needs of all students in the regular classroom. Two teachers explained that, "we were not specifically given education on how to provide for each student ability difference". Sweetie extended this view by expressing:

In my teacher preparation programs we were not actually given the opportunity to learn gifted education or the programs. We did not do anything like that. The general programs we did were a few courses in inclusive education mostly students with disabilities, child psychology, general education, methods of teaching and others. Also, with methods of teaching say science which I am teaching now, we were given the chance to learn more methods of teaching and assessing students after teaching. So I assess my students after teaching every major topic. For gifted education programs in Ghanaian teacher education, no. Maybe they will offer it in future, [...na wara nyim dee dam program yi wonye wo yen man yi mu? This expression is in Fanti-a Ghanaian local language spoken in the central region of Ghana, in English language it means that you know that we do not offer gifted education programs in Ghana]. (Sweetie, July 9, 2018, at 11:00am)

Sweetie indicated that during her pre-service education, they were not precisely provided with learning opportunities in the area of giftedness or gifted education. Rather, they were offered the opportunity to learn about application of multiple methods of teaching the subject areas and assessing students' performance. However, provision for all students' ability levels was a challenging task for teachers to meet; and it appeared preservice teacher education did not adequately prepare teachers for giftedness and gifted education programs in accommodating for students' diverse needs.

In summary, this section has discussed respondents' preservice professional education programs and four themes emerged. First, teacher education prepared teachers toward methodology and assessment to enable students' high performance in national test. Second, pre-service teacher education programs cater for students with physical disabilities, and with an emphasis on providing for the average students' academic needs compared to the gifted. Third, there was poor grounding concerning how to provide for the differing abilities of the gifted because emphasis was on pedagogy and content knowledge. Fourth, teachers considered that their limited number of teaching strategies was suitable for meeting students' special needs. This seems to imply that it is necessary for teachers to teach the gifted by having a broader knowledge about giftedness. Finally although the interview data revealed that all the participating teachers were expected to meet individual differences, with a focus on students' ability levels, application in the classroom was a difficult task.

4.4 Teachers' Beliefs about the Nature of Giftedness

Ten teachers were interviewed between June and July 2018, for the purpose of discussing beliefs about giftedness and the appropriate strategies used to support gifted

students. Analysis of the interview data revealed teachers' beliefs about the nature of giftedness focused on three dimensions: characteristics and definition (Section 4.4.1); beliefs about identification of gifted students (Section 4.4.2); and finally, cultural beliefs and attitudes towards giftedness (Section 4.4.3).

4.4.1 Teachers' Beliefs about the Characteristics and Definition of Gifted Students

The interview data revealed diverse views held by the teachers, yet there were a few consistencies. When teachers were asked to tell a story about the characteristics that gifted students possess, all ten respondents, Beauty, Daniel, Frank, Geo, Joe, Joan, Julie, Koldy, Rose and Sweetie, commented on key characteristics that gifted students' exhibited. Five foci emerged from the interview data, which can be broadly clustered as: (1) what is giftedness; (2) personality characteristics and behaviours; (3) nature of relationships; (4) academic characteristics; and finally, (5) views about the diversity among students' backgrounds. The following is a brief description of respondents' beliefs about what giftedness meant to them.

(1) What is giftedness: Teachers were asked to share their beliefs about what giftedness means. Eight of the teachers defined gifted students as 'smart', 'genius', 'good', 'highly intelligent', having 'special thinking abilities', grasping 'concepts fast' and always being 'ready to learn new things'. Geo noted, "I define them as brilliant students". They also used a variety of terms that reflect a sense of diversity among gifted students. Six teachers used the term "genius" to describe exceptionally gifted students while the four other teachers used terms such as "good", "smart", "brilliant", "exceptional" and "gifted", but often did not clarify what they meant. Despite the varied expressions that teachers used in defining gifted students, they all included a high intelligent quotient (IQ) in their definitions. Although Julie defined gifted

students as individuals with “high thinking ability”, she further noted that giftedness can be defined as, “somebody who has a high IQ, his IQ is very high”. However, one teacher defined gifted students as individuals with a high IQ in relation to their chronological age. Koldy expressed, “In my opinion, I will define them as people with high intelligent quotient which corresponds to their maturity or their age limit in the sense that if you have a high IQ you are smart”.

Consistency was also discussed in relation to gifted students’ characteristics. The following expressions emerged when teachers were asked if gifted students’ performance have been consistent. Eight of the teachers responded that, “not so regular”, “it depends on the teacher”, “when the interest of the child is attracted, or when the interest of the child is there you realise that so much”. Beauty expanded on this view by telling a story about a gifted student whose IQ unexpectedly regressed:

You know sometimes a child may be gifted but the way that child will be trained can also let the child’s IQ... come down or the child’s own behaviour. I had a boy in my class some time ago he was very good but it got to a time he started misbehaving and all of a sudden he started coming down so quickly I invited the parents. Truly when the parents came they gave me instances about the changes that went on so we had to come in and help and then before he went to the next class the attitude started changing because sometimes when they are into the teens because of peer pressure they learn certain things and that can let them.... (Beauty, June 26, 2018, at 10:00am)

This shows Beauty’s view on the changing nature of giftedness. That is, there were collective beliefs about gifted students’ ability levels changing over time, which is explained through the “malleability concept” in Section 2.5. This concept shows the dynamic nature of giftedness, as discussed by Dweck (2006).

Additionally, seven of the teachers believed that students' growth in ability is dependent on teachers' efforts, and can vary. That is, teacher knowledge about how to manage a gifted student, external factors and teacher support can enhance or constrain the student's developmental process, a view consistent with research (Gagné, 2004, 2010; Subotnik et al., 2011). Thus, a student's level of giftedness may change over time due to environmental factors (Dweck, 2006). Four teachers expressed that gifted students may respond to their environment by "dumbing themselves down" to fit in.

The interview data showed that probing individuals' understanding of the concept of giftedness is relative to teacher knowledge and support. Teachers were further prompted about their views concerning the changes in students' academic characteristics. Sweetie highlighted, "they are consistent as in some of them ... or some of them coming down, some of them diverting their interest here and there and due to the teachers that take them at that areas too". In Sweetie's comment, she described students' varying ability levels, using the expression, "coming down". This is when gifted students' ability declines, while other students' abilities are more consistent. Also, one teacher, Joe, commented that "parents help gifted students achieve". The second focus that emerged from the interview data was personality and behavioural characteristics.

(2) Personality and behavioural characteristics: Teachers were prompted to share their perceptions with the researcher about how gifted students behaved in the regular classroom. All the teachers shared a variety of views about the personalities that gifted students display. These range from quiet and reserved to energetic and assertive. The teachers' opinions varied regarding gifted students' quietness and reservedness. Five teachers, Frank, Geo, Joe, Koldy and Rose, expressed that, "gifted students choose to hide their abilities", but with support they can "develop a strong

sense of confidence”. Geo extended this view by noting that, “when you ask them a question they have the question in mind but until you call that person he will never respond”. In contrast, Joan noticed that gifted students were highly energetic, assertive and willing to question the teacher:

The gifted are mostly those who work with self-confidence ...they always want to be involved in things like working in groups so that they can help their colleagues. They want to help their classmates who are not gifted, and one thing I have noted about them is that they are friendly and not selfish. They are very humble and can associate themselves with everybody including us, I mean the teachers who are teaching them. They can confidently approach you if they do not understand anything. ..., they like everybody and are sociable because you know what... they relate well with their own classmates who are not good in mathematics and science and teach them as well [won abrabo ye nwanwa enti mehu won se wonim de, hwe saa nkorofo no ye genus. This statement is in the local Ghanaian language-Twi, and in English language it means the gifted usually exhibit unique personality characteristics which is beyond my understanding so I believe they are geniuses]. (Joan, July 13, 2018, at 1:00 pm)

This belief indicates that gifted students are believed to possess extroverted personality attributes. They want to find out what is happening in particular situation. They are curious in asking questions about teachers’ mistakes when writing on the board, and follow exactly what the teacher is doing. This shows that the gifted students are attentive, focus, selfless, and relate well with colleagues. Four teachers shared Joan’s view of the gifted students as being extroverted, because they ask questions and want to understand issues of contemporary importance. These characteristics were seen as contributing to strengthening their relationships with teachers and peers. In contrast, six teachers believed that gifted students isolated themselves, because they rarely associate with their peers. These characteristic differences are significant in

raising awareness about issues relating to giftedness in pedagogical classrooms of Ghana. That is, teachers in other countries are required to serve students independently, direct them to learn new content material, engage students in inquiry learning to explore problems (VanTassel-Baska, 2013). In this way, teachers need to moderate the difficulty of the tasks for particular students because the same task may not be of equal value for diverse students' special needs (Watters, 2010). However, the story is different in Ghana as the same task is provided for all students. For example, samples of students' tasks revealed that all students perform the same task in science instructional mainstream classrooms (Appendix G). In addition, samples of students' tasks in mathematics are not different. Students perform the same tasks by organising statistical data and finding the truth sets of integers (see Appendices G-I). Thus, gifted students' diverse learning needs and support tend to be ignored in the Ghanaian mathematics and science classrooms system. Consequently, teachers rely on academic performance in tests to determine children's abilities.

(3) *Relationships*: Participants were asked about how they relate with gifted students as well as the relationships among peers. Three less experienced teachers interviewed had negative beliefs about relationships with gifted students, due to their behaviour in the classroom. The three teachers felt that these students were more demanding, and therefore, teachers are required to be sufficiently prepared. They were uncomfortable with being challenged by these students. The interview data also revealed that unprepared teachers tend to "shout at them", and refused to engage them in class, thereby marginalising gifted students, especially when they "boldly point out teachers' mistakes". Beauty voiced how she had seen other teachers "shut them down" by shouting "oh gowayou!" which means 'go away' or 'get away from me'. Beauty also explained that, "sometimes too they don't get them involved because they know

that they know... [the answers] so they will not involve them". The remaining nine teachers expanded on this thought by explaining that the relationships with gifted students largely depended on how well an individual teacher is prepared. That is, teachers need to be prepared to enable gifted students to "push the boundaries" of their knowledge. They explained the view that unprepared teachers will marginalise gifted students.

All the ten participating teachers provided mixed views about relationships between gifted students and their peers. Two of the teachers, Beauty and Frank, stated that the young gifted students responded negatively to peers who do not understand concepts, and therefore, "lack moral character and need to be controlled". Five teachers, Geo, Joan, Joe, Julie and Koldy, felt that irrespective of gifted students being reclusive or "out of their shells", they seemed to "positively support others" and sought to make "things done right".

Teacher knowledge about giftedness enhanced their self-efficacy in developing gifted students. Three teachers, Frank, Geo, and Joe, expressed a view that teachers with less experience and knowledge about gifted students held more naïve beliefs than those with greater experience. Four of the respondents concluded that gifted students do not need special attention. This indicates that less experienced teachers perceived their relationships with gifted students differently. Seven of the respondents noted that sometimes teachers saw gifted students as "threats and enemies", which impacted on their relationships, and most importantly, their academic behaviours. Koldy, in representing other teachers' views, highlighted:

He actually hates them because they push him to the wall they always post questions he doesn't have answers to, so they tend to either shut them down

by not calling them to ask questions, not.... engaging them in the lesson from fear of embarrassment. (Koldy, June 27, 2018, at 2:30 pm)

(4) *Academic behaviours:* When respondents were asked about the academic behaviours of the gifted, the interview data disclosed that six of the teachers believed gifted students displayed “genius” or strong academic behaviours. In these situations, gifted students were seen to “think quickly” and “push teachers” to advance their teaching skills, indicating a high cognitive retentive memory. These teachers recognised gifted students as having different thinking characteristics and constantly seeking challenges. Eight teachers shared a common belief that gifted students are “highly intelligent”. Julie noted that the “genius have special thinking ability”, they are “fast thinkers” and are capable of solving challenging “questions very well”. In contrast, five of the teachers, Frank, Joan, Joe, Julie and Koldy, explained that gifted students become “bored and inattentive” if they are “not challenged”. Koldy remarked:

When they understand the topic and the teacher keeps on repeating that same concept over and over and over again with the intention of helping the.., they are not motivated to pay attention like they have already understood and you are wasting the rest of their time with them so their behaviour ..., when you are teaching they are attentive the moment they understand and you are re-emphasizing certain things they become bored because you are wasting their time. (Koldy, June 27, 2018, at 2:30 pm)

Joe, Julie, Koldy, Rose and Sweetie described gifted students as exhibiting high levels of achievement in specific domain areas, especially in “mathematics and science”. Gifted students are not only focused and “curious”, but also analytical, as they asked higher order questions.

Frank, Geo and Julie believed that there are high expectations for gifted students, as they are fast thinkers who innovatively contribute to solving problems. Giftedness is relative depending on whether the individuals are “smart and creative”. That is, the

gifted are not just intellectual but also must be creative and be able to use their abilities.

Geo acknowledged:

The intelligent people one thing I have noticed is that they are very creative that's one thing and then they can do things on their own that's another thing so a brilliant person sometimes when you teach that person he will learn and get it when we say this girl is very brilliant they know he can do it but an intelligent person may use his smartness to beat that person by creating it. (Geo, June 21, 2018, at 2:30 pm)

Six of the teachers believed that students labelled as “genius” or gifted are highly focused and diligent. Sweetie commented that, “they are brilliant but a bit curious, they are a bit inquisitive and ... ask questions that you yourself you don't know.”

(5) Diversity of students' backgrounds: All teachers believed that gifted students are from diverse socio-economic backgrounds, which broadens their knowledge of how to provide for all students' needs. Teachers were questioned about gifted students' backgrounds. They acknowledged that gifted students come from various socio-economic and cultural backgrounds. Seven of the teachers, Daniel, Frank, Geo, Joe, Sweetie, Julie and Koldy, broadened this view that the gifted “are all from different backgrounds”. Geo expressed that, “beliefs about providing for students with diverse needs will also differ”. Daniel added to this notion:

They come from different cultural backgrounds so that thing affects each and every child we have the northerners', the southern, the middle belt so their responses even tell you if you see their culture in some of the answers they give to you. They can give to you answers that is related to what their thinking and behaviour are like in their areas that they come from. (Daniel, July 16, 2018, at 11: 00 am)

In summary, this section has discussed the findings from the interview data on teachers' beliefs about gifted students. Personality and behavioural traits,

relationships, intellectual behaviours and diverse backgrounds were discussed. The interview data demonstrated that all the participating teachers have a wide range of views about giftedness. Teachers defined giftedness based on students' ability levels, but this can change depending on the students' environment. Participating teachers believed that giftedness is dynamic in nature, but tends to be diminished if proper support is not provided. Teachers' views about gifted students differ depending on each student's personal attributes. There was no one way that teachers defined giftedness, as their beliefs about the definition varied.

Relationships between teachers and gifted students depended upon many factors, including the teachers' experience, preparation and knowledge. The interview data revealed that when teachers were not adequately prepared, especially when the teacher had insufficient knowledge about giftedness, the relationship between teachers and gifted students was compromised. Regarding academic behaviours, the interview data showed that gifted students are innovative and smart, as they seemed to have a high cognitive retentive memory. Thus, giftedness implies being creative and smart. Gifted students were found to have diverse socio-economic backgrounds although they were from similar geographical locations. All the participating teachers have difficulty identifying gifted students because of the diverse socio-cultural backgrounds from which they emanate. This cultural diversity influences the way students express their giftedness.

4.4.2 Beliefs about Identification of Gifted Students

In this study, analysis of the interview data showed commonalities in teachers' beliefs about the identification of gifted students. Two main areas arose, which can be grouped

as: conservative approaches based on quantitative data from summative assessment tasks; and qualitative approaches of identification.

Techniques using quantitative data rely on students' performance on examination and other summative assessment tasks. That is, formal testing to measure IQ, aptitude or achievement tests, standardised tests and checklists. Quantitative approaches include scores on examinations but also other assessment tasks with numerical outcomes. However, advocates of gifted education refer to this process as traditional or conservative model of identification, which misidentifies the gifted (Borland, 2005, 2009; Cramond, 2004; Renzulli, 2002). The interview data revealed that all teachers relied on IQ measures in identifying gifted students.

Qualitative approaches of identification rely on other methods of measuring or assessing students' abilities, rather than relying only on test scores. These assessment procedures include behavioural patterns, teacher reports, teacher observations, students' products, past awards or honours, writing products and teacher, peer and parent nominations (Section 2.3.1). Qualitative processes, according to advocates of giftedness as discussed in the literature review, is the contemporary model of identification (Kaufman & Sternberg, 2008; Lister, 2004; Renzulli, 2002; Subotnik et al., 2011).

Conservative approaches using quantitative data: When respondents were asked how they identified gifted students, all the teachers interviewed assigned recognition to students who achieved highly in examination, and used this in assessing gifted students. The following expressions emerged from the interview data, with teachers recognising gifted students as those “who highly perform in examinations” and “students with high IQ performance”. The results disclosed that all the teachers identified gifted students based on high IQ achievement. Koldy told a story:

In my opinion, I will define [identify] them [gifted students] as people with high IQ's which corresponds to their maturity or their age limit in the sense that if you have a high IQ you are smart. If IQ and your chronological age matches together that is the smart child but where the IQ is high and the chronological age is low for that child. These smart students they are good. (Koldy, June 27, 2018 at 2:30 pm)

However, Koldy was unable to clarify how these students were identified. Nine teachers believed that IQ was the only determinant of giftedness, a naïve belief because this view recognised a limited number of students as gifted and Borland (2005, 2009) described it as an unbeneficial legend. However, six of the teachers acknowledged the limitations of an IQ measure as obstructive, in particular, describing this measure as unhelpful. The interview data showed that nine teachers were concerned with the focus being only on the academic domain. This is because teachers may ignore the special needs of students who are gifted or disabled, by only focusing on students with high IQs. Rose discussed the complexity in identifying students at both ends of the spectrum:

This talks about individual difference we say somebody is mentally retarded then we relate that to academic work we forget about other abilities that the students have. You know in Ghana we want those who grasp concepts so we use the constructivist method by which we teach from known to unknown.... Exceptional students are students that are gifted with high IQs, and they perform well in class test and end of term examinations. Those that are also below belt thus, mentally retarded, we have students that are very low they are exceptional then we have students that are very fast. Gifted ones they get things... [done right], their IQs are faster so the two can be exceptional. (Rose, July 10, 2018, at 11:00 am)

Processes for identifying gifted students were among the major concerns that respondents discussed. Assessment procedures were identified as the most common process for establishing who gifted students are, with a major emphasis on high IQ.

These assessment processes can be categorised as formative and summative assessment techniques. With the formative assessment approach, teachers mentioned “oral questioning and class exercises” as processes for identifying gifted students. The summative assessment approach considered students’ achievements in examinations, which teachers believed relies on a high IQ. Eight teachers described their beliefs of identifying gifted students through a conservative approach, emphasising the use of individual teacher’s assessments and standardised tests. Daniel shared his experience:

Presently, I have about 4 of them 2 girls and 2 boys out of 85, their IQs are high, and they performed highly in both class test and end of term examinations. These four students they are very fast, but most of them are slow learners, you give class test ... that are very simple they will take a long time... that is one of the ways I use to identify them. (Daniel, July 16, 2018, at 11:00 am)

Daniel expressed how he measured giftedness through scores on achievement tests, but did not explicitly clarify how gifted students’ IQs were measured to establish their giftedness. He argued that the majority of the students are slow to perform in both formative and aptitude tests depending on their IQs.

Joe raised the concern that despite teachers’ professional training “with highly gifted, we are not able to identify them well”. Further, Frank described a boy who was identified as exceptional in a specific area of electronics, but was getting low scores in other areas. In other words, he was not doing well in other subjects, and therefore, was not qualified as gifted. Frank further highlighted:

For all-inclusive education, is about you are teaching the whole class in general using simple process and then extent it or using a constructivist method, but after their talents have been identified, the right thing is may be if this child has been discovered to be good in this, like you push the child to the field for the child to be fully trained but here is the case that

you don't have that system. So, a child might be good in may be calculations, a child must be good in artist. Here is the case that we don't have any provision for them and by so doing all of them pass through the normal stream and they do all the nine subjects that we do in Ghana here which mostly doesn't help most of our children now. I have one student in my class, this boy is very good in electronics. With little thing that he will get he can use it to do something. Now he has even been able to manufacture an aircraft that can be able to fly for about 3 seconds, but the child is not good in the rest of the subjects and this child is still there, and we are declining the image and some teachers are complaining he is not doing well, he is not doing well but that's not his field. (Frank, June 22, 2018, at 4:00 pm)

Frank expressed the notion that teachers in Ghana are only reliant on students' high achievements in examinations and other summative assessments for identification purposes. The interview data revealed that while most of the teachers attempted to identify gifted students through the quantitative perspective, a few used qualitative techniques.

Qualitative processes of identification: As explained previously, this process is dependent on a combination of factors, including behavioural characteristics, nominations from peers, parents and teachers, teacher observations and achievement reports. Only three teachers, Frank, Koldy and Sweetie, expressed a broad view about assessing gifted students beyond quantitative measures. These teachers shared a common belief, noting that, "you identify them in the form of their exercises and asking those questions, then their behaviour in class and also giving those tasks in various subjects and their output will help you identify them". Sweetie broadened this opinion by highlighting, "giving them a task in various subjects and their output will help you identify them. You can identify them not only work as theory, but other areas too when you give them so many opportunities as in sports".

The interview data revealed that teachers who were knowledgeable in psychology, such as Frank and Koldy, used qualitative assessment to identify gifted students. These two teachers considered that an unusual number of their students were gifted (e.g., 10 out of 24 is unusually high). They were the only teachers to use the uncommon qualitative type of assessment for identifying gifted students. Koldy explained:

In my mathematics class we have a class... [of] 24 in class out of that I can really say that we have eight to, let's say 10 being gifted am using ten because eight of them they are consistent from each of the topics they are consistent they are with you but the eight sometime they are off sometimes they are on so I can't actually place my focus on these two because they vary. (Koldy, June 27, 2018, at 2:30 pm)

In Koldy's class, the academically gifted mathematics students are perceived to have diverse abilities. Those closer to the teacher have consistent abilities. Thus, gifted students' achievement relies on student-teacher relationships, and implies that teachers' beliefs about giftedness influence their pedagogical decisions. Although Koldy held sympathetic views towards giftedness and articulated acceptable strategies he did not show evidence in his lesson plans.

Nine teachers believed that giftedness is dependent on individuals' efforts in class. This implies that qualitative approaches can be used to establish if students are gifted, but Ghanaian teachers' focus is on achievement in class. Clearly, teachers do not understand Gagne's notion of gifts as potential which is developed into talent. Only two teachers, Frank and Koldy, used a combination of qualitative and quantitative assessments to determine if students were gifted.

In conclusion, this section discusses teachers' beliefs about the identification of gifted students. The literature showed that IQ quotas form just one part of identifying

gifted students. IQ usage is an actual quantitative measure for identifying the gifted, and is complemented with achievement or performance tests. This is a numerical determination of giftedness used by Ghanaian teachers. The results revealed that class tests and end of term examinations were commonly used. This implies that only teacher reports on achievement were employed to identify gifted students. Regarding qualitative assessments, the results showed that teachers rarely employed behaviour patterns or parent, teacher and peer nominations, which are advocated as part of contemporary processes of assessing gifted students. Using teacher reports alone meant that some gifted students may be misidentified due to external factors that could prevent students to excel during the conduct of the tests. Only two teachers used unusual types of assessment to identify gifted students. The use of IQ and high scores was the common device for gifted student identification as revealed by the participating teachers.

4.4.3 Influences of Cultural Beliefs on Giftedness

It was of interest to explore to what extent teachers were influenced by society's beliefs and attitudes towards gifted students and giftedness. When teachers in metropolitan Accra were asked to describe how gifted students are perceived in the Ghanaian culture, the teachers emphasised four key beliefs. These included: (1) supernatural spirit; (2) high social expectations; (3) a gendered dimension to giftedness; (4) the genesis of giftedness including biological and developmental beliefs.

(1) Supernatural spirit: The teachers acknowledged spiritual connotations of the conception of giftedness. Six participating teachers believed that gifted students possessed a “supernatural spirit”. Julie highlighted:

In Ghana, the gifted students some admire them, some also see them as if I could use the word ‘witches’ because they think they have some

supernatural gifts that they use in doing things and solving problems and other things. (Julie, June 26, 2018, at 3:30 pm)

A shared belief emerged, with teachers describing gifted students as having “double headed brains”, or being called “witches, weird and nerds”. Joe also highlighted that “these gifted students have strange powers”. Beauty expressed:

Some consider them as witches and all that because sometimes they do things awkwardly, things that you are expecting them to do they do it over. I had a student before when you are teaching he will either be reading story books or something, but you ask a question he will give an answer, so with that child you will say that child is a witch, because how can you be reading your storybook and then listen to me while your head is down? (Beauty, June 25, 2018, at 10:00 am).

Beauty’s opinion suggests that in the Ghanaian culture gifted students possessed some “magical powers”, in the sense that they are able to “solve difficult and unusual problems”.

The interview data showed that cultural beliefs related to the supernatural influence about teachers’ conception of giftedness. Seven teachers believed that the ancestral supernatural spirit of a prominent family member provided a blessed gift to the beneficiary. In the Ghanaian culture, giftedness is pure, conformist, held in high esteem and seen as a gift from the child’s ancestors. Julie told a story:

During child naming ceremony, the elders of the family invoke the spirit of ancestral blessing for the child with special gifts. Such child is named after one prominent person who is skilful, talented or gifted ancestor, (odi mu-Akan language). Sometimes the child is named after an ancestor or one family member who was a warrior or brave, an orator “onim badwa mu kasa” (Akan language). In English (one who speaks bravely in public) a musician, sports person or a leader “okandifo” (Akan language). The person must grow to hate sin, be clean, friendly to others lovely, open

minded, not selfish and show respect for the elderly or prominent people in society else the gifts will vanish. (Julie, July 31, 2018, at 4:30 pm).

Julie's beliefs revealed that a child can be gifted when an ancestral spirit is 'invoked' onto the child during their naming ceremony. This type of giftedness is everlasting, provided that the individual remains unadulterated, focused and generous to society. Apart from the cultural beliefs relating to the spirituality of giftedness, the interview data demonstrated that there were high social expectations for the gifted in Akan culture which is also reflected across the general Ghanaian culture.

(2) *High social expectations*: The interview data showed that the gifted are expected to demonstrate a high degree of potential and should have promising future prospects compared to their peers. That is, they are projected as icons in the Ghanaian socio-cultural environment. For this reason, teachers are expected to challenge gifted individuals on school tasks (i.e. "self-starters", innovators). Koldy expressed:

We will fail so we go in for these ones and we call them the intelligent students that is why I always use the 'self-starters' because the moment you start saying the question they have already thought of the end so they now give you the answer so we call them the intelligent, the clever, the brilliant students in class. (Koldy, June 27, 2018, at 2:30 pm)

This view indicates that society will not progress if it fails to provide for gifted students, as these individuals are capable of creating and providing tangible solutions to issues in society. The teachers discussed a variety of society's values relating to giftedness. The following expressions emerged in the interview data: "the gifted made teachers' tasks less difficult; they are given responsibilities or 'positions' in the school system; they are society's problem solvers and helping others" to understand and apply new knowledge. Koldy further added to this view by describing:

My view is that we must strongly be behind these children we must rally behind them by giving them the necessary support. Because they are whom

they are, and we cannot take that away from them. By assisting and guiding them we know the future, they are yet to come so by giving them the, the pathway to follow we are actually moulding the future leaders and we are actually saying that our society will be a better place for if these children end up well. (Koldy, June 27, 2018, at 2:30 pm)

Teachers' beliefs about how giftedness is perceived within the Ghanaian culture and how this contrasts with pedagogical conceptions of giftedness are dissimilar. For example, when Koldy's views are considered, these emerge as contradictory to how teachers treat these students in class. Thus while giftedness is perceived as a worthwhile future treasure in Ghanaian society, the school is expected to develop giftedness potential into talent through appropriate classroom instruction to meet the diverse needs of the gifted. However, in the Ghanaian junior high school mathematics and science regular classrooms, the same task including statistics and integers are provided for all students. This is not different from science as students perform the same task on technology and digestive system in biology (see Appendices G-I). That is, the way giftedness is perceived in society and teachers' beliefs about instructional-decisions are different.

(3) A gendered dimension to giftedness: Social norms concerning the role of women in society influenced teachers' perceptions of giftedness. In the interview data, a gendered dimension to giftedness emerged as a concern. During the interviews, teachers were asked about their cultural beliefs about gender in relation to gifted students. The teachers commented on a common characteristic about the cultural conceptions on the role of males and females. These included the socio-cultural beliefs that males are expected to be the 'bread winners', and are supposed to do all the hard work on behalf of their family. In contrast, teachers echoed a socio-cultural belief that females have different roles and expectations compared to males. The interview data

also revealed that males are considered more gifted compared to females. Beauty remarked:

We see boys to be gifted, it's because we normally want to educate the boys more than the girls that is why, they say that whatever they do they are going to marry so as for the boy oh he is going to work and take care of the family but you your husband will take care of you so mostly boys are known to be gifted more than the girls. (Beauty, June 25, 2018 at 10: am)

This implies that females are disadvantaged if gifted in the Ghanaian culture. Daniel articulated:

Growing up we saw that men are to be good, better performs than women so when we see women doing better than men those men or boys we castigate we just condemn them to nothing. How can you sit down, and a girl do better than you? It's unheard of, because as we were growing up at least the first 10 in our class we are always boys... (Daniel, July 16, 2018, at 11:00 am)

Daniel's view highlighted the pigeon-holing (a naïve belief) about gifted girls, and their lack of rights to reach their highest potential. However, the interview data indicated that with support from their teachers, they can develop strong self-esteem. As Sweetie highlighted, "in my view, I think boys being gifted are given more privileges than girls, because the males we see them as being superior, you know in my culture that is how I see it". The pigeonholing of gifted girls was a consistent belief among all teachers. In the interview data, Frank disclosed that, "the expectation that males are academically good or highly brilliant..., is real in the Ghanaian culture among females, and... [it] become [s] news if a female is academically good". Frank went on to explain:

Especially if the gender is female and the child is relatively good. In fact, the elders in the community even use her to challenge the other males who

are not doing well because in our culture we see males to be highly intelligent and being at the hierarchy in terms of everything so if a lady being found to be gifted and highly intelligent, that lady is highly respected. (Frank, June 22, at 4:00 pm)

The interview data showed a range of socio-cultural beliefs, including the belief that females are less likely than males to participate in Science, Technology, Engineering and Mathematics (STEM) areas. This is critical, as it affects classroom instruction in most “single sex schools”. The interview data revealed that teaching gifted students of the same sex in STEM areas was a challenging task and needed to be discussed in more detail. It was found that if the teacher was of the opposite sex, gifted students were more likely to understand concepts. Further analysis revealed that male teachers feared being seen as inferior, because they were afraid to be challenged by gifted boys.

The findings indicated that less experienced teachers attempted to suppress gifted students with the fear of them asking challenging questions for which they had not adequately prepared. In the same way, female teachers of gifted girls are afraid of the same challenges, and therefore, feared being inferior. In contrast, teachers of the opposite sex showed passion to support gifted students and were proud to see their future fortunes and progress. Frank further extended this thought by saying, “we male teachers we admire the female students who are gifted in mathematics and science and we support them”. Rose commented:

I think because of our culture the way ladies are not regarded so as a mathematics female teacher and my school is also a girls’ school, teaching girls is not easy it’s very difficult to integrate the concept. When male teachers are teaching mathematics and science I think it helps the students to grasp the concept faster in the girls’ school. I think making male teachers teaching mathematics and science in the girls’ school will help, the girls

go... [to] teach the boys because opposite sex attract. (Rose, July 10, 2018, at 11:00 am)

Although the interview data revealed that the gendered giftedness conception exists, two teachers' responses were contradictory. These teachers believed that either sex could be gifted, "so there is no stereotype and gifted students can be a male and can be a female". Julie described:

In the Ghanaian culture we associate giftedness to both boys and girls. It can be boys because I know last year there was a girl who was so sharp, she topped the whole circuit and she is a girl, but I don't know what happened. (Julie, June 26, 2018, at 3:30 pm)

Further, the interview data emerged showing a shared view about gifted students' cultural background. Geo described this notion:

We are all born to become gifted, each and every person has some potential, each human being has his own gift, but some they are very strong than others. The reason is that it all comes back to the challenges that one has from his or her background. (Geo, June 21, 2018, at 2:30 pm)

Interestingly, the teachers believed gifted girls were more likely to be introverted than the gifted boys.

Another interesting cultural characteristic about gifted girls arose in the interview data. The teachers believed that in the Ghanaian culture, gifted girls "hide their abilities" and isolate themselves, but they did not specify the cultural significance of such conduct. However, they become reclusive when they are given leadership responsibilities in the school system. All the participating teachers echoed the belief that gifted girls feel shy and choose to conceal their abilities. With support from their teachers, they can develop strong self-esteem. The teachers believed that it was important to support gifted girls, although it takes time to develop their self-confidence. Koldy remarked that, "they sometimes crawl to their shells as if they are

average students because they don't want to compete with the males". Koldy attributed this to the origin of giftedness development.

(4) *The genesis of giftedness development:* The interview data disclosed significant beliefs regarding the origin of giftedness development. When respondents were asked to tell a story of how giftedness was acquired and developed, three segments arose: (I) biological; (II) environmental; and (III) developmental factors.

(I) *Biological factors:* Teachers were asked about their beliefs on how giftedness was acquired and developed. All the teachers believed that with giftedness, biological factors contributed to its development. Koldy remarked:

There may be some factors or some variables that can come to play. One of them can be hereditary as in they can be inherited from their parents. If their parents are intelligent, if their parent are smart some genes can be transferred to them, so by biological make up, they are smart. For some too, they can acquire through the environment in which they grew up from. If you grew up from an environment where you are surrounded by educated elite, they are pushing you, they are giving you the assistance... the foundation is very key. (Koldy, June 27, 2018, 2:30 pm)

(II) *Environmental/external factors:* The teachers believed that external influences are critical. The interview data showed that the home determines the stability of gifted students' abilities more than the impact of effective teacher support. It was found that giftedness development begins from home ("tabula rasa"). That is, the home environment (child's first teacher) is one of the major determinants of a child's expression of giftedness. There were common opinions that, "everybody is born to be gifted" (nature). However, giftedness needs to be nurtured and advanced through challenging work and diligence for individuals to reach their desired potential and contribute to society. Joe explained:

Nobody is “tabula rasa” there is something in your mind before coming to school, that is why we were saying that in the educational system we learn from concentric approach. The concentric approach is that you learn from home, environment and then back to society. (Joe, July 18, 2018, at 10:00 am)

(III) Fixed and developmental beliefs of giftedness: The interview data revealed diverse beliefs about whether giftedness was fixed or developmental. Two teachers believed that giftedness was fixed. However, when gifted students are supported their learning grows or develops. While two teachers felt that a child’s giftedness was static, eight teachers believed that giftedness developed over time. Although the interview data revealed that giftedness is acquired “through birth and a gift from God”, Joe felt that giftedness is developed through “personal involvement and encounter with people”. The eight teachers believed that giftedness is an “acquired talent”, which develops through nurturing programs that are geared toward “talent” acquisition. Daniel commented:

A number of ways, they get their ability either observing what is going on around them at a particular time or being involved in the act itself at a particular time, for instance if you are asking people to dance they either watch, imitate and in the end you see that they are better than those who were doing it, so by observing others by taking part in the action they get the skills and so they acquire their skill. (Daniel, July, 2018, at 11:00 am)

In response to the discussion about environmental factors relating giftedness, one participant, Joe, expressed a belief that giftedness is a “cyclical” concept. By this term he means that giftedness begins at home, is enhanced in the school setting and comes back to support society.

In conclusion, this section has discussed the findings about the cultural beliefs and attitudes towards giftedness. Emerging themes included: supernatural spirit; high

social expectations; a gendered dimension to giftedness; the genesis of giftedness, and lastly, fixed and developmental beliefs about giftedness. With the supernatural spirit, the gifted were at times described as “witches”, possessing weird spirits that exhibited unusual actions compared to other children. In the Ghanaian culture, giftedness is a blessed and ancestral gift that diminishes when the gifted individual commits a sin. Gifted individuals are only “acknowledged” in the Ghanaian culture, although there are high expectations set for them. The interview data revealed a number of gendered dimensions of giftedness, such as gifted females hiding their abilities, and girls performing lower in STEM areas. This cultural belief seemed to influence gifted females’ achievements. Gendered giftedness was found to be prevalent among both males and females. The interview data also revealed that the home, school community and peers are considered key determinants for the development of gifts. In addition, the stability and dynamic nature of giftedness was relatively dependent on internal and external supports, and therefore, gifted students need to be accommodated towards appropriate talent development.

4.5 Summary of Findings Related to Research Question One

This chapter discusses teachers’ beliefs about giftedness in addressing Research Question One. Five key findings emerged regarding Ghanaian teachers beliefs about giftedness. Firstly, teachers held varied beliefs about the characteristics and definition of giftedness. These beliefs are grounded in personal experiences and are informed by theoretical perspectives. Participating teachers held naive beliefs patterns about gifted students and this influenced their relationships with them. Secondly, giftedness was viewed as a rare phenomenon in Ghanaian society. Thirdly, within the Ghanaian cultural setting, spiritual and supernatural influences on giftedness exist where gifted individuals were believed to have magic “powers”, seen as “icons”, and hence, distinct

from others. Fourthly, cultural beliefs about the role of women exist and consequently gifted females are less supported to engage in STEM areas compared to gifted males. Finally, high-test scores are the accepted measure for identifying gifted students. However, participating teachers acknowledged the complexity of IQ measure, with the focus being only on academic domain and hence, it is an unsupportive determinant.

Chapter 5: Ghanaian Teachers' Beliefs about Teaching Strategies

5.1 Introduction

Findings relating to Research Question 1 were presented in Chapter 4. That question focused on the teachers' beliefs about gifted children and the concept of giftedness. This chapter reports findings that relate to Research Question 2: What strategies do teachers in Ghana suggest should be put in place to further gifted education in Ghana? The essence of this question was to probe what knowledge participating teachers had of common practices advocated in gifted education.

The chapter presents results in four sections. (1) Constraints that confronted teachers in providing a program that catered for diversity (Section 5.2). (2) Perceptions of how gifted students are accommodated in the Ghanaian school system (Section 5.3). (3) Teachers' views about specific teaching strategies that they would implement (Section 5.4). (4) Teachers' reflections on broader structural approaches needed to cater for gifted students (Section 5.5). The chapter concludes with a summary of all findings about teachers' beliefs and strategies (Section 5.6).

5.2 Constraints on Teachers

Although teachers might have good understandings of practices in gifted education, contextual circumstances would influence their abilities to implement these practices. This section discusses how teachers were constrained in attempting to provide for all students' ability levels. Contemporary teaching practices draw heavily on the belief that learning occurs when students are deeply involved in the process of knowledge

construction to enable them make meaning which is different from inactively receiving information in the classroom (Alexander, 2008; Robinson et al., 2013). Ghanaian teachers in this study stated that they believed in constructivist approaches, but they identified a number of constraints in applying these principles. When teachers were asked to describe how they planned for and modified the curriculum in making provisions for gifted students, all ten respondents articulated constraints regarding instructional strategies employed to meet all students learning needs. Four themes arose from the interview data, and can be grouped as: (1) inadequate instructional flexibility; (2) overloaded curriculum; (3) pressure for syllabus completion; and (4) class sizes.

(1) Inadequate instructional flexibility: With respect to a lack of curriculum flexibility, nine teachers shared similar responses when they were asked about their beliefs on how they planned teaching practices for the gifted. Although the curriculum has been structured for teachers to implement in a prescribed manner, they argued that they have limited control over the content, as the curriculum is examination driven and it is their responsibility to ensure that all students can succeed in national test. In this regard, Frank noted that, “to address their needs, we are mostly limited because of the GES, their laws and customs, and also, Ghana’s IE curriculum is not flexible” (Section 5.5.2). Nine teachers believed that the requirements for implementing the curriculum in a timely manner were demanding. Daniel added to this viewpoint by highlighting:

The curriculum... I don’t see it as being flexible because they give us the syllabus under normal circumstance is like we should teach as to how we think will benefit the child but we are being sort of forced to follow the laid down procedure..., so we have to follow as we see it and not as we think. Where I think I have to modify it I do. (Daniel, July 16, 2018, at 11:00 am)

The lack of flexibility in the curriculum and how it should be delivered was also evident in the teachers' lesson plans, as there was a lack of variety in teaching approaches (see Appendices C-F). In the teachers' lesson plans, there was minimal or no planning for the needs of gifted students. The belief about curriculum inflexibility was evident in all the ten teachers' lesson plans; the structured lessons that were teacher-led had little scope for inquiry or creative activities. There were consistent opinions among nine respondents that the curriculum lacked flexibility. However, one teacher Joe, contradicted the majority view about the inflexibility of the curriculum and argued that there is flexibility in the curriculum. He further explained that teachers were expected to use their personal experiences to modify the curriculum in meeting students' diverse needs. Joe highlighted that the "syllabus is subjective, you are not obliged to use the syllabus, it's... [a] suggested, it's a guide." With this, Joe was suggesting that he could deliver the syllabus in his own way, yet, in his lesson plan, there were no modifications in providing for the gifted, rather, he followed the routinely process of lesson plan preparation. The way the teachers explained their pedagogical approaches in the lesson plans was predominantly teacher-directed with limited opportunities for engagement.

(2) *Overloaded curriculum*: All teachers were concerned that an overloaded curriculum would delay gifted students' ability to advance their content knowledge. When teachers were asked for their beliefs about the ideal way to provide for students' diverse needs, Rose noted that, "the syllabus is too loaded and difficult to provide for all students". Sweetie expanded on this belief by explaining:

With how we modify it; I believe it should come from above because our curriculum that we have is strictly (sic). We've been given so many topics, so many topics, and limited time to treat that of which it's not helping, we

tend to just pour out whatever it is whether ...[they have, or] three students understand....(Sweetie, July 9, 2018, at 11:00am)

Sweetie's opinion about the constraining effects of an overloaded curriculum is consistent with all the teachers' lesson plans. For example, all the teachers interviewed described that in the curriculum guidelines there are approximately 14-15 topics which have to be covered for Grade Seven mathematics in term one. This implies that a teacher needs to teach five topics in a 15-week period within one term. Of these topics, "numbers and numeracy" consisted of eleven sub-topics. Grade Eight mathematics consists of 14-16 topics, whereas Grade Nine has approximately 8-12 topics. Term two comprises 14-16 weeks, while term three consists of approximately 12-14 weeks. That is, the teacher is expected to teach 13-14 topics per term on average, with each topic having about 10-12 sub-topics. Some of the topics could have been integrated as classroom activities for students, which would reduce repetition and delay. Teachers' lack of control over curriculum selection, development and implementation appears to be a significant constraint on the provision of learning experiences tailored to individual needs. Additionally, there are no stated opportunities for students to reflect on concepts or express their views and direct their learning experiences. During the interviews, seven teachers argued that they used the constructivist approach, which focuses on building on what is known or meaningful to students. However, teachers face constraints in its use. Frank commented:

The teacher stands in the gap, hold [s] the child's hand through practice to get to that destination and the child then explores from known to come to terms with the reality and observe the concrete aspect of the topic that you are teaching. (Frank, June 22, 2018, at 4:30pm)

The seven participating teachers talked about using a constructivist approach for classroom instruction. For example, two teachers stated that, they used the

“constructivist method by which we teach students to understand the basics and then extend it”, as stated by Joe, or as Frank highlighted, “we teach from known to unknown”. However, constructivist theory of learning is not about teachers stating questions for students to answer and then solving problems in mathematics as found in all the teachers’ lesson plans. Rather, it is the process of teaching strategies that can engage students to formulate their own questions using various expressions and learning experiences through hands-on-activities (Alexander, 2008; Robinson et al., 2013). There was a relatively naïve understanding of constructivism among the teachers interviewed. All the teachers expressed that they were compelled to use their personal beliefs and experiences as an individual teaching technique. Few recognisable constructivist teaching approaches such as student centred active engagement in exploration and discussion were mentioned. These results were consistent with each teacher’s lesson plan, as they all detailed a specific objective in the Objectives/Relevant Previous Knowledge (RPK) column (see Appendix C-F). This process of lesson planning does not involve providing opportunities for gifted students’ input or extension activities.

(3) Pressure to complete syllabus requirements: There is pressure on teachers to cover a subject syllabus due to three reasons. Teachers were asked for their views on completing the syllabus in a timely manner. All the teachers expressed similar responses. First, the teachers noted that a teacher’s ability to complete the syllabus shows that the teacher has taught all topics in each subject. That is, students will not miss the fundamentals for the next grade (Section 5.5.2). The evaluation or remarks column in each teacher’s lesson plans emphasised lessons which had been successfully taught or interrupted by some circumstances. This indicates that teachers are pressured

to complete the syllabus to show that they have accomplished their task as a subject teacher.

Second, all teachers noted that when students achieved highly in centralised tests it indicates that the teacher has taught the entire syllabus. As stated by the participating teachers, “completing the syllabus guarantees students passing their standardised Basic Education Certificate Examination (BECE)” (Section 4.4). This shows that teachers were being pressured for syllabus completion to enable students’ high achievement in the national test. This aligns with teachers’ lesson plans where most stated questions and discussions in grade nine relied on samples of the BECE questions (see Appendix F).

Finally, nine teachers expressed that “Ghana’s IE curriculum” has a major emphasis on “examinations”. For example, Frank noted that, “students’ high achievements in national examination is important” (Section 5.5.2) and signifies that the teacher was able to complete the required teaching syllabus. This suggests that rote learning may be encouraged among gifted students, due to the pressure on teachers to complete the syllabus with high scores in external examinations. Koldy expressed a commonly held view by explaining:

Every teacher’s aim is to cover the syllabus, but what we seem to forget is that rushing the children through to complete is different from taking your time for the children to understand each concept, to me, I believe that at every stage of teaching there should be learning. (Koldy, June 27, 2018 at 2:30 pm)

Frank was also concerned about the inequities in the curriculum, stating that, “we will blame the curriculum because the curriculum has not been able to address the needs of these students”.

A likely explanation for this view is that the examination focus places high expectations on gifted students' achievement. In these circumstances, only student performance is considered, ignoring their creative thinking skills. That is, high pressure on completing the syllabus content in order to prepare students for a national test or external examination, constrains opportunities for providing different experiences for gifted students. The questions would likely be focused on the prescribed content. This view aligned with the teachers' lesson plans as they often stated content oriented questions to be discussed with students in general (see Appendix D).

(4) Class sizes: All respondents were critically concerned about large class sizes and found it difficult to provide for all students, particularly when the class sizes were above 50. Recently, a Ghanaian newspaper reported that the Ghana Association of Graduate Teachers (NAGRAT) instructed the government and the Ghana Education Service (GES) to strictly use the recommended global standard class size of at most 30 students per class (Graphic, 2017).

According to the NAGRAT vice president's statement, currently there are more than 50 students in some mixed ability mainstream classrooms across the country, which constrained teachers' effective delivery of pedagogical practices. However, it has been reported that the average size of a grade one class in Ghanaian primary schools in 2011 was 36.63 pupils (UNESCO Institute for Statistics, 2018).

In spite of the recommended global standard class size, all the respondents revealed that Ghanaian schools often had large class sizes when they were asked for their opinions on the number of students in their classes. Beauty expanded on this view by stating that, "we have so many pupils in a class, one teacher in a class of 75 is not the best way because they need to be grouped according to their ability". Thus, in such

large classes, teachers are concerned that providing for the gifted during instruction would result in elitism by discriminating against other students given minimal time and would account for inequalities.

To conclude, the constraints of teaching gifted students have been discussed. The findings revealed insufficient instructional flexibility; an overloaded curriculum; difficulties with syllabus completion; and large class sizes. Teachers believed in a constructivist view of teaching, in which they were unable to implement due to a lack of flexibility and an overloaded curriculum. Hence, teaching appeared to be highly teacher centric. This situation may lead to insufficient instructional time and inability for teachers to provide for all students' needs. Instruction in mainstream classrooms may not provide the necessary experiences that challenge gifted students. The trade-off was that completion of the syllabus guaranteed gifted students' outstanding achievements in standardised examinations. Large class sizes were a major hindrance in providing for students' diverse needs.

5.3 Teachers Beliefs about Accommodating Gifted Students

The focus of analysis of data reported in this section was on general approaches to supporting gifted students in the regular classroom. In the following section (Section 5.4) the focus will be on specific teaching approaches. Three foci were identified from the interview data, which can be classified as: (1) responsibilities; (2) inadequate accommodation for academic or learning needs; and (3) marginalisation. All participating teachers believed that giving responsibility to students accommodated the gifted. In attempting to do this, gifted students' academic needs were overlooked and disregarded.

(1) Responsibilities: With regards to how the gifted were accommodated in the classrooms, the interview data revealed that all the teachers shared a common belief that gifted students made teachers' tasks less difficult in the instructional classrooms. These teachers believed that gifted students were acknowledged when they provided them with tutoring or leadership responsibilities. Seven teachers expressed that, "they are given most positions to hold in the school (school prefects)" and are "encouraged to teach others (peer tutors/TAs) as role models to their colleagues". Additionally, "at times they are used as mentors". In the interview data, all the teachers encouraged gifted students to support their struggling peers to understand new concepts and strategies, which enabled gifted students to build their self-confidence. Sweetie broadened this view by highlighting:

As I said for every row there are two or more brilliant students in every row so they have been dispatched to all the rows or the columns in the classroom and when there is going to be a new topic they serve as Teaching assistants (T.A) oh I have about six to eight T.A's so any time after teaching when I ask questions I realised that most students are not grabbing it and T.A's I have assigned them to certain students that when you don't understand anything this is your sister or brother to help you to understand it so even in class when I after teaching out something or what to present I just go sit by those that I have assigned to them and there is a little explanation using the local language that they understand best. (Sweetie, July 9, 2018, at 11:00 am)

Thus, in the interview data, it was disclosed that all the teachers shared a consistent belief regarding how gifted students were accommodated through the allocation of responsibilities in the classroom.

(2) Accommodating academic needs: Teachers were asked how they provided for gifted students' academic needs. Responses from six of the teachers depicted a

belief that “gifted students can make it on their own without extra support on academic work”. Frank expressed that, “this situation, where most good students only passed through the school system with no proper support; something must be done about it”. Despite teachers assigning roles to gifted students, more than half of the teachers expressed that the academic needs of these individuals were not adequately met in the classrooms. That is, gifted students were not adequately challenged with advanced learning materials. Overall, interview data showed that although Ghana’s IE practices were outlined in policy documents, gifted students were rarely accepted. Joan extended this view by stating:

They all pass through the school system with the average, below average, the disabled, whatever they are all included, but if it will be possible they should also get special materials, and special teaching so that at the end of the day they will also benefit. (Joan, July 13, 2018, at 1:00 pm)

This view of neglecting gifted students’ needs was a concern discussed in detail among all the teachers interviewed.

(3) Marginalisation: When respondents were asked to describe how successful teachers accommodated gifted students in the Ghanaian school system, five teachers stated that there were “no” practices implemented or those practices that were “not good”. Joe remarked that, gifted students “are too known”, meaning that gifted students think they know everything or have an answer to every question, “so they ignore them.... without taking proper attention to their culture”. Regarding the question of how teachers accommodated the gifted, the interview data further revealed that, five “teachers do feel that gifted students are a threat to them”. Koldy expanded on this view by articulating:

It’s not good, I will not say it’s the best, I will not say it’s the best because most of the teachers some they have gone through the training alright, but

they are not exhibiting that professionalism. Some too teaching is, is, is
someway but if you have the children at heart and the children are the
centre of your teaching, you accommodate them but some it is the teacher
at the centre of teaching, so these children are neglected. (Koldy, June 27,
2018, at 4:00 pm)

Seven teachers acknowledged that gifted students were not the only group of students
whose diverse needs were overlooked. Five teachers, Beauty, Daniel, Joan, Julie and
Rose, believed that the special needs of the physically disabled were also not
accommodated for, due to large class sizes (e.g., a class of 75 students). Beauty
supported this belief by telling a story:

The class is big (65), I will not see them going out and he will watch when
...[I] am not watching then he goes out, so the others will come and prompt
me madam he has gone out and he is very intelligent although he is like
that he is very intelligent. So, when you are teaching orally he can give
you oral answers very well, but he will not want to write but the day he
will want to write he will write nicely. (Beauty, June 26, 2018, at 10:00
am)

Beauty claimed that large class sizes had become a limitation for teachers, as they
cannot appropriately accommodate gifted students, and especially a gifted student with
a physical disability.

In summary, respondents discussed how Ghanaian teachers accommodated
gifted students in the mainstream instructional classrooms. The following expressions
emerged in the interview data, including responsibilities, insufficient accommodation
for academic needs and marginalisation. With regard to responsibilities, the interview
data showed that gifted students were recognised by giving them responsibilities
around the classroom. In addition, they were made to support struggling students,
which helped regular classroom teachers. With regard to inappropriate
accommodation for academic needs, it was learnt that teachers believed that gifted

students could reach their potential without extra support, and hence, their special needs were not appropriately provided for. The findings revealed that gifted students were not the only group that was neglected, but also the physically disabled. The large class sizes do not accommodate for all students' diverse needs. Gifted students were marginalised, and at times, were sidelined from class activities. In general, a lack of knowledge about giftedness and experience in teaching gifted students is of concern among the participating teachers.

5.4 Beliefs about Teaching Strategies

In this section, the analysis of the interview data revealed that teachers had a wide range of beliefs about what strategies could be appropriate to address the needs of all students. Teachers' views about pedagogical techniques were clustered into three themes: teaching practices based on a teacher's own beliefs and experiences (Section 5.4.1); differentiation strategies that provide inclusive experiences (Section 5.4.2); and finally, analytical and inquiry strategies that potentially challenge gifted students' learning needs (Section 5.4.3).

5.4.1 Individual Beliefs and Experiences

In this section, teachers were questioned about the strategies they employed to provide for all students' diverse needs. The analysis of interview data revealed that all the teachers used their own personal beliefs and experiences to inform strategies in developing gifted students. That is, teachers were unable to identify or describe any teaching approaches advocated by experts in gifted education. Thus, the majority of the teachers believed that they had inadequate knowledge about giftedness and suitable teaching practices. Teachers were further prompted about what they do with students who have already learnt the new material. Their responses are discussed below.

Nine of the teachers' explained how they adopted inclusive education (IE) strategies in the classroom, specifically for gifted students' learning needs. The teachers highlighted that, "gifted students and their special needs are not given any attention"; "we haven't seen anything like that"; and, "the teachers use their own experience, knowledge and beliefs" in shaping gifted students and meeting their diverse needs. Joe expressed this opinion:

We use our own experience when you realise that this child is different from others you have to adapt a method that will enable your teaching... [to] be effective... when you have a special child as to how to teach or handle him or her ... you have to use your own methodology. (Joe, July 18, 2018, at 10:00 am)

He went on to argue:

Those people they are not many, so we will come out with...our own questions relating to what we have taught or learnt, we haven't seen that. (Joe, July 18, at 10:00 am)

Clearly, all the teachers believed that applying personal experience to provide for gifted students' learning needs is ideal as they are "not many" in the classroom (Section 4.4). Respondents believed that providing for gifted students by applying personal experiences, would lead to exclusiveness and less time to focus on the majority. Moreover, one teacher argued that the curriculum was mandated and did not specifically require teachers to offer opportunities for gifted students' development, stating that "we should teach as to how we think will benefit the child but we are being sort of forced to follow the laid down procedure". Daniel expanded this view, stating that he "treats everyone equally in class." This suggests that there is no need to address students with special needs, as it would amount to less time for other students, leading to elitism.

Providing learning opportunities for gifted students to generalise ideas or concepts from concrete to abstract information, based on individual teacher's beliefs and experiences, was missing from instructional practices in all the teachers' lesson plans. The Relevant Previous Knowledge (RPK) section in the teachers' lesson plans seemed to be the only place where every teacher provided opportunities for students to challenge ideas from concrete to abstract, and then solve harder questions. However, to implement RPK was at the teachers' discretion, and not all teachers completed the RPK with these strategies. Encouraging students to analyse ideas may be challenging for gifted students, because they rarely practice such techniques in instructional classrooms.

In summary, the interview data showed that all teachers employed their own opinions and skills to challenge gifted students' learning. There is little evidence that they adopted any strategies advocated for the gifted as described in Chapter 2. This indicated that teachers focused on teaching strategies that cannot adequately provide opportunities for gifted students learning. All the teachers acknowledged that their major emphasis was "on the average students". Although teachers strictly followed the routine procedures that were stated in the curriculum, teachers' lesson plans incorporated individual teacher experience and thus, did not provide specific teaching strategies for gifted students (see Appendices C-F). This implied that gifted students, struggling students and physically disabled students were likely to be marginalised (see sample students mathematics and science tasks in Appendices G-I).

5.4.2 Specific Approaches to Teaching

Although gifted students have diverse needs, teachers were pressured to focus on academic needs to enable high achievement in national examinations. The interview

data revealed that four male participating teachers claimed to use “holistic approaches” to foster the social, physical, creative and intellectual development of gifted students in the mainstream classroom. With this approach, the participating teachers did not clarify specifically what a “holistic approach” implies during the interview. However, they believed that all students would benefit from this teaching approach. Frank’s view was that this strategy “focused on academic performance, as all students can benefit”. The four male teachers thought that employing brainstorming and whole class discussion would provide for the needs of all gifted students, as well as the whole class. Koldy extended this thought by noting:

The next strategy to me, I will recommend ... something. I came across recently it’s like the use of is like an acronym like they call it SPICE is like the ‘S’ is for the social aspect of the child, where the ‘P’ is physical and the ‘I’ is intellectual and the ‘C’ is for creativity and the E is for emotion the next strategy is that you can use this acronym SPICE to assist ...these children. The reason why am saying is that the intellectual aspect is there since they are all gifted in their own ways they all fall short of one of these domains of learning so you..., these, indicators. (Koldy, June 27, 2018, at 2:30 pm)

Koldy described how he used the SPICE model as a “holistic” approach to teaching the gifted, which he assumed was equitable for classroom instruction. However, “holistic” approaches in Western education are meant to develop each student’s social, physical, intellectual, creative and emotional needs (Patel, 2003). That is, it develops the individual to be self-dependent and confident to think critically and analytically during classroom teaching and learning. This shows that “holistic approaches” go beyond the participating teachers’ beliefs about the meaning of the strategy and they lack the understanding and application of “holistic approaches”. Furthermore, there was little evidence that teachers were providing for all students’

diverse needs concurrently. There was no evidence in Koldy's lesson plan that he followed the "holistic" model or backed up his claims about the SPICE model.

Additionally, responding to the question concerning the use of effective teaching strategies, six teachers highlighted that, "we use general teaching to help all students". Although teachers expressed they used a "general teaching" approach, they did not clarify the meaning of this strategy. This strategy was not specifically mentioned in any of the teachers' lesson plans (see Appendix D). It was disclosed by the six teachers that this technique was appropriate for "providing for all students' needs with no equity" issues - a naïve belief. That is, teachers believed teaching all students using such approaches could promote fairness in the mainstream classrooms.

When teachers were further prompted about their opinions that enabled specific approaches to teaching, all the teachers responded that, we "teachers did not do any special course" or "we were not given any specific training". These responses suggested that teachers applied teaching approaches relative to their own experiences in attempting to meet all students' needs. That is, specific approaches would apply. Joe extended this view by stating:

In the syllabus, I haven't seen anything ... [that] if you have this paper and you finish this paper give the person something. I haven't seen some before but what I normally do is that if I realize that this person is good or special I give him something I grade his work, by letting it to be a bit difficult and he use the same time as 20 minutes as their colleague will use and also use the same time to finish it in order not to disturb the class. (Joe, July 18, 2018, at 10:00 am)

The findings of the interview data revealed that nine of the participating teachers raised concerns about their inadequate knowledge of specific inclusive education approaches and skills necessary to provide for gifted students' needs. Daniel

broadened this belief by stating that, “I have no idea about inclusive education, maybe they think we are doing something, but I can’t see anything that is inclusive enough.” These findings are consistent with the teachers’ lesson plans, as there were no specific approaches for supporting and providing for gifted students’ diverse needs. Rather, the lesson plans contained approaches that were designed for the entire class, including brainstorming and whole class discussions.

In addition, general exercises for the whole class were stated in teachers’ lesson plans, without specifically providing for gifted students. The lesson plans also had insufficient activities to promote creative thinking skills (see Appendix G for a sample teacher’s science lesson plan). That is, there were no precise teaching techniques for gifted students to share and discuss ideas on the materials dealt with in class. Joe extended this notion:

I just give everybody the right to do things when they finish. Those that are very good, I keep giving while the others have not finish I keep giving more so that everybody will be occupied, and not one person finishing and becoming idle in the class then I give them time wherever you have reached, we will stop at the same time we will go through the activity for everybody to see his level and not just gifted students, but I have learnt a lot from this interview. (Joe, July 18, 2018, at 10:00 am)

Joe believed that giving extra work to gifted students would enable inequities in the classroom. This implies that some students’ needs were not catered for when teachers relied on specific approaches to teaching gifted students in the mainstream classrooms. It can be noticed from the findings that each of these teachers is attempting to develop classroom culture using a range of strategies based on a constructivist learning theory. A constructivist teaching is based on the belief that when students are actively engage in the process of knowledge building and meaning making, then, learning has taken

place; as oppose to inactively receiving learning material (Peters, Cornu, & Collins, 2003). That is, students represent the meaning and knowledge but not the teacher. However, the constructivist lens is practised differently with teachers acting as edifice of information rather than students. These teachers theorised concepts of a constructivist teacher in the traditional or natural perspective due to their limited exposure to giftedness during professional development; large class sizes; and a mandated inclusive education curriculum. As consequence, teachers are compelled to experiment traditional constructivist instruction; developed classroom cultures with low levels of students' engagement and passively receiving information. For example, rather than providing challenging tasks to develop gifted students autonomy and facilitate their learning, teachers' lesson plans were routinely developed with no space for modification of tasks to challenge all learners abilities (see Appendices E-F) of sample teachers lesson plan. Additionally, effective strategies including critical, creative and problem-solving skills were missing in the samples of all the mathematics and science teachers' plans (see Appendices C-F). The same topics in mathematics including statistics, area and volume; and digestive system in science; with at most two sources highlighted in each teachers' lesson plan (Appendices C-F) to cater for all learners in an entire class. Therefore, participants theorised concepts of a constructivist teacher using self-directed traditional constructivism technique.

To conclude, there was little evidence of gifted education practices being routinely adopted as a specific teaching approach. These results showed that teachers seemed confused with what specific approaches were appropriate in providing for all students' special needs in the regular classrooms. Consequently, the findings from the interview data showed that gifted students were not challenged in the Ghanaian classrooms.

5.4.3 Differentiation Strategies

Teachers were asked about the specific strategies which have been advocated in the literature for meeting students' diverse needs. The common response was that all the teachers adopted strategies that they believed were capable of contributing towards classroom instructional equity. That is, individual teachers employed techniques that they assumed had attributes of differentiation. However, respondents' knowledge about differentiation strategies varied at the individual level, and appeared to be confusing. Six out of the ten teachers believed that differentiation was a way of classifying students based on their abilities. Rose described differentiation when she stated, "that's grouping students of different abilities". Whereas, the remaining four teachers thought differentiation was "identifying the ability of students and giving them the task according to their level". For example, Koldy expressed this view by explaining that, "in terms of teaching you must cater for all these special children and that is inclusive education".

Despite variations in the definitions of differentiation, all the teachers expressed beliefs that teaching is about engaging students with meaningful and concrete concepts. In particular, the significant strategy that was advocated by the participating teachers for gifted students was the modification of instructional techniques, which focused on higher order thinking and meaningful problem solving. By applying strategies, such as brainstorming, questioning, group work, independent learning and whole class discussion, students could relate their experiences to the real world. Although these strategies, according to the interview data, were considered characteristics of differentiation, the process of tailoring instruction to suit individual needs was missing.

Teachers were asked if they successfully applied differentiation strategies, and in response, they all admitted that “we do not do it”. Presumably, a constructivist approach would imply that teachers ascertain what each individuals’ needs are, and teach accordingly. That is, they would differentiate. Seven of the teachers acknowledged differentiation as an important technique for meeting students’ varying needs, but this was not used in Ghanaian classrooms. These results align with teachers’ lesson plans, which had no clear application of appropriate differentiated materials for mathematics and science teaching and learning (see Appendices C-F).

The interview data revealed that all the teachers were concerned about a large class size as another factor affecting implementation of differentiation strategies. Sweetie expanded this view by stating that, “...one teacher in a class of about 75 is not the best way because they need to be grouped according to their ability...,” and “this make teachers tend to overlook differentiation strategies.” The interview data demonstrated that all the respondents expressed that providing for all students’ diverse needs was “tedious”, and consequently they disregarded these strategies. Instead, teachers would “leave the gifted, the physically challenged, the weak and concentrate on normal students.”

Participating teachers were asked to describe what they do with students who finish their tasks before others. All the teachers voiced common responses, stating “we teachers, we focus on academic”; emphasis was “on the average students more than the gifted in the classes”; “gifted students are not so much in the classes”; “the average students they outweigh all so the teachers’ interest is often on the average students more than the highly intelligent student or the gifted child”; “we directed most of our question to those intelligent ones”; and, “we give them more exercises so that all will benefit”.

Quite apart from the above, teachers were asked whether or not differentiation strategies contradicted IE principles. The interview data showed that the teachers' views were diverse. Six of the teachers believed that differentiation strategies were not consistent with inclusive education, while four teachers described their lack of requisite knowledge for its application. Five respondents, Beauty, Daniel, Frank, Julie and Rose, held disapproving beliefs about differentiation strategies. They described them as unhelpful, as they marginalised “the low ability students and disabled”, which contradicted IE principles. Daniel added to this opinion by pointing out that:

I hate differentiating my pupils everybody is everybody, everybody is good everybody is bad. That is what I told you when you tend to differentiate them... the one who is not good accepts he is not good, so he doesn't even make any effort anymore. (Daniel, July 18, 2018, at 11: 00 am)

Six teachers felt that differentiation strategies were challenging due to inadequate teacher knowledge and IE philosophical beliefs. The interview data were consistent with teachers' lesson plans, as they do not mention promoting models that assisted students to understand concepts or learn the content in advance. It was clear that teachers were not employing strategies that were ‘evidence based’, such as ‘graphic organisers’, which promote students’ advanced level thinking. In the interview data, eight of the teachers expressed that, “we do not use differentiation strategies, because all the students learn the same thing at the same time and at the same pace.” Therefore, there was the need for “teacher knowledge in differentiation” strategies. The findings aligned with teachers’ lesson plans, which revealed planning for all students to answer the same questions, with the same level of content knowledge (see Appendix E, F and G of sample students class tasks or exercises; Appendix E for

a gifted student; F for an average student; and Appendix G for a physically disabled student).

In summary, it appeared that teachers were confused about how to differentiate the curriculum or provide specific instruction for gifted students. Confusion arose for teachers, because there were no provisions for defining students' diverse needs in the curriculum. Also, a lack of training or professional development contributed to a poor understanding of differentiation approaches. Therefore, teachers, in attempting to offer support in mathematics and science teaching and learning for the gifted, relied on individual teachers' preferences and experiences.

5.4.4 Analytical and Investigative Strategies

Advocates of gifted education endorse inquiry learning as an effective approach to supporting gifted students (Archambault et al., 1993; Gentry et al., 2011; VanTassel-Baska & Hubbard, 2016; VanTassel-Baska, Avery, Stuck, Feng, Bracken, Drummond, & Stambaugh, 2003). This section explores the extent to which teachers pursue inquiry strategies to support gifted students' learning. Teachers were asked to explain the strategies they used in mathematics and science to promote advanced level learning among gifted students. Analytical and inquiry strategies were rarely discussed by all the teachers interviewed.

All teachers articulated that gifted students were not encouraged to participate in activities that would assist them in building arguments, such as written, oral and visual activities. Instead of asking students to gather information and draw inferences, students were made to infer and present findings using gathered data provided by teachers (see Appendices G, H and I of sample students' mathematics and science tasks). These findings were consistent among all mathematics and integrated science

teachers' plans (see Appendices C, D, E, and F of sample mathematics and science teachers' plans). These results demonstrated that gifted students were not challenged with analytical and inquiry approaches to teaching and learning.

In the teachers' lesson plans, although there are multiple types of questions that have been detailed in the 'evaluation and remarks column', there was no inclusion of strategies that allow gifted students to investigate problems and analyse information.

5.4.5 Summary

In brief, individual teaching strategies in support of gifted students have been discussed. First, the result indicated that teachers used their own understandings and experiences to shape and develop gifted students. Second, differentiation strategies were ignored, as teachers found it difficult to understand differentiation and its application in classroom instruction. Furthermore, independent inquiry involving critical and creative thinking strategies were overlooked by teachers. Lastly, gifted students were rarely encouraged to think analytically and investigate ideas.

5.5 Beliefs about Structural Strategies

This section explores teachers' beliefs about broader structural approaches. These include: ability grouping (Section 5.5.1); grade skipping (Section 5.5.2); and finally, streaming (Section 5.5.3). In most jurisdictions, these practices tend to be implemented at a school-wide level or require endorsement by school administrators.

5.5.1 Ability Grouping for Accommodating Individual Differences

One important grouping strategy that all the teachers expressed they used to accommodate gifted students in the Ghanaian junior high school system was mixed

ability grouping. That is, clustering of students with a diverse range of abilities or grouping students of different ability levels together (Section 2.7.5).

The participating teachers were asked to provide their opinions about the strategies they employed to cater for individual differences in the regular classroom. In response to the interview question, all ten respondents remarked that in their classrooms, a different range of abilities such as the gifted, low achieving, average ability and struggling students are all clustered in one classroom to receive the same information and instruction in all subject areas. Julie, expanded this view by stating:

I teach in JHS 2 ... [grade eight] and in that class we have the gifted students, those with low ability, the average, the physically disabled and the struggling students, and they all take part in all subjects, class exercises and class tests at the same time. (Julie, June 26, 2018 at 3:30 pm)

This view implies that mixed ability grouping was typically practised in the Ghanaian mainstream classrooms. Through this strategy, a series of ideas emerged as teachers agreed with this view for accommodating students' different abilities. Six teachers believed that, "when students are grouped together they learn" to tolerate the views of each other. The remaining four teachers also thought that when students are grouped with diverse abilities, "peer teaching is good" as support from "gifted students" enabled other students to "understand" and apply "new" knowledge.

Although all the teachers endorsed mixed ability grouping, they were concerned about their insufficient knowledge on mixed ability grouping strategies. Rose added to this opinion by highlighting:

Since we are individuals and we have different abilities..., we group students according to [their] varying abilities in the classrooms so our curriculum should also be structured in a way. I think one teacher taking them or teaching the whole class with students having several abilities and

children who have physical disabilities at a time is not enough, although the gifted can help them but it is not enough, because what about the low ability students, ... you can imagine the time that the good students spend to help the weak, we need more training ... (Rose, July 10, 2018, at 11:00 am)

Rose believed that it was important to group students based on their abilities, as individuals are different. She also expressed that teachers need further professional development on mixed ability grouping strategies and this will benefit teachers in the Ghanaian regular classrooms. All ten teachers explained that when students of diverse range of abilities are grouped together in the same classroom, gifted peers could explain challenging ideas in real life situations to their class mates and share ideas relating to material discussed in class. Teachers believed this was a more appropriate strategy. Beauty broadened on this view by noting that, "...I normally ask the intelligent ones to sit beside the low ones".

This finding was corroborated by all the teachers' lesson plans, where pedagogical approaches were stated typically to provide for an entire class at one time (see Appendices D-F). Also, in the teachers' lesson plans, every teacher noted that specific objectives would be achieved by the end of each lesson. Additionally, there were no statements in the teachers' lesson plans that indicated activities or structured questions for individual discussion and development of ideas. The lesson plans showed a few questions which were detailed for all students to answer as a whole class exercise or test. These actions were frequent across the ten teachers' lesson plans (see Appendices C-F).

In conclusion, the interview data revealed that teachers catered for individual differences by relying on mixed ability grouping. However, opportunities for gifted students to ascertain individual ideas through structured questions were lacking. Other

appropriate strategies that enhance gifted students' abilities, such as advanced learning, were also overlooked. Although teachers overwhelmingly supported the use of mixed ability grouping, this strategy was not indicated in their lesson plans.

5.5.2 Grade Skipping/Acceleration

Acceleration or grade skipping strategies were discussed in Section 2.6.3 as an approach that may benefit gifted students. However, some researchers believed accelerating students may have negative effects if teachers relied solely on IQ measures (Davis et al., 2014; Neihart, 2007). A review in the US referred to acceleration as a structural process that allows a student to skip one or more grades (Davis & Rimm, 2004). Although acceleration is generally not done by individual teachers but as a systemic policy adopted at the school level, respondents managed to share with the researcher their opinions when asked to describe their beliefs about accelerating gifted students at their school level. All the teachers were critical about the application of these techniques. Two opinions emerged, including age and maturity specifications, and domain general models.

Age and maturity specifications: Regarding the teachers' views about grade skipping or acceleration, all the teachers' responses during the interview revealed that it was relatively contextual. That is, the strategy was reliant on the type of school and if the student was far older than their peers or classmates. According to the majority of the teachers, accelerating students to an above grade level or subject only prevailed in Ghanaian private schools. This practice was rare in Ghanaian public schools, which often relied on "students' maturity". Eight out of the ten teachers stated that accelerating or skipping gifted students to higher grade levels or subjects was undesirable in Ghanaian public schools. Koldy expressed the belief that students would "miss the fundamentals." Half of the teachers indicated that grade skipping or

acceleration could be adopted if the student was far older than their peers. Frank highlighted:

The right thing if somebody is academically sound, those students we challenge them either we accelerate them..., the age limit sometimes ... doesn't help most of the children. Here is the case that even if you are 13 years, and you enter into the university, Ghana education service will not let you go. It will be very difficult to pass through, because for them their age limit is by 7 you have to be in class 1. So by 15, 18 you are now completing senior high school. But our modern generation, now things have changed. A child can be at the age of 9 but the child can be academically sound that the child should be even be promoted or accelerated to the next class. But here is the case that sometimes the educational structure that the Ghana education service- GES, it will be very difficult to be permitted so sometimes we identify them. But to address their needs, we are mostly limited because of GES their laws and customs as students high achievements in national examination is important and this shows the teachers output of work.... (Frank, June 22, 2018, at 4:00 pm)

The assumption is that students can only be made to skip a grade if the individual had matured, as they would miss learning critical concepts.

Domain general models approach in grade skipping: A general domain model approach assumes that a student performs highly in every subject area. If students meet this condition, they are eligible to skip a grade (Kaufman & Sternberg, 2008). Assessment relies on formal testing to determine a student's IQ. When teachers were asked to share their views about grade skipping, five respondents expressed that students who achieved highly in all domains could be made to skip a grade. Joe noted that, "will it help if we skip students because their IQs are high in all subjects, we will not get the numbers who are experts... [in the subject areas]?" In this situation, it appeared difficult for teachers and the accelerant, because more work was required in

each grade due to a different curriculum. For example, Joan believed, "...every class has its own syllabus if you jump the child, the basics that the child needs to go to the other class will not be there, and we only move to another topic when we finish teaching the previous one." Two teachers, Joe and Sweetie, voiced a contrasting belief, when they expressed that it was necessary to accelerate students, so they could develop problem solving and advanced learning skills. Sweetie remarked, "it is good..., they are really gifted, they are really intelligent, so they can learn certain things even if you skip them they are going to grasp whatever is ahead..." As well as a teacher, Joe is a parent of a gifted accelerant. He briefly described:

In fact, I had a daughter who was promoted and was thinking because of her age she will find it difficult but I realised that she was able to perform, she had ... six ones in JHS going to SHS, so I realised that she is good, and one thing, it has reduced her cost of education... (Joe, July 18, 2018, at 10:00 am)

Four teachers, Frank, Geo, Joe and Joan, supported advanced learning when students skipped grades, which challenged these students to reach their maximum potential. The remaining six teachers recognised that the home and school were necessary determinants for challenging and sustaining the progress of gifted students, but did not advocate for grade skipping. They concluded that Ghana's inclusive education curriculum is not sufficiently supportive of gifted students skipping grades. These findings are consistent with teachers' lesson plans, as 'curriculum compacting' was the only acceleration strategy employed by teachers. This is when teachers move onto other topics after teaching previous ones. The topics are not repeated, but are replaced with new ones.

In brief, this section has discussed the interview data in regards to accelerating or grade skipping students in above grade levels and subjects. Individuals may skip a

grade if they are over age, or if they have a high IQ performance across all subject areas. Eight participants believed that skipping a grade was unhelpful, as students would miss critical concepts because each grade has a different syllabus. Streaming

In Section 2.7.4, it was discussed that streaming is being practised in most countries, including Australia (Johnston & Wildy, 2016; Pattinson, 1963). Most United States schools have been practising tracking, an alternative term for streaming (Neihart, 2007), which was discussed in Chapter 2. Streaming has been argued to be appropriate for accommodating individual differences in regular classrooms (Johnston & Wildy, 2016; Pattinson, 1963). The participating teachers were asked about their beliefs concerning streaming or the type of education system practised in Ghana. Streaming is seen to be interpreted differently compared to Australia, Europe and the United States. Responses from all the teachers indicated that in Ghana, schools appeared to be streamed in terms of school hours with morning and afternoon shifts. Thus, engaging students in the morning and afternoon shifts seemed to denote streaming or mainstreaming according to the participating teachers. Neither shift is selected based on criteria related to ability. In this thesis, the term homogeneous or single ability class grouping is used in lieu of streaming. Homogeneous ability grouping means clustering individuals of similar characteristics (i.e., streaming, setting or tracking).

The findings from all the teachers interviewed showed that the Ghanaian school system practised mixed ability classroom instructional techniques in all schools across the country. That is, students with high abilities, average abilities and low abilities are grouped or housed in the same classroom for instruction.

Respondents were further prompted to describe whether these mixed ability techniques were helpful in the classroom. The teachers articulated that although mixed ability grouping was appropriate, as the gifted supported the struggling peers or

students with low abilities, teachers' professional development was inadequate to meet all students' needs in the regular classroom. Inadequate professional techniques for effective mixed ability grouping implementation was a challenge. Frank noted that, "we need extra in-service training on grouping skill". All the teachers noted that "the training they gave us was not enough to provide" for the learning "needs for all students in a class" and "we cannot only pay attention to the needs of the gifted and every student"; Joe expressed that this is "not possible". This suggests that providing for individual student's learning needs in the mixed ability class is a challenge for the participating teachers due to a lack of requisite giftedness knowledge. In this situation, some students' learning needs were overlooked, causing inequalities in the mixed ability mainstream classrooms. The ten teachers had five main concerns resulting from insufficient professional preparation concerning the appropriate implementation of mixed ability grouping: the gifted are not challenged; difficulty to complete school tasks; the weak and the physically disabled do not benefit; setting high expectations for students; and, encouraging students' marginalisation and truancy. These opinions are discussed below.

The gifted are not challenged: In response to the question about participating teachers' views of whether streaming was helpful, all ten teachers suggested that gifted students were not challenged in the mixed ability classrooms and their performance tend to regress. Further, eight of the teachers expressed that Ghana's IE was not adequately "challenging gifted students as expected", and their performance tend to "decline drastically". Frank remarked on this belief:

In fact, if somebody is academically sound and you don't challenge this child, the child feels relaxed, and if care is not taken the child will start declining, because every day that child is 1st, 1st, 1st, [and] 1st, there is no

challenge... It tarnishes the intelligence of that child. (Frank, June 22, 2018, at 4:00 pm)

This supposition indicates that gifted students in mixed ability classrooms are likely to become complacent if they are not challenged. Two of the respondents noted that a teacher's interest was geared toward addressing the needs of average students rather than challenging gifted students. This may contribute to them becoming "lazy", "complacent", and above all, "truant". Koldy made a broader assumption about the focus of the curriculum on average students:

I will say that the Ghanaian curriculum hasn't totally tackled these children because the Ghanaian curriculum ... is always designed in such a way that it will meet the average because we have first of all we have the urban, we have the rural streaming..., [streams] and the curriculum is not designed for only the urban sector, they are writing a standardised examination so it cuts across both the rural and the urban sectors, so it is for the average, an average this is what the child is supposed to know, but if you give this average content or curriculum to these gifted children they turn out to lose interests in the field because the curriculum is not challenging enough because they just add the average level which is not challenge them to, to move up. (Koldy, June 27, 2018, at 2:30 pm)

Another idea emerged from interviewing the teachers on whether streaming was helpful. The teachers revealed a traditional teaching approach which appeared to have been explicitly designed for students to only pass standardised examination. Hence, its aim was geared towards average students and not towards challenging the gifted.

Difficulty to complete school tasks in the mixed ability classroom: In response to the question on teachers' perceptions about streaming, all the teachers expressed that when "students of varying abilities are placed together in one classroom [i.e., mixed ability classroom], we give the same kind" of tasks. These teachers believed that some "gifted students may not take part". Joan stated that, "the gifted students will

not complete the given task because they think the exercises are not challenging enough”. The weak or low ability students may also have difficulty completing classroom tasks because it may not match their ability levels. Geo expanded on this view by stating that, “for the weak students, no matter how I teach in class they cannot finish class exercises”. The physically disabled may also have challenges completing the tasks as a result of their disabilities. Julie noted that “there is a boy with a visual disability in my class, this boy is gifted but cannot see and read from the board, because of that he finds it difficult to finish class exercises”. Although the average students may find it appropriate, they may form the minority group of each class, in this circumstance, the majority of the students within the mixed ability classroom would be disadvantaged.

The ten teachers were concerned about limited instructional time as one of the factors limiting students’ ability to complete classroom tasks. Joe broadened this view by expressing:

It’s not helpful because you will not be able to complete the syllabus. The morning and the afternoon 1st and 2nd sections some will come 8 o’clock and finish 12, some will come 12:30 to one and close like 4:30, you realised that they were not able to finish class exercises because of limited time but when you have more time you will be able to complete. (Joe, July 18, 2018, at 10:00 am)

The gifted, the weak and the physically disabled do not benefit: In responding to the previous question about whether streaming was useful, all the teachers expressed their views that the majority of gifted students in the mixed ability school system passed through school unrecognised. According to the teachers interviewed, there were several factors that account for this issue; Frank stated that, “teachers keep repeating” previous materials, “gifted students are not encouraged” to think creatively and

analytically, and gifted students are “made to assist the weak to understand “previous topics” and “mark exercises”. These practices affected gifted students negatively, with them becoming distracted, frustrated, “truant”, “lazy” and “complacent”. Koldy broadened this belief by stating:

When they understand the topic and the teacher keeps on repeating that same concept over and over and over again with the intention of helping the middle rollers or the weak students to understand those topics. They also become lazy because they think like you are boring them with one particular thing, you are boring them so they play in the class or they fidgeting or they start showing. They are not motivated to pay attention like they have already understood and you are wasting the rest of their time..., so their behaviour... when you are teaching they are..., [become] inattentive. ... [However,] the moment they understand and you are re-emphasising certain things they become bored because you are wasting their time. (Koldy, June 27, 2018, at 2:30 pm)

This notion suggests that repetition of instructional material does not support competition among gifted students, but rather discourages students’ learning. That is, gifted students become inattentive in the mixed ability classrooms when instructional materials are repeated, despite the high expectations set for them in society.

Furthermore, all the teachers noted that gifted students need more time to advance their learning experiences towards advanced knowledge in mathematics and science. These teachers further stated that “the allocated teaching... [instructional] time” is inadequate for “gifted students to do difficult tasks” (Joe), and spending time on gifted students would mean under-valuing the non-gifted students. Koldy remarked that this would result in “neglecting other students”. Thus, respondents thought that the gifted do not need extra support in the Ghanaian mixed ability classrooms. This lack of instructional time concerning the implementation and appropriateness of mixed

ability grouping suggests that the special needs for the weak and the physically disabled students would also not be appropriately met because their needs are equally provided within the scanty allocated teaching period. Therefore, adequate time is critical in providing for every student's learning needs. This finding means that teachers were rejecting mixed ability grouping which is commonly practised in Ghanaian junior high schools and advocating for homogeneous grouping or a single ability class grouping, where students of similar attributes are grouped in separate ability classes. Participating teachers believed that when students are grouped in a single ability classroom, the needs of the gifted, the weak and the physically disabled would be met compared to the mixed ability grouping that teachers are currently experiencing in the regular classrooms. They also thought that with homogeneous grouping classroom, instructional time would be more than mixed ability grouping, a naïve belief. However, if the practices of mixed ability grouping should be maintained, participating teachers would prefer to work within a well-refined classroom with students of diverse abilities and adequate instructional time to cater for each student's learning needs.

Setting high expectations for students: In responding to the question of teachers' perspectives about appropriateness of ability grouping, all the respondents expressed that society had high expectations for gifted individuals. That is, "we teachers, we cherish them", they "make our work faster and less difficult", and, "intelligent people, they are the renowned ones and icons", so "we teachers up hold them" (Frank). Joe noted that, "if you do not have them in your class, especially in your mathematics and science classes, you cannot finish your syllabus, and you will end up with poor results in the BECE examinations". Geo commented:

Somebody like 'Kwame Despite', look he is gifted. If teachers were to give him some support, right from his education, he would have helped Ghanaians better than what he is doing now. He is generous, because he used to help people out of their poverty, the widows, and the physically disabled and ... [,] the orphans and... their education. He is smart and has creative mind. For him he is not only smart, but innovative. He has many new projects that gives him income. We teachers we... need to really support all gifted people because look, they are not selfish, they solve our problems, but we do not provide for their needs, now we need to change, that's that. 'Yen suban no, pesemenkomenya no enyne, yenyae'. [In English Language as; our selfish behaviour is not helpful, we should stop]. We need to support the intelligent people, the gifted so they can help all of us to live with joy. (Geo, June 21, 2018, at 2: 30 pm)

This belief presupposes that, although gifted individuals are admired in the Ghanaian school system, there were inappropriate structures to meet their needs. In teachers' lesson plans, there were no statements indicating how teachers provided for gifted students' learning needs. For example, seven of the participating teachers noted that gifted students are only "acknowledged", but they are not explicitly "supported". In general, if gifted students are well supported in the regular classrooms, society would largely benefit.

Student marginalisation: When teachers were asked to share their beliefs about how suitable Ghana's junior high school system or streaming was, all the teachers expressed that when gifted students are not appropriately accommodated by teachers, "students become marginalised". Frank highlighted, "streaming..., [otherwise mixed ability classroom] it doesn't help and students usually get confused". That is, "when you meet them in the evening, they will tell you they are in the morning shift, and in the morning they will tell you they are in the afternoon shift". Some students become "truant" and eventually, drop out of school. Koldy spoke extensively on this opinion:

To me, this streaming [mixed-ability classroom or ‘in-housed’] system we have in Ghana is just like ... neglecting other students, like making selection when teaching students of different ability levels in the same class, like you’re sorting out so certain students are being selected while others are not, or certain students are being given priorities, others are not so it’s like you are..., sorting out in the school system. (Koldy, June 27, 2018, at 2:30 pm)

This notion suggested that the practice of mixed ability grouping is inequitable and does not benefit all students in inclusive classrooms. Thus, Koldy is endorsing the practice of homogeneous grouping rather than mixed ability grouping. However, in the teachers’ lesson plans there was no mention of activities that can promote and support gifted students’ development in either the homogeneous class or the mixed ability classroom. That is, gifted students have no place in teachers’ lesson plans and as a result their learning needs are overlooked. In the teachers’ lesson plans, classroom instruction was focused on the average student cohort and marginalised the gifted, the weak and the physically disabled students as well.

5.6 Summary of Results Related to Research Question Two

This section has examined teachers’ beliefs about effective strategies needed to support gifted students in addressing Research Question Two. The results disclosed the approaches that the participating teachers adopted for supporting gifted students.

First, teachers used their own understandings and experiences to provide for the gifted due to their inadequate knowledge about giftedness and thus adopted “general” strategies to enable them meet deadlines. That is, their teaching approaches were not informed by any specific theoretical understanding of how to cater for gifted students. Teachers were constrained with this style of teaching the gifted. Second, teachers misunderstood the concept of differentiation and acceleration strategies and held

confused and contradictory ideas. Hence, the participating teachers overlooked these strategies when developing the gifted. Third, the results showed insufficient evidence of recommended giftedness strategies, including problem solving, critical, inquiry and creative thinking skills. That is, the Ghanaian teachers' approaches to teaching the gifted rarely involved classroom discussion and were mostly teacher-led. Fourth, it seemed that there was confusion and contradiction amongst the teachers regarding mixed ability grouping. Teachers practised mixed ability grouping in the classrooms but appeared to lack the required professional skill for effective mixed ability grouping at the school level. That is, they would prefer classes structured by diverse ability level so that the students that are more able could help the less able. Therefore, in the Ghanaian classrooms, mixed ability grouping is a commonplace learning environment.

In conclusion, it appeared that training programs did not explicitly prepare teachers for gifted education practices and concepts, therefore, they were constrained in attempting to provide for the gifted. Rather, teachers' preservice programs focused on methodology and assessment strategies to enable students' high achievement in high stake national tests.

Chapter 6: Discussion

6.1 Introduction

The aim of this study was to explore Ghanaian teachers' beliefs about giftedness and how they believed gifted students should be supported in the regular classroom or through school wide strategies. It addressed two research questions: RQ1: What beliefs do teachers in Ghana hold about giftedness? RQ2: What strategies do teachers in Ghana suggest should be put in place to further gifted education in Ghana? This chapter is organised according to the research questions, by comparing the results and findings of the data and interpreting them with reference to the literature.

This chapter is structured as: Research Question One (Section 6.2); teachers' naïve beliefs about giftedness (Section 6.2.1); teachers believed giftedness is grounded in spiritual origins (Section 6.2.2); teachers' beliefs about the gifted across all Ghanaian cultures/tribes (Section 6.2.3). Finally, the section concludes with a summary (Section 6.2.4).

Research Question Two (Section 6.3); also considers the discussion in five parts, namely; lack of knowledge about teaching strategies (Section 6.3.1); peer teaching strategies (Section 6.3.2); individual teachers adopted strategies to enable success in national tests (Section 6.3.3); structured strategies for accommodating the gifted (Section 6.3.4); and streaming (Section 6.3.5). Finally, the section concludes with a summary (Section 6.3.6).

6.2 Research Question One: Beliefs about Giftedness

Based on the interviews conducted with the ten teachers, three key findings emerged from the data: First, teachers held naïve beliefs about giftedness (Section 6.2.1); second, teachers believed giftedness is grounded in spiritual origins (Section 6.2.2); third, teachers expressed beliefs that gifted students are found across all Ghanaian cultures and tribes (Section 6.2.3). Finally, the section concludes with a summary (Section 6.2.4).

6.2.1 Naïve Beliefs

Naïve beliefs in the context of this study can be described as uninformed views or misconceptions that occur when a person has not developed a deep understanding of the topic in question. As reported in Section 4.4.1, a range of naïve beliefs emerged from the interviews with all ten teachers about the concept of giftedness. For example, one teacher found it difficult to define giftedness and questioned that, “do we have one definition?” (Section 4.4.1). This finding aligns with a study by Cramond (2004), which revealed that accepting a single definition of giftedness may indicate the end of society’s acceptance of individual cultural perspectives. Although Cramond (2004) did not clarify the meaning of this statement, presumably it means that society would have to depend on a particular culture to agree on a single definition of giftedness. Cramond (2004) further described a single definition of giftedness, noting, “how can we expect to solve [a problem], when they can’t even agree on a definition of giftedness!” (p. 15). Each teacher in this study was uncertain about whether giftedness could be defined in a precise way. Cramond (2004) proposition can be critiqued as it raises confusion about whether she was endorsing the formulation of a single definition or whether she was using a series of attempts to arrive at a single definition.

A dominant belief that the teachers had in the study was that giftedness is determined by a student high intelligent quotient (IQ) (Section 4.4.2). Researchers of gifted education do not mean that IQ tests or cognitive ability tests do not provide relevant information. Rather, it specifies the use of a combination of subjective and objective measures by carefully considering the best of each measure (Davis, Rimm, & Siegle, 2014), specifying the use of multifaceted approach. Therefore, using only IQ measure to identify students' giftedness is a naïve view because IQ is an outdated and traditional way of identifying students' giftedness. Such traditional IQ definitions originated in dated research such as Terman's (1925) work from the United States which defines a limited number of gifted students as, "the top 1% level in general intellectual ability, as measured by the Stanford-Binet Intelligence Scale or comparative instrument" (p. 43). This categorisation is outdated with current research which shows that a vast array of characteristics can be used to determine giftedness such as art, music, language and leadership (Borland, 2005, 2009; Renzulli, 2002).

Using only IQ to categorise students as gifted can be called a naïve or "exclusive" belief (Renzulli, 2002). An exclusive view denotes that giftedness only focuses on the intellectual component, and hence, can be considered a naïve view or a harmful myth (Borland, 2005, 2009). The findings showed that it was predominantly the respondents with limited experience on gifted education who held the naïve or exclusive beliefs about gifted students. This finding is consistent with reports discussed in Chapter 2. For example, Kim et al. (2005), a Korean qualitative case study, found similar results relating to teachers having exclusive views which influenced their naïve beliefs about gifted students. Carman (2011) study in the United States found that pre-service teachers have naïve beliefs which led to exclusive beliefs about giftedness as they viewed gifted individuals as only being Caucasian.

All the participating teachers held naïve beliefs about gifted students' academic achievement. They acknowledged that gifted students exhibited high academic performance in mathematics and science classes through demonstration of their achievement and that they are seen as “geniuses”. This view expressed by the teachers aligns with existing research model such as Sternberg's Pentagonal Implicit theory. The theory was established in the US by Sternberg in 1993, and was expanded by Sternberg and Zhang in 1995. It postulates that there are five characteristics that describe gifted students. These are: Excellence, Rarity, Productivity, Demonstrability and Value (see Section 2.4.2). Later, the theory was validated in Hong Kong by Zhang and Sternberg in 1998 and then in China by Zhang and Hui in 2003. Lee (1999) also demonstrated its validity in Australia. Their analysis found similar results to this current study, related to gifted students who are described as “geniuses” as they show “excellence” in academic performance.

Findings from this study also showed that gifted students are those who demonstrated high levels of achievement in “mathematics and science” (Section 4.4.1), signifying that giftedness comprises attainment in specific discipline area only. This belief aligns with the second criterion of Rarity (Sternberg, 1993) that views gifted students as not the norm, relative to peers. Tapper (2012) found parallel results in a New Zealand context where this view of gifted individuals suggested they exhibited brilliance in one domain, but not across all areas specifically.

6.2.2 Cultural Beliefs

The study identified that cultural beliefs influenced teachers' perceptions of giftedness. Teachers believed that giftedness is grounded in spiritual connotations. Findings indicated that the gifted are at times labelled as “witches” or possess weird spirits as

they display rare actions, such as working on mathematics while remaining attentive to the teacher's classroom instruction on another subject area (Section 4.4.3). This indicates that gifted students are influenced by some 'magical powers' such that they can "solve difficult and unusual problems". The spiritual giftedness is often believed to be inherited from ancestors. Ngara and Porath (2004), in a Zimbabwean review of research and drawing on interview data from 16 teachers, found similar results associated with giftedness as a social concept with spiritual undertones. In addition, Alencar, Braga, Prado and Chagas-Ferreira (2015), in a Brazilian indigenous context, found that there was a link between spirituality and creative giftedness which was seen as the "blossoming of spiritual intelligence" (p. 224). Thus, spiritual giftedness was believed to exist in the socio-cultural setting of indigenous students.

Interestingly, alternative findings showed that teachers judged gifted students based on their personal and behavioural characteristics they exhibited in the socio-cultural environment. Findings revealed that these attributes ranged from quiet and reserved, to energetic and assertive in their communities (Section 4.4.1). This characteristic behaviour needs to be identified and develop appropriate classroom culture which have high levels of engaging gifted students' diverse learning needs with effective classroom pedagogical practices. However, the cultural beliefs hinder teachers approach towards gifted students learning needs because they believed these students do not require extra teacher support and ignored them.

6.2.3 Giftedness across Cultures and Tribal Beliefs

Seven of the participating teachers accepted that gifted students came from a variety of cultural backgrounds. These results are consistent with Sternberg (2007), Renzulli (2005) and Kaya (2015), who drew on educators' conceptions of giftedness. They

found similar results, that gifted students have varied cultural origins, ethnicity, contexts and values.

Remarkably, giftedness stands out in all Ghanaian cultural groups and each group has a way of valuing and describing giftedness; however, there are parallels within these descriptions of giftedness. For example, in the Ghanaian local dialect, giftedness in the Ga tribe Accra, is described as “Nyomonikeenor” (English: God given gifts). In the Volta region, the Ewe tribe describes it as “Mawu nunana” (English: God given gifts). The Asante tribe describes it as “Onyankoropon akyede”, or in the English Language this means gifts from the supreme God. In Fantse, it is described as “Nyankopon akyedze”, meaning God given gifts. All cultures in Ghanaian society ascribe giftedness in relation to gifts from God. One teacher noted that, “giftedness is from God, its God gifts” (Section 4.4.3).

In addition, giftedness was noticed by the majority of the respondents as a blessed gift from ancestors; it is “pure”, “open-minded” and “not selfish” (Section 4.4.3). Another cultural belief shared across the participating teachers was that an individual can become gifted during a child naming ceremony, where libation is poured onto the child and a gifted family member’s name or an ancestral supernatural spirit is invoked unto the child in question. In such a beseeched practice, the gifted individual portrays a good moral conduct and spirituality.

In Ghanaian society, giftedness assumes a high social standing. Students who are gifted are given a higher social status than non-gifted students. The result of this study revealed that all the teachers have high social expectations of gifted individuals in Ghanaian society. That is, the gifted are likely to exhibit a substantial degree of potential with many good future prospects, relative to their peers. Due to this, teachers acknowledged their responsibility to help develop gifted students through school tasks,

such as allowing them to be “self-starters”, “innovators”, “leaders” or “problem solvers” of society (Section 4.4). This suggests that gifted students are perceived to be “special” or “icons” in the cultural setting.

Subotnik and colleagues (2011), in their work on cognitive testing, drew on quantitative and qualitative data and found the link between “potential” as an essential component to begin with, and “eminence” as a completely developed talent (p. 7). The relationship between “eminence” and “icons” has parallels with the Ghanaian culture, which believes that prosperity is awaiting the gifted when fully developed and assessed. This suggests that gifted students bring their potential to be developed to benefit society because being an “icon” does not necessarily mean they can contribute to society, unless their potential is fully developed into talent (Gagné, 2004, 2005, 2010; Subotnik et al., 2011). This finding is evident within the fourth criterion Demonstrability (Sternberg, 1993), and relates to the first criterion of Superiority of an individual as an established attribute.

Furthermore, results indicated that “labelling students as gifted” is undesirable because it may lead to “discrimination” among students. Thus, participating teachers believed that when students are labelled ‘gifted’, would mean allocation of limited instructional time for the majority student cohort. In addition, the individuals become complacency leading to underachieve; and the weak and struggling students become effortless.

Gendered perspectives of giftedness are similar across Ghanaian tribes. Data disclosed that all the teachers perceived males to be more gifted than females, because gifted males performed highly in science compared to gifted females. This stems from the Ghanaian socio-cultural perspective that males perform all challenging tasks in society (Section 4.4.3). Analysis of interview data suggested that respondents held

‘implicit theories’ or tacit thoughts concerning the roles played by gender in society (see Section 2.4.2). Tacit beliefs are referred to as common sense views or knowledge that resides in the minds of people, which are used in judging interactions in society (Kim, 2015). Findings in this study showed that gendered outlooks were not only present in Ghanaian cultures and tribes, but were also consistent with Western cultures. Lee (1999) found comparable results related to gender disparities. That is, gifted females were less likely to be nominated for gifted programs compared to gifted males, because the focus was on science.

Hyde and Mertz’s (2009) work drew on a review of data in the US and other nations on gender variations in mathematics and found similar results relating to gifted males achieving highly in mathematics compared to gifted females. Beliefs about gendered giftedness in STEM areas were not only parallel with Ghanaian teachers in this study who represent cultures and tribes in the Ghanaian society, but also existed within other African cultures and Western cultures.

6.2.4 Multiple Views of Giftedness

In this study, there were several opinions about the origin of gifted attributes. The findings of this study showed that there were multiple origins of giftedness, including varying personality traits (Section 4.4). With the prevailing belief that “everyone is born to be gifted”, the results disclosed that half of the teachers believed some gifted individuals were born with giftedness. The remaining teachers believed that other students have their giftedness nurtured and that a student’s giftedness potential needed to be developed through hard work and meticulousness (Section 4.4).

Laine et al. (2016), in their review of a Finnish study with 212 teachers, drew on interviews and questionnaires and found comparable results associated with

giftedness, described as having multifaceted perspectives regarding its origins. This view aligns with Nguyen (2011), an Australian study that examined the concept of giftedness. In his study, Nguyen (2011) found similar results showing that giftedness can be developed through nature and both internal and external factors are required for the total development. Contrasting with this belief, Wu's (2006) work on 'nurture over nature' draws on Confucian beliefs of giftedness and found that giftedness is a developed concept and it is acquired by achievement but not through nature. Wu's (2006) proposition aligns with the view of one respondent in this study, who disclosed that giftedness is a developed concept and no one is born with it. However, findings revealed that nine teachers in this study thought that no one is born blank before commencing schooling. This belief stemmed from the fact that gifted students potential developed from home before schooling, and this view restricted their understandings of giftedness and classroom pedagogical approaches.

Contrasting with Wu's (2006) study of 'nurture over nature', in this current study, the findings showed that giftedness was 'nature over nurture' (Section 4.4.3). The home and the school are required to support gifted individuals in developing their potential into talent to become productive in their society (Gagné, 2005, 2010; Subotnik et al., 2011). In brief, this current study posits that support for the development of giftedness in students is key.

6.2.5 Summary

In conclusion, Ghanaian teachers' naïve beliefs about gifted students disclosed parallels with four of the five attributes of Sternberg's Pentagonal Implicit theory (1993). For example, teachers in this study perceived gifted students as "geniuses" (see

Section 4.4.2), because they showed high academic achievement in one of the STEM areas. This aligns with Sternberg's explanation of Excellence.

A sense of Rarity was evident in the beliefs of all the Ghanaian teachers who stated that there were "not many" gifted students (see Section 4.4.3). Teachers considered gifted students to be important for Ghanaian society (see Section 4.4.2), thus, gifted students were valued as "icons" who can contribute to the wellbeing of the country.

Demonstrability, that is, gifted students demonstrate a high achievement in one or more subject areas. This is consistent with the respondents' views. All teachers also believed that IQ was a necessary and valid measure for establishing who the gifted students are. However, participating teachers acknowledged the limitations of using IQ as a determinant because it is an unsupportive measure given the emphasis being solely on academic domain. Only two teachers determined students' giftedness using an unusual process beyond test scores (Section 4.4.2). However, there was no evidence in this study that the participating teachers believed that gifted students have to demonstrate Productivity.

It was also found that spiritual and supernatural giftedness existed in the Ghanaian culture. Gifted students were seen as different from their peers as they had "magical powers" which allowed them to solve unusual problems. Further, giftedness is seen as a gift from God in Ghanaian tribes.

Across all Ghanaian cultures, there is gender disparity regarding support for gifted males rather than gifted females. Due to this, in Ghanaian society, gifted females are disadvantaged in STEM areas.

6.3 Research Question 2: Teaching Strategies

Chapter 5 presented results from the interviews that focused on how teachers were supporting gifted students in Ghana. This section discusses the key findings of Chapter 5 in six segments: insufficient knowledge about the strategies for teaching gifted students (Section 6.3.1); peer teaching strategies (Section 6.3.2); teachers using a number of strategies to determine giftedness including success in national tests, teachers suggesting structured teaching strategies for accommodating gifted students (Section 6.3.3); strategies for differentiation (Section 6.3.4); grouping and acceleration strategies (Section 6.3.5); and streaming (Section 6.3.6). Finally, the section concludes with a summary (Section 6.3.7).

6.3.1 Lack of Knowledge about Teaching Strategies

In this study, the findings revealed many factors that contributed to insufficient knowledge about strategies for teaching the gifted. First, teachers had inadequate exposure to strategies for supporting students' diverse needs during pre-service teacher preparation. This contributed to a lack of appropriate accommodation for gifted students' intellectual needs. Kaya (2015) identified that teachers' beliefs about how to provide for students of diverse needs depended highly on their professional development. Deku and Vanderpuye's (2017) investigation in Ghana, on inclusive education provisions, noticed similar results relating to inadequate teacher preparation to enable effective accommodation for students' diverse needs.

The second point was that there are no teaching strategies that are advocated for gifted students outlined in the inclusive education policy for teachers to implement in developing gifted students. For this reason, all the participating teachers believed that providing strategies to meet gifted students' diverse needs is not mandatory. Moreover,

these teachers believed that gifted individuals can learn these pedagogical strategies on their own, a naïve belief. This finding aligns with Moon and Brighton's (2008) study which found parallel results linked to teachers' traditional beliefs that no extra support is needed for strategies in developing gifted students. The fundamental core belief of the participating teachers was that extra teaching strategies for gifted students pressured their classroom instruction. Therefore, teachers tend to ignore gifted students' special needs because there are no precise teaching strategies designed for gifted students' development.

A third point that accounted for a lack of knowledge about teaching strategies was the issue of planning for gifted students before classroom pedagogy. It was found in Section 4.4 that unprepared teachers marginalised gifted students and viewed them as "threats and enemies" (Section 4.4.1), and a well prepared teacher exhibited self-confidence towards gifted students' development. This belief aligns with Sullivan's (2011) work in Australia concerning teaching mathematics using informed approaches in pedagogy, which found similar results that knowledge of giftedness strategies augments teachers' self-efficacy in classroom pedagogical approaches.

The fourth point that contributed to insufficient giftedness knowledge about teaching strategies was the challenge of inadequate instructional time to prepare and shape gifted students. Preparation of teaching strategies for the gifted demands ample instructional time and attempting to do that may lead to neglect of the non-gifted majority. As a consequence, this inadequate knowledge about pedagogical strategies would influence how the mainstream curriculum is integrated with effective giftedness teaching strategies. The ten respondents felt that their authority was threatened by gifted students due to inadequate knowledge about the required giftedness strategies (Section 5.3). Subotnik and Jarvis's (2005) research found comparable results

associated with insufficient time for teachers in developing gifted students' potential into talent (Section 2.4). Deku's (2013) work in Ghana drew upon data from mixed methods and found congruent results associated with a lack of knowledge of teaching strategies to cater for gifted students. However, teachers with positive beliefs and the desire for teaching gifted students welcomed the gifted (Watters, 2010), and provided them with the required teaching strategies based on their own knowledge and experience. Findings from this current study expand on earlier results (Deku, 2013; Ngara, 2017); that as a result of inadequate knowledge of teaching strategies, the gifted, the physically disabled, and struggling or weak students only "passed through the school system" with limited support (see Appendices G-I of students sample tasks).

The fifth reason was that teachers did not have enough knowledge about teaching strategies that allow for the required flexibility to cater for the diverse abilities of gifted students' learning. To accommodate the learning needs of gifted students, the mainstream curriculum is expected to be flexible to allow for modification of effective implementation (UNESCO, 2016). However, the findings from this study revealed that teachers have limited control over the content of the school curriculum (Section 5.2). In accordance with UNESCO (2016), despite students' ability levels and backgrounds, the mainstream curriculum needs to be comprehensive for teachers to adjust to fit their own style of teaching. In contrast to the UNESCO (2016) ideal, all the teachers' lesson plans were mandated. Teachers were expected to use a routine template with no space allocated to plan for student diversity and make modifications (see Appendices D, E and F). A lack of flexibility in the curriculum was mirrored in teachers' lesson plans (see Appendix C for a sample teacher's lesson plan). Abgenyega and Deku (2011) and Deku and Vanderpuye's (2017) studies in Ghana analysed professional development

on inclusive education practices and found parallels about the restrictive and inflexible nature of the curriculum (see Appendices C-F).

Finally, the result of this study disclosed that the curriculum was overloaded and the teachers were pressured to rush through content without paying attention to appropriate teaching strategies. This obstructed teachers' ability to advance their teaching strategies of content knowledge to provide for students' diverse needs (Section 5.2). That is, each teacher needed to deliver 39-44 topics yearly, with 10-12 sub-topics per week on every major topic (Section 5.2). This finding corresponds to previous Ghanaian studies suggesting that the concern of all teachers was to complete the overloaded syllabus because it was mandated (Abgenyega & Deku, 2011; Deku & Vanderpuye, 2017), leading to scant knowledge about teaching strategies for the gifted.

6.3.2 Peer Teaching Strategies

A common practice reported by participating teachers was to employ peer teaching strategies, which consists of assigning gifted students with tasks as peer tutors to help other students. The findings revealed that all the teachers believed this practice helped to improve gifted students' self-efficacy and generate their enthusiasm. It was asserted that students are inspired when given roles or tasks to assist the weak and struggling students in mainstream classrooms.

Using gifted students as tutors denotes a 'double edge sword' as there are positives and negatives. A double edge sword in the Ghanaian context means that although the gifted spend most of their instructional time as peer tutors in developing their self-confidence by supporting their non-gifted peers to understand concepts discussed in class, this does not allow for effective individualised learning of advanced

content knowledge in mathematics and science. Therefore, general teaching approach would apply for both the gifted and all other students. Judy and colleagues (1988) examined gifted and non-gifted performances drawing on two pedagogical approaches and qualitative data on peer tutoring. They found similar results related to benefits for both the gifted and the non-gifted peers (see also Matthew, 2002; Neihart, 2007). Contrasting this position, Maree (2018), in a review of research in South Africa, found that peer tutoring exploits the gifted.

6.3.3 General Strategies to Meet Students' Diverse Needs and Success in National Test

Respondents in this study associated relevance to “general” teaching strategies that suited the whole class rather than strategies that the literature purports would challenge gifted students. For example, critical thinking, differentiation or creative thinking strategies were not prioritised. In the “general” teaching approach, teachers applied a whole class discussion to enable all students to perform the same tasks at the same time, or brainstorm examination questions with the whole class to enable students’ success in national test, a naïve belief (Section 5.3.2). This view contradicts with ‘Socratic discussion’ or a heroic art of teaching, which requires students’ thinking power to understand concepts and requires their general involvement (Alexander, 2008; Robinson et al., 2013) and problem based content learning experience (Hmelo & Ferrari, 1997).

Colvin (2008) in a United States study of eight teachers’ beliefs, employed qualitative case studies by drawing on both interview and observational data. Colvin found similar results describing that all African-American teachers and two Caucasian teachers supported all-inclusive teaching strategies. In this current study, an all-inclusive teaching strategy is referred to as a “general” teaching approach (see Section

5.4.2). Contrasting this standpoint, Robinson et al. (2013) in a North Carolina study on curriculum analysis, drew data on interviews and observations using 14 teachers, 10 students and educators of the curriculum and a combination of five subjects (Section 2.6.1). They found that advanced subject matter knowledge, critical thinking and analytical inquiry, modern theory integrated with a regular curriculum were effective instructional strategies to meet all students' diverse needs (see also Brighton & Wiley, 2013; Tomlinson, 2013; VanTassel-Baska, 2013).

In spite of the numerous endorsements by researchers on the application of effective instructional strategies to support gifted students' learning experience, all the participating teachers overlooked these strategies. For example, in Section 2.6.1, many studies, including Hyde and Mertz's (2009) work in the US, drew data on gender and cultural variations in mathematics and found similar results related to teachers ignoring higher order subject matter with problem solving strategies to increase high stake performance in examinations. However, teachers' classroom pedagogical strategies are fundamental, but are impacted by their personal beliefs concerning the needs of gifted students (Ford, 2010; Kaya, 2015; Miller, 2009; Smith, 2006; Starko, 2008, Watters, 2010). The "general" or all-inclusive classroom teaching strategies described by all teachers in this study revealed little evidence of inquiry learning or analytical, creative and critical thinking strategies. Rather, they used "general" or all-inclusive strategies that suited the needs of the whole class to enable students' success in external or national test (see Section 5.4.2). Also, see Appendix B, which has an extensive set of effective teaching strategies advocated in gifted education.

6.3.4 Strategies for Differentiation

Differentiation strategies emerged in discussion with the participating teachers as one of the major approaches. Differentiation strategies, as discussed in Section 2.7.2, denote the procedures that are used to offer learning experiences, which can challenge students' diverse needs in the regular classroom (Tomlinson, 2013).

The findings disclosed that professional development rarely prepared teachers for classroom differentiation instruction. The ten Ghanaian teachers' understanding of differentiation strategies were dissimilar and seemed confused. For example, six of the teachers interviewed attempted to define differentiation solely as grouping students in accordance with their abilities, while the remaining four respondents believed that it was a way of applying several different methods of teaching a topic presumably to all students. All the teachers were considerably concerned about their lack of knowledge on how to differentiate the curriculum in inclusive classrooms (Section 5.3). Archambault and associates' (1993) research in the US drew data from 7,300 third and fourth grade teachers and found comparable results associated with teachers being insufficiently trained to provide for students' diverse needs (see also Abgenyega & Deku, 2011; Deku, 2013; Miller, 2009; UNESCO, 2016).

Large class size was another concern that confronted all the respondents in regards to differentiation strategies (Section 5.4.3). Oswald and Villiers (2013), a South African study, drew on qualitative data and found analogous results associated with large class sizes (see also Brighton, 2003). In this Ghanaian study, teachers' concerns about differentiation strategies were solicited and the majority of the teachers were in favour of supporting differentiation strategies. Yet, the minority teachers did not support differentiation. These teachers believed they had no explicit training in differentiation strategies for meeting all students' special needs (Section 5.4.3).

Archambault et al. (1993) found comparable results, that over sixty percent of the teachers in their study had no giftedness training (Section 2.6.2). The findings of this study in Ghana revealed that all the participating teachers were uninformed about differentiation strategies with four teachers suggesting it marginalised the low ability students (Section 5.4.3).

6.3.5 Grouping and Acceleration Strategies

In this section, findings to be discussed include evidence of grouping and acceleration strategies. Grouping students in accordance to their varying abilities, that is mixed ability grouping, was a strategy that all the participating teachers endorsed. The results revealed that teachers believed grouping students according to their various abilities in a class was ideal (mixed ability grouping) (Section 5.4.1). Judy et al. (1988) revealed similar results associated with gifted students achieving highly in mixed ability grouping regular classrooms. This suggests that further professional development on grouping strategies would benefit Ghanaian teachers.

Acceleration was another strategy discussed. Proponents of acceleration recommended this strategy for gifted students (Colangelo, Assouline, & Gross, 2004). In addition, Neihart (2007) argued that there was no evidence that accelerating gifted students negatively affects students' academic work. In spite of the reported benefits of acceleration, all the teachers in this current study were not in favour of acceleration for gifted students. These teachers believed that the accelerant would find it challenging to cope with the syllabus in the higher grade. They were of the view that a student can only skip a grade when they have matured (Section 5.5.2). Hoogeveen, Hell and Verhoeven's (2005) research in the Netherlands drew data from 31 secondary school teachers' opinions about acceleration and found similar results related to

teachers' concerns about student maturity. Alternative resistance to acceleration stemmed from the fact that accelerating a gifted student may lead to inequalities in the school system.

In this current study, the only acceleration teachers could offer was topics that were outside the curriculum or had already been taught but not repeated. One teacher broadened this view by stating that "we only move to another topic when we finish teaching the previous one" (Section 5.5.2). Similarly, Manyoma and Ncube's (2013) study in Zimbabwe, drew on questionnaire data which described parallel results related to curriculum compacting (moving to a new topic without reinforcing the former). They found that previously learnt materials needed to be excluded to avoid repetition and to reduce the workload for teachers of gifted students. This shows that reiteration of the curriculum creates boredom for gifted individuals in the instructional, mainstream classroom.

6.3.6 Streaming

While streaming was discussed in the literature review, it was argued by some researchers that it contributed to student injustices (Johnston & Wildy, 2016). Pattinson's (1963) and Forgasz's (2010) studies drew on teachers' views about streaming and selection criteria for class groups in high school mathematics classes. They found that if streaming was equitably practised and the curriculum was modified in streamed classes, then it was successful.

An Australian study by Sullivan (2011) reviewed the influence of grouping students by performance and found that teachers' positive thoughts and expectations about achievement groupings of all forms can stimulate the provision of effective pedagogical approaches. He found similar results that teachers' self-efficacy is crucial

in mathematics classes that are streamed. This finding is similar to this current study where participating teachers admitted that their lack of self-confidence to meet all students' needs was limiting the implementation of strategies such as streaming.

In Section 5.5.3, the findings revealed that the Ghanaian school system employs more of mixed ability grouping techniques rather than streaming. All the participating teachers were confused with the definition of streaming. They defined streaming as a system where all students with varying abilities are grouped together. Thus, streaming was misinterpreted as mixed ability grouping. In fact, streaming denotes the grouping of able students in accordance to their abilities in separate classes (Section 2.7.4). Streaming and mixed ability grouping are dissimilar strategies. All the teachers referred to mixed ability grouping as the dominant practice in the Ghanaian school system.

The findings suggested that all the teachers preferred mixed ability grouping to streaming because the gifted supported the weak and struggling students, and built peer relationships. There were no inequity issues relating to mixed ability classrooms. Saleh et al.'s (2005) study on mixed ability grouping drew data from students in a biology class and found similar results related to the benefits derived by all students within the mixed ability clustering (see also Matthew, 2002). This current study suggests that there are parallels regarding the benefits of streaming and mixed ability grouping because they both accommodate individual differences equitably (Pattinson, 1963). However, this study suggests that equitable approaches of instruction would be enhanced if teachers had adequate knowledge about streaming or mixed ability grouping strategies.

In another dimension, Matthew's (1992) study about mixed ability grouping found inconsistent results associated with frustration and disagreement regarding

cooperative learning among students (see also Poole, 2007). Similarly, streaming strategy was also found to encourage student discrimination and reduce classroom socio-cultural relationships (Johnston & Wildy, 2016). Unfolding this range of findings, it can be deduced that for either streaming or mixed ability grouping, there are both benefits and weaknesses. The implementation process is paramount depending on the context and focus of the study and above all, teacher knowledge about the preferred strategy and its application. Ghanaian teachers' requisite knowledge about streaming or ability grouping strategies is vital to provide effective strategies necessary to support the gifted in the regular classroom instructional practices.

6.3.7 Summary

In conclusion, although teachers have naïve beliefs about the effective pedagogical approaches required for gifted education practices, all the teachers suggested many teaching strategies that they could use when catering for gifted students that are supported in the literature. Despite these suggested approaches, the teachers were not given adequate pre-service training to effectively provide for gifted students' needs. Rather, the focus of pre-service programs was on methodology and assessment to enable high achievement in national examinations. Moreover, a gendered giftedness exists not only in the Ghanaian culture but also in Western cultures, where gifted females are disadvantaged in STEM areas. Interviewing teachers through semi-structured interviews about their beliefs and the strategies they use to develop and shape the gifted, is a significant preliminary step towards adequately catering for gifted students in the Ghanaian mainstream junior high classrooms.

Chapter 7: Conclusion

7.1 Introduction

This chapter presents an overview of the study's limitations (Section 7.2), contribution to theory (Section 7.3), future research directions (Section 7.4) and lastly, provides recommendations for practice (Section 7.5).

The findings of this study revealed teachers' beliefs about giftedness and gifted education practices in Ghanaian mathematics and science mainstream classrooms. A general conclusion can be drawn given that the teachers interviewed had limited awareness of the construct of giftedness and lacked knowledge of the range of diverse strategies promoted by researchers and practitioners in the international literature. At least three contributing factors can be asserted from these findings. First, preservice teacher education is lacking in relation to gifted education. Second, class sizes limit the possibility of teachers implementing effective strategies. Third, the curriculum lacks flexibility and discourages teachers modifying their classroom instructional practices to align with the needs of gifted students (and others). However, the teachers also revealed that spiritual and supernatural influence on giftedness exists in the Ghanaian culture, as well as a gender disparity, where females are disadvantaged in gifted programs within STEM areas compared to their male counterparts.

7.2 Limitations

This research was limited to ten teachers in the Greater Accra municipality. Consequently, as this is a case study investigation, this study cannot be generalised. Also, the study cannot claim that the ten respondents are representative of all teachers in the junior high schools of Ghana.

Moreover, considering the nature of this study and Ghanaian culture, while the researcher remained as neutral as possible during the interview process, the presence of the researcher may have influenced the participating teachers. For example, the discussion about teaching strategies raised the teachers' awareness about ways to cater for gifted students.

Other limitations of this study are that the researcher did not observe classroom teaching and this may be necessary in future studies and the lack of policy documents on gifted education. Further study is warranted in other regions and nations in Africa, including more subject areas and with a substantial increase in the number of teachers.

7.3 Contribution to Theory

The findings obtained in this study propose new understandings into Sternberg's (1993) Pentagonal Implicit theory and Subotnik et al. (2011) and Gagné's Developmental Model of Giftedness and Talent [DMGT] (2004, 2005, 2010), discussed in Section 2.3.2.

The findings suggested that models of implicit beliefs are culturally dependent. That is, individuals may value what seems significant in one's culture. Thus, the Ghanaian participating teachers valued four out of five of Sternberg's (1993) theories about giftedness and did not recognise Productivity; although there was an expectation that gifted students would ultimately make an important contribution to society.

The study builds on Subotnik et al.'s (2011) idea of "eminence" by suggesting that this view is paralleled with being an "icon" and further correlates with Sternberg's (1993) criteria of Demonstrability and Superiority as established giftedness characteristics.

Gagné's Developmental Model of Giftedness and Talent [DMGT] (2004, 2005, 2010) (Section 2.4.1), presented a list of supporting attributes that established the development of giftedness. They are Naturalistic, Chance, Environment, Intrapersonal and Developmental (Gagné, 2004, 2005, 2010). Gagné's DMGT is consistent with two of the models which this current study found in the Ghanaian culture. These models highlighted the existence of spiritual and supernatural influences of giftedness as supporting attributes and align with Gagné's (2004, 2005, 2010) DMGT but excluded the naïve belief patterns found in the Ghanaian culture. These three models need to be acknowledged and included in the published models of giftedness.

7.4 Future Research Directions

In regards to the aforementioned findings, numerous recommendations for future research are presented below:

1. In this study, all the teachers' beliefs, experiences and knowledge in gifted education practices were linked. Therefore, improving teachers' advanced content knowledge and experience with theory-based practices can help change their naïve beliefs. A future research question could be: "To what degree do pedagogical approaches in gifted education, such as experience in teaching problem solving, affect teachers' beliefs in developing gifted students?"
2. As a case study inquiry, future investigations using observations in two or three regions such as the northern, volta and western parts of the country are essential to learn more about teachers' beliefs in Ghanaian junior high schools.
3. The current research could be replicated by including more teachers and schools across the country and beyond Ghana. This would uncover a larger teacher population and would permit generalisation through a strong response rate. A future question could be: "What beliefs do teachers across African

- countries hold in relation to pedagogical approaches that integrate the general curriculum and contribute to the development of gifted education?”
4. The study could be broadened by investigating trainee teachers’ beliefs too. An alternative study could also be conducted in the senior high schools about teachers’ beliefs for comparison with the results of the junior high schools.
 5. In regards to the naive beliefs held by teachers in relation to curriculum differentiation, it is necessary to provide teachers with adequate experiences that challenge their belief systems. A future question could be: “What are teachers’ beliefs in relation to curriculum differentiation during preservice preparation and its application in classroom instruction?”
 6. Investigation into the beliefs of administrators, academic staff, and departmental heads and curriculum leaders towards the provision of appropriate gifted education in Ghana is needed. A future research question could be: “What are the beliefs of curriculum leaders and academic staff toward giftedness and gifted education practices in Ghana?”
 7. As participants used a range of strategies that do not cater for appropriate students diverse needs, it is important to investigate teachers’ beliefs about constructivist teaching in Ghana. Future research could also focus on the need for constructivist teaching and learning. A future research question could be: “What are teachers’ beliefs in relation to the need for constructivist teaching and learning in Ghanaian junior high schools?”
 8. Finally, Ghana can and should participate in the knowledge economy to ensure a well-informed and proactive labour force fills STEM job positions in the country. A future research question could be: “What pedagogical approaches

are available for Ghanaian teachers to develop gifted students' problem solving skills, as well as their critical and analytical thinking in STEM areas?"

7.5 Recommendations for Practice

The results of this research have relevant implications for practice in Ghana. For instance, the Ministry of Education (MoE), curriculum developers, lecturers of Education Colleges and universities may apply the outcomes of the study when planning for teacher preparation and program assessments.

The following recommendations are proposed as a reflection of teachers' opinions and responses in relation to gifted education in Ghana:

1. The findings from this study may help the Ghanaian MoE, Colleges of Education, curriculum developers and universities of teacher development to consider employing the relevant initiatives in gifted education. For example, teachers' qualifications, levels of experience and beliefs, interests/passions, advanced subject areas and flexible curriculum would enhance diverse needs and may change teachers' naïve beliefs about giftedness and gifted education practices.
2. The application of outmoded and conservative pedagogical approaches towards gifted students' development, and the findings of teachers' naïve beliefs may help to raise awareness by the MoE. With this knowledge, other stakeholders could examine and improve teacher education.
3. The findings indicated that teachers are unaware of curriculum differentiation strategies. That is, comprehensive advanced knowledge on how to meet all ability differences through appropriate strategies is required for teachers.
4. Pedagogical approaches, such as the integration of the general curriculum with advanced content knowledge, creativity, critical thinking and inquiry learning

should be given sufficient space in the curriculum with regards to differentiated learning and its application in schools.

5. In brief, in-service training and workshops for teachers in relation to catering for students' diverse needs could help boost their self-efficacy and cater for the gifted in mixed ability mainstream classrooms.

In brief, this study has influenced my knowledge and insights as a Ghanaian female mathematics and science teacher regarding the cultural perspectives of developing giftedness in Ghana. Most concerning to me was the situation of gifted females being disadvantaged and being seen as less performing in STEM areas.

Although, the existence of a society's culture can impact on the lives of individuals, in my view, it is the individuals' naïve belief systems that gradually develop into traditions and norms which influence their exclusive actions towards gifted students. That is, individuals are the executors of society's culture and not the vice versa.

It is hoped that stakeholders in education would embark on awareness actions concerning gifted education promotion through the media to disseminate information about giftedness across the Ghanaian urban and the rural communities. Although there have been some efforts by the government of Ghana to enhance female education in STEM areas, the focus was not specifically towards providing for all students' diverse needs in the regular mixed ability classrooms. A review of inclusive education and approaches of teacher professional development is essential in Ghana in order to understand better how to improve practices that align with those used in the Organisation for Economic Co-operation and Development (OECD) countries who are part of the knowledge economy. Finally, this study is the first of its kind in Africa and

Ghana is one of the emerging countries that is committed to quality gifted education to enable the nation's participation and contribution towards the knowledge economy.

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Appendices

Appendix A: Interview Questions

The following are sample questions that the researcher asked participating teachers; questions were not limited to those listed below:

- How long have you been in the teaching service?
- What subject do you teach?
- Have you been given any preservice training in special education?
- Have you experienced teaching students with special needs before?
- What is your view about high achieving students in your classroom?
- What strategies do you use to develop the more able and high achieving students' diverse needs?
- What is your definition of giftedness?
- How do gifted students improve on their learning?
- What do you perceive about the gifted students' intellectual characteristics?
- Describe the different activities we may notice in your learning setting if we walked into your classroom.
- How does students' giftedness improve?
- How would you nurture a student who is finding it difficult to concentrate in your class?
- How is giftedness viewed in the Ghanaian culture?
- How does the Ghanaian culture influence giftedness?
- Have you ever had a student drop out of school that you considered to be exceptional?

- What do you think is the nature of student intellect?
- Why do you believe this is the nature of student intellect?
- Explain the kind of experiences you may offer for students to link the content with real world application in and out of the classroom setting.
- What strategies do you employ to provide for the gifted?
- What ways do you meet the needs of your gifted students?
- How do you perceive giftedness regarding gender?
- How would you differentiate/what modifications would you make for students with diverse levels of ability?
- To what extent do you encourage students to pursue independent projects?
- How do you engage gifted students who are not motivated to be involved in the independent projects?
- What kinds of projects might you have students produce for your class?
- Do you think it is acceptable to provide a different curricular experience by using a more advanced curriculum unit on a teacher selected topic?
- How do you differentiate your curriculum to meet students' diverse needs?
- Does differentiation contradict the mainstream curriculum?
- How do you group your students in mathematics and science classes?
- What are the strategies you use to integrate the mainstream curriculum to meet all students' diverse needs?

Appendix B: Strategies and Pedagogical Approaches Advocated in Gifted Education

Strategies and pedagogical approaches advocated for teaching gifted students and useful in analysing lesson and unit plans.

Advanced work of each subject area (Archambault et al., 1993; VanTassel-Baska & Hubbard, 2016):

- Application of research skills to real world situations/questions in subjects/content
- Relating students experiences to the depth of subjects
- Using critical and higher order thinking procedures
- Employing problem-solving skills
- Creating online learning opportunities
- Using inquiry approach
- Follow-up activity
- Different kinds of exercises

A priori strategies for William and Mary Classroom Observation Scales which demonstrated what strategies teachers suggested to support gifted students education in their lesson plans (VanTassel-Baska et al., 2003).

The general teaching techniques for curriculum planning and delivery incorporates:

- Setting high expectations
- Integrating activities in application of new knowledge
- Encouraging students in expressing their opinions and reflecting on ideas learnt

Differentiated teaching strategies:

- Key differentiated program materials for mathematics and science
- Higher lever grouping by targeting gifted students for classroom instruction
- Using models of thinking to enhance understanding of high level content knowledge
- Applying clear pedagogical strategies, such as graphic organisers, to promote advanced-level thinking

Catering for individual differences:

- Provide independent or group learning opportunities for promoting in-depth understanding of content
- Accommodating individual differences, through individual conferencing
- Student or teacher choice in selecting materials and assignments tasks
- Encouraging several explanations of procedures and situations
- Allowing individual students to find out important ideas using structured questions or activities

Critical thinking techniques:

- Encouraging students to assess situations or issues
- Involving students to compare and contrast ideas, for example, analysing generated ideas
- Providing opportunities for students in generalising from concrete to abstract concepts
- Encouraging students to analyse or summarise material learnt in mathematics and science classrooms

Creative thinking approaches:

- Soliciting several varying views about issues or concept
- Engaging students to explore different points of beliefs by reframing ideas

- Encouraging students to show open-mindedness and tolerate imaginative, playful solutions to issues
- Providing opportunities for students in developing and explaining their own ideas

Analytical and investigative strategies:

- Applying the inquiry approach by encouraging advanced level learning
- Stimulating students to think critically by asking their own questions and then proceed to ask advanced level questions
- Using analytic activities that analyse text, models and sources of figurative ideas
- Applying relevant activities that assist students to create oral and visual arguments by writing or using models and symbols
- Drawing inferences from gathered data and representing findings using a relevant procedure

Acceleration strategies (Archambault et al., 1993; Gentry et al., 2011; VanTassel-Baska & Hubbard, 2016):

- Offering higher-level tasks
- Accelerating students within above-grade-level content or subjects, depending on the progress of each student
- Diagnostic testing for suitable skill levels in subject areas

Assessments (Gentry et al., 2011; VanTassel-Baska & Hubbard, 2016)

Assessing students in wider context using:

- Above/higher level formative assessment in each lesson
- Ongoing assessment
- Summative assessment
- Rubrics

Appendix C: Sample Lesson Plan 1 (Mathematics)

Teachers' Sample Lesson plan—mathematics. Students are provided with organised data rather than allowing students to gather data and organise themselves. Also, see related tasks offered in Appendix H.

9th Week Ending: 06/07/18
 Subject: MATHEMATICS
 Reference: SIMARHS RD DAT 1:14

Day/Duration	Topic/Sub-Topic/Aspect	Objectives/R.P.K	Teacher-Learner	Activities	Teaching Learning Materials	Core Points	Evaluation and Remarks
MONDAY 02/07/18 1HR 10MIN	STATISTICS MEDIAN/MEDIAN	By the end of the lesson pupil will be able to find the three averages R.P.K: pupils can arrange objects in ascending order	Introduction Ask pupils to arrange numbers in ascending order Step: Guide pupils to find median and mean distribution Eg Find the median of 0, 1, 2, 3, 4 median = $\frac{2+3}{2} = 2.5$ mean = $\frac{0+1+2+3+4}{5} = 2$	Arrange a define of a and	Counters, text books, jitters etc	Median is the most middle item in a distribution Mean is the sum of all items divided by the number of items	Find the mode, median and mean of the ff a) 0, 2, 3, 4, 5
MONDAY 04/07/18 1HR 10MIN	FREQUENCY TABLE	By the end of the lesson pupil will be able to draw a frequency table R.P.K: Pupils can list some of the methods of obtaining information	Step: Guide pupils to draw a frequency table from the below information Eg The frame the ages of pupils in a MS 1 classroom 15, 14, 14, 16, 15, 17, 14 15, 14, 15, 16, 16, 15 Draw a frequency table for the above information	draw a given of pupil A, B, K le for	Class register, jitters, etc	Frequency table Age tally frequency 14 III 5 15 III 5 16 IIII 8 17 / 1 18 / 1 Σf=20	Construct a freq table for the distribution below 5, 6, 8, 5, 5 2, 6, 8, 7, 10 9, 5, 3, 4, 3 4, 4, 5, 7, 3

Appendix D: Sample Lesson Plan 2 (Mathematics)

Volume of cuboids-Mathematics task.

Students are made to state formulas without hands-on-differentiated activities. Hence, there is little encouragement of creative and critical thinking skills and problem solving techniques. Only charts were mentioned.

9TH Week Ending: 06/07/18
 Subject: MATHEMATICS
 F2 Reference: SYLLABUS RN UNIT

Day/Duration	Topic/Sub-Topic/Aspect	Objectives/R.P.K	Teacher-Learner	Activities	Teaching Learning Materials	Core Points	Evaluation and Remarks
WEDNESDAY 04/07/18 1HR 10MIN	VOLUME OF A CUBOID	By the end of the lesson pupil will be able to calculate the volume of a cuboid R.P.K: Pupil can find the area of a rectangle	Introduction: Ask pupils to state the area of a rectangle Step: Guide pupils to calculate the volume of a cuboid length is 8cm, width is 5cm and height is 4cm Volume = $L \times W \times H$ $= 8 \times 5 \times 4$ $= 160 \text{ cm}^3$	to state calculate etc	Charts of cuboid exercise books etc	Volume of Cuboid $\text{Volume} = L \times W \times H$ Where L = length, W = width and H = height	The length of a cuboid is 2m, its breadth is 30cm and its height is 50cm. Find its volume in cm^3
THURSDAY 05/07/18 1HR 10MIN	VOLUME OF A CYLINDER	By the end of the lesson pupil will be able to calculate the volume of a cylinder R.P.K: Pupil can find the area of a circle	Step: Guide pupils to calculate the volume of a cylinder base radius is 7cm and height is 5cm Volume = $\pi r^2 h$ $= 22 \times 7 \times 7 \times 5$ $= 770 \text{ cm}^3$	calculate etc	Charts of cylinders exercise books etc	Volume of a cylinder $\text{Volume} = \pi r^2 h$ where r = radius, h = height and π = constant ($\frac{22}{7}$)	

Appendix E: Sample Lesson Plan 3 (Science)

Students brainstormed names of food with charts without employing a constructivism approach to discussion to motivate analytical thinking skills and to challenge students' abilities.

4th Week Ending 24th FEBRUARY 2018
 Subject: INTEGRATED SCIENCE FOR GRADE 3
 Reference: National Curriculum Framework for Science

(List 1-3) Page: 484
 of New Text Science For GRADE 3 by Theodore G.T. Kom-2019, P. 3, Pg. 51
 Integrated Science in Scope For GRADE 3 by K.S. Tiwari, Page, 484

Day / Duration	Topic/Sub-Topic/Aspect	Objectives/R. P. K.	Teacher - Learner	Activities	Teaching Learning Materials	Core Points	Evaluation and Remarks
Wednesday	Topic: Digestion in humans.	At the end of the lesson the pupil will be able to: 3.3.1 explain what is meant by digestion. 3.3.2 (a) draw and identify the parts of the human digestive system.	(i) Let pupils in turn list the food they eat the day and its nutrients. (ii) Brainstorm with the class and list the main term digestion. (iii) Using the chart, pupils to identify the parts of the human digestive system.	Slide presentation pupils to draw the human digestive system.	Chart showing a labelled diagram of the human digestive system. Fruit and light soup, Yam and egg stew, bread and fried egg. * Fruits, yam, bread → Carbohydrate * Fish, egg, meat → Protein etc. * The breakdown of complex food molecules by enzymes in the body to release energy. Mouth, Salivary gland, gullet, stomach, pancreas, liver, duodenum, small intestine (ileum), colon, rectum and anus.	Define the following terms: digestion, assimilation. List in table the nutrients of digestive system in humans. REMARKS: Lesson not needed because students were waiting 'Make Next Lesson'	
8:00 - 9:15	70 minutes						
9:20 - 9:55	35 minutes	R. P. K. Pupils can state the type of food they eat the night before.	(iv) Guide pupils to draw and label the parts of the human digestive system in their notebooks. (v) Summarise lesson through question and answer.	chart of the human digestive system.			
10:25 - 11:00	35 minutes						
Thursday	Topic: Digestion in humans.	At the end of the lesson the pupil will be able to: 3.3.2 (b) state the function of the parts of the human digestive system. 3.3.3 (a) describe the action of the stomach.	(i) Let pupils state parts of the human digestive system. (ii) Using the chart, state the function of each part of the human digestive system. (iii) Discuss the action of the stomach.	the digestive system pupils to draw the human digestive system.	Chart showing a labelled diagram of the digestive system in humans. - Mouth, oesophagus, stomach, duodenum, ileum, large intestine, rectum and anus. - Mouth contains teeth which break down the food into smaller pieces and the tongue rolls it into balls. - Oesophagus allows food to pass through it to get to the stomach.	(i) What is a digestive enzyme? (ii) Give two examples of digestive enzymes. (iii) State the function of the stomach.	
1:25 - 2:40	70 minutes						

Appendix F: Sample Lesson Plan 4 (Science)

The same questions are presented for students in both classes (3A & 3B), and the same instructions were written in the lesson plans.

(Pgs 1-3) Page: 44
 2) Neo let. Science for 4th by Theodore D. T. Kim - Zulu, R.K. 2, Pg. 51
 3) Integrated Science in Hope for 4th by K.D. Thomas, Page: 534

Day / Duration	Topic/Sub-Topic/Aspect	Objectives/R. P. K.	Teacher - Learner	Activities	Teaching Learning Materials	Core Points	Evaluation and Remarks
Thursday 9:15-10:15 70 minutes	Topic Digestion in Humans.	of enzymes on food. R.P.K. Pupils can list the parts of human digestive system.	(i) through discussion, pupils to explain the digestive enzymes and some examples.	guide demon table	Chart showing a labelled diagram of the human digestive system.	-Enzymes are biological catalysts speed up the rate of chemical reactions in the body. By Salivary amylase (ptyalin).	Stomach and Liver in digestive Restrictions Lesson not finished due to 'Mobs' that 'examinate' into peptides etc.
Friday 10:25-11:45 70 minutes	Topic Digestion in Humans.	By the end of the lesson the pupil will be able to: 3.3.3 a. describe the changes that occur to different food substances as they pass through the alimentary canal. R.P.K. Pupils can state the functions of the parts of the alimentary canal.	(i) Let pupils state parts of the alimentary canal and outline their functions. (ii) describe the changes that occur to food substances as they pass through the alimentary canal.	the change different they alimentary	Chart showing a labelled diagram of the human digestive system.	In the mouth the food is chewed and mixed with saliva. Starch digestion starts in the mouth. Protein digestion starts in the stomach. The stomach produces gastric juice which contains hydrochloric acid and protein digestion enzymes. In the duodenum, pancreatic juice is produced and pancreatic juice by the pancreas and production of bile by the liver. Absorption occurs in the ileum. Maltase convert maltose into glucose. Trypsin convert peptides into amino acids and lipase convert fat and oils into fatty acids and glycerol.	At the end of the following food substances: a) Protein b) Carbohydrate c) Fat and oils d) Waste matter as a ball of food passes through the alimentary canal. REMARKS Lesson not finished because students were writing 'Mobs' that 'examinate'.
3B 8:10-9:15 70 minutes							
3A 8:10-9:15 70 minutes							

Appendix G: Sample Students' Tasks 1-3 (Science)

All students are offered the same tasks in science and the same questions to work on.

technology benefits society.
③ The product of science cannot be seen or touch but the product of technology can be seen and touch

④ The product of science can be demonstrated and understood but the product of technology can be bought and used without understanding.

⑤ Science and technology make communication and faster.

⑥ Science is a knowledge generating process but technology is the process by which science knowledge are used and applied.

⑦ State 4 harmful effects of science and technology in society.

Improved health.

Production of drugs and vaccines to help fight diseases.

Production of equipment for diagnosing diseases.

Machines of operation.

7/7

technology benefits society:

1) The product of science cannot be seen or touched but the product of technology can be seen and touched.

2) The product of science can be demonstrated and understood but the product of technology can be bought and used without understanding.

3) Science and technology make communication and faster.

4) Science is a knowledge generating process but technology is the process by which science knowledge are used and applied.

5) State 4 harmful effects of science and technology in society.

Improved health.

Production of drugs and vaccines to help fight diseases.

Production of equipment for diagnosing diseases.

Machines of operation.

7/7

Exercise 8.5.12 Integrated Science class work 14th October, 2011

Exce

1. What is technology?

Technology is use of scientific knowledge to make useful tools to satisfy human needs.

2. State 4 ways in which science and technology benefits society.

a) Improved Agriculture

b) Improved transportation

2/10

3. State 4 harmful effects of science and technology on society.

a) Improved transportation

b) Improved Air Agriculture

c) Improved communication

d) Improved Education

7/7

Appendix H: Sample Students' Tasks 1&2 (Mathematics)

Students are provided with organised data and the same questions.

Ex 2 25th SEPTEMBER 2017
 1. The marks obtained by 20 pupils in a test were as follows:
~~4~~ 4, 8, 7, 6, 2, 1, 7, 4, 3, 7,
 6, 4, 7, 5, 2, 7, 5, 4, 8, 3.

a. Construct a frequency distribution table for the data above.

A frequency table showing the marks of 20 pupils in the test

Marks	Tally	Frequency	Fx
1		1	1 ✓
2		2	4 ✓
3		2	5 ✓
4		4	16 ✓
5		2	10 ✓
6 ✓		2	12 ✓
7		5	35 ✓
8		2	16 ✓

15/15

$\Sigma f = 20$ $\Sigma fx = 100$

b. Use your table to find:

i. Mean =

ii. Mode =

i. Mean = $\frac{\Sigma fx}{\Sigma f} = \frac{100}{20} = 5$ ✓

ii. Mode = 7 ✓

marks or class	tally	frequency	fx
2		1	2
3		3	9
4		4	12
5		6	30
6		2	12
7		0	0
8		2	16
9		2	18
10		1	10
		$\Sigma f = 20$	$\Sigma fx = 109$

9/10

use you table find

- i) mode ii) Median (iii) Mean

i) mode = 5

ii) median = $\frac{5+5}{2} = \frac{10}{2} = 5$

iii) mean = $\frac{\Sigma fx}{\Sigma f} = \frac{109}{20} = 5 \frac{9}{20}$

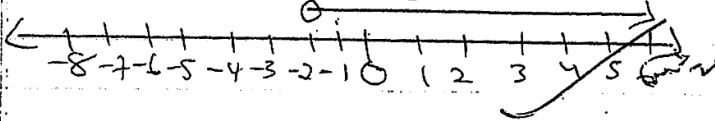
Appendix I: Sample Students' Tasks 3&4 (Mathematics)

Students are provided with the same tasks and questions.

∴ The truth set is $(x: \frac{3}{5} \leq x \leq \frac{2}{5})$ //

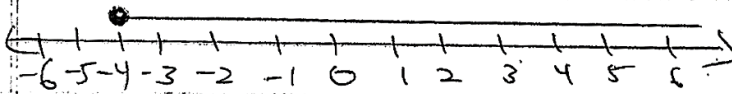
9) Present the ff: on the number line.

(i) $(x: x > -2)$



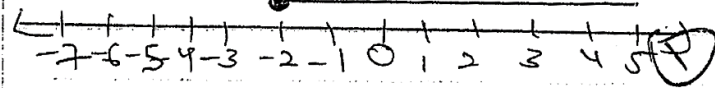
(ii) $(x: x \leq -4)$

Soln

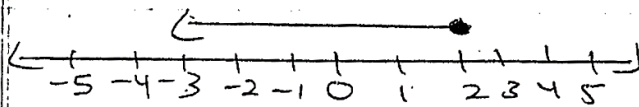


(iii) $(x: x \leq -2)$ ✓

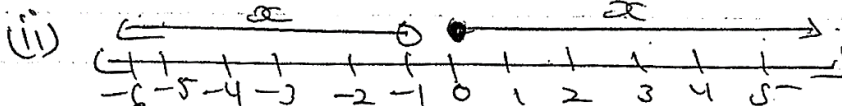
Soln



10) (i) Write the inequalities.



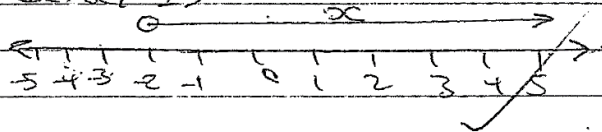
∴ $x \leq -3$ ✓



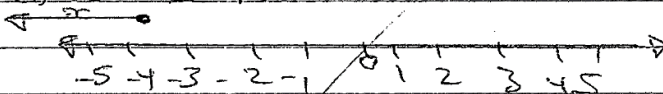
$-1 < x \leq 0$ //

9 Present the ff: on the number line

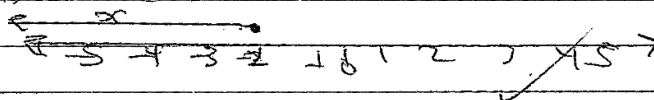
(i) $(-\infty; -7)$



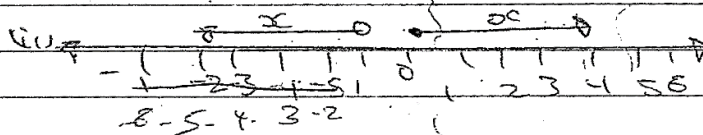
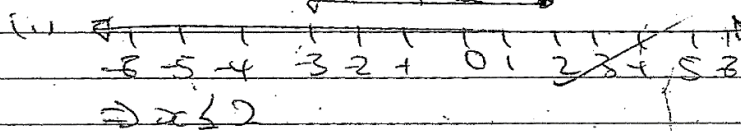
(ii) $(-\infty; -4)$



(iii) $(-\infty; -2)$



10 Write the inequalities



$\Rightarrow x < -1$ \cup $(\infty; 0)$