DEVELOPMENT AND VALIDATION OF GIFTEDNESS ASSESSMENT INSTRUMENT FOR PRIMARY SIX PUPILS IN LAGOS STATE, NIGERIA

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A THESIS IN THE DEPARTMENT OF EDUCATIONAL FOUNDATIONS SUBMITTED TO THE SCHOOL OF POSTGRADUATE STUDIES, UNIVERSITY OF LAGOS.

IN PARTIAL FULFILLMENT OF THE REQUIREMENTS FOR THE AWARD OF THE DEGREE OF DOCTOR OF PHILOSOPHY (Ph.D) IN MEASUREMENT AND EVALUATION OF THE UNIVERSITY OF LAGOS.

NOVEMBER, 2010

APPROVAL

THIS RESEARCH REPORT HAS BEEN APPROVED FOR THE DEPARTMENT OF EDUCATIONAL FOUNDATIONS, AND THE SCHOOL OF POST GRADUATE STUDIES, UNIVERSITY OF LAGOS.

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DEDICATION

This work is dedicated to the memory of my husband, Uchechukwu Jude Anya for initiating this dream. Regrettably he could not live to see it to the end. Continue to rest in Peace.

ACKNOWLEDGEMENTS

I am grateful to so many people who in one way or another contributed to the successful completion of this work. First, my immense appreciation goes to my supervisors, Dr. I.P. Nwadinigwe and Prof. G.C. Ilogu, who guided me and painstakingly supervised the work. My gratitude also goes to my other lecturers in the Department of Educational Foundations for their beneficial censure and brilliant ideas to this work: Prof. Ngozi Osarenren, Prof. A.M. Olusakin - my HOD, Dr. (Mrs.) Abe, Dr. Ubangha, Dr. (Mrs.) Alade, Dr. Oni, Dr. Aletan, Rev. Dr. Isichei, Prof. Omoegun and Dr. Okoli.

My profound gratitude goes to my siblings, especially Doctor Ifeanyi Nwoko and Mrs. Chika Amanze Nwachukwu, for their financial assistance in the printing of the instruments. I am also indebted to Dr. (Mrs.) Nelly Utuama, who took over the payment of my school fees after the death of my husband.

I also appreciate my colleagues, Dr. (Mrs.) Aneke for her financial assistance; and Mrs. Charity Iruobe, Dr. (Mrs.) Alufohai, Mrs. Stella Anyama, Joy, Nelson, Ayo, sister Tessy, for their prayers and counselling. I also thank my cousin, Rev. (Sis.) Chijindu Anyanwu, for her Novena Masses.

My gratitude goes to my parents and my friend Barrister Edwin Ukanwa for their encouragement; to Dr. O. Okoro of the Department of English, University of Lagos for editing the work and to Dr. Charles Umeh for giving direction to it.

Words are not enough to express my special gratitude to my bosom friend, Mr. Oliver Ezirim for his love, care, moral and financial assistance for the final binding of this work. Honey, you are one in a million to me.

I will not forget my best friend, Mrs. Ijeoma Ugo - Osuoha, and my research assistant, Uche Onukogu. Esther, Ngozi and Alli who helped in typesetting the work; and Onyinyechukwu Kenneth Anya **-** my only child for his patience and understanding.

Above all, I am grateful to my God who made all things possible.

Glory be to His Holy Name!

CHIDIMMA ADAMMA ANYA

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ABSTRACT

The need to identify the 'real' gifted children in Nigeria for proper placement into gifted schools and the operationalization of giftedness concept prompted the development and validation of the Giftedness Assessment Instrument (GAI).

Following the process of item construction, GAI comprises three components derived from several sources in a manner that retains the merits and eliminates the demerits of the sources, hence it is said to be integrated. The three components are: Above average ability test (GAI-1), Creative ability test (GAI-2) and Task commitment/motivation scale (GAI -3) with their independent attributes obtained through factor analysis using principal components with varimax rotations. The test was administered to 600 primary six pupils from public and private schools randomly selected from the six educational zones of Lagos State. The results obtained include: norms - for males and females and for public and private schools, high reliability and validity coefficients and discriminant validity with other standardized convergent and divergent measures of giftedness. To enhance the interpretation of the results, the scores were transformed into standard scores. The instrument was recommended for use in the identification and selection of primary six pupils into the gifted schools.

CHAPTER ONE

1.1 Background to the Study

Every society has its own gifted and talented persons. Across cultures and over periods in history, these individuals have been recognized either through their outstanding positive contributions to society or for some spectacular achievements or positive behavioural manifestations. Children are said to be gifted if their cognitive abilities, when developed, qualify them to become high level innovators, evaluators, problem solvers or leaders in the complex society in which they live (Oghounu & Oniyama, 2004). They are said to be talented if in the process of doing things, evidence of positive exceptionality and creativity is manifested (Onu, 2002). Sometimes, it is difficult to separate or even distinguish between the two terms since often one connotes the other (Anih, 2001).

In the past few decades, the type of sophisticated scientific and technological developments that have emerged such as America's feat of producing the atomic bomb, Russia's 1957 launching of the space satellite, the sputnik, and the introduction of the internet to mention a few, have focused the attention of the world on a particular kind of creative ability in these individuals (Yoloye cited in Okeke, 2001).

Nigeria is anxious to take off technologically, to revamp her economy and improve the over - all standards of living for the generality of her citizens. The decision, therefore, to identify Nigerian children who, by virtue of outstanding abilities are capable of high performance, is of paramount importance. Onu (2002) opines that children thus identified require differentiated educational

programmes, experiences and services beyond those normally provided by the regular school programme.

The National Policy on Education, FRN (2004) recognised the existence of the gifted and talented individuals by describing them as:

> *People (children and adults) who have/possess very high intelligence quotient (IQ) and are naturally endowed with special traits (in arts, creativity, music, leadership, intellectual precocity, etc.) and therefore find themselves insufficiently challenged by the regular school/ college/ University programmes (pp. 47-48).*

The policy further enunciated that "opportunities should be provided for exceptionally gifted and talented children to develop their talents, natural endowments/traits at their own pace in the interest of the nation's economic and technological developments (p.48)".

However, the development and recognition of giftedness in children started to be of major concern to the Federal Government of Nigeria more than two decades ago. Their efforts to see them through, in their educational system, necessitated the launching of "an operation catch – the - genius" in 1982 under the leadership of Professor Jubril Aminu as the then Federal Minister of Education (Makinde, 1998). The Minister clearly stated that the purpose of the policy was to ensure that the gifted children in Nigeria were not neglected any longer. This policy was buttressed by the establishment of the Suleja Academy for the Gifted and Talented, which took off on the 25th of May 1990 (Omoegun, 1998).

Silverman (2003) posits that Giftedness like developmental delay, involves inherent differences in development from birth to maturity. According to her, early intervention is essential for optimal functioning of developmentally

advanced children. She further states that "Gifted four or five year olds are mentally like six or seven year olds, and usually have excellent attention spans. In the same vein, Adima (2004) affirms that if the gifted are identified early, assisted and motivated towards the right path, they are assets of immeasurable proportion. If these groups of children are to be assisted, they have to be identified and identification can only take place through the use of an accurate psycho-educational assessment instrument. It is an appropriate assessment instrument that would distinguish them from their counterparts in school and out of school and expose their educational, vocational and psychological needs. Primary six was selected for this study because it is the class that the Blueprint on Education for the Gifted and Talented (1986) recognizes as ideal to partake in the examination for the selection of gifted children to Suleja Academy in Niger State.

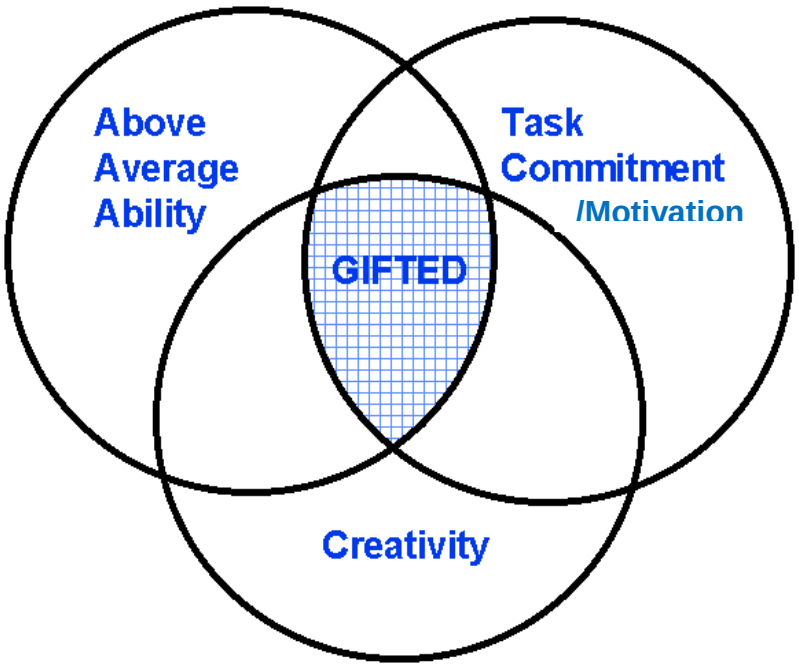
However, the task of identifying the gifted and talented children has become a growing concern for our nation's public and private school systems. For years, our society has judged intelligence on school performance and equated high grades with high intellect, even though many educators and researchers have long realized that many of our brightest students are not necessarily the "A" students (Fakolade, 2006). Apart from this, some current definitions of giftedness have also grown out of the awareness that IQ alone does not define all the possible areas of giftedness. Intelligence tests are as Guilford (1967) suggests "only a small sample of intellectual activity in limited areas of human endeavour".

Giftedness has also been associated with socioeconomic and gender bias. For instance, Adesokan (2000) reports that there is a socio-economic bias in the use of the cognitive test alone as an assessment criterion where children of the highly placed in the society only are usually offered admission into Suleja Academy. She also maintains that in some families, giftedness is more recognised in the males than in the females, and parents prefer their sons to be more gifted than their daughters.

However, the concept of giftedness has also expanded in recent times to include many areas that have added value for both individual and society (Robinson, 2003). For instance, the contributions of gifted individuals such as William Jefferson, Philip Emeagwali and Wole Soyinka have called for the re-definition of giftedness and the better way to identify the "real" gifted children for placement in special programmes.

In support of the above assertions, Renzulli (2005) conceptualized giftedness as the cluster of three interlocking abilities namely: above average ability, creativity and task commitment /motivation. He further explained that gifted and talented children are those possessing or capable of developing this composite sets of traits and applying them to any potentially valuable area of human performance.

Fig: 1 Renzulli's Three-Ring Conception of Giftedness



Renzulli (2005) maintains that no single cluster makes giftedness; rather it is the interaction among the three clusters that research has shown to be the necessary ingredient for creative-productive accomplishment. The shaded portion of figure 1 above represents this interaction. It is also important to point out that each cluster plays an important role in contributing to the development of gifted behaviour. This point is emphasized because one of the major errors that continue to be made in identification procedures is to overemphasize above average abilities at the expense of the other two clusters of traits. It is pertinent therefore to assess the gifted persons by the use of a proper validated identification instrument that comprises all the attributes of giftedness as enumerated by Renzulli (2005).

1.2 Statement of the Problem

An overview of the gifted programme currently going on in Nigeria seems to suggest that the gifted children have not made any impact in the society like their counterparts in the United States of America, Canada, United Kingdom, Israel etc, despite the huge amount of money spent on the programme (Onu, 2002, Anih, 2001). It also seems that the "real" gifted persons are left out as a result of over- reliance on only cognitive ability test alone in the selection process. This is contrary to Renzulli's (2005) definition that giftedness is made up of three interlocking clusters of ability, namely, above average (cognitive ability), creativity and task commitment/motivation.

Moreover, the cognitive ability test currently in use measures only two attributes (verbal and numerical (quantitative) aptitude skills) among all other attributes enumerated by Renzulli's (2005) conception of giftedness. Similarly, the test scores are transformed into percentile norms for the selection process of the gifted children. Unfortunately, percentile ranks are unequal score units and also ordinal level rather than interval measures. Hence, the fact that percentile rank units bunch up in the middle and spread out at the extremes of the scale causes difficulty in the interpretation of changes and differences in the transformed scores (Aiken & Groth-Marnat, 2006).

In addition, some attitude scales developed by psychologists for instance the Ibadan Creativity Scale on creativity and task commitment do not measure divergent thinking. The scores obtained are not usually distinguished into separate components of mental abilities and their applications to the selection criteria for the gifted programme are yet to be effected by stakeholders

(Fakolade, 2006). Even for the use outside African context, some other properties which call for urgent revision of these present test instruments include their unwieldy length which makes their use time-consuming and cumbersome for the gifted programme. It is in the light of these numerous problems that the present instrument is being developed with the use of factor analysis in order to assess all the necessary attributes of giftedness so as to fill some of these gaps in its measurement.

1.3 Theoretical Framework

The study is anchored on two theories.

1. Renzulli's (2005) Theory of Giftedness
2. Sternberg's (2005) Theory of Intelligence

Renzulli's (2005) Theory of Giftedness

This theory otherwise known as the three-ring conception of giftedness, states that giftedness comprises three interlocking clusters of traits, namely, above average ability, task commitment and creativity. Renzulli sees the three main ingredients as what makes human accomplishment. He pointed out that each cluster plays an important role in contributing to the development of gifted behaviours, for instance, above average ability consists of the capacity to process information, to integrate experiences that result in appropriate and adaptive responses to new situations and the capacity to engage in abstract thinking. These traits are measured by cognitive or intelligence tests and are broadly applicable to traditional learning situations. The theory believes that for a child to be termed gifted, he /she must have the potential to perform in any of these traits mentioned above.

Task commitment also known as intrinsic motivation is a non-cognitive factor. It is as important as the ability to process information, reason analytically, and understand spatial relations and think conceptually. It is characterized by perseverance, dedicated practice, endurance, self confidence, trust and effort that are guided by concrete problem oriented and creatively guided goals. Gifted children are therefore far more task-oriented in their work than are people in the general population. When one feels both self-determined and competent in pursuing a certain task, intrinsic motivation arises and leads to action. According to Collins & Amabile (1999), intrinsic motivation is innate to the human organism and is ever present as a motivator. It is a natural ongoing state of the organism unless it is interrupted, because intrinsically motivated behaviours satisfy a person's need to action.

Creativity means having the ability to express yourself in your own way. Children are naturally creative; they see the world through fresh, new eyes and use what they see in original ways (Sternberg, 2005). In the investment theory of creativity, Sternberg also states that creative ideas are both novel and valuable. They potentially have impact and this impact is what makes a gifted person. Creative ability allows individuals to contribute original and meaningful ideas to the society.

The crux of this theory is that since giftedness comprises the three abilities mentioned, identification measures must involve these components for them to produce the "real" gifted individuals. The use of cognitive/intelligence tests only in the identification of gifted children is incomplete and can result in a severe problem of under-identification of gifted and talented children. However,

Renzulli's theory suggests a combination of the three clusters in the identification process.

Sternberg's (2005) Theory of Intelligence

This theory states that Wisdom, intelligence and creativity synthesized (WICS) model is a possible common basis for identifying gifted individuals. According to Sternberg (2005), WICS is an acronym standing for wisdom, intelligence and creativity, synthesized. Wisdom, intelligence and creativity are *sine quo non* for the gifted leaders of the future. He states that without a synthesis of these three attributes, someone can be a decent contributor to society and perhaps even a good one, but never a great one.

Sternberg's (1999) successful intelligence includes; the ability to achieve one's goals in life, given one's socio-cultural context, capitalizing on strengths and correcting or compensating for weakness ,to adapt to, shape, and select environments and a combination of analytical, creative and practical abilities.

From the investment theory of Sternberg, the creative person buys low by presenting a unique idea and then attempting to convince other people of its value. Creative work requires applying and balancing the three intellectual abilities-creative, analytic, and practical - all of which can be developed (Sternberg, 1985).

According to Sternberg's balance theory of wisdom (Sternberg, 2001), wisdom is defined as the application of intelligence and creativity as mediated by values toward the achievement of a common good through a balance among (a) intrapersonal, (b) interpersonal and (c) extrapersonal interests, over the (i)

short- and (ii) long-terms to achieve a balance among (iii) adaptation to existing environments (iv) shaping of existing environments, and (v) selection of new environments.

Wisdom is not just about maximizing one's own or someone else's self interest, but about balancing various self-interests (intrapersonal) with the interests of others (interpersonal) and of other aspects of the context in which one lives (extrapersonal), such as one's city, country, environment or even God.

In identifying gifted individuals, three very important factors according to Sternberg (2005) to be considered are intelligence, creativity and wisdom-synthesized so that they work together effectively. For example, motivation and energy are extremely important as well. This theory is closely linked to Renzulli's theory in that it equally identified three very similar concepts which should be considered in the identification of giftedness. Thus, a synthesis of the thesis of the two theories is likely to lead to the conclusion of valid and reliable instruments for the assessment and identification of gifted children.

1.4 Purpose of the Study

The purpose of this study is to develop and validate an instrument known as **Giftedness Assessment Instrument (GAI)** for Primary Six pupils.

Specifically, the study has the following objectives:

(1) To develop the normative data of the instrument.

(2) To establish the psychometric properties of the instrument.

(3) To determine the factor structure of the instrument.

(4) To examine whether there is any sex difference in giftedness ability among primary six pupils using the Giftedness Assessment Instrument (GAI) as a measure.

(5) To ascertain whether the type of school the pupils attend influences their giftedness ability using the GAI as a measure.

1.5 Research Questions

The following research questions guided this study:

(1) To what extent will the Giftedness Assessment Instrument (GAI) have high test-retest and internal consistency reliability?

(2) To what extent will the Giftedness Assessment Instrument (GAI) have high concurrent and discriminant validity?

(3) To what extent will the Giftedness Assessment Instrument (GAI) have high construct validity?

(4) What is the significant sex difference in the giftedness ability of the pupils using the GAI as measure?

(5) To what extent will the type of school the pupils attend influence their giftedness ability using the GAI as measure?

1.6 Research Hypotheses

The following hypotheses also guided this study:

(1) The scores of the participants in the Giftedness Assessment Instrument (GAI) will not yield significant high reliability coefficients as determined by Cronbach alpha, split-half and test-retest methods.

(2) The scores of the participants in the Giftedness Assessment Instrument (GAI) will not yield significantly high coefficients of concurrent and discriminant validity when compared with other related standardized measures of the pupils' ability.

(3) The scores of the participants in the Giftedness Assessment Instrument (GAI) will not yield significantly high coefficient measures of construct validity.

(4) There is no significant sex difference in the determination of the pupils' giftedness ability using the GAI as measure.

(5) There is no significant difference in the giftedness ability of the pupils in private and public schools using the GAI as measure.

1.7 Scope of the Study

This study covers Nigerian children with a mean age of 10 years who are resident and in both public and private schools in selected local government council areas of Lagos State. Apart from the geographical scope, the study is functionally concerned with the development and validation of Giftedness Assessment Instrument (GAI) to satisfy a deficiency in the availability of instruments that measure all the attributes of the three clusters of abilities that constitute giftedness.

1.8 Limitations of the Study

In spite of the valuable contributions of this study, there are a few limitations.

The sample size for the study should have been larger so as to obtain a more generalizable norm for the instrument.

The GAI should be used in conjunction with other information (e.g. other creativity measures, teachers' or parents' ratings and portfolios) in order to minimize false negatives - missing creative children whose variety of creativity is different from that measured by a single test.

1.9 Significance of the Study

The major significance of this study lies in the fact that it will go a long way in filling the void in knowledge concerning the conception of giftedness and its method of assessment in Nigeria. Specifically, this study will produce an objective test of giftedness that stakeholders and researchers in education could use for its identification among Primary Six Pupils of the Basic Education Programme.

The instrument will be helpful to classroom teachers in identifying gifted children, thus enabling them to channel the extra energy of the children to more gainful activities before they are sent to the special schools.

The different attributes of the instrument will be useful to teachers in determining more specifically directions of giftedness or special talents in the child. The pupil's scores in each sub-section will reveal areas of interest and talent which will go a long way in helping the curriculum planners of gifted programmes to provide enrichment materials in the different areas.

It will help parents to recognise early signs of giftedness in their children by reporting them to teachers and appropriate organizations for proper attention.

Many teachers are not conversant with the various procedures involved in the development and validation of instruments. The GAI will serve as a valid and reliable model for them.

Furthermore, the instrument will form a model to be used by other selection bodies such as the military and financial institutions in their own selection processes.

1.10 Operational Definitions of Terms

Giftedness: Giftedness is defined as the possession of superior ability that can make a child become an outstanding contributor to the welfare of his/her society.

Creativity: This is the ability to think divergently - to produce a large number and variety of original responses to a stipulated stimulus situation.

Task commitment: This is a refined or focused form of motivation or energy brought to bear on a particular problem (task) or specific performance area.

Intelligence: This is the aggregate or global capacity of the individual to act purposefully, think rationally, and deal effectively with his/her environment.

Intelligence test: A test to measure how well a person is able to understand and think in a logical way about things.

Divergent thinking: It is creative thinking that involves the production of more than one solution to a problem.

Talent: A talented child is a gifted child with special aptitude geared towards a more specific area or field of interest in which he/she excels. In this study "giftedness" and "talentedness" are used interchangeably.

Intelligence Quotient (IQ): IQ means a measure of general mental ability indicating an individual's relative standing within his/her age group.

$$IQ = \frac{\text{Mental age}}{\text{Chronological age}} \text{ X } 100$$

Norm: This is a standard (created by the scores of a large group of individuals) used as the basis of comparison for scores on a test.

Factor analysis: It is a statistical method of simplifying the description of behaviour by reducing the number of categories from an initial multiplicity of test variables to a few common factors, or traits.

Factorial Validity: It is the correlation of the test with whatever is common to a group of tests or other indices of behaviour.

Construct validity: It refers to the extent to which scores on a psychometric instrument designed to measure a certain characteristic are related to measures of behaviour in which the characteristic is supposed to be an important determinant of behaviour.

Discriminant validity: It is a situation in which a psychometric instrument has low correlations with other measures (or methods of measuring) of different psychological constructs.

Spatial reasoning: It is the ability to judge the positions and sizes of objects. Test items measuring spatial reasoning were drawn to cover specific topics like visualization effects, simple matrix, solid geometry, unit forms, space relationships, class forms, system analysis, patterns and three - dimensional forms.

CHAPTER TWO

LITERATURE REVIEW

2.0 Introduction

This study focuses on the development and validation of a Giftedness Assessment Instrument (GAI) for Primary Six pupils. Giftedness is a complex concept covering a wide range of abilities and traits. What is presented here is a review of related literature using the following outline:

- Origin of giftedness
- Nature and concept of giftedness
- Historical Overview of Giftedness in Nigeria
- Characteristics of gifted and talented persons.
- Empirical studies on identification strategies of giftedness
- Guilford's (1967) structure of the intellect model
- Identification and assessment of gifted and talented children
- Factors that affect giftedness.
- Giftedness and intelligence
- Giftedness and creativity
- Giftedness and task commitment
- Giftedness and gender
- Giftedness and socio-economic status.
- Special educational programme for the gifted and talented.
- How to make giftedness productive.
- Psychometric assessment of test instruments
- Summary

2.1 Origin of Giftedness

The term *gifted children* was first used in 1869 by Francis Galton. He referred to adults who demonstrated exceptional talent in some areas as gifted, for example, a gifted chemist. Children could inherit the potential to become gifted adults, and Galton referred to these children as gifted children. Terman (cited in Silverman 2000) expands Galton's view of gifted children to include high IQ. In the early 1900s, he began his long-term study of gifted children, whom he defined as children with IQs of 140 or more. His study found that IQ alone could not predict success in adulthood. Hollingsworth (cited in Sternberg (2003), also, believe that the potential to be gifted was inherited. However, she felt that providing a nurturing home and school environment were also important in the development of this potential.

2.1 .1 Genetic and other biological factors

The proposition that intelligence and highly valued abilities are inherited is not a very popular one in our society. It can be used as a springboard for arguments in selective reproduction of humans (with intelligence or other characteristics being the primary factors in the selection of mates) and as a reason to downplay the importance of improved environmental conditions for citizens already born or conceived.

Silverman (1999) is of the view that new conceptions of intelligence and giftedness might, at first, seem to allow us to side step the issue of genetic factor in giftedness. That is, if 1Q is abandoned as the criterion for defining giftedness in favour of a variety of practical intelligence, giftedness might be seen as something that is less affected by genetics.

Plomin (cited by Sternberg, 2003) reports that behavioural genetic research deals with individual differences. Genetic influence is so ubiquitous and pervasive in behaviour that a shift in emphasis is warranted. The fact that giftedness is partly inherited, regardless of how it is defined, should not be misinterpreted as an indication that environmental factors are unimportant. Although genetic influences on the development of superior abilities cannot be derived, these biological influences are clearly no more important than the environment in which children are nurtured. Biological factors that are not genetic may also contribute to the determination of intelligence. Nutritional and neurological factors, for example, may particularly determine how intellectually competent a child becomes. But it does not follow that superior nutrition and neurological states early in life contribute to superior intelligence.

Gardner (2001) states that studies of individuals with high IQ, such as Terman's classical studies, typically have shown them to be physically superior to others of less intelligence in characteristics such as height, weight, attractiveness, and health in adulthood as well as in childhood. However, it is not clear whether these physical characteristics are a result of generally advantaged environments or of another factor that accounts for superior intellect. More adult males than females are considered gifted and creative by an overwhelming margin; men achieve outstanding status and recognition more frequently than women of the same age. However, there is little evidence that these performance differences are the result of biological differences. The available research points far more clearly to social and cultural expectations as an

explanation for the disproportionate number of males who are recognized as gifted (Conroy, 2000; Eccles, 1998). Genetic factors are involved in the determination of giftedness. Environmental influences alone cannot account for the fact that some individuals perform so far above average (Zigler & Farber, 1998).

2.1.2 Environmental factors

Families, schools, the peer group, and communities obviously have a profound influence on the development of giftedness (Tannenbaum, 1998). Stimulation, opportunities, expectations, demands, and rewards form a correlation between socio-economic level and IQ, undoubtedly in part, because the performances measured by intelligence tests are based on what families, schools, and communities of the upper classes expect and teach. As definitions of intelligence and giftedness are broadened to include a wider range of skills and abilities that are not so specific to socioeconomic class, we will no doubt see changes in the way we view environmental effect on giftedness (Plomin cited by Sternberg, 2003)).

Research has shown that parents differ greatly in their attitudes toward the management of their gifted children. Some parents view having a gifted child as positive; some as negative. Fathers appear to see their children as gifted less than mothers (Cornell, 2000; Silverman, 2000). A study of individuals who have been successful in a variety of fields has shown that the home and family, especially in the child's younger years, are extremely important (Bloom & Sosniak, cited in Okeke, 2001). They identify the following to occur in the families of highly successful persons:

- Some in the family (usually one or both parents) had a personal interest in the child's talent and provided great support and encouragement for its development.
- Most of the parents were role models (at least at the start of their child's development of talent), especially in terms of life-style.
- There was specific parental encouragement of the child to explore, to participate in home activities related to the area of developing talent, and to join the family in related activities.
- Teaching was informal and occurred in a variety of settings. Early learning was exploratory and much like play.
- The family interacted with a tutor/mentor and received information to guide the child's practice (interaction included specific tasks to be accomplished, information or specific points to be emphasized or problems to be solved, a set time by which the child could be expected to achieve specific goals and objectives, and the amount of time to be devoted to practice). Parents sought special instruction and special teachers for the child.
- Parents encouraged participation in events (recitals, concerts, contests) in which the child's capabilities were displayed in public. Children who realize their potential for accomplishment have families that are stimulating, directive, supportive, and rewarding of their abilities. Research does not indicate much else about how families encourage gifted performance. Moreover, the stresses and needs of families of gifted children are poorly understood (Silverman, 2000).

2.2 Nature and concept of giftedness

Winner (1996) and Simonton (2003) believe that the concept of giftedness is closely tied to talent. They also assert that the terms are used interchangeably and that talent may be viewed as a specific form of giftedness. Grantham (2002) sees giftedness as the potential to excel at the upper end of any talent continuum. Fakolade (2006) gave a broader perspective on the concept of gifted and talented development by saying that "children and youth with outstanding talent perform or show the potential for performing at remarkably high levels of accomplishment when compared with others of their age, experience, or environment (p. 32)"

Giftedness in a child is revealed as superior latent abilities. Indications of this are found particularly where the child attains a remarkable level of achievement in a pre-school intelligence test, teaches himself/herself to read as an infant and shows signs of exceptional language skills as a school beginner (Silverman 2000.) A gifted child is also described as such on the basis of the attainment he has already achieved in a formal school situation, including excellent scholastic achievement; other exceptional abilities and the development of remarkable talents. Barbe (1996) observes that giftedness is expressed particularly by way of mental achievements, ingenuity, creativity, visible expressions of feelings, public performance and motor skills, to mention but a few. On the basis of their mutual differences with regard to the nature and quality of their talents, gifted children can be described as a very heterogeneous group.

According to Passow (1998), some gifted youngsters are only slightly above average with respect to the criteria applied while others are so unusual as to be extremely rare; some individuals are gifted/talented in a single area, while others seem to be unusually able in practically any area**.** He maintains that when a pupil shows exceptional ability only in a particular field or attain an excellent level of achievement in respect of a specific discipline, the term specific giftedness is generally applied. The phenomenon that pupils sometimes excel in various fields can be indicated by terms such as 'universal or complex giftedness (Revesz,1999). For Clark, (2000), it appears that a child's uniqueness increases in relation to his giftedness.

When only the superior intellectual abilities of a subgroup of gifted children are emphasized, the gifted are sometimes thought of as those pupils constituting only a certain small percentage of the school population, or they are labelled as those with a particular IQ. When the term highly gifted is used, it immediately calls to mind someone who is intellectually superior, and a specific criterion is used as a starting point to bring about this closer declination. In the United States, it is the custom throughout to use an IQ score of 146 and 148 as the criteria when using the Wechsler and Standford-Binet individual intelligence scales, respectively.

According to Safter (1999), children with such exceptional high IQ scores, who reveal themselves as rarities, are known as child prodigies. Here, one particularly thinks of children with an IQ of between 160 and 200. These children are apparently hampered by an imbalance between their chronological age and their mental age as their peers are considerably older

than themselves and great difficulties are experienced in providing for their particular educational needs. The concept 'genius' is reserved exclusively for the adult gifted who have already achieved international status and recognition for their remarkable achievements (Adesokan, 2000). This concept is therefore not generally used in educational circles in reference to children. Gifted children therefore, form a very divergent group of children which can be defined in various ways and which can be divided into subgroups.

2.3 Historical overview of giftedness in Nigeria

The origin of gifted education in Nigeria can be traced to the resolve of the Federal Government to cater for the education of disabled persons as was pronounced by the then head of State, General Yakubu Gowon, in a nationwide broadcast in 1974. When the National Policy on Education was released, it contained newly introduced Special Education programmes which were to cater for the handicapped and the exceptionally gifted children. Specifically, section 8: 36 of the National Policy on Education (1981) states that:

Government has already stated that all the children including the gifted as well as those with physical, mental learning difficulties must be provided for under the new education system.

Education for the gifted, according to the policy statement is designed to enable the exceptionally gifted children to develop at their own pace for full self-actualization in the interest of economic and technological advancement. As a means of practicalising the policy statement, a committee set up by the Federal Government to work out a suitable programme for the education of the gifted recommended the appointment of five Federal Government Colleges to serve as pilot institutions. The approval of this recommendation led to the selection of

King's College, Lagos; Federal Government Colleges in Ilorin, Benin, Kano and Maiduguri as pilot schools for gifted education in Nigeria. As time went by, the Federal Government eventually, instituted a gifted school named Federal Government Academy in 1989 exclusively for the education of the gifted children at the secondary school level.

The establishment of the academy led to a multi-stage selection procedure for the admission of pupils into the academy. At the initial stage, the top five percent of pupils in all the local Governments of the Federation were identified. Candidates who scaled this selection were further subjected to further screening exercise at the state and National levels from where the top five percentages are admitted into the academy. The screening exercise was basically through national entrance examination.

In the past, the National Board for Educational Measurement has been mandated to select qualified pupils for the academy. The new assessment procedures of the board include:

- Identification of the best ten primary six pupils in all local government areas.
- Conduct of common entrance examinations in mathematics, English language, Progressive matrices and general aptitude tests.
- Submission of the result to the Minister of Education for decision making process. (Adigun, 1999).

In an attempt to ensure equal representation of pupils from all states of the Federation, the board has recently introduced relative merit strategy. This new

procedure admits the best two candidates from all the states of the Federation and Abuja.

2.4 Characteristics of gifted and talented children

Some children, who have special talents in areas such as music, dance, art, or leadership may not be outstanding in academics. Characteristics in those persons who are considered to be gifted and talented include the following: the ability to rapidly acquire, retain, and use large amount of information; the ability to relate one idea to another; the ability to make sound judgments; the ability to perceive the operation of larger system of knowledge that may not be recognized by the ordinary citizen; the ability to acquire and manipulate abstract symbol systems; the ability to solve problems by refraining the question and creating novel solutions (Clark, 2008; Maker, 1998; Gallagher & Gallagher; 1999; Piirto, 1999).

Silverman (1999) identified the following characteristics for the highly gifted or children with IQ scores at least three standard deviations above the mean (IQ > 145): intense intellectual curiosity; fascination with words and ideas; perfectionism; need for precision; learning in great infinitive leaps; intense need for mental stimulation; difficulty conforming to the thinking of others; early moral and existential concern; tendency toward introversion;

Maker (1998) contends that the three areas that appear most often within various definitions and characteristics of the gifted and talented involve high intelligence, high creativity, and excellent problem solving skill. She states that such an individual is capable of: (a) creating a new or more clear definition of an existing problem, (b) devising new and more efficient or

effective methods, (c) reaching solutions that may be different from the usual, but which are recognized as being effective, perhaps more effective, than previous solutions. This dynamic perspective, characterizes a gifted person as a problem solver, one who enjoys the challenge of complexity and persists until the problem is solved in a satisfying way.

The gifted individual has been persistently stereotyped as being physically weak, socially inept, and narrow in interests, and prone to emotional instability and early decline. Terman's early studies, and many others, shattered the myth that giftedness carries with it, a set of undesirable characteristics. In fact, it now appears that gifted children tend to be superior in every way in intelligence, in physique, in social attractiveness, in achievement, in emotional stability, and even in moral character. The danger now is a developing stereotype of the gifted child as "superhuman", and someone immune to ordinary frailties and defects. Morelock & Feldman (1998) and Gallagher (2000), report that gifted children tend to be far ahead of average children in academic achievement.

Parrone (1997) opines that gifted people enter occupations demanding greater than average intellectual ability, creativity, and motivation. Most find their way into the ranks of professionals and managers, and a high proportion distinguish themselves among their peers in adulthood. Occupationally, as educationally, they tend to be winners.

Gifted children tend to be happy and well liked by their peers, with many of them as social leaders at school. Most are emotionally stable and self-sufficient and are less prone to neurotic and psychotic disorders than average

children. They have wide and varied interests and perceive themselves in positive terms, (Coleman & Gallagher, 2003; Janos & Robinson, 1998).They emphasise that one area of giftedness often overlooked is emotional giftedness-extraordinary sensitivity to one's own feelings and to others. For example, as a group, it appears that gifted children, youths, and adults are particularly aware of and are concerned about interpersonal and intrapersonal events and issues.

Piechowski (1999) summarizes that the outstanding features of the emotional development of the gifted is their emotional sensitivity and intensity. Sometime it is hidden; sometime it is prominent. In an exploratory study of emotional growth of gifted adolescents, he finds out that only a small number followed a type of growth, oriented more toward outward achievement and recognition, than toward introspection and emotional awareness. These characteristics are associated with emotional giftedness because it is in self-scrutiny; which leads them to develop a more accepting and compassionate understanding of others.

Comerford & Creed (1999), relying heavily on extensive literature search and observations of gifted persons, put together many traits common to gifted children. They contend however, that it is not likely that a gifted child will exhibit all the traits listed, but the likelihood of a gifted child exhibiting many of the traits is highly indicated. According to them, a gifted child when compared with his chronological peers;

- finds pleasure in intellectual activities;
- likes to create, invent, investigate and conceptualise;

- learns easily and readily;
- displays great intellectual curiosity and inquisitiveness;
- uses vocabulary which is superior in both quantity and quality;
- demonstrates a richness of imaginary in formal language and brainstorming
- learns to read early (often well before school age);
- displays intellectual and physical restlessness;
- memorizes easily and retrieves from memory easily and quietly;
- learns basic skills better, more quickly and with less practice;
- sees relationship and handles higher levels of abstractions;
- evidences an ability to cope with more than one idea at a time;
- follows complex directions easily.
- possesses unusual imagination;
- shows initiative, originality, versatility, and virtuously;
- evidences friendliness and outgoingness in desire for social acceptance.

Furthermore, Kitano & Kirby (1996) observe that the positive traits usually considered as positive signs of giftedness may go unnoticed in the presence of more salient negative behaviours that can also be noticed as some of the characteristics of the gifted children. The reticent characteristics of a gifted child as observed by the Educational Information and Resource Centre (1998) include the following:

- inability to conceal boredom in the face of routine tasks and refusing to carryout role homework
- resistance of moving easily to topic other than the ones of interest to

them;

- being self critical and impatient with failure;
- fondness for criticizing others even their teachers;
- exhibiting traits of emotional sensitivity in the form of over-reacting, getting easily angry or even showing preparedness to cry when things go wrong.

2.4.1 Educational and occupational characteristics

Gifted children tend to be far ahead of average children in academic achievement. Most learn to read easily; many of them are taught to read by their parents or teach themselves before they start school. Many are more advanced in reading than in areas that require manual dexterity, such as writing and art, and more advanced in reading than in mathematics, which depends more on sequential development of concepts and skills. According to Gallagher (2000), contrary to popular opinion, which pictures gifted students as constantly bored with and antagonistic toward school, most gifted children like school and love to learn. He also asserts that many gifted students are younger than their classmates because of their superior academic performance.

Not surprisingly, gifted people tend to enter occupations demanding greater than average intellectual ability, creativity, and motivation. Most find their way into the ranks of professionals and managers, and a high proportion distinguish themselves among their peers in adulthood. Occupationally, as educationally, they tend to be winners (Parrone ,1997,Gallagher, 2000).

However, Nwazuoke (2006) believes that this description does not hold true for every gifted person. He maintains that it is not unusual for a gifted child to be

unrecognized by school personnel or to become unpopular with teachers because of such characteristics as inquisitiveness, unusual knowledge and wit, or boredom with unchallenging school work. It is an unfortunate fact that much talent goes to waste because school personnel are oblivious of the needs of gifted children or refuse to alter the lockstep plan of education for the sake of superior students.

2.4.2 Social and emotional characteristics

Gifted children tend to be happy and well liked by their peers. Many are social leaders at school. Most are emotionally stable and self-sufficient and are less prone to neurotic and psychotic disorders than average children. They have wide and varied interests and perceive themselves in positive terms (Coleman & Fultz, 1998; Janos & Robinson, 1999).

One area of giftedness often overlooked until recently is emotional giftedness—extraordinary sensitivity to one's own feelings and to others. For example, as a group, it appears that gifted children, youths, and adults are particularly aware of and concerned about interpersonal and intrapersonal events and issues. Piechowski (1999) summarizes as follows;

> *"the emotional and social aspects of giftedness include concern for moral and ethical behaviour. There is a tendency among most people to hope that those who are the brightest are also the best that moral attributes such as fairness, honesty, compassion, and justice go along with intelligence (p.44)".*

Gifted individuals should be able to act on what is right as they see it, and they should be able to perceive what is right more quickly or more profoundly than the average person. However, the corruptibility of major figures in every profession in the society raises questions about the moral and ethical superiority

of gifted persons. Here again, one must qualify the discussion by stating that there are individual differences among gifted people and that not every gifted person will be characterized by the description that fits the group. Most studies show gifted people to be superior to average individuals in concern for moral and ethical issues and in moral behaviour (Piechowski, 1999, Gallagher, 2000,).

At an earlier age, most gifted children tend to be concerned with abstract concepts of good and evil; right and wrong, justice and injustice (Lyth, 2004; Hollingworth, 1998). They tend to be particularly concerned with social problems and the ways they can be resolved. The immoral, unethical gifted individual seems to be the exception rather than the rule. It may be that gifted people are the ones who have the greatest potential for helping individuals and societies resolve their moral and ethical dilemmas. It is worth remembering that almost any definition of giftedness will include people, who are recognized as moral giants (Gruber, 1999 and Piechowski, 1999).

When gifted students complain, what are their gripes? Galbraith (1998) studied the complaints of over 400 gifted students. Approximately equal numbers of boys' and girls' responses to surveys and interviews were obtained. The students ranged in age from 7 to 18 years. However, the findings do suggest that gifted students need more than intellectual challenge to feel good and use their special abilities to the fullest.

One common and persistent notion regarding gifted people, especially those who excel in the arts, is that they are prone to mental disease. It has been especially difficult to destroy, the myth that creative excellence is linked to mental illness. Some great artists, musicians, and scientists have gone through periods of

mental instability or psychosis, but their achievements were probably made in spite of, not because of, their emotional distress. The misconception that gifted people tend to be social misfits and emotionally unstable was abetted by a classic study' by Hollingworth (1998) of children who tested at 180 or higher IQ. She reports that these children were quite isolated from their peers and not very well adjusted as adults (Morelock & Feldman, 2001).

2.5 Empirical studies on instruments for the identification of giftedness

There are some attitude and aptitude tests with established reliability and validity in the measurement of giftedness. These instruments differ in the emphasis they place on the particular programme in which students are placed.

In one study Wechsler (2003) examined the factor structure of Wechsler Intelligence test for Children -Fourth Edition (WISC-IV) and obtained four indices namely verbal comprehension, perceptual reasoning, working memory and processing speed. The instrument is a standardized test on 2200 children including Asian and American in proportion to their distribution in America. Parental educational levels and geographical regions were also proportionally represented. Though this instrument was used for placements based on IQ scores which provided parents better understanding of interpreting their children's scores, it often does not represent a child's intellectual abilities as well as general ability index and also does not accommodate language diversity.

In another study investigating the instruments used for the identification of giftedness, Pfeiffer & Jarosewich (2008) developed a scale known as Gifted Rating Scale (GRS-S). The participants consist of 122 elementary and middle

school students with a mean age of 10.31 (SD=2.06).The instrument also consist of six scales; intellectual ability, academic ability, creativity, artistic talent, leadership ability and motivation. The GRS-S coefficient alpha reliabilities ranged from .97 to .99.The test manual also reports evidence in support of the internal structure and convergent and divergent validity (Pfeiffer & Jarosewich, 2008).The limitations of this instrument is that; the samples were nominated by teachers based on academic level, therefore the relationships among scales may be influenced by selection effects. Again, the study was also limited by the sample size.

In another study based on teacher nomination is the Scales for Rating Behaviour Characteristics of Superior Students (SRBCSS) (Renzulli, Smith, White, Callahan, Hartman & Westberg, 2004).The instrument was based on the identification of student's strengths in the areas of learning, creativity, motivation, leadership, artistic, musical, dramatics and communication with a confirmatory factor analysis of 726 students drawn from public primary schools. The Cronbach's alpha reliabilities range from .95 to .97.Though this instrument has a very high content validity as a result of the confirmatory factor analysis used in the analysis of the result, it also seems to be biased as a result of teacher ratings of the student's characteristics.

Akinboye (1997) developed an attitude battery known as Ibadan Creative Assessment Scale (ICAS).The test comprises of four sub-scales; ideative fluency, ideative originality, ideative flexibility, and ideative motivation. Using a sample of 200 children of mean age of 12, for each of the sub-scales, high coefficient reliability indexes of 0.79, 0.77, 0.72 and 0.85 were obtained. The main demerit of this scale is that the items were too lengthy to complete by the participants

for a short period. Again, the content could not produce all the components of giftedness.

The Nigerian version of Intelligence test by NECO (2005) – the Gifted Children Screening Examination (GCSE) paper 1 and 2 has four subsections of 80 items each. The factor structures were four namely English language, verbal aptitude, mathematics and quantitative aptitude. The testees are primary six children with mean age of 10 years. This standardized test has been in use for the selection of gifted children since the inception of the programme (Adesokan, 2000). One of the disadvantages is lack of content and construct validity. Moreover, the items are too lengthy for the time allotted for the examination. There is also a socio-economic bias in the administration of this instrument; therefore the purpose of using it is not being achieved (Fakolade, 2006).

These numerous problems of the various cognitive and non cognitive instruments for the identification of giftedness are the main challenges that have been tackled in the development of Giftedness Assessment Instrument (GAI). While adopting in GAI-1 Eysenck's (cited by Omoluabi,2006) format of 40 items per test, the scores can be distinguished into ten ability categories namely: abstract reasoning, verbal reasoning, spatial reasoning, numerical reasoning, mechanical reasoning, picture completion, spelling,similarities,reasoning analogy and serial reasoning.

The GAI is also integrated because it eliminated the demerits of tests like WISC-IV, GCSE 1 and 2, SRBCSS and ICAS and at the same time retained their merits. One merit of GAI is that it is a confluence of these other tests in terms of the composition of its items. The cognitive ability aspect also covers the

characteristics of above average ability which is one of the domains of giftedness and the non-cognitive measures deals with (creativity and Task commitment/motivation) domains of giftedness respectively (Renzulli ,2005).

It is pertinent to note that the task commitment aspect of GAI is an attitude inventory; this is based on the premise that attitudes determine observable behaviours which is eminent in gifted individuals (Falaye, 2004).The creativity test is an ability test requiring the participants to sample a variety of verbal and figural dimensions of creative thinking based on the idea generated from Torrance Test of Creative Thinking (Torrance, 1998).

2.6 Guilford's (1967) structure of the intellect Model (SOI)

This model emphasises that the mind is composed of at least three dimensions: operations, contents and products. Guilford (1967) identified 120 different abilities in his structure of the intellect model. The model is a three-way classification of intellectual abilities namely: operations, contents and products. According to Guilford (1967), there are five kinds of operations:-

- Cognition – the ability to understand, comprehend, discover and become aware.
- Memory – retention of information
- Divergent thinking – the process of generating multiple solutions to problem.
- Convergent thinking – the process of deducting a single solution to problem.
- Evaluation – the process of judging whether an answer is accurate, consistent or valid.

The content Dimension includes the broad areas of information to which operations are applied such as:-

- Figural content – includes all that is non-verbal or pictorial.
- Symbolic – includes verbal thinking and communication.
- Semantic – comprises information organized as symbols or signs that have a meaning by themselves, for example, numbers and letters of the alphabet.
- Behavioural – It means the social behaviour in the society.

The Product Dimension: As the name suggests, the dimension contains results of applying particular operations to specific contents. There are six kinds of products namely:

A unit – represents a single item of information

A class – a set of items that share some attributes

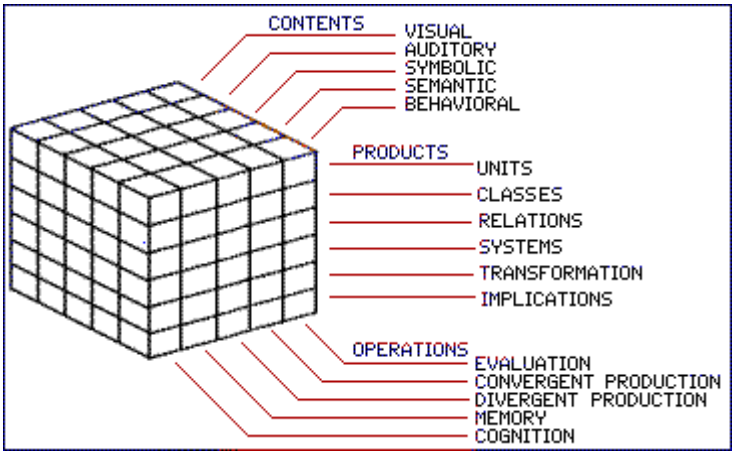
A relation – represents a connection between items or variables.

A system – an organisation of items or networks with interacting parts.

A transformation – changes in an item or attribute e.g. reversing the order of letters in a word.

An implication – an expectation or prediction.

Fig 2: Structure of the Intellect model (SOI)



The model proposes that creativity consists of a number of closely related factors or methods in the divergent thinking slab of the SOI model. Particularly important is the cell formed by the intersection of semantic contents with divergent thinking productions. This matrix of factors contains those that are usually stereotyped as "verbal creativity: including ideational fluency, spontaneous flexibility, associational fluency and originality. Under this model, gifted children are those with high endowments in the verbal creativity where as non- gifted children have their endowment elsewhere.

Guilford remarked that IQ tests assess only ability to think convergently; in other words, to deduce a single answer, either right or wrong. He therefore proposed that more tests should be constructed to assess the potential for divergent thinking. However, specific cognitive abilities (above average abilities) have to be identified from the cognitive attributes in consonance with the multidimensionality of intelligence posited by the SOI model and for the fact that giftedness requires a combination of different abilities.

2.7 Identification of giftedness

Measurement of giftedness is a complicated matter. Some components cannot be assessed by traditional means (1Q test). In addition, the particular definition of giftedness will determine how test scores are interpreted. However, if it is indeed important to identify gifted children early so that they will achieve self-fulfilment and be aided in the development of their special potential to make a unique and valuable contributions to the society, it is important that appropriate methods be used (Fakolade ,2006).

According to Renzulli (2002), the most common methods of identification include 1Q (based on group or individual tests), standardized achievement tests, teacher nominations, parent nomination, peer nominations, self-nominations and evaluations of students' work or performances. Typically, some combination of several of these methods is used. Identification practices have been extremely controversial, and best practices have frequently been ignored. He further listed six "rampant" problems in identification practices.

(1) Elitist and distorted definitions of giftedness
(2) Confusion about the purpose of identification
(3) Violation of education equity
(4) Misuse and abuse of tests
(5) Cosmetic and distorting use of multiple criteria.
(6) Exclusive programme design (p. 81).

The concerns expressed by this list are that biased and unreliable criteria for identifying giftedness (e.g., overreliance on 1Q and achievement tests), are sometimes used to provide special educational opportunities in an exclusive programme that is discriminatory, even when school systems claim that they are using multiple and fair criteria (e.g., the criteria may all measure essentially the same thing) (Fakolade, 2006).

As Renzulli & Reis (2002) put it, in some cases "the multiple criteria game ends up being a smoke screen for the same old test – based approach" (p 118).

They maintained that it is still possible to develop identification methods that are fair, reliable, equitable and do not result in an exclusive or discriminatory programme design.

According to them, six-steps of identification system are associated with the definition of giftedness:

Step one: Test score nomination: This involves a nomination on the basis of test scores – any single test or sub-test score or other performance indicator that would put the student in the top 8 percent according to local norms.

Step two: Teacher nomination: Here teachers are informed of which student in their classes have been nominated by test scores and are asked to name any additional student who shows particularly high levels of creativity, task commitment, interest, talent performance, or potential.

Step three: Alternative pathways to identification: This involves nomination by parents, peers, or self, tests of creativity, product evaluation or any other pathways that can be reviewed by a screening committee or evaluated in a case study approach.

Step four: Special nomination: Here a list of all nominated students is circulated to all teachers in the school and to past teachers who may know of students' abilities that have somehow gone unrecognized in steps one through three. The idea of step four is to provide a "safety value" for recognition of students who might otherwise have been overlooked.

Step five: Notification of parents: This provides parents with information about why their children were nominated for the talent pool- The goals and nature of

the programme as it relates to their child's strength areas, and how a programme based on the three-ring conception of giftedness differs from other types of programmes.

Step six: Action Information nominations: This step provides another "safety value" by seeking nominators from teachers throughout the year when they notice a student's high interest in a particular topic, area of study, issue, idea or event taking place in or outside of school.

Although no identification system is perfect, the procedures described by Renzulli & Reis (2002) have widespread support and are consistent with recommended practices (Shore, Cornell, Robinson & Ward, 2003). The focus of identification methods should be on balancing concern for identifying only those students whose capabilities are markedly above average with concern, for including all who show promise for gifted performance.

2.7.1 Method of identification of gifted children in Nigeria

According to the Blue Print on Education for the Gifted and talented persons (1986), identification plan were based mainly on the use of intelligence test since giftedness was perceived mainly in terms of high intellectual performance and ability. Thus, only children who scored up to a given minimum, example 1Q 140 or 170, were identified as gifted.

However, a modified multiple criteria approach was also recommended to be used in Nigeria. This involves among other things, ascertaining the target population, deciding on a screening procedure, selection or construction of

identification instrument and then actual selection or identification by means of combining various measures (Oyelami, 2007).

Fakolade (2006) asserts that since the inception of gifted programme in Nigeria only 1Q test (achievement test in English and Mathematics) has been adopted as identification measure. This has resulted to many children being left out in the selection process, this has called for this study.

2.7.2 The importance of early identification

Virtually all children, whether gifted or not, tend to excel in an environment that provides support and stimulation that fits well with their abilities and interest. Research indicates that because of the importance of providing gifted children with appropriate support and stimulation from an early age, it follows that they need to be identified as early as possible if they are to reach their developmental potential.

Whilst many gifted children will thrive in a supportive and stimulating environment in their preschool or school, some will show behaviour problems if they are bored, or because they need to work with and relate to older children who are of a similar mental age (Adesokan, 2000). Some will not show their advanced skills because they want to be like the other children, and to be liked by them. Some may have specific learning difficulties which mask their advanced abilities in other areas.

Identifying children's giftedness can be a difficult task, partly because of the many forms giftedness can take. Apart from this, many forms of giftedness are not always easy to detect in early childhood. While environment both at home

and at school are quite important in raising the gifted child, it may be rather difficult to get the child interested in an area for which she is not naturally disposed. Our experience in sports training is that compelling a child to work out or practice beyond his/her capacity may be detrimental to the child's physical and emotional health. All children will do their best in an area of interest, when they have skills and they are encouraged to practice and enjoy themselves (Gross, 2003).

2.8 Challenges associated with the assessment of the gifted child in Nigeria.

Gifted and talented individuals are only a select few who can turn the country they find themselves around in terms of their contribution if they are discovered early and assisted (Okeke, 2001). In the same vein, Adima (1998) affirms that if the gifted are identified early, assisted and motivated towards the right path, they are assets of immeasurable proportion. It is an undebatable fact that gifted children exist in various parts of Nigeria. If these groups of children are to be assisted, they have to be discovered. Discovery can only take place through the use of assessment instrument. It is appropriate assessment that would distinguish them from their counterpart in schools and out of schools and expose their educational, vocational and psychological needs.

However, a number of challenges face the psycho-educational assessment of these set of children. These challenges included those that are posed by parents, government and non-government agencies, personnel or professionals working with the gifted children. Gearheart & Gearheart (1999) contend that assessment problems may be viewed from three overlapping areas. These

include problems inherent in the actual tests or assessment procedures, those relating to assessors and those that arise in an attempt to interpret the results of assessment. Attempt is, hereunder, made to elucidate the following challenges:

i. Parental/guardian ignorance

The informal assessment strategy recognized parents/guardians as the first assessors of a gifted child. They live and interact with the child and most of these inherent traits of giftedness are exhibited in their presence. Ironically, most parents/guardians are too preoccupied to notice these traits or lack the techniques of isolating them or ignorant to the point of referring the child for professional assessment. Some parents, in the submission of Abang (1999), prevent their children from being assessed because of the stigma associated with special needs. While some parents, due to lack of knowledge, curtail the curiosity in their children because of cultural practices, some parents hide or prevent their gifted handicapped from attending school or social functions.

ii. Inappropriate test instruments

Standardized tests usages are indispensable tools in the assessment of gifted children. There are several tests in circulation but the ones that would discover and assist the Nigerian gifted child mostly are the ones developed by Nigerians. Werts, Culatta, & Tompkins (2006) observe that the cultural bias inherent in several tests used to discover gifted/talented students often makes it difficult to obtain fair estimate of their abilities. Unfortunately, most assessors of gifted children rely on foreign tests or adapt foreign tests when dealing with the gifted child. Ihenacho (1998) affirms that foreign standardization cannot be used in Nigeria because of cultural beliefs and attitude. Ajobiewe & Ajobiewe (2004) have equally pointed out that most intelligence tests have an "Anglo-Centric"

bias in terms of differences in language, attitude of individual student, critical life experiences, children's relationship with peers, attitude towards multiple-choice situations and trial and error approaches.

iii. Inadequate trained personnel

Trained personnel can only carry out valuable assessment of a gifted child. A trained personnel must have undergone a number of theoretical and practical courses at the University level. Some of the courses that would improve the proficiency of personnel, in the view of Nwabuisi (2004), include: introduction to measurement and evaluation procedures for teachers, individual psychological testing, and psychological measurement practicum in psycho-educational assessment development. It is, however, doubtful if some of these courses are included in the curriculum for trainees. In cases where they are available, the problem might be absence of qualified personnel to teach or incessant strikes by academic and non-academic staff or student's unrest. Longbab & Arinze (2007) have reported that efficient teachers are few in gifted education in Nigeria despite the fact that efficient teachers serve as catalysts for giftedness.

iv. Unhealthy rivalry among professionals

This approach utilizes team techniques of assessment in which diverse professionals such as special educators, guidance counsellors, educational psychologists and other professionals contribute to the assessment of the gifted child. The collaborative efforts of these professionals would lead to accurate assessment while unhealthy rivalry would thwart meaningful assessment. Gearheart & Gearheart (1999) have pointed out that if multidisciplinary team has insufficient or inappropriate representation there will be breakdown in

assessment procedure which will lead to inaccurate conclusions. It is disheartening to note that discrimination by some professionals is a problem militating against assessment of giftedness in Nigeria (Obani, 2004), as some professionals tend to feel that they are more relevant and superior to other professionals.

v. Poor funding of test construction

The development of standardized test requires financial back up or sponsorship. This is because the tests are supposed to follow international guidelines during the process of construction. The huge amount requires may put off interested test developers from venturing into such area. Regrettably, government and non-governmental organizations that ought to be of assistance are focusing their attention on other numerous challenges ravaging the country.

vi. Inadequate number of gifted schools

Gifted schools are places where gifted/talented children are trained. There is only one of such in Nigeria- Suleja Academy. This is grossly inadequate to cater for gifted children in Nigeria. When qualified children are not adequately admitted in gifted schools because of insufficient spaces, some parents might not see the need for psycho-educational assessment of their children. Apart from this, the school is mainly for secondary education, which implies that the child would still have to complete his/her, University education in the conventional University just like pre-primary and primary education.

vii. Impact of environment on gifted child

The contributory impact of environment to giftedness cannot be underestimated. Children who are gifted abound in both urban and rural areas. However, the

environment in which this set of children operate has significant effect on their performance on assessment tests. Exposure of gifted children in the urban centres cannot be equated with that of the gifted children in the rural areas. Hearne & Maurer (2000) have pondered on what become of children who are raised in a less nurturing and poor environment but have potential for giftedness. Clark (2008) equally observed that intelligence tests are constructed in a way that has built-in limitations and as such, it can be unfair to those who are not closely identified with the dominant culture. The National Research Council (2002) and Castellano (2003) equally pointed out that children from culturally/linguistically diverse and/or economically disadvantaged families and gifted children with disabilities have been dramatically underrepresented in programmes for gifted children. Consequently, the absence of stimulating learning environment could hinder a fair assessment of children from rural setting.

viii. Ceiling effect

There is also this challenge of ceiling effects in an attempt to assess the gifted child. Ceiling effect occurs when the child's knowledge goes beyond the limits of the test (Silverman, 2009). When this happens the inherent abilities in the child is under-assessed and this could negatively affect the decision making process on the child's performance.

ix. Period of identifying the gifted child

Scholars in gifted education acknowledge the significant impact of heredity. This therefore implies that a child is capable of eliciting giftedness/talentedness traits at early stage of life because these traits are innate. The period that these traits

are elicited has implications for the child's assessment. When a child is detected to be gifted early in life, educational programmes that would cater for his/her needs could be mounted. In Nigeria, attempt to discover gifted children takes place when the child is about to gain admission into the junior secondary school (Kolo, 2006). This implies that most of the child's educational needs have not been adequately addressed.

2.9 Factors that Enhance or inhibit Giftedness.

Both environment and heredity play important roles in the development of the intellect (Reis, 1999; Simonton, 1997). Many factors can affect individuals' outcomes (Brown & Kitano, 1997). Attitudes, expectations, and values expressed in different cultures, societies, socioeconomic levels, and families influence the development of talent. Environmental factors correlate with both increased and diminished giftedness. For example, children whose early experiences are not rich and diverse often do not develop outstanding cognitive skills, and children who are not challenged in school tend not to develop their potential fully.

Educators must not underestimate the power of even subtle events that occur in classrooms and at school. For example, everyday, girls and boys are taught, both directly and indirectly how to dress and how they are supposed to act. Attitudes and opinions expressed by family, friends, TV and print media (including textbooks) influence behaviour and teach role expectations (Reis, 1998). Particularly for girls, what is deemed appropriate behaviour (for instance "don't be too aggressive." Girls don't do well in mathematics) influence their choices and may limit their ultimate

achievement (Rimm & Rimm-Kaufman, 2001). The power of the peer group and of school culture is a critical element that influences all youngsters' behaviour (Schroeder-Davis, 1998). For instance, 66 percent of high school students say that athletes get more attention, including school wide celebration of their accomplishments than student scholars. There is no doubt that schooling and educational experiences can and do make a difference (Parker,1998). Thus, many experts advocate offering special programmes to help gifted individuals achieve their potential.

Intellectual and academic achievements are not the only characteristics that can be influenced by attitudes, expectations and opportunities. Some time ago, Renzulli (2005) observed that many young children are inherently creative, yet relatively few adults are. Creativity is a developed trait and is related to risk taking. It also affects the expression of talents (Sternberg, 2000), what happens to children during their preschool and early elementary school years? Is creativity discouraged by the educational process? Teachers tend to favour highly intelligent students who are artistic or creative for special programmes. This seems to be particularly true for those who come from different cultures and those who live in rural areas (De Ieon, Arugus-Calro & Medina, 2001). Even children's peer groups criticize divergent, independent and imaginative behaviour among their creative friends. Many educators tend to encourage realism instead of imagination: dolls talk and act like real children; computerized toys teach children the correct answers to arithmetic problems and the correct way to spell words. College students are advised to select courses that will lead to high-paying jobs. Krippner (2007) made the point that the society is

achievement-oriented; therefore it rewards individuals merely for being competent. The qualities valued are ability to get along with others, work toward a goal, and adapt. It is not creativity and individual differences. In fact, the need for acceptance causes many people to repress giftedness. If creativity is not fostered, it can be lost (Kirschenbaum, 1998). Thus, many experts believe that it is important to identify not only academically talented children but also those who show promise of creativity (Fishkin & Johnson, 2003).

Educators must come to understand their potential role in inhibiting creativity. Divergent thinking can be a challenge to teachers who are trying to meet the needs of children with a wide range of abilities and interests. In times of high stakes state-wide achievement testing, the pressure to have entire classes attain a standard level of achievement can be overwhelming. Many teachers feel that to create order and to progress through the curriculum at the required pace demand considerable control, and they place greater emphasis on classroom rules.

2.10 Giftedness and intelligence

According to Stenberg & Grigorenko (2002), "intelligence is not a fixed entity, but a flexible and dynamic one (i.e. it is a form of developing expertise). Developing expertise is the ongoing process of the acquisition and consolidation of a set of skills needed for a high level of mastery in one or more domains of life performance (p. 267) ". Thus someone can be gifted in one domain but not in another. Furthermore, according to Sternberg & O'Hara, (1999), intelligence is just one of the six forces that generate creative thought and behaviour. It is the

confluence of intelligence, knowledge styles, personality, motivation and the environment that forms gifted behaviour.

Gardner's (1999) multiple intelligence theory also gave credence to the assertion that intelligence and giftedness are closely related; for instance Linguistic intelligence, which involves sensitivity to spoken and written language, the ability to learn languages and the capacity to use language to accomplish certain goals, is required of people who are gifted in writing, lawyers and speakers. Musical intelligence which is the capacity to recognize and compose musical pitches, tones and rhythms are also required for gifted dancers, athletes, mimes and so on.

The conclusion from the above evidence is that there is no ideal way to measure intelligence and therefore one must avoid the typical practice of believing that a person's 1Q score is a measure of his/her intelligence. Even Terman (1959) warned against total reliance on tests. This also concludes the fact that superior intelligence (giftedness) can possibly be found outside the domains of measurable intelligence and therefore cannot be subjected to psychometric tests and measurements alone if it is to be truly identified (Renzulli, 2005; Adesokan, 2000; Fokolade, 2006).

Moreover, psychologist have – admitted that intelligence is two-dimensional. It is epigenetical because humans are born with it at a general level and it can be cultivated because the environment (biological, educational and social is needed to develop it (Akinboye, 2000). Hence, the modern view of most psychologists that heredity sets the limits for giftedness and the environment determines how far the set limits are realized can be deduced.

Thus, it logically follows that every gifted person is imbued with superior intelligence, but this can be manifested in different areas of human endeavour and in different ways either theoretically or practically or both.

2.11 Giftedness and creativity

Creativity means having power to express yourself in your own way. Children are natively creative. They see the world through fresh, new eyes and then use what they see in original ways (Sternberg, 2003).According to Clark (2008), creativity is the highest expression of giftedness. Creative tendencies in a child, according to Kolo (2006), entail the ability to approach tasks and endeavours in a manner that showcase varied and unique perceptions accomplishing one's objectives. Creativity consists of ability to perceive what others perceive but thinking of what no one else has thought and doing what no one else has done.

Crookes (2010) maintains that creativity in schools is not just about after school enrichment and Arts week. According to him, it is about developing students who are independent thinkers, who make connections between subjects, find innovative solutions and have original thoughts. It is about developing the sort of learner who not only passes examinations and adds value at school, but develops an enquiring mind that adds value to society. Creativity is at the core of a successful, inclusive curriculum, and at the heart of high quality teaching and learning.

According to Sternberg (2005), creativity is one important factor to be considered in identifying giftedness. The investment theory of creativity Sternberg (2003), states that creative ideas are both novel and impacting and

this impact is what makes a gifted person. Creative ability allows individuals to contribute original and meaningful ideas to the society.

Different creativity tests have been used in the identification of giftedness. A combination of creative indices would ensure that children's creative abilities and potentials are noted and used in placement (Runco, 2005). Assessment of creativity is often accomplished with the Torrance Test of Creative Thinking (TTCT). Davis & Rimm (2003) point out that 95 percent of researchers and educators who use divergent thinking tests use Torrance Test of Creative Thinking.

Creativity tests, mostly devised during the past 30 years, are aimed at assessing the qualities and abilities that constitute creativity. These tests evaluate mental abilities in ways that are different from-and even diametrically opposed to-conventional intelligence tests. Because the kinds of abilities measured by creativity tests differ from those measured by intelligence quotient (IQ) tests, persons with the highest scores on creativity tests do not necessarily have the highest IQs. Creative people tend to have IQs that are at least average if not above average, but beyond a score of 120 there is little correlation between performance on intelligence and creativity tests (Sternberg, 2005).

Most creativity tests in use today are also based at least partially on the theory of creativity evolved by J. P. Guilford in the 1950s. Guilford posited that the ability to envision multiple solutions to a problem lay at the core of creativity. He called this process divergent thinking and its opposite-the tendency to narrow all options to a single solution-convergent thinking. Guilford identified three components of divergent thinking: fluency (the ability to quickly find multiple

solutions to a problem); flexibility (being able to simultaneously consider a variety of alternatives); and originality (referring to ideas that differ from those of other people). Early tests designed to assess an individual's aptitude for divergent thinking included Torrance Test of Creative Thinking (TTCT), Torrance (1998), and Structure of Intellect Learning Abilities Test (SOI-LA), (Meeker & Meeker, 1990).

The most extensive work on divergent thinking was done under Guilford's direction at the University of Southern California by the Aptitudes Research Project (ARP), whose findings between the 1950s and 1970s produced a broad structure-of-intellect (SI) model which encompassed all intellectual functions, including divergent thinking. A number of the ARP divergent thinking tests, which were originally devised as research instruments for the study of creativity, have been adapted by a variety of testing companies for use by educators in placing gifted students and evaluating gifted and talented programmes.

2.12 Giftedness and task commitment

Task commitment means a refined or focused form of motivation, it represents energy brought to bear on a particular problem (task) or specific performance area (Renzulli,2005).Whitmore (2004) asserts that if gifted students are to realize their potential, particular attention must be paid to the promotion and maintenance of intrinsic motivation in the classroom. According to him, there is a direct link between the motivational orientation brought by a student to a task and the likelihood of her being creative at that task, and it is the environment that in large part shapes that motivational orientation.

Gifted children have a deep intrinsic motivation to master the domain in which they have high ability, and are almost manic in their energy level (Winner, 2000). She maintains that gifted children have a powerful interest in domain in which they have high ability, and they can focus so intently on work in this domain that they lose sense of the outside world. Moreover, she opines that these children combine an obsessive interest with an ability to learn easily in a given domain. Unless social and emotional factors interfere, this combination leads to high achievement. Winner (2000) also submits that this intrinsic drive is part and parcel of an exceptional, unborn giftedness.

Furthermore, winner (2000) suggests that, this intense drive characterizing gifted children should be recognized, celebrated, cultivated and not to be destroyed. When children are under challenged in school, as so often happens to gifted children, they sometimes lose their motivation, and become under achievers. When parents and schools try to force single-minded driven children to be well-rounded, to curtail activity in their domain of gift and spend time on more normal activities, they may end up stifling the drive. All children, not only gifted, would be better educated if teachers sought to find out, what motivates and excites individual students, and then harness this drive towards learning.

2.13 Giftedness and gender

The concepts of gender provide a clear and relatively easy measure of socio-educational permission to be gifted. Most obviously, gender achievement in countries where girls are not allowed any education beyond puberty, if at all, will grossly exaggerate the apparent differences in native ability between sexes (Heller & Ziegler, 2006). An international review of research on gender

differences in giftedness failed to find any reliable evidence that girls are inherently less able than boys. Consequently, they suggested that girls and boys can act as experimental controls for each other to gauge the power of social effects, eventually best seen in career outcomes.

Freeman (2003) also posits that even in USA and Britain, there are no clean cut differences that existed between boys and girls in subject areas. Hence, Johnson (2004) asserts that in Britain the academic achievement of gifted girls at school are surpassing those of gifted boys in virtually all areas of study and at all school ages. Generally, adult males than females are considered gifted and creative. By an overwhelming margin, men achieve outstanding status and recognize more frequently than women of the same age. (Kerr, 2001).

However, there is little evidence that these performance differences are the result of biological differences. The available research points out for mere clearly to social and cultural expectation as explanation, for the disproportionate number of males who are recognized as gifted (Connoy, 2003; Eccles, 1998).

In another development, Reis (1998) points out that in most professions and occupations, men continue to surpass women in the highest levels of professional and creative accomplishments. She maintained that many measures of success used to define accomplishment in the society are based on male indications and, in addition, men have developed most of the conceptions of giftedness and talent that have been recognized in both contemporary psychology and educational psychology (Reis, 2002).

However, Belkin (2003) concludes that the reasons for the successful accomplishment of some talented girls and women and the failure of others to realize their high potential in meaningful works are complex and depend on many factors including values, personnel choices, and sociocultural forces. If our society is to move actively to support talented girls and women to realize their abilities and potentials, work environments must be altered and they must support diversity of life choices.

2.14 Giftedness and Socio-economic Status

Giftedness is found among children of all classes (Whitemore, (2000); Subotnik, 2003).Some authors Borland & Wright, (2003); Gordon, (2000) and Reis, (1998), argue that the fact that minority students are underrepresented in gifted programmes is evidence that the practice of gifted education is rife with inequalities. Robinson & Ward (2000) in their own view assert that the under representation problem is a reflection of the larger social problem that is not unique to gifted programmes. Oladokun (2006) supports this view by submitting that in Nigeria, gifted children are often identified in the private schools which most often select children from the elite class.

According to Carol (2008), gifted children are considered special needs children. This means that they have special educational needs on their intellectual as well as social and emotional traits. She further suggests the provision of private schools and homeschooling for the gifted.

The most important factor of achievement in school associated with the family is socio-economic status. The relationship between socio-economic status and achievement is always consistent, no matter the measure of status, whether

occupation of the father, education of the parents, income of the family or a combination of these variables. Mba (2007) opines that socio-economic status is associated with family size. According to him, children from low socio-economic background come from mainly large family, start school with a verbal disadvantage probably due to the fact that such children have less frequent interactions with adults at home since mothers and older siblings are either working or trading. The verbal disadvantaged children from lower socio-economic background could also be attributed to the fact that such children do not often have the privilege to attend nursery schools as against their counterparts from the high socio-economic background.

Adesokan (2000) notes that poor socio-economic conditions in conjunction with pedagogical neglect are a factor that can prevent the child from attaining his "full mental ability". He referred to Runco (2005), who defines disadvantaged gifted youths as "those who experienced economic, social, and/or emotional deprivation as a dominant factor in their lives (p. 49)". Furthermore, some children come from a wide variety of backgrounds and gifted children who come from low socio-economic backgrounds may find it more challenging to excel in their studies; factors such as looking after family members, cooking and cleaning, and working part-time jobs may prevent a student from realizing their full potential.

2.15 Educational programme for the gifted

Gifted students need exposure to a challenging and conceptually rich curriculum. Silverman (2001) notices that too many gifted children are languishing in the regular classroom unable to focus their attention on materials that were

mastered long ago and are unbearably simplistic, and has been reiterated beyond their tolerance level. Since gifted students 'learn at a faster rate than most students and can absorb and reconfigure more concepts, they benefit from a differentiated curriculum that is modified in both its pace and depth (Piirto, 1999). He recommends acceleration which is the general term for modifying the pace at which the student moves through the curriculum; and enrichment which means probing or studying a subject at a greater depth than would occur in the regular curriculum.

2.15.1 Acceleration

Acceleration means providing students opportunities to move through required curriculum at a faster pace. The acceleration options include:

- Early admission to school
- Grade skipping/advancement
- Content acceleration in one or two subjects while remaining with age peers
- Testing out of courses.

Research reported on acceleration is almost unfairly positive in its result (Anderson 2000, and Gallagher, 1997).

- Curriculum compacting or telescoping
- Concurrent enrolment in both high school and college
- Advanced placement tests
- Early admission to college (Piirto, 1999, p. 25).

Silverman (2001) believes that acceleration is a "necessary response to a highly gifted student's faster pace of learning (p.25)". Many studies also indicate that if acceleration is practiced wisely, students benefit by having increased interest in

school, attaining higher levels of academic achievement, receiving recognition of accomplishment, and completing high levels of education in less time which provides increased time for pursuing careers at the end of schooling (Fakolade, 2000; Gross ,2003). Maker (2002) opines that one of the practical benefits of acceleration is that it is both time and cost effective for school personnel to implement. Opponents of acceleration like Fedhusen & Moon (1998) believe that gifted children who are grouped with older students will suffer negative social and emotional consequences or that they will become contemptuous of their age-peers. Although after reviewing a longitudinal research on the academic acceleration of mathematically precocious youths, Swiatek (1998) found no evidence that acceleration harms willing students either academically or socially/emotionally. Feldhusen (2000) believes that acceleration is the most powerful educational service that can be offered to gifted and talented children. Acceleration appears to be a plan that can work very well but demands careful attention to the individual case.

2.15.2 Enrichment

Enrichment experiences allow students to investigate topics of interest in greater detail than is originally possible with the standard curriculum. Topics of investigation may be based on the ongoing activities of the classroom but may permit students to go beyond the limits of the day-to-day instructional offerings. However, by allowing the students to help define the area of interests and independently access a variety of information and materials, the teacher can learn to facilitate the development of gifted and talented students' competencies and skills (Clark, 2008).

Renzulli (2005) noted that many of the activities provided under the guise of special education for the gifted cannot be justified. He argues that if gifted or average children spend their time playing games designed to foster creativity or problem – solving strategies, they are not being served well. According to him, if the traditional content – oriented curriculum (which emphasizes pouring facts into students' heads) is replaced by an equally insane process-oriented curriculum (which emphasizes purely cognitive processes into students' heads), no real progress has been made. He opines that a defensible programme for the gifted must state how education for them will be the same and how it will be different from education for all students.

Renzulli & Reis (2002) develop an enrichment model based on the notion that children exhibit gifted behaviour in relation to particular projects or activities in which they bring bear their above-average ability, creativity, and task commitment. Students selected into a "talent pool" through case study identification methods are engaged in enrichment activities that involve individual or small group investigation of real-life problems; they become practicing pollsters, politicians, geologists, editors, and so on.

However, Olenchak & Renzulli (2003) find out that students may stay in the enrichment programme as long as they have the ability, creativity, and motivation to pursue productive activities that go beyond the usual curriculum for students of their age.

Starko (2001) in his study on the effects of the revolving door identification model in giftedness and self efficacy using enrichment model finds out that students who became involved with self selected independent studies in school

wide enrichment model (SEM) programmes initiated their own creative products both inside and outside school more often than students who qualify for the programme but did not receive services. Also students in the enrichment group reported over twice as many creative projects per student (3.37%) as the comparison group (0.50) have showed greater diversity and sophistication in projects. The number of creative, products completed in schools was highly significant prediction of self efficacy.

Enrichment is not a "do-your-own-thing" approach with any structure or guidance. Children involved in enrichment experiences should not be released to do a random, haphazard (and thus inefficient) project (Adesokan, 2000). She further states that for enrichment programme to be effectively carried out, a basic framework that defines limits and sets outcomes is necessary.

2.15.3 Ability grouping

Ability grouping is a provision that allows some students to be separated from the more typical students by some given criterion, example (measures of intelligence). Ability grouping may be implemented as special classes or schools, special groups meeting prior to or after school. They sometimes undergo pull-out programmes during school hours where gifted students are separated for a given period of time and then returned to the regular programmes, or workshops (Adesokan, 2000).

In the 1971 hearings held by the U.S. department of Health, Education and welfare, gifted students expressed preference for programmes where they are separated for part of the day, but not totally segregated from other students. They asked for flexibility in their programme and in their curriculum (Marland

cited in Silverman, 2001). Grouping allows for more appropriate, rapid and advanced instruction which matches the rapidly developing skills and capacities of the gifted students (Gordon, 2001).

On the other hand, some schools of thought consider total separation whereby all gifted students need to interact with those who can challenge them. However, for the highly gifted, ability grouping would justifiably comprise the major part of their educational experience. The moderately gifted and the mildly gifted would need less specialized grouping if classrooms could be individualized in a non-graded individualized classroom, a cluster group of five or seven gifted students would be adequate to meet their needs for peer challenge. When this type of clustering is done in a classroom that is not organized to meet individual needs, where flexible grouping cannot occur, or where different types of ability are not valued and nurtured, gifted students do not flourish (Adesokan 2003).

2.15.4 Critique of ability grouping

Some schools of thought and educational decision makers are often concerned that ability grouping is detrimental to students left in the regular classroom. Some teachers are sometimes concerned that their "silver" children will have no incentive, that the "spark" will be gone.

In the study conducted by Goldberg & Passow (2001), in which they compared achievement gains between classes heterogeneously grouped with gifted student and classes comprising non-gifted students only. It was revealed that:

(a) In science, there were small differences evident with the presence of gifted students contributing an upgrading effect.

(b) In social-studies only the very bright students gained from their presence.

(c) In mathematics, it was a down grading effect when the non-gifted and the gifted were grouped together (p.101).

Nevertheless, grouping on itself is insufficient to have significant effects on achievement among the gifted; the curriculum content and process must change to become more appropriate to the gifted learner. Mertison (2002) confirms that the longer the gifted are allowed to be in special programmes, the greater will be their gain.

2.16 How to make Giftedness productive

Productive giftedness implies both value and scarcity. To bear maximum fruit, a child or adult's giftedness must be nurtured by multiple causes over multiple time periods. Any one of these causes and time periods may be necessary but insufficient by itself. Rather it seems that sustained application of the necessary causes seems crucial for the highest levels of accomplishment.

Lochle (cited in Walberg & Paik, 2005) suggests that individual scientific discoveries involves too many steps such as, asking the right questions, setting forth a researchable hypothesis, gaining financial support for the research and so on. Even though each step has an easy access of completion, the probability of success is too small, that explains why scientific productivity is rare.

As applied to childhood development or accomplishment, the causes appear more general, but no less crucial. Bloom (cited in Renzulli, 2005) conducts a research on how giftedness is developed among sculptors, neurologist, Olympic swimmers and tennis champions. His study examined the roles of teachers,

parents and out-of-school personnel in the developmental process. One of the findings of these studies was that, once parents became aware of their child's exceptional talent; they took a more active role in developing that talent. In many cases, parents employed special out-of-school coaches, teachers, programmes and institutions to maximize their children's early giftedness.

Those who excel earlier tend to excel later, because their earlier and later social environments tend to give them similar advantage. A child that is musically stimulated at age two is more likely than others to be further simulated as an adolescent. Early environmental and parental stimulation predicts later environments and both have impact on learning and degree of later accomplishment. Early influences provide a background of early achievement, which increases the rate of progress. With some exceptions, eminent adults tend to work diligently, choose their goals carefully and once committed, complete difficult tasks.

Accomplished individuals, in any case exceedingly well organised-hard workers often routinise or leave to others time-consuming tasks that contribute little to their accomplishment. One clear example is one American President – Thomas Jefferson, who along with scientific/inventor/artist – Leonardo da Vinci, was one of the few people in history who was highly accomplished in more than one field. An active plantation farmer, architect, ambassador to France, and two-time president of United States of America, he conducted world-class research on agronomy and botany and wrote books, pamphlets, and tens of thousands of letters on a variety of subjects. It was recorded that Jefferson always carried along his drawing instruments in his pockets and was noted for early rising and

late retirement to bed by these words "whether I retire to bed early or late, I rise with the sun" (Walberg & Paik, 2005). The above attributes is also noted in the personal predilections of Aristotle, Mother Theresa, Bill Gates, Philip Emeagwali - gifted persons.

2.16.1 Enhancing Productive Giftedness in Nigeria

Though a necessary determinant of productive giftedness, hard work alone can hardly be the only cause. Psychologists have been interested in identifying the factors that promote academic and other learning in general and among gifted students in particular.

Walberg (2003) maintains that the amount and quality of instruction and stimulation in classrooms, homes, peer groups and mass media have consistent and powerful effects on learning and can be increased, which promotes a disciplined mastery of a general or specialized field.

Research consistently shows that the home and school can serve as places of continual stimulation and encouragement for a child. For reasons of first learning and quality of time alone, the home is foundational and of continuous importance, about 92 percent of children's time in the first 18 years of life is under the responsibility of parents and only eight percent is spent in school (Walberg,2003). Home influences include informed parent-child conversations about school and everyday events; encouragement and discussion of leisure reading; monitoring and talking about television and peer activities; deferral of immediate gratifications to accomplish long term human capital goals; and providing a warm, nurturing environment where the child's basic needs are met and ideas and habits may be constructively challenged.

In the classroom, specific methods of teaching and certain new programmes in schools may be more effective than others, for example mastery learning, cooperative learning and adaptive education.

To teach habits associated with hard work, parents and teachers can provide supportive environments. Parents should invest in their child's education, and teachers can offer demanding courses, assign reasonable amounts of well-designed home-work, and provide incentives to stimulate and reward hard work.

2.16.2 The Role of Government in Making Giftedness Productive

The case study report on the evaluation of gifted education practices in Nigeria, with specific reference to Suleja Academy, showed 62 percent of the teachers interviewed agree that the activity currently going on at Suleja academy has not achieved the objectives for setting up the institution (Anih, 2001). Recently, there was a provision to establish at least a gifted school in each state of the Federation. This is a good development, since gifted education has been decentralized. The task facing us now is not only establishing a gifted school but how to achieve our aim of producing men and women like Thomas Jefferson of America, Philip Emeagwali, Mother Theresa and so on? In this way, stake holders on special education should bear in mind that the provision for all it takes to make giftedness productive must be their first priority. Onu (2002) posits that for Nigeria to move forward in their gifted education there is need to redefine what giftedness and gifted education are to Nigerians.

Firstly, identification of gifted-children should not only be based on achievement test, creative ability tests and other multiple criteria should be included. This is true bearing in mind that the creative child sometimes exhibits traits that may be

considered negative but are essential for the production of novelty products. Parents and other stakeholders should be carried along in any decision bordering their children/wards in the aspect of special education.

The philosophy or theories guiding the programme and the curriculum of the school should be clearly stated and implemented by gifted education planners. There should be proper monitoring, follow-ups and evaluation of the programme by gifted education planners as at when due.

2.17 Psychometric properties of assessment instruments

This is concerned with the evaluation of behaviour: cognitive abilities, personality traits and other individual and group characteristics in order to assist in making judgements, predictions and decisions about people. The tools or instruments used in validation are known as psychological tests. Anastasi & Urbina (2004) believe that before a test instrument can be used with assurance, information concerning the norms, reliability and validity of the test for its specific purposes must be obtained.

The many kinds of tests designed for different purposes differ in major characteristics. They vary in the way they are administered, the aspect of behaviour they measure and the way in which they are scored and interpreted. However, in the face of this diversity in nature and purpose, psychological tests still have a common differentiating characteristic. This common feature of psychological test is that they are standardized and objective measures.

Standardization according to Anastasi & Urbina (2004) implies uniformity of procedure in administering and scoring a test. If the scores obtained by different

persons are to be comparable, testing conditions must be the same for all. Standardization therefore is an important step in designing and evaluating psychological tests and other assessment instruments. Before a test instrument can be used with some assurance, information concerning the norms, reliability and validity of the test for its specific purposes must be obtained.

i. Establishment of Norms: A norm is a standard created by the scores of a large group of individuals used as the basis of comparison for scores on a test. Psychological tests have no predetermined standard of passing or failing, performance on each test is evaluated on the basis of empirical data. In most cases, an individual's test score is interpreted by comparing it with the scores obtained by others on the same test.

ii. Validity: This is defined as the extent to which a test measures what it was designed to measure. In other words, validity is the accuracy or usefulness of a test. A test may have much different validity, depending on the specific purposes for which it was designed, the target population, the condition under which it is administered and the method of determining validity. Some of these validities include:

- **Construct Validity**: This refers to the ability of a test to measure the psychological construct that it was designed to measure such as giftedness. One way this can be assessed is through the test's convergent and divergent validity, which refer to whether a test can give results similar to other tests of the same construct and different from tests of different constructs respectively.

- **Content Validity:** This refers to the ability of a test to sample adequately the broad range of elements that compose a particular construct. One way of accomplishing this is to compare the test's content with an outline or table of specification concerning the subject matter to be covered by the test.
- **Criterion-Related Validity:** This refers to the ability of a test to predict or replace someone's performance on something. It involves the procedures in which the test scores of a group of people are compared with ratings, or other measures of performance. Whenever a criterion measure is available at the time of testing, the concurrent validity of the test can be determined. When scores on the criterion do not become available until sometime after the test has being administered, the focus is on the predictive validity of the test.

- **Face Validity:** This refers to the extent to which the appearance or content of the materials (items and the like) on a test is such that the instrument appears to be a good measure of what it is supposed to measure (Aiken, 2006). This particular feature according to Aiken (2006), is certainly an important consideration in marketing the test, though Anastasi & Urbina (2004) is of the view that face validity is technically not considered a form of validity.

iii. Reliability: This is the ability of a test to give a consistent result (Richmond, 2006). No psychological test can be of value unless it yieldsa consistent or reliable measure. Consequently, one salient point that must be determined about a newly constructed test is whether it is sufficiently reliable to measure what it was designed to measure. According to Thompson (2004), reliability is a

property of the scores obtained when the test is administered to a particular group of people on a particular occasion and under specific condition. To Lahey (2001), reliability is the ability of a test to produce similar scores if the test is administered on different or by different examiners. Reliability can be achieved in different forms. They include among others:

- **Test-Retest:** This refers to how well results from one administration of the test relate to results from another administration of the same test at a later time. Usually, the same test is administered at different times. This kind of reliability is fraught with problems of fluctuations in performance from one test session to the other. It is always desirable to specify the time interval between tests since retest correlations decrease progressively as interval lengthens (Anastasi & Urbina, 2004).
- **Alternate-Forms Reliability**: This is an index of reliability (co-efficient of equivalence) determined by correlating the score of individuals on one form of a tests with their scores on another form. Here, the same persons can be tested with one form of a test on the first occasion and with another equivalent form on the next occasion. The correlation between the scores obtained on the two forms represents the reliability of the test. Like test-retest reliability, alternate-form is usually accompanied by a statement of the length of the interval between test administrations, as well as a description of relevant intervening variables (Anastasi & Urbina, 2004). The problem with this type of reliability is that if the behaviour functions under consideration are subject to a large practice effect, the use of alternate forms might reduce but not eliminate such effect.

- **Internal Consistency:** The extent to which all items on a test measure the same variable or construct. This can be determined in different ways depending on the nature of the scale. The methods of determining internal consistency include:

i. Split-half: Here, a single test is viewed as comprising two parts measuring the same thing. Two scores are obtained for each person by dividing the test into two equivalent halves. For instance, the odd-numbered items may be scored separately from the even-numbered items. Then the correlations between the two sets of scores are obtained. In using the odd/even approach, it is always better to arrange the items in an increasing order of difficulty.

ii. Kuder-Richardson: Here, a test can be divided in many different ways into two halves containing equal number of items. Because each way may result in a somewhat different value, it is not clear which halving strategy may yield the best estimate of reliability. One solution to this problem is to compute the average of the reliability estimate. This can be done using the formula provided by Kuder & Richardson (1937). This technique is applied to scales whose items are scored as right or wrong or according to some other all-or-none format (yes or no). On the other hand, the coefficient alpha is a general formula for estimating the reliability of a scale consisting of items on which different scoring weights (Likert scales) may be assigned to different responses (Aiken, 2006)

It could be noted that the traditional concept of reliability pertains to norm-referenced tests, which are designed primarily to differentiate among individuals who possess various amount of a specific characteristic. The greater the range

of individual differences in the test scores, the higher the reliability of the test (Aiken, 2006).

2.18 Summary

This chapter reviewed studies on the conceptions of giftedness and its assessment procedures. It tried to identify the available methods presently in use for the assessment of giftedness in Nigeria. It was discovered that with all the multifaceted identification procedures mentioned, selection of the gifted was based mainly on high achievement in cognitive tests. Empirical review of identification methods shows that not many local instruments have been developed by experts for use in the selection process of the gifted. The study also looked at the criteria involved in the validation process of a measurement instrument.

From available findings, giftedness consists of three major characteristics: above average ability, creativity and task commitment/motivation and it is pertinent that assessment instruments must possess all the attributes of the three constructs mentioned. This can only be possible through the use of adequate psychometric properties in the development and validation process. It is only through the adoption of proper assessment instruments that the 'real' gifted individuals will be selected to our special schools.

CHAPTER THREE

METHODOLOGY

3.0 Introduction

This chapter discussed the following sub-topics: research design, study area, population, sample and sampling techniques. In addition instrumentation, validity, reliability, pilot study, procedure for data collection and method of data analysis are presented.

3.1 Research Design

The research design for this study is an instrumentation design. This design is subsumed in descriptive survey design. According to International Centre for Educational Evaluation (1982), a study is instrumentation when it is aimed at developing new or modifying content, procedures, technology or instruments of educational practice. This design is suitable for this research in the sense that the study tried to identify systematically the problems within the procedure for the identification of gifted children in Nigeria. After going through the concept and theories of giftedness, the researcher tried to develop and validate an instrument called Giftedness Assessment Instrument (GAI) by administering it to the participants with other related measures.

3.2 Study Area

The study was carried out in Lagos State located in the South Western part of Nigeria. It is bound by Ogun State in the east and north, while in the south, it adjoins the Atlantic Ocean. Lagos was the capital of Nigeria and is still the commercial nerve centre of the country. The State is populated with nearly 10 million inhabitants according to the 2006 census. Lagos State accommodates all

the ethnic groups in Nigeria. The Lagos State Universal Basic Education Board (LSUBEB) is in charge of public Primary and Junior Secondary (for Basic Education) schools while the State Ministry of Education is in charge of the private schools in this category. The schools Local administration is under the Local Government Education Authorities (LGEA) of the state.

3.3 Population

The target population consists of all the Primary six pupils of Lagos State public and private schools. The mean age of the pupils is 10 years. The class was chosen because it is from here selection is usually made into the Suleja Academy for the gifted and talented children in Nigeria.

3.4 Sampling Technique

The stratified sampling method was applied using the six Educational Districts in the State. In choosing the number of schools from each District, the hat and draw method of simple random sampling was adopted for both the public and private schools. Similarly, the same method was used to choose the intact classes from each of the selected schools. This is because randomisation of the participants in each class may eliminate the target group - the gifted.

3.5 Sample

The sample for the study consisted of six hundred Primary six pupils (350 pupils from public and 250 pupils from private schools). The participants also comprised 275 males and 325 females respectively. The size of the number of females is because they appear higher in number in the various schools. Similarly, the choice of public and private schools is also to fully represent their socio-economic status so as to compare their abilities. Two schools from both

the public and private sectors were selected from each of the six zones that constitute the Lagos State Education Districts. The distributions of the samples according to zones, type of school, and sex are presented in tables 1 and 2.

Table 1: Distribution of samples from Public School based on Zone/Districts and Sex

ZONES / Districts		Private Schools Selected	M	F	Total
Zone 1	Agege	Dairy Farm Primary School Agege	14	16	30
	Alimosho Ifako-Ijaiye	Agbado Ijaiye Primary School	15	13	28
Zone 2	Ikorodu Kosofe	Arowosegbe Primary School	10	16	26
	Shomolu	Pedro Primary School, Somolu	9	19	28
Zone3	Epe	Ansar-Ud-Deen Primary School, Epe	18	10	28
	Eti-Osa Ibeju-Lekki Lagos Island	Ikoyi Primary School	11	16	27
Zone: 4	Apapa	Nanti Comm. Primary School. Apapa	10	18	28
	Lagos Mainland Surulere	Animashaun Primary School, Surulere	10	21	31
Zone: 5	Ajeromi- Ifelodun	Sea Breeze Primary School, Ajeromi	14	22	36
	Amuwo-Odofin	2nd Avenue Primary	16	12	28
	Badagry Ojo				
Zone:6	Ikeja	Adeniyi Jones Primary School, Ikeja.	13	19	32
	Mushin	Oye Primary School, Mushin	11	17	28
	Oshodi-Isolo				
		Total	**151**	**199**	**350**

Table 2: Distribution of Samples from Private schools based on Zones/Districts and Sex

ZONES / Districts		Private Schools Selected	M	F	Total
Zone 1	Agege	Starfield Nur/prim.school, Agege	10	15	25
	Alimosho	Ifako Int. Nur/prim. School, Ijaiye	6	12	18
	Ifako-Ijaiye				
Zone 2	Shomolu	St. John Nur/Prim school, Onipanu	8	12	20
	Ikorodu	St. Ann Nur/Prim.school, Ikorodu	10	10	20
	Kosofe				
Zone3	Lagos Island				
	Eti-Osa	Diamond Nur/Prim. School, Ajah	9	11	20
	Ibeju-Lekki	Lekki Phase 1 Estate Nur/Prim.	8	10	18
	Epe				
Zone: 4	Apapa	St .Benedict nurs. and prim. School ,Ijora	13	9	22
	Lagos Mainland	Banjo nur. and primary School, Yaba	5	10	15
	Surulere				
Zone: 5	Ajeromi-Ifelodun				
	Amuwo-Odofin	Forteress children school, Amuwo Odofin	12	14	26
	Ojo	Christobell Jur. Academy, Iba	16	8	24
	Badagry				
Zone:6	Ikeja	Christland Nur./Prim. School, Ikeja	15	10	25
	Mushin	Pedro Nur/prim. School,Mushin	12	5	17
	Oshodi-Isolo				
		Total	**124**	**126**	**250**

3.6 Instrumentation

The following instruments were used in collecting data for this study.

(1) Giftedness Assessment Instrument (Above average/Cognitive ability test (GAI-1), Creative ability test (GAI – 2) and Task Commitment/Motivation Scale (GAI – 3).

(2) Gifted Children Education Programme Screening Examination (GCSE) (2005) paper I (Mathematics and Quantitative aptitude) and paper 2 (English language and Verbal Aptitude).

(3) Torrance Tests of Creative Thinking (TTCT) (Torrance, 1998).

(4) Ibadan Task Commitment/Motivation Scale (ITCMAS) (Akinboye, 1979).

(5) Mathematics Attitude Scale (MAS) (Obe, 2002).

Giftedness Assessment Instrument – Above Average/Cognitive ability test (GAI-1): It is a 40-item multiple choice aptitude test designed by the researcher and her supervisors, to measure the cognitive ability/ intelligence of the participants. The test covered all the attributes of above average ability components of giftedness such as abstract reasoning ability, verbal, spatial, quantitative reasoning ability etc. It has five options lettered A-E; participants are expected to choose the letter that corresponds to the answer for each.

Creative Ability test (GAI -2): It is the second component of GAI made up of six tasks, involving the participants to draw and give a title to their drawings (pictures) or to write questions, reasons, consequences and different uses of objects to be completed under 60-minutes. Each task is given 10 minutes. These different kinds of abilities are called divergent thinking or creative thinking abilities designed to measure general mental abilities commonly presumed to be

brought into play in creative achievements (Torrance, 1998). It is believed that a possession of a high degree of abilities measured by this test increases the chances that the individual is creative.

Task commitment/Motivation Scale (GAI-3): This is the third component of GAI that comprises a 21-item inventory designed to measure the pupil's motivation and competent ability in pursuing a task. The scale is drawn from the characteristics of the third cluster of ability of giftedness (Renzulli, 2005). It is also a self rating scale that yields score on a 4-point response format ranging from 1-4.

Gifted Children's Screening Examination (GCSE) Paper I and 2

This examination was designed by the National Examinations Council of Nigeria (NECO, 2005) to identify the pupils that are gifted for placement in the Gifted Children's Academy in Suleja. It consists of two types of 80-item multiple choice aptitude tests for each of mathematics and quantitative (paper I) and English and verbal aptitude (paper 2) examinations. The time allocated for each examination is 1½ hours. NECO reported a three week test-retest reliability coefficient of 0.88 and 0.85 respectively for the papers 1 & 2.

Each question carries 1 mark for the 80 items. The test scores for each testee was converted into percentile and the range of scores in the percentile rank is regarded as gifted and is admitted into the school for the gifted and talented in Suleja. The aim of adopting this test is to determine its concurrent validity with the GAI-1 component.

Torrance Tests of Creative Thinking (TTCT) (Torrance, 1998)

This is a battery of test activities designed by Torrance (1998), to measure creative thinking process. It involves different kinds of thinking abilities, each contributing something unique to the batteries under development. The tester requires the examinee to draw and give a title to their drawings or to write questions, reasons, consequences and different uses for objects (words).This instrument has been used for the identification of the creatively gifted in the USA and for special population around the world. The author reported a test-retest and interrater reliability coefficient of 0.59 to 0.97 and 0.90 respectively. It was adapted for this study in order to determine the concurrent validity of GAI-2.

Ibadan Task Commitment/Motivation Scale (ITCMS) (Akinboye, 1979)

This is a self-rating attitude scale designed by Akinboye (1979), to assess an individuals' degree of commitment to task. It is a 16-item inventory adapted from Ibadan Creativity Assessment scale (ICAS) by Akinboye (1979). It is a 10-point Likert scale ranging from 0 (totally unlike me) to 9 (very much like me). Akinboye reported a test-retest reliability of 0.79 and internal consistency with coefficient alpha of 0.76.It has both positive and negative scoring methods. The purpose of adapting this instrument was to determine its convergent validity with GAI-3.

Mathematics Attitude Scale (MAS): It was developed by Obe (2002) to measure an individuals' attitude towards mathematics. It consists of 30-items using a 5-point Likert scale. Obe (2002) recorded a high stability coefficient of 0.79 and Cronbach's coefficient alpha ranging between 0.76 to 0.82. This

instrument was also adapted to determine the discriminant validity of GAI-1 component.

Scoring of the instrument was by assigning 5 to strongly agree, 4 to Agree, 3 to Undecided,2 to Disagree, and 1 to strongly Disagree for positively stated statements. The points were also awarded in the reversed order for negatively stated statements. All the instruments used in this study can be seen in Appendix A-F.

3.7 Procedure for the Development of the Giftedness Assessment Instrument

The development of GAI was done in stages as described below:

(1) Selection of test domain based on the three ring conception of giftedness (Renzulli, 2005).

(2) Item writing and selection based on the characteristics and theories of giftedness. For GAI-1, an initial pool of 64 items was generated. These items were then assessed for face validity with the help of experts in measurement and evaluation and psychology including the supervisors of this work and content validity based on the test blue print as shown on table 3.

Table 3:
TEST BLUE PRINT OF GAI - 1

CONTENT/BEHAVIOURAL OBJECTIVES	KNOWLEDGE	COMPREHENSION	APPLICATION	ANALYSIS	SYNTHESIS	EVALUATION	TOTAL
Weight	**32.5%**	**22.5%**	**17.5%**	**5%**	**12.5%**	**10%**	**100%**
Verbal Reasoning	4	1	-	-	2	-	7
Abstract Reasoning	-	2	3	1	1	2	9
Numerical Reasoning	2	1	2	-	1	1	7
Mechanical Reasoning	2	1	-	-	-	-	3
Special Reasoning	2	1	-	-	-	-	3
Spelling	1	-	-	-	-	-	1
Similarities	1	1	-	-	-	-	2
Picture Complete	-	-	1	-	-	-	1
Reasoning analogy	-	2	1	1	1	1	6
Serial Reasoning	1	-	-	-	-	-	1
Total	**13**	**9**	**7**	**2**	**5**	**4**	**40**

Table 3 shows the test blue print of GAI -1. This indicates that the items were developed based on the Blooms taxonomy of educational objectives, thereby ensuring content validity of the instrument.

Based on the recommendations of test experts and the evidence on the test blue print, the number of items was pruned down to 40.

The development of GAI-2 aimed at a systematic coverage of the creative ability attributes of giftedness. These abilities are also called divergent thinking, productive thinking or inventive thinking. It also started by Item writing and selection of items emphasizing classroom experiences that stimulate creativity

based on Torrance (1998) and Swartz (1998) which defined creativity as a process of becoming sensitive to problems, deficiencies, gaps in knowledge, missing elements, disharmonies, identifying the difficult, searching for solutions, making guesses, or formulating hypotheses about the deficiencies, testing and retesting these hypotheses and possibly modifying and retesting them; and finally communicating the results. An initial pool of 20 items was generated. These items were then assessed for content validity by experts including the supervisors of this work. Based on the recommendations of these individuals, some items were removed and others revised or re-worded as a result of which the number of items came down to 10. The draft was then written in verbal and figural tasks forms consisting of several activities, each designed to tap different aspects of creative functioning.

Development of GAI-3 also followed the same method as in GAI-1 and GAI-2 above. After generating an initial pool of 45 items which was given to experts for assessment, the items were reduced to the final draft of 21 after trial testing.

3.8 Procedure for Scoring of Giftedness Assessment instrument

GAI-1: The test carries 40 marks of 1 point each for every correct answer. A participant's overall score is calculated by the total number of correct answers. The higher the score, the higher the possession of above average ability.

GAI-2: This is based on five norm referenced measures namely fluency, flexibility, originality, elaboration, abstractness of title and resistance to premature closure (Torrance, 1998).

For fluency, 1 point was given to a list of interpretable, meaningful and relevant responses to the stimulus.

For flexibility, 1 point was also given to a number of different categories represented, as provided in the manual. Therefore, efficient scoring requires familiarity with the categories, since each response must be classified into one of the categories. It is scored for tasks 1-4 only.

The scoring of originality is based on the responses which are unexpected, unusual, unique or statistically infrequent. 1 point is given to the above category and a list of responses that fall into zero originality is provided for all the tasks as provided in the manual.

Elaboration is the addition of pertinent details (Torrance, 2008). It is scored for tasks 5 and 6. There are two assumptions underlining the scoring of elaboration:

(1) The minimum and primary response to the stimulus figure is a single response. Essentially, the scorer must ask "what is the minimum detail that I must see for this to be; for instance, "a girl"?

(2) The imagination and exposition of detail is a function of creative ability, appropriately labelled elaboration (Torrance, 2008). To score elaboration therefore, credit is given for each pertinent detail (idea, piece of information etc.) added to the original stimulus figure, its boundaries, and for its surrounding space. However, the Primary response itself must be meaningful before elaboration has any worth or can be scored. It is not necessary to make a precise count of the details produced in each task. However, careful estimates should be made within the limits listed for each task in the scale on the scoring sheet. For example in activity 5, 1 (0-9) 2 (10 – 19) 3 (20 – 29) 4 (30 – 39) 5 (40 – 49) 6 (50 and above) details. The elaboration score is the sum of the scores for the two

activities. Examples of responses which score elaboration points are also provided in the manual.

Abstractness of title is the ability to produce good titles involving the thinking processes of synthesis and organization. A creative person has the ability to capture the essence of the information involved, to know what is important. Such titles enable the viewer to see the picture more deeply and richly. The titles produced in activity 5 are scored in an attempt to represent this quality of a creative person.

The titles are evaluated on a scale ranging from 0-3 and are provided in the manual.

Scoring for resistance to premature closure (task 2 only): This measure is based on the premise that a creative person is able to keep open and delay closure long enough to make the mental leap that makes original ideas possible. Less creative persons tend to leap to conclusions prematurely without considering the available information (Torrance, 2008). In responding to activity 5, such people close the incomplete figure immediately with straight or curved lines, cutting off chances of more powerful, original images. Each response in task 5 is evaluated according to the scales provided in the manual.

GAI-3: The total score was obtained by reversing the values of items 2, 4,7,9,10,14,17,19,21 and using direct scoring for the remaining items. The sum of the reverse and direct score of the items gave a participant's overall score in GAI-3. The higher the score, the higher the possession of task commitment ability by the individual.

3.9 Pilot Study

The next procedure for the development of this study was the pilot study conducted by the researcher. The purpose of the pilot study was to try out the new instrument, to determine its item structure and also re-validate the old instruments used for concurrent and discriminant validation. The sample for the pilot study was randomly selected from both public and private primary schools in Lagos Island Local Government Council which were not used for the main study. The simple random sampling method was employed in the selection of the intact classes that constituted the number of participants for the pilot study. The distribution of the participants was as presented below:

Table 4:

Distribution of sample for pilot study

Sample Category	Boys	Girls	Total
St. Peter's (Faji) Primary school, Aguda Lagos	13	25	38
Lagos Island Local Government Primary School	17	29	46
Fazil-Omar Ahmadiyya Primary School	24	19	43
Doland Nursery and primary school	15	13	28
Ade-Oshodi Memorial Baptist School	24	21	45
Total	**93**	**107**	**200**

Firstly, the draft of GAI-1 was administered to a selected sample of 93 male and 107 female participants. The test was scored according to the provision in the manual and the scores were subjected to item analysis. In the item analysis, items whose difficulty index ranged from 0.5 and 0.7 were selected as good; Similarly, items whose discriminating index were above 0.30 and positive were

equally selected Obe, (1980) and Ilogu (1990, 2005) (see Appendix I). This brought the items in the final test to 40. The validation of GAI-3 was done with test -retest method. For GAI-2, an interrater scoring was carried out by the researcher and the assistants using the participant's scores in the test and the result is indicated below:

To determine the interrater reliability of GAI-2, a sample of 100 test records were independently scored by two trained scorers. The result is as follows:

Fluency	-	0.91
Flexibility	-	0.95
Originality	-	0.91
Elaboration	-	0.96
Abstractness of title -	-	0.97
Resistance to preventive closure	-	0.96

The above results indicate that when scorers follow the scoring guidelines, a high degree of relationship exists with results from independent scoring of the same records. It also shows consistency in marking among ratters.

The GCSE (NECO, 2005), ITCMAS(Akinboye, (1979), TTCT (Torrance,1998) and MAS (Obe, 2002) were adapted for the purpose of this study by reducing the number of activities and modifying some items that have culture bias before using them for the pilot study. The instruments were found to be reliable with high test-retest reliability coefficients ranging from 0.62 to 0.86.

3.10 Procedure for Data Collection

3.10.1 Permission for Research

With the aid of an introductory letter from the researcher's Department, permission was granted from the Chairman of LSUBEB and the Director of Education, Lagos State Ministry of Education who were in charge of public and private Primary schools respectively. A letter of introduction to the different schools was obtained which the researcher used to administer the tests in the respective schools represented in the sample.

3.10.2 Appointment and Training of Research Assistants

Five research assistants were appointed to assist the researcher in the collection of data, scoring of the test and record keeping for this study. For each school, the class teacher helped to maintain order during the administration of the tests. The research assistants received two hours training daily for two days on how to administer and score the test instruments. They were mainly Masters Degree Students in Measurement and Evaluation and psychology. They were also adequately remunerated for the jobs they carried out.

3.11 Procedure for Administration of the Instrument

The test forms were administered to the participants by the researcher and the assistants. The research assistants were divided into three groups of two persons each. Since there were six zones to cover, each group took charge of two zones. The classroom teachers also helped to maintain order during the test taking sessions. The administration of the instruments went on for three consecutive days in each school. The first thing was to establish rapport with the pupils by formally introducing self and arranging the classes for adequate

spacing for an examination. The spacing was done to reduce malpractice. The pupils were informed that the outcome of the test would, in no way affect them in any of their school activities. The instruments were then distributed to them after adequate spacing. The instructions for each test instrument were read and explained until they all understood what they were expected to do. They were also requested not to mark the test forms so as to make them usable for other participants. Hence, they were provided with plain sheets of papers for rough works.

The first set of the instruments comprising the GAI -1 and the GCSE were administered to the participants concurrently on the first day. The second day was used for GAI-2 and the TTCT. While the third and last day was used for GAI-3 and ITCMAS and MAS. As a sort of reinforcement and also to sustain their interest and continued presence for the duration of the exercise, the researcher brought a lot of snacks which was shared after each session of the test administration. The children were happy and each time promised to participate in the next session.

3.12 Method of Data Analysis

The data collected from various instruments were treated statistically using both descriptive and inferential statistics. Descriptive statistics was used to show means, standard deviations, and standard scores for the norms and testing of the hypotheses.

CHAPTER FOUR

RESULTS OF DATA ANALYSIS

4.0 Introduction

This chapter presents the norms and results obtained from various statistical analyses carried out in the study. Five null hypotheses were formulated to guide the study. Descriptive and inferential statistics were used for the analyses of the data generated in the study. All hypotheses were tested at 0.05 level of significance.

4.1 Norms: To obtain norms for the Giftedness Assessment Instrument (GAI) as a measure of giftedness, it was administered to the 600 participants. Mean scores and standard deviations obtained across gender and type of school under the normal testing condition were computed as the local norm and are presented in Table 5.

Table 5

Mean scores and Standard Deviations of the Participants on GAI

Sex	**Descriptive statistics**	**GAI-I**	**GAI-2**	**GAI-3**
Male	Mean SD N	19.88 5.30 275	80.75 34.16 275	54.12 7.65 275
Female	Mean SD N	21.17 5.40 325	82.75 30.62 325	56.03 7.58 325
Total	Mean SD N	20.58 5.40 600	81.83 32.34 600	55.15 7.67 600
Type of school	**Descriptive statistics**	**GAI-I**	**GAI-2**	**GAI-3**
Public	Mean SD N	17.43 4.40 350	80.01 32.47 350	53.56 7.30 350
Private	Mean SD N	24.9 3.40 250	84.38 32.47 250	57.39 7.70 250
Total	Mean SD N	20.54 5.40 600	82.01 32.34 600	55.15 7.70 600

The result above indicates that female participants and pupils in the private schools have slightly higher mean scores in all the components of GAI. To further enhance the interpretation of norms for the GAI-1 and GAI-2, raw scores of the participants were grouped and converted to standard scores (T-score) as presented in tables 6 and 7.

Table 6

T-score Norms for GAI-1 (N=600)

CLASS INTERVAL	MID POINT	F	Z - SCORE	T – SCORE
7 - 9	8	5	-2.3	27
10-12	11	64	-3.6	14
13-15	14	57	-1.2	38
16-18	17	87	-0.6	44
19-21	20	118	-0.1	49
22-24	23	95	0.5	55
25-27	26	127	1.0	60
28-30	29	42	1.6	66
31-33	32	5	2.1	71

*Mean=20.41, Sd=5.44

Table 7

T-score Norms for GAI-2 (N=600)

Class interval	Mid point	F	Z-score	T-score
22-30	26	60	-1.73	33
31-39	35	35	-1.45	35
40-48	44	7	-1.17	38
49-57	53	16	-0.89	41
58-66	62	51	-0.62	44
67-75	71	132	-0.34	47
76-84	80	11	-0.06	49
85-93	89	38	0.22	52
94-102	98	71	0.49	54
103-111	107	42	0.77	58
112-120	116	69	1.05	61
121-129	125	42	1.33	63
130-138	134	18	1.61	66
139-147	143	2	1.88	69
148-156	152	6	2.16	72

*Mean=82.01, Sd=32.34

Evidence from tables 6 and 7 above show that the cut-off marks for GAI-1 and GAI-2 respectively are 25.44 and 114.35, due to the fact that their standard deviations are high, the pass mark is therefore placed at one standard deviation above the mean (normality assumption). With GAI-1, pupils that are gifted fall between 25 and 33 while pupils that are gifted fall between 114.35 and 156 using GAI-2 as measure. Their standard scores are between 60 and 71 and 61 and 72 respectively. The T – Score is useful in order to enable a layperson to understand the scores and for easy interpretation to parents (Nwadinigwe, 2002).The scores of GAI-3 was not converted. Also, the slight difference

between the means in tables 5 and 6 is because while the analysis in Table 5 involves single data, the data used in Table 6 is grouped.

4.2 Test of Hypotheses

Reliability

In order to determine the reliability coefficient of the GAI, a two week interval test – retest analysis with Pearson product moment statistical technique, Cronbach's Alpha for internal consistency and split – half method were computed using 600 participants selected for the study. This was also to test hypothesis one of this study. The results are presented in Table 8.

Table 8

Reliability Coefficients of GAI

GAI COMPONENTS	N	$\overline{X}_1$	$\overline{X}_2$	Sd_1	Sd_2	2-week test-retest	Cronbach's alpha	Split- half Method
GAI – 1	600	29.19	28.65	4.73	4.85	0.84	0.91	0.74
GAI – 2	600	61.42	60.93	6.26	7.20	0.83	0.80	0.78
GAI – 3	600	61.91	61.01	6.26	7.21	0.78	0.87	0.71

*Significant at P<.05, df =598, r-crit. =.062

The results in table 8 show that GAI has a significant high test- retest and internal consistency reliability coefficient, with GAI – I having two week test-retest reliability coefficient of 0.84, Alpha of 0.91 and split – half method reliability coefficient of 0.74. GAI–2 recorded a remarkable value of a two week test-retest reliability coefficient of 0.83, alpha of 0.80 and split – half reliability coefficient of 0.78, while the analysis also produced for GAI -3 a two week test-

retest reliability coefficient of 0.78, an alpha coefficient of 0.87 and split – half of 0.71. With this result, hypothesis one which states that GAI will have no significant coefficient of reliability is rejected.

Validity

To determine the concurrent and discriminant validity of GAI with other commonly administered measures of giftedness, Pearson product moment statistical tool was used to intercorrelate the scores of participants. This was also to test hypothesis two of this study. The result is presented in table 8**.**

Table 9: Intercorrelation Matrix of GAI and Other Measures (Criterion).

	GAI-1	GAI-2	GAI-3	TTCT	MAS	GCSE-1	GCSE-2	ITCMS
GAI-1	1							
GAI-2	.030	1						
GAI-3	.251*	-.049	1					
TTCT	.107*	.656*	-.002	1				
MAS	-.024	.000	.030	-.030	1			
GCSE-1	.687*	.526*	.075	.082*	.466*	1		
GCSE-2	.561*	.110*	.148*	.123*	.051	.000	1	
ITCMS	.148*	.041	.746*	.141*	-.000	.150*	.110*	1

*** Correlation is significant at the 0.05 level (2- tailed)**

Evidence from table 8 indicates that GAI was correlated with other standardised measures such as TTCT, MAS, GCSE-1 and GCSE-2, and ITCMS. The obtained coefficients were in the expected direction; low, negative and statistically significant. This result shows that GAI has a significant concurrent and discriminant relationship with other standardised measures of ability, hence hypothesis two is rejected.

Hypothesis three states that the scores of the participants in the newly developed Giftedness Assessment Instrument (GAI) will not yield significantly high coefficient measures of construct validity.

In order to determine the factorial structure of the instrument which is an aspect of construct validity (Brace, kemp & Snelgar, 2006), factor analysis with principal component and direct varimax rotation were used. Kaiser's criterion (Child, 1979) which states that only factors having latent roots greater than one are considered was applied since factors less than one eigenvalue will add nothing to the data (Kachigan, 1982). However, in order to obtain information about the factorability of the data, the kaiser-Meyer-Olkin (KMO) measure of sampling adequacy and Bartlett's tests of sphericity that were conducted yielded 0.64 for GAI-1, 0.60 for GAI-2 and 0.61 for GAI-3 respectively. As a measure of factorability, KMO values of .60 and above are acceptable (Brace, Kemp & Snelgar, 2006). The subsequent factor analysis performed also produced 10, 8 and 8 factors respectively for each component of GAI which conformed to Kaiser's criterion. The results are presented in Table 10, 11 and 12**.**

Table 10

Initial Eigen values of the extracted Factors of GAI – 1.

COMPONENTS	EIGEN VALUES	% OF VARIANCE	CUMULATIVE %
1.	5.16	12.90	12.90
2	5.86	12.15	25.05
3	3.21	8.06	33.11
4.	2.79	6.97	40.08
5.	2.64	6.61	46.69
6.	1.91	4.77	51.45
7.	1.73	4.39	63.32
8.	1.67	4.17	59.94
9.	1.36	3.39	63.32
10.	1.34	3.35	66.68

Table11: Initial Eigen values of the extracted factors of GAI – 2

FACTORS	EIGEN VALUES	% OF Variance	CUMULATIVE %
1	2.45	11.15	11.15
2	2.06	9.34	20.49
3	1.93	8.76	29.28
4	1.80	8.19	37.47
5	1.42	6.45	43.92
6	1.29	5.89	49.82
7	1.19	5.40	55.22
8	1.11	4.99	60.22

Table 12

Initial Eigen values of the extracted Factors of GAI-3

FACTORS	EIGEN VALUES	% OF VARIANCE	% CUMULATIVE
1	4.26	11.30	11.30
2	2.29	7.97	19.27
3	1.98	7.38	26.65
4	1.76	6.98	33.63
5	1.64	6.77	40.39
6	1.55	5.68	46.08
7	1.37	5.49	51.58
8	1.04	5.08	63.24

The results in tables 10, 11 and 12 indicate that 10 factors accounted for 66.68% of the total variance for GAI-1 while 8 factors accounted for 60.22% for GAI-2 and 8 factors accounted for 63.24% of the total variance for GAI-3.

The extracted factors were maximised using varimax rotation to reduce overlap and ensure distinctiveness of factors. Burt-Bank formula was then used to determine significant factor loadings and to ensure that no item loads significantly on multiple factors (Floyd & Widaman, 1995). Using Burt-Bank formula, a cut-off value of 0.5 was obtained as the least value for inclusion. The items that loaded in each of the factors and their communalities are presented in Tables 13 and 14 and 15 below.

Table 13

Factor names, communalities and their loadings for GAI-1

Item No	Communalities	Factor name	Factor loading
1	.65	Verbal reasoning	.65
2	.61		.61
3	.54		.54
4	.69		.69
5	.65		-.61
6	.76		.65
7	.73		-.57
8	-.45	Abstract reasoning	.73
9	.91		.53
10	.53		.64
11	.64		.56
12	.56		-.46
13	-.46		.51
14	-.51		-.51
15	.51	Numerical reasoning	-.52
16	-.51		.78
17	-.57		.77
18	.76		.75
19	.61		-.79
20	-.52		.76
21	.78		.71
22	.77	Mechanical reasoning	.90
23	.75		.54
24	-.79		.91
25	.76		.90
26	.71	Spatial reasoning	.61
27	.58		-.56
28	.91		.98
29	-.61	Spelling	-.65
30	-.55		-.76
31	.91	Similarities	.91
32	.98		.98
33	.65	Picture completion	.90
			.91
34	.90	Reasoning analogy	-.51
35	.54		.65
36	.90		.58
37	.61		.91
38	.90		.61
39	.71		.90
40	.91	Serial reasoning	-.45

The results shows that 7 items loaded significantly in Factor 1-verbal reasoning, 7 items in factor 2-abstract reasoning etc. and in order to appropriately name the components extracted, the items were arranged in order.

Table 14

Factor names, communalities and their loadings for GAI-2

Item No	Communalities	Factor names	Factor loadings
1	-.51	Fluency	.72
2	-.64		.59
3	.51		.76
4	.64		.51
5	.54	Flexibility	-.51
6	-.52		-.64
7	.62		.51
8	.71		.62
9	.72		.56
10	.59		.52
11	.76	Originality	.64
12	.66		.54
13	.63		.53
14	.83	Curiosity	.54
15	.69		.62
16	.51	Speculation	.69
17	.53		.79
18	.62	Adventurous	.63
19	.56		.83
20	.69	Openness to Experience	.69
21	.79	Elaboration	.52
22	.52		.56

The results shows that 4 items loaded significantly in Factor 1-fluency, 6 items in factor 2- flexibility etc. and in order to appropriately name the components extracted, the items were arranged in order.

Table 15

Factor names, communalities and their loadings for GAI-3

Item No	Communalities	Factor name	Factor loading
1	.58	Interest	.58
2	.71		.59
3	.59		.53
4	.60		.59
5	.65	Enthusiasm	.58
6	.53		.54
7	.71	Endurance	-.59
8	.57		.60
9	.58		.56
10	.54	Determination	.71
11	.69		.69
12	-.56		.54
13	.54	Fascination	.65
14	.50		.65
15	.60	Perseverance	.57
16	.64		.64
17	.65	Self-confidence	.54
18	.54		.67
19	.59		.56
20	.67	Drive to achieve	.50
21	.56		.60

The results show that 4 items loaded significantly in Factor 1 - Interest, 2 items in factor 2 - Enthusiasm etc. and in order to appropriately name the components extracted, the items were arranged in order. From the results above, hypothesis three which states that the scores of the participants in the newly developed

Giftedness Assessment Instrument (GAI) will not yield significantly high coefficient measures of construct validity is therefore rejected.

Null Hypothesis four**:** There is no significant gender difference in the pupils' giftedness ability using the GAI as measure.

Alternative Hypothesis four: Females possess higher giftedness ability than Males using GAI as measure.

To determine whether there is any difference observed in the scores, with respect to gender, an independent t-test was adopted and the result is indicated in table16.

Table 16

Gender differences in giftedness ability of the pupils using GAI as measure

COMPONENTS	Gender	N	$\overline{X}$	Sd	df	t-cal.	t-crit.	Remark
GAI-1	Female Male	325 275	21.13 19.84	5.30 5.41	598	2.93	1.96	*
GAI-2	Female Male	325 275	82.75 80.75	30.62 34.16	598	0.78	1.96	ns
GAI-3	Female Male	325 275	56.03 54.12	7.59 7.65	598	3.05	1.96	*

* Significant, ns =not significant

Table 16 shows a calculated t-value of 2.93 for GAI – 1; and 3.05 for GAI-3 at P <0.05. This indicates that females possess higher giftedness ability with GAI-1 and GAI-3 than the males, thus the hypothesis is rejected. While with GAI-2; the t-cal. of 0.78 is less than t-crit. of 1.96 showing no significant difference in

the giftedness ability between male and female participants using GAI-2 as measure thereby accepting the null hypothesis.

Null Hypothesis five**:** There is no significant difference in the giftedness ability of the pupils in public and private schools using GAI as measure.

Alternative Hypothesis five: Pupils in the public schools will possess higher giftedness ability than pupils in the private schools using GAI as measure.

To determine whether there in any difference observed in the scores with respect to the type of schools that the participants attend, an independent t-test was adopted and the result is indicated in table 16.

Table 17

Difference in giftedness ability of the pupils in private and public schools using the GAI as measure

Components	Type of School	N	$\overline{X}$	Sd	df	t-cal.	t-crit.	Remarks
GAI-1	Private	250	24.90	3.14	598	22.88	1.96	*
	Public	350	17.43	4.43				
GAI-2	Private	250	84.38	32.47	598	1.64	1.96	ns
	Public	350	80.01	32.07				
GAI-3	Private	250	57.39	7.66	598	6.21	1.96	*
	Public	350	53.56	7.28				

* Significant, ns= not significant

Table 17 shows the calculated t- values of the differences between pupils in private and public schools in above average ability (GAI – 1) (22.88; P<.05), creative ability (GAI – 2) (1.64; P<.05) , and task commitment / motivation scale

(GAI -3) (6.21; P<0.05) respectively. This indicates that students from private schools have significant high above average (GAI-1) and task commitment/motivation scale (GAI-3) than their counterparts in the public schools, thus rejecting the null hypothesis. With GAI-2 measure, the hypothesis is accepted indicating that there is no significant difference in the giftedness ability of the pupils in the two categories of school with the pupils in the private schools manifesting higher mean scores of 24.90 in GAI – 1, 84.38 in GAI -2 and 57.39 in GAI – 3 respectively.

4.3 Summary Of Findings

1. Giftedness Assessment Instrument (GAI) is a valid and reliable measure of giftedness ability considering the high reliability and validity coefficients obtained. Thus, hypotheses one and two earlier stated were rejected.

2. The extracted factors for each of the GAI components indicate that similar items or those describing similar manifestations are grouped together. The factors may be regarded as different domains of above average, creativity and task commitment/motivation scales as contained in the GAI because they conformed to Kaiser's criterion in the process of initial factoring. Hence, hypothesis three was rejected.

3. Gender has a significant influence in the pupil's giftedness ability using GAI-1 and GAI-3 components of GAI, with the female participants manifesting higher mean scores in all the component measures of giftedness, but with GAI-2 component, there is no significant difference in giftedness ability among female and male participants.

4. There is a significant difference in the giftedness ability of the pupils in the GAI across the type of schools they attend with pupils from the private schools manifesting higher mean scores in all the components of GAI except with GAI-2 component where the hypothesis is accepted.

CHAPTER FIVE

DISCUSSION OF FINDINGS, IMPLICATIONS, RECOMMENDATIONS, SUGGESTIONS FOR FURTHER RESEARCH, SUMMARY AND CONCLUSION

5.0 Introduction

This study focused on the development and validation of Giftedness Assessment Instrument (GAI) for primary six pupils in Lagos State, Nigeria. The results, which are basically the psychometric properties of GAI, reflect the extent to which it yields reliable and valid measures of the giftedness construct.

5.1 Discussion of Findings

This section presents a discussion of the results of the test norm and the five tested hypotheses.

Establishment of Test Norms

The norms in tables 5, 6 and 7 indicate the cut-off points for evaluating the relative potentials of individual participants and hence the performance level for decision making in the selection and placement of pupils to gifted programmes. The importance of the norms lies in the fact that such decision making is not arbitrary but one that is based on objective criterion (Omoluabi, 2006). This view therefore negates the common practice of arbitrary taking 95 percentile and above performance as the criterion for decision making when the GCSE was used. If 95 percentile of a raw score of 40 were used as the criterion cut-off point in the case of GAI-I, almost 100 percent or 599 out of 600 participants will be on the exclusion list thus eliminating the target group. A norm therefore

represents an equitable value of the relative performance of all the participants in the standardized sample.

Hypothesis One: The scores of the participants in the newly developed Giftedness Assessment Instrument (GAI) will not yield significant high reliability coefficients as determined by Cronbach's alpha, split-half and test-retest methods.

The results in table 8 were to demonstrate if the newly constructed instrument were reliable. The reliability coefficients obtained (2-week test = 0.84, 0.83 and 0.78, Cronbach's Alpha = 0.91, 0.80 and 0.87, spilt half method = 0.74, 0.78 and 0.71) are all high and significant (P> 0.5, df = 598, r = 0.062). This result is in consonance with the view of Aiken & Groth -Marnat (2006), who affirm that the acceptable reliability coefficients of a new test must not be less than 0.70; this therefore confirms hypothesis one.

Hypothesis Two: The scores of the participants in the newly developed Giftedness Assessment Instrument (GAI) will not yield significantly high coefficients of concurrent and discriminant validity when compared with other related standardized measures of the student's ability.

The results in table 9 showed that it has concurrent validity coefficients of 0.69 and 0.56 with GCSE-1 and 2, 0.66 with TTCT, 0.75 with ITCMAS and divergent coefficients with MAS thereby confirming hypothesis two. This result is in agreement with the views in related studies; Aiken & Groth - Marnat (2006) and Brace, Kemp & Snelgar (2006) both agree that the acceptable range for concurrent validities should be 0.50 to 0.80. The range indicates that although the instrument involved are measuring similar construct; they are not replicas of

one another. The result also indicates that what 80 items in the case of GCSE 1 & 2, can measure in one and half hours, GAI-1 with 40 items can also do same in twenty minutes, thus confirming the efficacy of GAI-1 component. The divergent coefficients obtained between GAI and MAS indicate that the instruments are measuring different constructs. This also confirms hypothesis two.

Hypothesis Three: The scores of the participants in the newly developed Gifted Assessment Instrument (GAI) will not yield significantly high coefficient measures of construct validity.

Providing further support for the utility of the GAI, exploratory factor analysis which Brace, Kemp & Snelgar (2006), state is another way of determining construct validity of instruments was carried out, thus, yielding support for its multidimensional factor structure based on traditional statistical criteria. As can be seen from tables 10 to 15, the data were analysed by means of a principal component analysis, with varimax rotation. The various indications of factorability are good; for instance, the KMO measure of sampling adequacy and Barlett's test of sphericity indicate that the data is factorable. Ten, eight and eight factors (for GAI-1, 2, 3 components respectively) with eigenvalues greater than 1.0 were extracted and rotated, using varimax rotation. This implies that the factors extracted are independent of one another and are invariant. The component factors extracted can be thought of representing different components of giftedness and are named based on the manner of clustering of items on each component (see Tables 13, 14 and 15). The factors extracted are similar, but more comprehensive to those extracted by Pfeiffer & Jarosewich

(2005), Wechsler (2003), Akiboye (1997) and NECO (2005).For instance, while NECO (2005) identified only four factors namely Mathematics, English, Verbal and quantitative aptitude, GAI combined more items that cover more attributes underling giftedness than any of the ones seen in the aforementioned studies. This could therefore imply that GAI is a more comprehensive measure of the giftedness construct than GCSE which is a four factor test thus confirming hypothesis three.

Hypothesis Four: There is no significant sex difference in the determination of the pupils' giftedness ability using the GAI as measure.

The result on table 15 demonstrates gender influence on giftedness ability; it also shows that females obtained higher mean scores in two measures of giftedness components (GAI-1 and GAI- 3). However, the hypothesis was accepted with GAI-2 as equally indicated in table 15. This result is contrary to Kerr (2001) who reported that boys achieve outstanding status than girls of the same age. However, Reis (1998) was in agreement with the findings of GAI-1 where male's manifested higher mean scores, when she asserts that men will continue to surpass women in higher levels of profession and creative accomplishments. The implication of this result is that females manifest giftedness ability than their male children; though most parents prefer their males to be gifted more than their females (Reis, 1998).

Hypothesis Five: There is no significant difference in the giftedness ability of the pupils in private and public schools using the GAI as measure.

The impact of socio-economic status was also evaluated using the type of schools the participants attend as a yardstick. The result in table 16 shows a

significant difference between public and private schools using GAI-1 and GAI-3. This result is in support of the views of Oladokun (2006) who state that giftedness is present in children of the elite class. It is also in agreement with the views of stake holders of gifted programme in Nigeria who often search for gifted children from the private schools. Enriched environment which is said to promotes giftedness can only be provided by the elite class in private schools. On the contrary; the researcher observed that the selection of children to the gifted programme in Nigeria is evidence that the practice is equally rift with inequalities and political manipulations existing in the country.

5.2 Implications of the Findings

The findings of this study have very important implications for gifted education providers in Nigeria.

1. In screening, identification and selection of primary school pupils for placement into the gifted programmes in the country, the GAI can effectively be utilized.
2. The study also showed that possession of above average or cognitive ability only is not enough to prove that a child is gifted, creative ability and task commitment/motivation scale equally played major roles and should not be left out as selection measures. This implies that a child who performed well in creative ability and task commitment/motivation scale may also be considered for selection. The findings of this study therefore demonstrated that giftedness has other underlying attributes which cannot be overlooked during its application.
3. The standard scores employed as norms for this instrument has proffered a solution to the controversy in the use of percentile norms. As mentioned

earlier, the standard scores represent measurement on an interval scale having desired means and standard deviations.

5.3 Recommendations

Based on the findings of this study, the following recommendations are made.

(1) Stakeholders in the gifted programmes should adopt the Giftedness Assessment Instrument (GAI) which measures all the attributes of giftedness for the selection process of gifted children.

(2) Parents and Government as a whole should provide enabling environment for children even at the early stages of schooling in order to enhance divergent thinking ability. Such conducive environment also may be a sort of motivation to the child for overall task accomplishment.

(3) The researcher recommends that parents should provide the opportunity for both their male and female children to be gifted.

(4) GAI provides that individuals whose scores are equal to or above the norms of the components qualify for placement in the gifted programme.

5.4 Suggestions for further research

The following suggestions are made as a result of the findings emanating from this study:

(1) Future research should seek to validate the GAI using a larger sample in order to obtain enduring norms for the instrument which will facilitate the screening of pupils into the gifted programmes in Nigeria.

(2) It is pertinent to conduct a predictive study of how each sub-component of the divergent thinking tests predict future creative achievements using

the same sample. This will further standardize the GAI-2 component of the instrument.

(3) Further research should establish the concurrent validity of GAI with other standardized achievement measures not used in this study.

(4) A longitudinal study of pupils identified with this instrument and put in gifted programmes could be conducted.

(5) Further instruments should be developed and validated along side with GAI.

5.5 Contributions to Knowledge

(1) In this study a new instrument - **the Giftedness Assessment Instrument (GAI**), was developed and validated with adequate psychometric properties suitable for use in the identification of giftedness among Primary six pupils in the Basic Education programme.

(2) It has also revealed the different factors which are indications of the domains that make up giftedness through the method of factor analysis adopted for the construct (factorial) validity of the instrument.

(3) The study also revealed that cognitive ability/intelligence test alone does not account completely for the variance in giftedness but that some affective components are also involved such as creative ability test and task commitment/motivation scale.

(4) The study shows that Giftedness Assessment Instrument (GAI) is efficacious when compared to what is currently used to select pupils to Federal Government Academy, Suleja.

(5) This study has developed a norm to be adopted in the classification of giftedness ability during the selection process of pupils into the gifted programmes.

5.6 Summary and conclusion

This study focused on giftedness a term that means different things to different people. To understand the concept better, some of the definitions proffered by other experts have been reviewed. Borrowing from these other views, this study operationally defined giftedness as the possession of superior ability that can make a child become an outstanding contributor to the welfare of his/her society. Also the different theories and models explaining the characteristics and identification measures were reviewed. Considering the focus of this study and the observed shortcomings in the identification measures adopted in the selection of gifted children in Nigeria, Renzulli's three ring conception of giftedness theory and Sternberg's theory of intelligence was found very suitable in addressing the issues raised in this work and were therefore used as theoretical framework.

An instrument known as Giftedness Assessment Instrument (GAI) was developed and validated for Nigerian samples. Factor analysis of the instrument showed that giftedness is a concept that has several underlying attributes (multi-dimensions). Other psychometric properties of GAI indicate that it is a valid and reliable measure of giftedness and its use can be generalized to other populations owing to the heterogeneous characteristics of the sample populations used for the study.

GAI has therefore objectified the works of Akinboye (1979), NECO (2005), Pfeiffer & Jarosenrich (2008) and Torrance (2008). Generalization will be

enhanced if this study is replicated with populations in rural setting and also with larger samples.

Inspite of these limitations, the merit of GAI over other similar tests is that it can be used as a quick screening instrument during selection, identification and placement of gifted children.

Specifically, pupils whose scores are equal to or above the norms of the components qualify for selection. It is also recommended that those with high scores in GAI -2 and GAI-3 should as well be considered for selection to the gifted schools.

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APPENDIX A

GIFTEDNESS ASSESSMENT INSTRUMENT

(Above Average Ability Test) (GAI-1)

INSTRUCTION

Please answer the following questions by choosing the right letter from the options A to E on the list provided. You are to spend 20 minutes on this section.

1. Choose the word that has the same meaning with the word in bold letters

   Impolite:

   A unhappy
   B angry
   C faithless
   D rude
   E talkative

2. To **boast** means----------

   A. to encourage
   B. to brag
   C. to boss
   D. to lie
   E. to conceit

3. **Amendment** means----------

   A. freedom
   B. a constitution
   C. a correction
   D. a rule
   E. the laws

4. Choose the word lettered A to E, the one which is **opposite** in meaning to the word written in capital letters LITERATE

   A. wise
   B. educated
   C. learned
   D. illiterate
   E. foolish

Which one of these words below **most suitably** fills the gap in the sentences in numbers 5 and 6 below?

5. Every morning my mother _____ me a cup of tea

   A. is giving
   B. has given
   C. gives
   D. given
   E. gave

6. My dog has lost _____ tail

   A. its
   B. his
   C. its'
   D. it
   E. it's

7. Choose the word with the correct spelling.

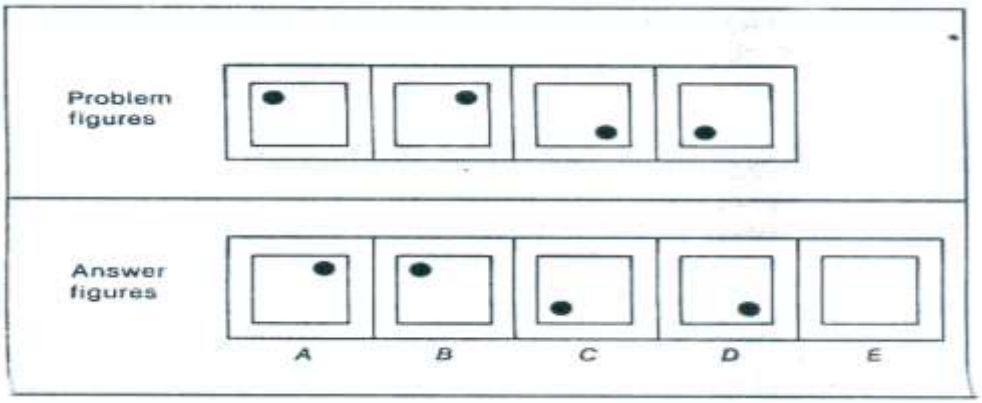
   A. offered
   B. ofered
   C. oferred
   D. offerad
   E. offared

8. Car seat belts are meant for----------

   A. locking yourself in the car
   B. safety in the car
   C. sleeping in the car
   D. your car decoration
   E. providing balance to the car

9. Pick the figure that continues the series in the problem figures.

   Problem figures



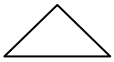
10. Addresses are provided on letters and not just names alone, so that ------
    A. names will be in order
    B. letters will be easier to read
    C. people can write to people
    D. letters will be easier to sort
    E. letters will get to the owners'
11. ---------- is the reason why cars have license plates.
    A to identify the car
    B. to show the country of origin
    C. to find it if it gets loss
    D. for police to see
    E. to avoid accidents.
12. A paper is made of----------
    A. rags
    B. bark
    C. trees
    D. wood pulp
    E. leather
13. A telephone and a radio are said to be alike because----------
    A. both make sound
    B. both can be turned on and off
    C. both have numbers
    D. both are communication instruments
    E. both are appliances

14. The duplicate of a letter can be made by using----------
    A. an ink
    B. second Sheet
    C. carbon Paper
    D. bound Paper
    E. typing Sheet
15. Thermometer is to temperature as Barometer is to---------
    A. wind
    B rain
    C. c l o u d
    D. sunshine
    E. pressure
16. A person who guards the prisoners is called----------
    A. warder
    B. army
    C. police
    D. warden
    E. count messenger
17. To be brave means to be ----------
    A. strong
    B. courageous
    C. good
    D. a fighter
    E. a brave man
18. An Island is a ----------
    A. land
    B. a beach
    C. land surrounded by water
    D. an ocean
    E. a place by a river
19. 0.257 is equal to----------
    A. 25.7%
    B. 2.57%
    C. 25%
    D. 57%
    E. 75%

20. The three - quarter of a certain number is 15. What is the number?
    A. 12
    B. 16
    C. 20
    D. 25
    E. 24
21. The average of X and Y is 20, if Z is *5,* what is the average of X, Y and Z?
    A. 8
    B. 10
    C. 15
    D. 12 ½
    E. 17 ½
22. The number of minutes in a ¾ of an hour is----------
    A. twenty - one minutes
    B. forty minutes
    C. forty - four minutes
    D. forty - five minutes
    E. fifty-four minutes
23. Find how many 5 kobo sweets a girl can buy with 45 kobo.
    A. 5
    B 9
    C. 10
    D. 15
    E. 18

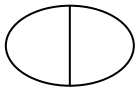
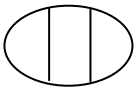
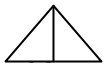
24. Find the value of 1/8 of 100
    A. 10
    B. 12
    C. 12 ½
    D. 15
    E. 25
25. 3 = _____% of 15.
    A. 5
    B. 10
    C. 15
    D. 20
    E. 25

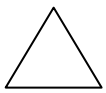
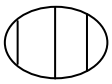
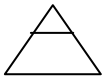
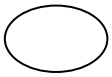
26.  is to  as  is to

A. 
B. 
C. 
D. 
E. 

27. The part of a machine that comes in contact with chemicals should be ---- ----------

A. greased
B. plastered
C. washed
D. panel beaten
E. painted

28.  is to   is to

A. 
B 
C. 
D. 
E. 

29. The shape of a football is ----------

A. round
B. oblong
C. cylindrical
D. circular
E. spherical

30. Choose the letter that begins the word describing the missing part of the picture below.

A L
B E
C T
D A
E S

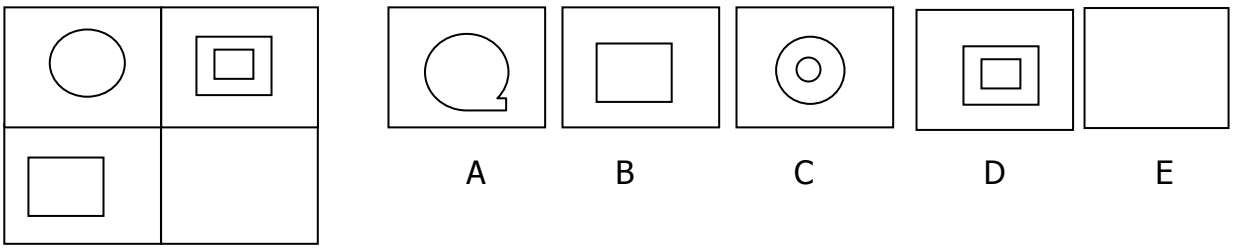
31. Which of the following symbols below can best complete the blank space in box III?

A. 000000
B. 00000
C. 000
D. 00
E. 0

I	II	III
x	xx	xxx
00	00	?
	00	

32. Choose the one that does not belong to the following animals.
A. bear
B. cow
C. snake
D. dog
E. tiger

33. Which one on the right belongs to the empty box on the left hand side?



34. Ade's mother sent him to the farm to get nine tubers of yam. Ade could only carry two tubers at a time. How many trips to the farm would Ade have to make?

A. 3

B 5 ½

C 4

D 5

E 6

35. The fog is as ---------- as sponge

A. heavy

B. full

C. light

D. wet

E. damp

36. Which of the following descriptions best satisfies the criteria hard and round?

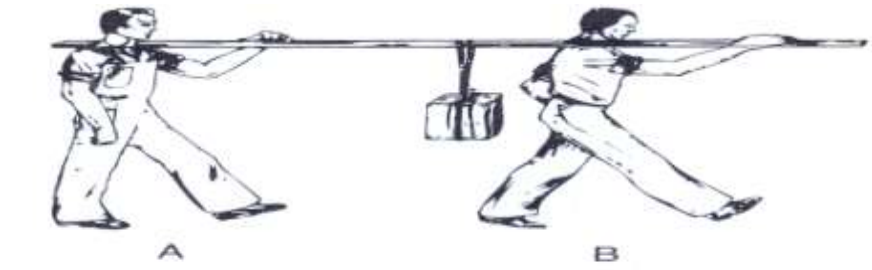
A. tennis ball
B. lawn Tennis
C. button
D. electric bulb
E. orange

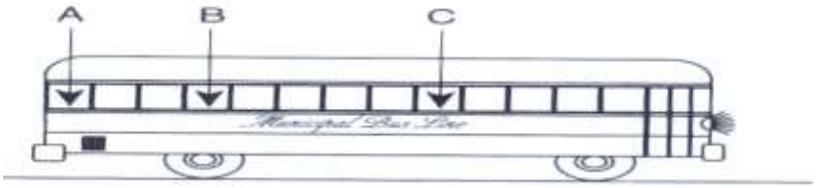
37. An axe is used to ----------

A. scrape
B. chop wood
C. remove nail
D. sharpen metal
E. break rock

38. ---------- is not a part of a motor car.

A. steering
B. clutch
C. break
D. tyre
E. fuselage





Look at the two diagrams above and use it to answer question 39 and 40.

39. Which of the men carries more weight?
    A. man B
    B. man A
    C. both men carry equal weight
    D. none of the men
    E. the object is not heavy
40. Which letter in the bus above shows the seat where a passenger will get the smoothest ride?
    A. seat A
    B. seat B
    C. seat C
    D. seat A and B
    E. seat B and C

APPENDIX B

CREATIVE ABILITY TEST (GAI-2)

INSTRUCTION:
PLEASE FILL IN THE SPACES PROVIDED BELOW.

NAME:----------

AGE:----------

SEX:----------

SCHOOL:----------

CLASS:----------

DATE:----------

Activities 1-3: Ask-and-Guess

Instruction: The first three activities will be based on the drawing in the **next page.**

These activities will give you a chance to see how good you are at asking questions to find out things that you don't know and in making guesses about possible causes and consequences of happenings. Look at the picture. What can you tell for sure? What do you need to know to understand what is happening. What caused it to happen and what will be the result?

Activity 1: Asking

On this page, write out all of the questions you think of about the picture above. Ask all of the questions you would need to ask to know for sure what is happening. Do not ask questions which can be answered just by looking at the drawing. You can continue to look back at the drawing as much as you want to.

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Activity 2: Guessing Causes:

In the spaces below, list as many possible causes as you can of the action shown in the picture above. You may use things that might have happened just before the things that are happening in the picture or something that happened a long time ago that made these things happen. Make as many guesses as you can. Don't be afraid to guess.

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Activity 3: Guessing Consequences:

In the spaces below, list as many possibilities as you can of what might happen as a result of what is taking place in the picture. You may use things that might happen right afterwards or things that might happen as a result long afterwards in the future. Make as many guesses as you can. Don't be afraid to guess.

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Activity 4: Unusual Uses (Old Motor Tyres))

Most people throw their old motor tyres away, but they have thousands of interesting and unusual uses. In the spaces below, list as many of these interesting and unusual uses as you can think of. Do not limit yourself to any size of tyre. You may use as many tyres as you like. Do not limit yourself to the uses you have seen or heard about; think about as many possible new use as you can.

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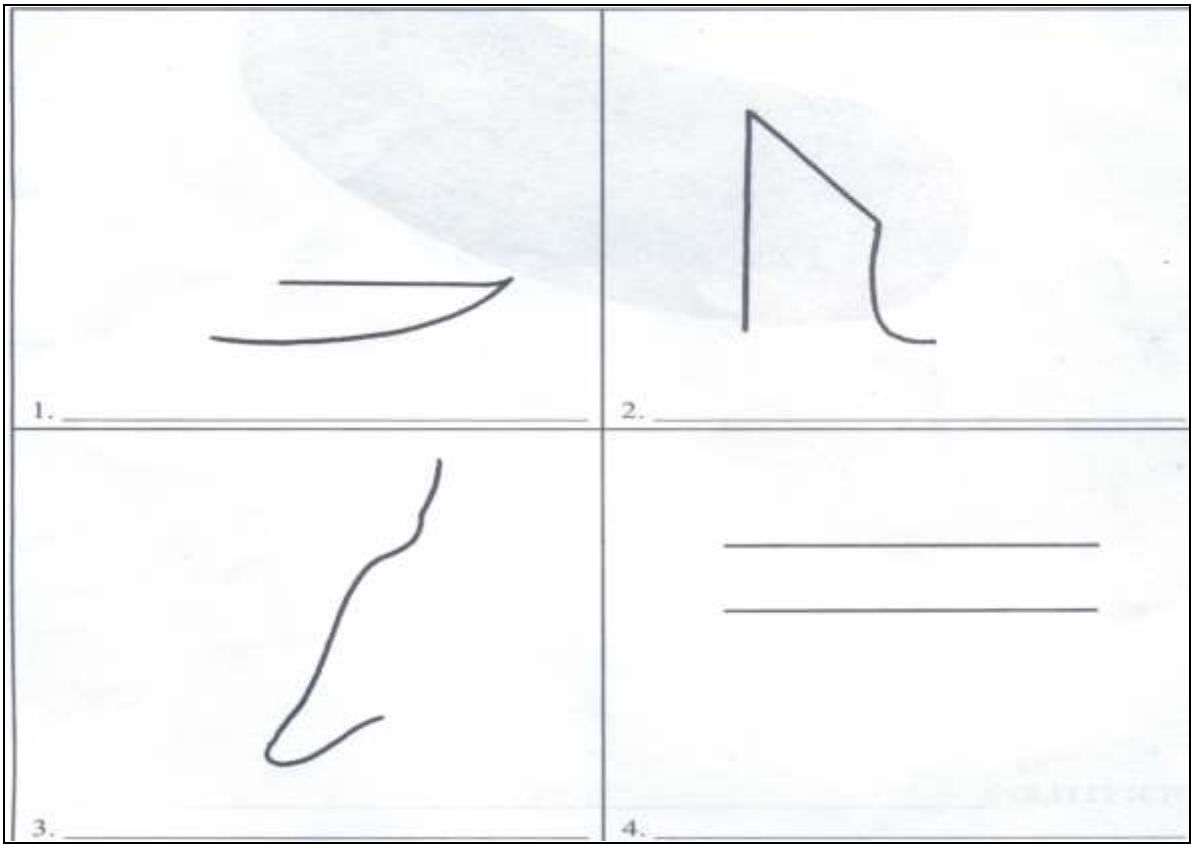
Activity 5: Picture Completion

By adding lines to the incomplete figures below and the next page, you can sketch some interesting objects or pictures. Again, try to think of some picture or object that no one else will think of. Try to make it tell as complete and as interesting a story as you can by adding to and building up your first idea. Make up an interesting title for each of your drawings and write it at the bottom of each block next to the number of the figure.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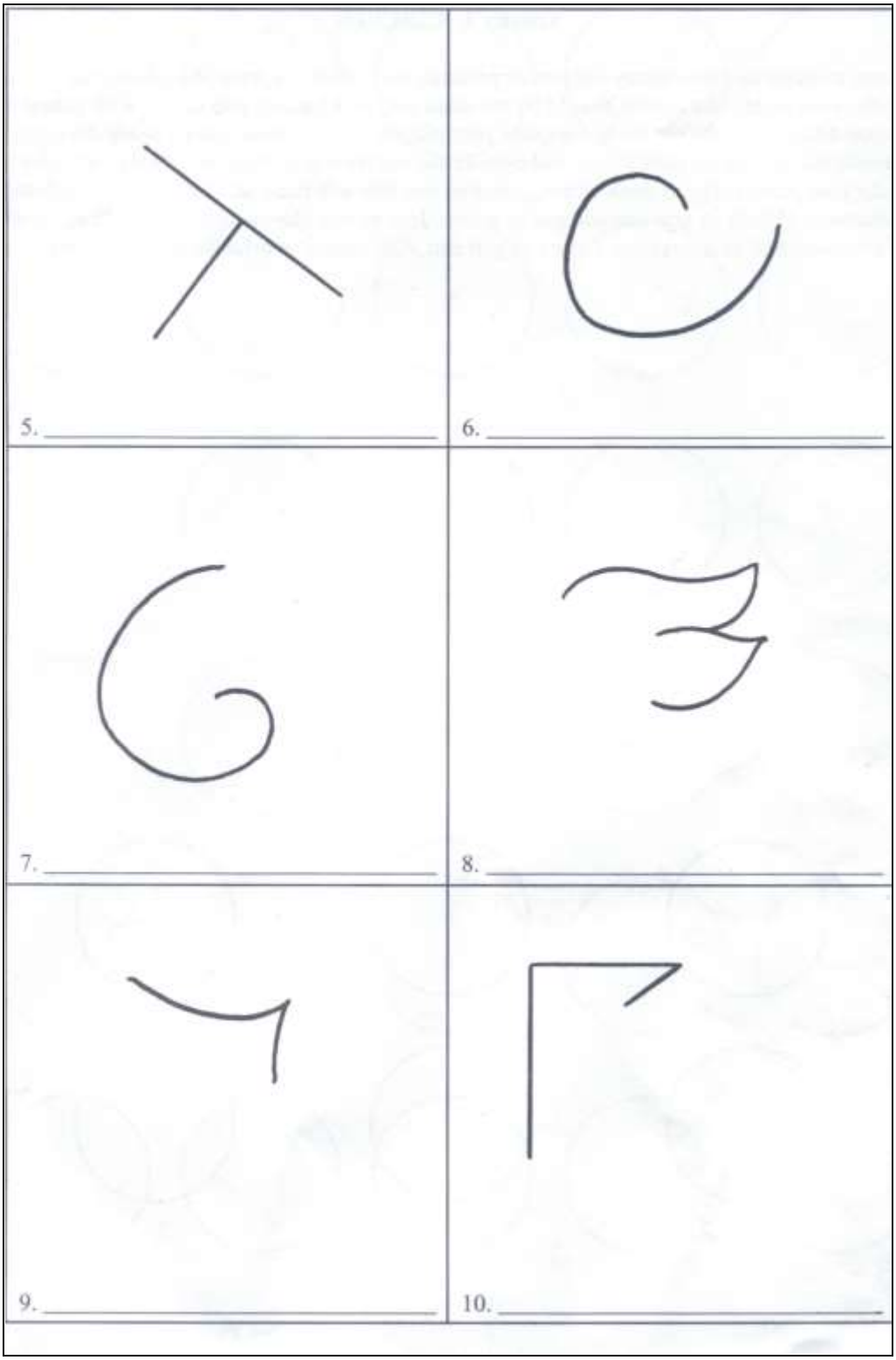
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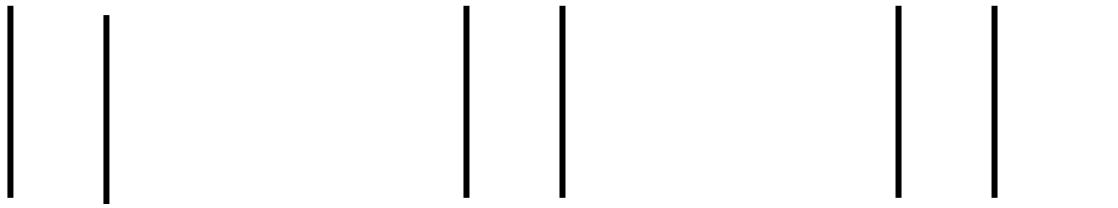
Activity 6: Lines

In ten minutes see how many objects you can make from the pairs of straight lines. The pairs of straight lines should be the main part of whatever you make. With pencil or crayon add lines to the pairs of lines to complete your picture. You can place marks between the lines, on the lines, and outside the lines – wherever you want to in order to make your picture. Try to think of things that no one else will think of. Make as many different pictures or objects as you can and put as many ideas as you can in each one. Make them tell as complete and as interesting a story as you can. Add names or titles in the spaces provided.



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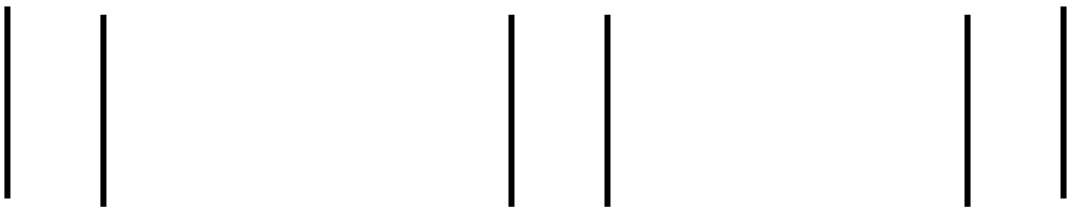
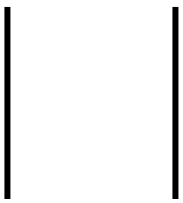
4.----------5.----------6----------



7.----------8.----------9----------



10.----------

APPENDIX C

TASK COMMITMENT/MOTIVATION SCALE GAI-3)

INSTRUCTION

Please use the four point scale below to rate yourself on each of the following statements. Tick ☑ in the column that best describes your person. Your response is meant for research purposes and nothing more.

4 Very much like me
3 Like me
2 Some how like me
1 Unlike me

NO.	STATEMENTS	4	3	2	1
1	I am interested in finding solutions to problems.				
2	I don't bother to look for solutions to problems				
3	I don't mind spending the whole day as long as I got the solution to the problem.				
4	I like to work but easily get tired				
5	I keep myself busy doing something all the time				
6	I always look out for various ways of solving a problem.				
7	I don't care when my mates criticize my ideas				
8	I believe that there is always a solution to every difficult problem.				
9	I feel discouraged at times when things are done in a wrong way.				
10	I need to be encouraged sometimes to continue in works that initially excite me.				
11	I can easily cope with any situation				
12	I like to put in order what people have disorganised				
13	I have great determination to succeed in whatever I do.				
14	I easily get bored when things are always done in the same way.				
15	I am always willing to give my best when it comes to solving problems for people.				
16	I enjoy doing difficult and challenging jobs				
17	It does not worth it involving oneself in difficult tasks.				
18	I prefer to work independently				
19	Group work is usually interesting				
20	I am not easily satisfied with my speed or products.				
21	It is not necessary to bring out one's best skills when solving problems				

APPENDIX D

GIFTED CHILDREN EDUCATION SCREENING EXAMINATION PAPER 1

(MATHEMATICS AND QUANTITATIVE APTITUDE)

APPENDIX E

GIFTED CHILDREN EDUCATION SCREENING EXAMINATION PAPER 2

(ENGLISH LANGUAGE AND VERBAL APTITUDE)

APPENDIX F

TORRANCE TESTS OF CREATIVE THINKING (TTCT)

The first three activities will be based on the drawing below. These activities will give you a chance to see how good you are at asking questions to find out things that you don't know and in making guesses about possible causes and consequences of happenings. Look at the picture. What is happening? What can you tell for sure? What do you need to know to understand what is happening? What caused it to happen and what will be the result?

Activity 1. Asking: On this page, write out all of the questions you can think of about the picture on the page opposite this one. Ask all of the questions you would need to ask to know for sure what is happening. Do not ask questions which can be answered just by looking at the drawing. You can continue to look at the drawing as much as you want to.

1.----------

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Activity 2. Guessing Causes: In the spaces provided below, list as many possible causes as you can of the action shown in the picture on page 2. you may use things that might have happened just before the things that are happening in the picture, or something that happened a long time ago that made these things happen. Make as many guesses as you can. Don't be afraid to guess.

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Activity 3. Guessing Consequences: In the spaces below, list as many possibilities as you can of what might happen as a result of what is taking place in the picture on page 2. You may use things that might happen right afterwards or things that might happen as a result long afterwards in the future. Make as many guesses as you can. Don't be afraid to guess.

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Activity 4: Picture Construction

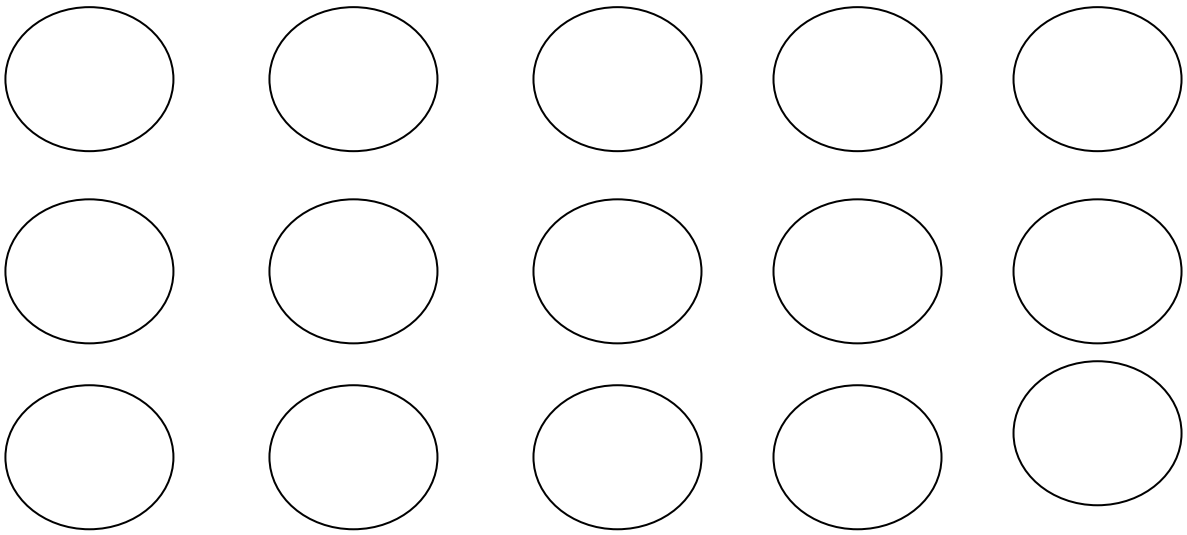
Below is a curved shape. Think of a picture or an object which you can draw with this shape as a part.

Try to think of a picture that no one else will think of. Keep adding new ideas to your first idea to make it tell as interesting and as exciting a story as you can.

When you have completed your picture, think of a name or title for it and write it at the bottom of the page in the space provided. Make your title as clever and unusual as possible. Use it to help tell your story.

YOUR TITLE:----------

Activity 5. Circles: In ten minutes see how many objects or pictures you can make from the circles below and on the next page. The circles should be the main part of whatever you make. With pencil or crayon add lines to the circles to complete your picture. You can place marks inside the circles, outside the circles, or both inside and outside the circles – wherever you want to in order to make your picture. Try to think of things that no one else will think of. Make as many different pictures or objects as you can and put as many ideas as you can in each one. Make them tell as complete and as interesting a story as you can. Add names or titles below the objects.



APPENDIX G

IBADAN TASK COMMITMENT/MOTIVATION SCALE (ITCMS)

APPENDIX H

MATHEMATICS ATTITUDE SCALE (MAS)

APPENDIX I

ITEM ANALYSIS FOR GAI -1

item No	NO IN UPPER GROUP U=180	NO IN LOWER GROUP L=180	ITEM DIFFICULTY INDEX P	DISCRIMINATION INDEX D
1	140	100	0.67	0.22
2	142	100	0.67	0.23
3	150	98	0.69	0.29
4	135	100	0.65	0.19
5	135	95	0.64	0.22
6	120	90	0.58	0.17
7	125	92	0.60	0.18
8	122	85	0.58	0.21
9	120	97	0.60	0.13
10	130	99	0.64	0.17
11	134	85	0.61	0.27
12	141	100	0.67	0.23
13	131	102	0.65	0.16
14	125	88	0.59	0.20
15	124	84	0.58	0.22
16	140	110	0.69	0.17
17	120	90	0.58	0.17
18	138	92	0.64	0.26
19	154	97	0.69	0.32
20	112	85	0.55	0.15
21	110	89	0.55	0.12
22	115	80	0.54	0.19
23	117	81	0.55	0.20
24	120	84	0.57	0.20

25	119	78	0.55	0.23
26	140	76	0.60	0.36
27	127	88	0.61	0.59
28	144	100	0.68	0.24
29	132	65	0.60	0.26
30	114	73	0.52	0.23
31	112	84	0.54	0.20
32	125	91	0.59	0.19
33	122	100	0.62	0.12
34	118	70	0.52	0.23
35	134	92	0.63	0.23
36	141	101	0.67	0.22
37	112	74	0.52	0.21
38	116	80	0.54	0.20
39	125	94	0.61	0.17
40	119	83	0.56	0.20

APPENDIX J

KEYS TO THE ABOVE AVERAGE ABILITY (GAI-I) TEST

1. D
2. A
3. C
4. D
5. C
6. B
7. A
8. B
9. C
9. C
10. C
11. A
12. D
13. D
14. C
15. D
16. A
17. B
18. C
19. B
20. C
21. C
22. B
23. E
24. C
25. A
26. C
27. D
28. B
29. C
30. A
31. E
32. C
33. D
34. D
35. E
36. A
37. B
38. E
39. A
40. C

APPENDIX K

KEYS: Gifted children's Screening Examination Paper 1

1	C	21	C	41	D	61	B
2	D	22	D	42	C	62	E
3	E	23	A	43	A	63	E
4	B	24	C	44	D	64	B
5	B	25	D	45	C	65	A
6	C	26	C	46	C	66	C
7	B	27	A	47	B	67	D
8	E	28	C	48	B	68	Bonus
9	A	29	B	49	D	69	Bonus
10	C	30	A	50	D	70	Bonus
11	E	31	C	51	D	71	Bonus
12	D	32	E	52	A	72	D
13	D	33	B	53	B	73	C
14	B	34	A	54	C	74	D
15	D	35	B	55	D	75	E
16	C	36	A	56	E	76	D
17	D	37	B	57	D	77	E
18	D	38	C	58	B	78	C
19	A	39	A	59	C	79	D
20	E	40	A	60	D	80	B

APPENDIX L

KEYS: Gifted Children's Screening Examination Paper 2

1	B	21	C	41	B	61	B
2	D	22	B	42	D	62	E
3	D	23	A	43	D	63	B
4	A	24	A	44	A	64	D
5	D	25	C	45	C	65	A
6	C	26	C	46	B	66	D
7	E	27	B	47	C	67	A
8	A	28	C	48	A	68	D
9	D	29	D	49	E	69	A
10	D	30	A	50	A	70	D
11	D	31	B	51	E	71	E
12	B	32	B	52	D	72	A
13	A	33	C	53	E	73	D
14	B	34	A	54	C	74	B
15	D	35	A	55	A	75	A
16	E	36	C	56	D	76	D
17	D	37	A	57	E	77	B
18	D	38	E	58	E	78	E
19	C	39	B	59	C	79	D
20	B	40	B	60	E	80	E

APPENDIX M

ASSISTANCE FOR RESEARCH PROJECT

APPENDIX N

RESEARCH PROJECT
SCHOOL OF POST GRADUATE SCHOOL
UNIVERSITY OF LAGOS, AKOKA – LAGOS

_____
_____
_____

Dear Sir/Madam,

Appointment as part-time Research Assistance

Sequel to our earlier discussion on the above subject matter, I am delighted to inform you that you have been appointed a part-time Research Assistant to the above named research project.

Your duties include:

1. Assist the principal Researcher in the administration and collection of research instruments
2. Assisting in the collation of data generated
3. Assisting in scoring the instruments
4. Any other duty as may be directed by the principal researcher.

You shall be adequately remunerated.

The study is expected to last for three consecutive days. Traveling allowance is guaranteed.
A training session will be organized to acquaint you with the research procedure and methodology.
If you accept this offer, please endorse the attached duplicate copy and send same to the undersigned within three weeks from the receipt of this letter.

Congratulations.
Yours faithfully,
Anya Chidimma (Mrs.)

APPENDIX O

APPLICATION FOR THE PURCHASE OF TORRANCE TESTS OF CREATIVITY THINKING

APPENDIX P

GIFTEDNESS ASSESSMENT INSTRUMENT (GAI)

USER'S MANUAL

The GAI was developed and validated for the use of teachers, counsellors and professionals in Nigeria after several research works on the theories and characteristics of giftedness. It is a combination of three distinctive components of giftedness namely above average/cognitive ability test (GAI-1), creative ability test (GAI-2) and task commitment/motivation scale (GAI-3). The authors believe that the possession of high scores on this ability put together make a child gifted.

Author: Anya, Chidimma Adamma
Supervised by: Dr. I.P. Nwadinigwe
Dr. Ilogu G. C.
Department of Educational Foundations
University of Lagos, Nigeria

No. 1: April 2010

To measure:

(a) Cognitive/intellectual ability

(b) Creative ability

(c) Task commitment/motivation scale.

Description

Above average ability (GAI-1). The 40 item aptitude test designed to assess the cognitive ability of the pupils. It consists of 10 subscales of giftedness which are:

- **Verbal reasoning:** Measures language skills.
- **Abstract reasoning:** Measures skills for inductive and deductive reasoning, concept evaluation, memory and cognition as well as logical reasoning.
- **Numerical reasoning**: Measures numerical or computation abilities such as mathematical skills like addition, subtraction, division, multiplication, fraction and percentages.

- **Mechanical reasoning**: Measures the dexterical; specific areas like construction of objects, operations, placement and turning transformation and tools maintenance.
- **Spatial reasoning**: Measures ability to judge the positions and sizes of objects.
- **Spelling:** Ability to indicate whether a word is spelled correctly or incorrectly.
- **Similarities:** Measures ability to show how two or more words are the same.
- **Picture completion:** Measures ability to dictate any missing part of an object.
- **Reasoning analogy:** Perceiving relationships among forms or objects.
- **Serial reasoning:** Ability to present numbers or objects in sequence.

Creative ability Test (GAI-2): This second component of GAI also called divergent thinking or creative thinking abilities is designed to measure general mental abilities commonly presumed to be brought into play in creative achievements (Torrance, 1998). It comprises of six tasks involving the pupils to write questions, draw and give a title to their drawings and different uses of objects.

Task Commitment/Motivation scale (GAI-3): This comprises of a 21-item attitude inventory designed to measure the pupil's motivational competent in pursuing a task. As a measure of aspect of giftedness, GAI-3 consists of 8 attributes:

Interest: tendency to know more, the feeling that one has when one wants to know or learn about something.

Enthusiasm: Strong feeling of excitement and interest in something and a desire to become involved.

Endurance: The ability to continue doing something painful or difficult for a long period of time without complaining.

Determination: The quality that makes one continue trying to do something even when it is difficult.

Fascination: A very strong attraction that makes something very interesting.

Perseverance: The quality of continuing to try to achieve a particular aim despite difficulties.

Self-Confidence: Quality to believe on oneself

Drive to achieve: Inner will to succeed against all odds.

SCORING

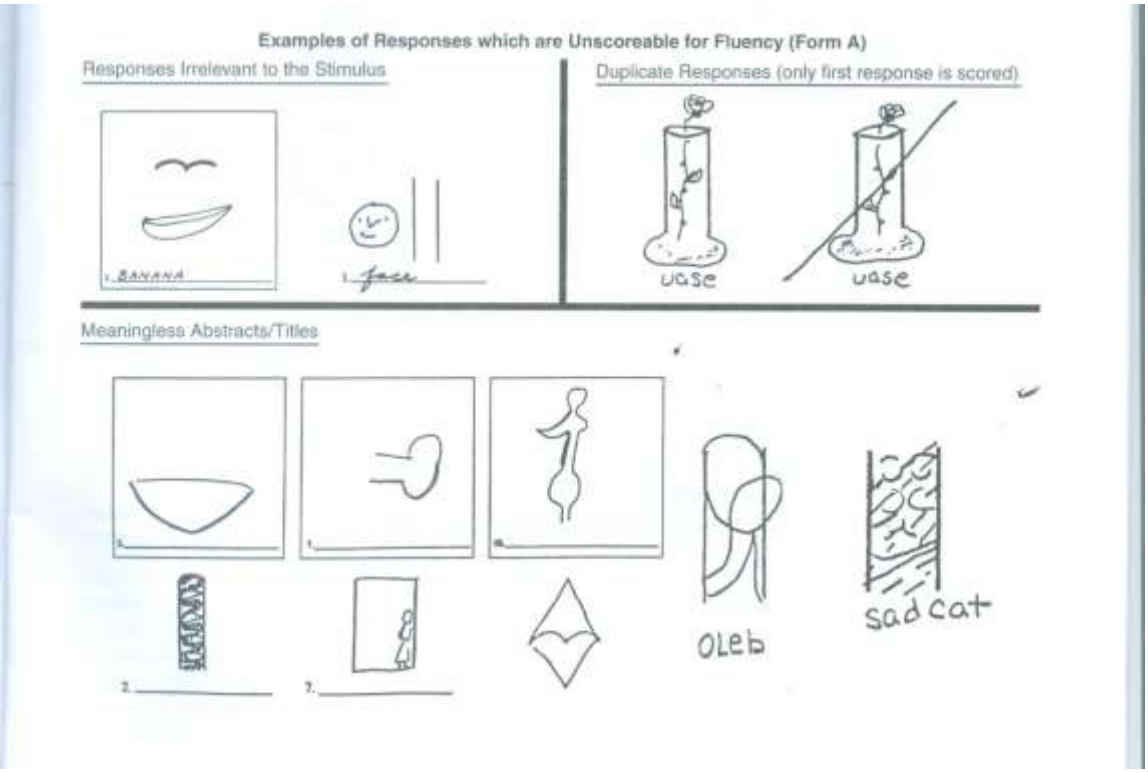
For GAI-1: There is no special rule the overall score is 40 marks and each question carries 1 point for every correct answer. The higher the score, the higher the possession of above average ability.

The scoring of GAI-2 is based on five norm referenced measures of creative factors namely; fluency, flexibility, originality, elaboration, abstractness of title, and resistance to premature closure.

Fluency is the total number of relevant interpretable, different unusual uses, meaningful and relevant responses to the stimulus or object. 1 point is given to each answer provided by the examinee. A list of irrelevant questions, statements, words or stimulus, unreasonable responses, uninterpretable drawings with titles, incomplete figures and alphabets which are scored zero are provided below:-

- Does the boy have a hat?
- Is he standing up?
- Are his ears long?
- The boy got up and washed his face
- Then he ate breakfast and going school
- He went to school and did his lessons
- They boy went home and played with his sister
- Then he had his dinner
- Then he went to sleep.
- Use it to make human beings
- Use it to build houses.

- Use it to make aeroplane
- Use it to cook or fry
- Irrelevant stimulus e.g banana, sad cat,etc.



Flexibility is scored by the variety of categories of relevant responses using the numbered flexibility categories provided below. 1 point is given for each category used. No credit is given if a category is repeated. It is scored for activities, 1-4 only.

For activities 1-4, using the numbered flexibility categories given, classify each response and record its category number on the scoring worksheet. If a response does not fit any of the given categories, add categories X1, X2 etc as such response occur.

Flexibility Categories – Activity 1

1. **CHARACTER IN PICTURE, includes queries to determine the physical description of the figure both externally and internally, NOT emotional, NOT clothing (see separate categories).**
   Why are his ears so large?
   Why are his ears pointed?
   How big is he?
   Is it a he or a she?
   Does he own a boat?

2. **CHARACTER OUTSIDE PICTURE, physically and temporally (does NOT include family)** Who forced him to look into the water?
   Has he told anyone where he is?
   Do people make fun of him? .
   Did someone send him?

3. **COSTUME, CLOTHES IN GENERAL**
   Why does he dress this way?
   What colour are his clothes?
   Is he dressed like others in his country?

4. **COSTUME, SPECIFIC ITEMS OF APPAREL** What is that thing on his hat?
   Does he have striped pants?
   What colour is his shirt?
   Why are his shoes pointed?

5. **EMOTIONS, includes actions and reactions,**
   thinking, personality, etc.
   Is he happy?
   What is he thinking about?
   Does he like what he sees?

6. **ETHNIC FACTORS, includes race, religion,**
   language, etc.
   Is he real? (Is he a human being?)

9. **MAGIC, includes magical, mystic powers**
   of figure and/or his surroundings.
   Does he perform magic?

10. **OCCUPATION, includes job, people, or organizations for which he works.**
    What does he do for a living?
    Is he a clown?
    Is he doing this as part of an act?

11. **PHYSICAL ACTION IN PICTURE**
    Is he looking for something in the water?
    Why is he kneeling on the ground?
    Is he going to fall in?
    Is he getting drunk?

12. **PHYSICAL ACTION OUTSIDE PICTURE**
    Did he steal something and come here to find it?
    Will he be punished for getting wet?

13. **PHYSICAL CHARACTERISTICS OF OBJECTS OR SITUATION**
    Is there a boat nearby?
    Is something making sounds go through the water?

14. **PHYSICAL CHARACTERISTICS OF THE SETTING, includes descriptions of landscape,**
    reflective surface, underwater, etc.
    Is it a lake?
    Is that grass under him? Is it muddy?

15. **TIME**
    When did this take place?
    How long has he been here?
    What time of day is it?

16. **WEATHER, NATURAL DISASTER**
    Did an earthquake make him fall down?
    Is it about to rain?

Is he from another planet? What language does he speak? 7. **FAMILY, includes relatives, immediate and distant; friends; questions about home.** Does he have a family? Where does he live? 8. **LOCATION, includes setting of the figure and the situation.** In what country is this taking place? Why is he here? Is this on another planet?	17. **WHOLE PICTURE, includes questions about the artist, the picture as a whole, etc.** Who painted the picture? What kind of story was the artist trying to tell? Where did the artist live? How many years ago was the picture painted?

Flexibility Categories – Activity 2

1. **CHARACTERS IN PICTURE, ideas about brought about by figure's physical**
   - He is hot.
   - He sprained his ankle.
   - He is trying to shrink his ears.
2. **CHARACTERS OUTSIDE PICTURE, people and animals, except family.**
   - He is supposed to meet someone there.
   - Someone had told him that he had changed and he's checking to see if he has.
   - He is meeting some friends (girl, mermaid,
3. **COSTUME, CLOTHES IN GENERAL, not items of clothing.**
   - He wanted to see his new costume.
   - He is washing his clothes.
   - He is checking on his costume for a play.
4. **COSTUME, SPECIFIC ITEMS OF APPAREL**
   - He wanted to see if his hat was on straight.
   - He got his pants dirty and is going to wash
   - He is trying to bend the toes of his shoes.
5. **EMOTIONAL, psychological, mental**
   - He has always been vain and likes to himself.
   - He is happy.
   - He is dreaming about his wife.
6. **ETHNIC, includes questions about race, language.**
9. **MAGIC**
   - He is trying to break a spell.
   - He turned into an elf from a boy.
   - The water will keep him young.
10. **OCCUPATION, causation attributed he was in.**
    - He is an actor rehearsing for a play.
    - He is doing a special job for his
    - He escaped from a circus.
11. **PHYSICAL ACTION IN PICTURE**
    - He slipped and fell.
    - He is counting the ripples.
    - He is looking for fish.
12. **PHYSICAL ACTION OUTSIDE**
    - Someone is sending him a message through the water.
    - The police are pursuing him.
    - His mother punished him.
13. **PHYSICAL CHARACTERISTICS OF OBJECTS OR SITUATION**
    - The sun was very hot.
    - There were strange sounds.
    - His toy submarine in the water won't
14. **SETTING, factors associated with the natural landscape.**
    - He was attracted here by the flowers.
    - The muddy bank made him slip.

The waters are sacred.
He is worshipping a god.
He is performing a ritual.

7. **FAMILIAL CAUSES**
He is bringing water home.
He was thrown out of his home.
He has pushed his little brother in.

8. **LOCATION, includes causation related to is, was, or will be**
He is lost in the woods.
It is a famous place to visit.
He just arrived from Mars and is
The water looks strange.

15. **TIME**
It was a long time ago and people like this then.
It was the first day of spring and he felt

16. **WEATHER, NATURAL DISASTER**
He is trying to get away from the
It is a hot day and he is trying to cool

Flexibility Categories – Activity 3

1. **CHARACTER IN PICTURE**
He'll get wet.
He'll catch a cold.
He exploded from drinking too much.

2. **CHARACTER OUTSIDE PICTURE**
Somebody will slip up behind him and him in.
He will meet his friends.
A bee might sting him.

3. **COSTUME, CLOTHES IN GENERAL**
He might get his new clothes soiled.
He has to wash his clothes.
He may get ants in his clothes.

4. **COSTUME, SPECIFIC ITEMS OF**
His hat will fall off.
He will get grass stains on his pants.-
He might lose his shirt.
His shoes got dirty.

5. **EMOTIONS**
He breaks out crying because he is so
He screamed when he saw his
He went home happy because he

6. **ETHNIC FACTORS**
He loses his faith.
He could turn into another race.
He jumps in after his god.

7. FAMILY
He'll go home late.
His family will die of poisoned fish.
His brother will push him in.

8. **LOCATION**
He will become lost.

9. MAGIC
He finds it's not a magic well.
He is going to have bad luck for reflection.

10. **OCCUPATION**
He became a fisherman.
He will become a great poet and the water.

11. **PHYSICAL ACTION IN PICTURE**
He'll go swimming.
He will catch a frog.
He'll lie on the bank and rest.

12. **PHYSICAL ACTION OUTSIDE**
He will be punished for leaving his
He will build a boat and sail away.
He will show his classmates the found in the water.

13. **PHYSICAL CHARACTERISTICS OF OBJECTS**
He will destroy the toy boat he
He will put up a sign advertising the
A poison in the lake will kill the fish.

14. **SETTING**
He will make a better path to the
The beauty of the flowers will to write a poem or paint.

15. **TIME**
He didn't notice the time and
It's the end of his trip.
He stayed by the pond for three

16. **WEATHER, NATURAL DISASTER**
It will start to rain.

He will return to his home planet. He likes the pond so well, he'll build a nearby.	He will get hit by lightning.

Flexibility categories – Activity 4

1. **TOY:** Children Play With It
2. **ANIMAL SHELTER:** Snail cage, pen, stall for animals
3. **BUILDINGS:** Playhouse, Huts, block enemy view
4. **ECOLOGICAL USES:** To recycle, to melt and use again
5. **COSTUME:** Make shoes, bags, watch, ladies belts
6. **GROWING:** Flower holder, trees
7. **DESTRUCTION:** Put in garbage, throw away
8. **SCIENTIFIC:** Burn to drive away insects
9. **WEAPONS:** Burn a thief
10. **SUPPORT:** Support telephone umbrella, water drums etc.
11. **PATTERN**: Make catapult,
12. **CONSTRUCTION USES:** repair spoilt tyres, block drainages etc.

Originality: For activity 1-4, 1 point is given only when a response is given fluency credit. No credit is given if a response is repeated.

For activity 5 and 6, originality is based upon the statistical infrequency and unusualness of the responses. Bonus credit is given for combining two or more figures into a single image. In making the evaluation for originality, focus must be placed on the use of the stimulus (incomplete figure or pair of lines) rather than the title. 1 point is credited to each response. A list of responses which score 0 originality points are provided.

Zero-Originality Responses –Activity 1

Responses	Flexibility Category	Responses	Flexibility Categor
Colour, what colour is he?	6	Looking for something, is he?	11
Doing, what is he?	11	Looking for, what is he?	11
Dressed, how is he?	3	Looking in the water, is he?	11
Drink water, will he/does he want	11	Looking in the water, why is	5
Ears, why does he have pointed?	1	Lying down, is the boy near	11
Elf, is he an?	6	Name, what is his?	1
Falling down, is he/has he fallen	11	Old/age, how old is he/what is	1
Fall in, will he/is he falling in?	11	Pointed ears, why does he	1
		Reflection, is he looking at his?	11
Gold, is he looking for?	11	Sad, why is he so?	5
Happening, what is?	11	See himself, can he?	11
Happy, why is he so?	5	Shoes, why are his	4
Hat, is that a?	4	Shoes, why are his like an	4
Hat, why does he have on a?	4	Shoes, is he wearing?	4
		Shoes, why does he wear such	4
Himself, can the boy see?	11	Sick, is he?	1
Home, where is his?	7	Stream, is it a?	14
Kind of clothes, what is he	3	Water, where is the?	8
Kind of hat, what is he wearing?	4	Water, will he slip and fall into	11
Lake/pond/pool/river/sea/stream,	14	Wearing, what is he?	4
Look like, what does he?	1	What is he looking at/for?	11
Looking at the reflection, why is	5	Where is he?	8
Looking for, is he for under the water?	11	Who/what is he?	1

Zero-Originality Responses – Activity 2

Responses		**Responses**	
Flexibility		**Flexibility**	
Category		**Category**	
Clothes, he put on his	3	Mud, he fell in the	14
Drink of water, he came for	11	Playing, he is/was	11
Dropped/threw coins/rocks/money something into the water	11	Resting, he is	1
Face/hair/hands, he wants to wash	1	Shirt, he put on the	4
Fell down, he on the ground	11	Shirt, his was white	4
Forest, he is at the edge of	8	Shoes, the boy put on his	4
Grass is green	14	Swimming, he wanted to go	11/14
Himself, he is looking at	11	Thirsty, he is/was	1
Image, he is interested in seeing his	5	Watching for fish/frog/life/rocks/shell	11
Image, the water reflected his	14	something/treasure/turtle in/under the water	
Look at himself, he likes to	5		
Looking at/for his reflection	11		
Looking for/at fish/frog/life/rocks/shells something/treasure/turtle in/under the water, he is	11	Water, he is looking into the	11
		Water, he wanted some	5

Zero-Originality Responses – Activity 3

Responses	Flexibility Category	Responses	Flexibility Category
Catch frog/fish/turtle, he will/is going	11	Look for fish/frog/gold/turtle/watch, he	11
Clothes dirty, he will get his	3	Married, he will get	7
Clothes, his will get wet	3	Mother might/will call him	7
Clouds may form	16		
Cold, he will catch a	1	Nose, a fish might bite his	13
Dirty, he will get his clothes	3	Old age, he will die of	11
Drink of water, he will/might get a	11	Ripples in the water will	14
Drop something, he might/will	11	See himself in the water, he will	14
Eat frog/fish/turtle, he will/is going	11	Someone may/will push him in	2
Fall into the water, he will/is going	11	Something, he may/will catch	11
Family, he will get married and	7	Swimming, he will go in	11
Freeze up, the water will	14	Treasure, he might/will find a	13
Go home, he will	7	Trouble, he will get into	12
Grass stain on his clothes, he will	3	Wet, he will get	1
Happy, he will be	5		
Himself, he will see in the water	4		
Home, he will go	7		

Zero-Originality Responses – Activity 4

Responses Flexibility Category	Responses Flexibility Category

Play with it	1	Make shoes/slippers	5
Rear snail	2	Make bags	5
Flower holder	6	Burn a thief	9
Burn to kill insect	8	Prevent erosion	12
Demarcate roads	3	Support telephone umbrella	12
Build cages	2	Stand water drums	12
Make catapult	11	Make handles of tools e.g cutlass,	
Repair spoilt tyres	12	knives	5
Support plants	10	Indicate danger	12
Plant flower	6	Block drainage	12
Build huts/shelters for animals	2	Block enemy view during war	2
To cook burn to see in the nights	8	Put in garbage, throw away etc	7

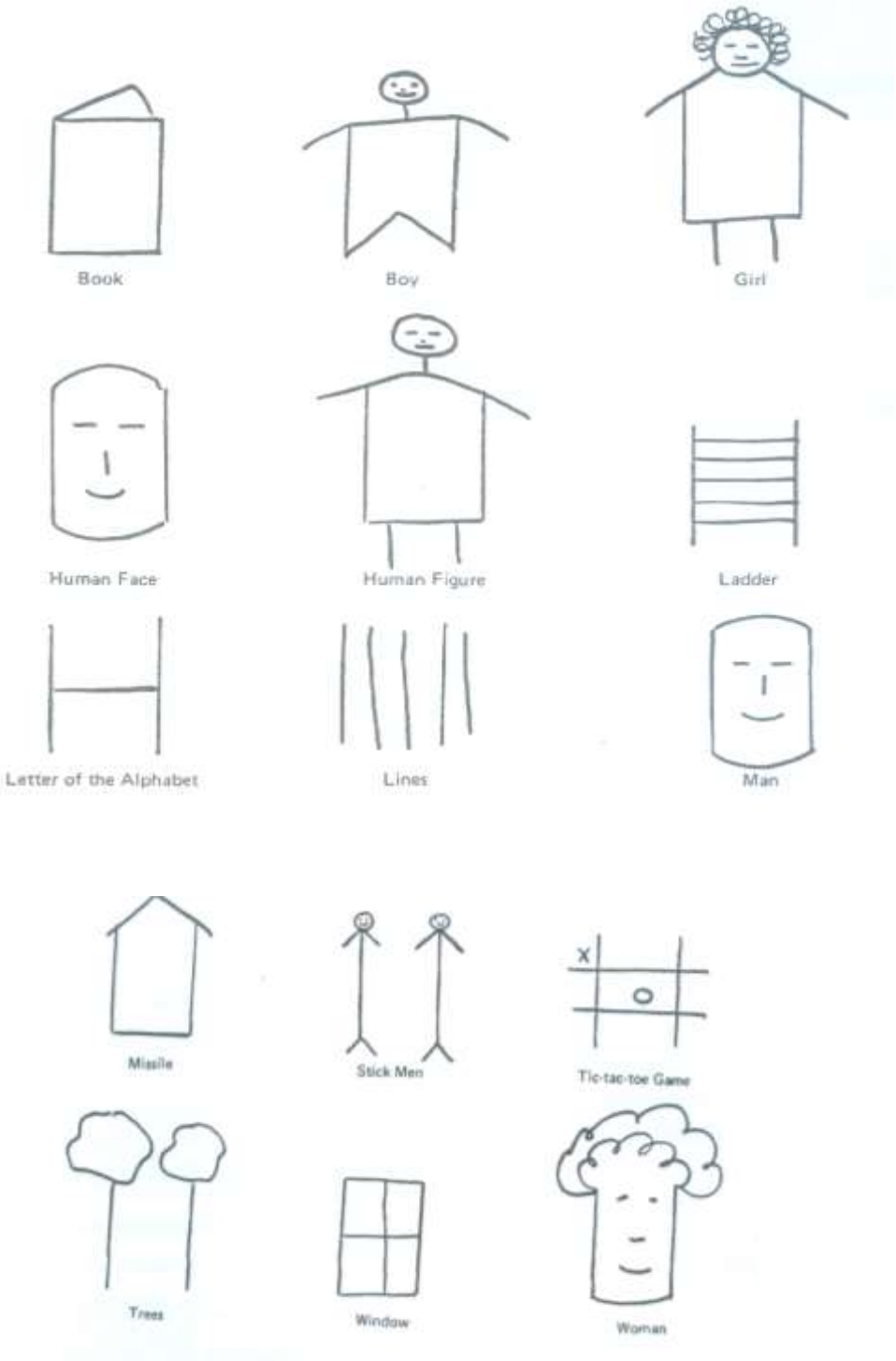
Zero-Originality Responses – Activity 5 and 6

Animal	thumb
Banana	hand
House	Hot dog
Bowl or dish	finger
Nose	Numerals
Knife	arm
Leg	letters of the alphabets
Egg	Hat
Sausage	shoe
Human face	ladder
Geometric figure	Rail/road tracks
Rectangle	duck
Street	flower
Road	leaf/leaves
Highway	Box
Kite	flag
Multiplication sign (X)	boot
Window	Book
Snail	door
Snake	ladder
Bird	picture frame
Gift	Tree

Elaboration: Credit is given for each pertinent detail (idea, piece of information, etc) added to any original stimulus figure, its boundaries and its surrounding space. Additional 1 point is given for decoration, colour, when it

adds an idea to the basic response; deliberate shading, variation in design which is meaningful. It is scored for activity 5 and 6.

Examples of Responses which Score 0 Elaboration Points



Elaboration is also scored according to the scale provided below signifying the scores to be given for each category of details provided by the participant.

Elaboration (circle appropriately number 1-6)

Act. 5:	**1(0-5)**	**2 (6-12)**	**3(13-19**	**4(20-26)**	**5(27-33)**	**6(34+)**
Act. 6:	**1 (0-8)**	**2(9-17)**	**3(18-28)**	**4(29-39)**	**5(40-50)**	**6(51+)**

Abstractness of Titles

This score relates to the participants synthesizing and organizing processes of thinking. At the highest level, there is the ability to capture the essence of the information involved to know what is important, enabling the viewer to see the picture more deeply and richly. The titles produced in activities 5 and 6 are scored in an attempt to represent this quality of person's thinking. The titles are evaluated on a scale ranging from 0 - 3 according to the criteria described below;

Score	**Criteria**
0	Obvious class or generic title, such as man, hat, duck, mountains etc
1	Simple descriptive title at a concrete level involving a modifier plus a class such as man with big ear, a dangerous dog, a happy boy, flying kite etc.
2	Imaginative, descriptive title in which the modifier goes beyond a concrete physical description as titles which reveal the feelings or thoughts of the person or object such as; "the dog named king/queen, your teacher sees all, I want more hair on top" etc.
3	Abstract but appropriate title capturing the essence of the picture, going beyond what is seen and telling a story, such as "time of your life; sweetheart's quarrel, hello, "unwanted" etc.

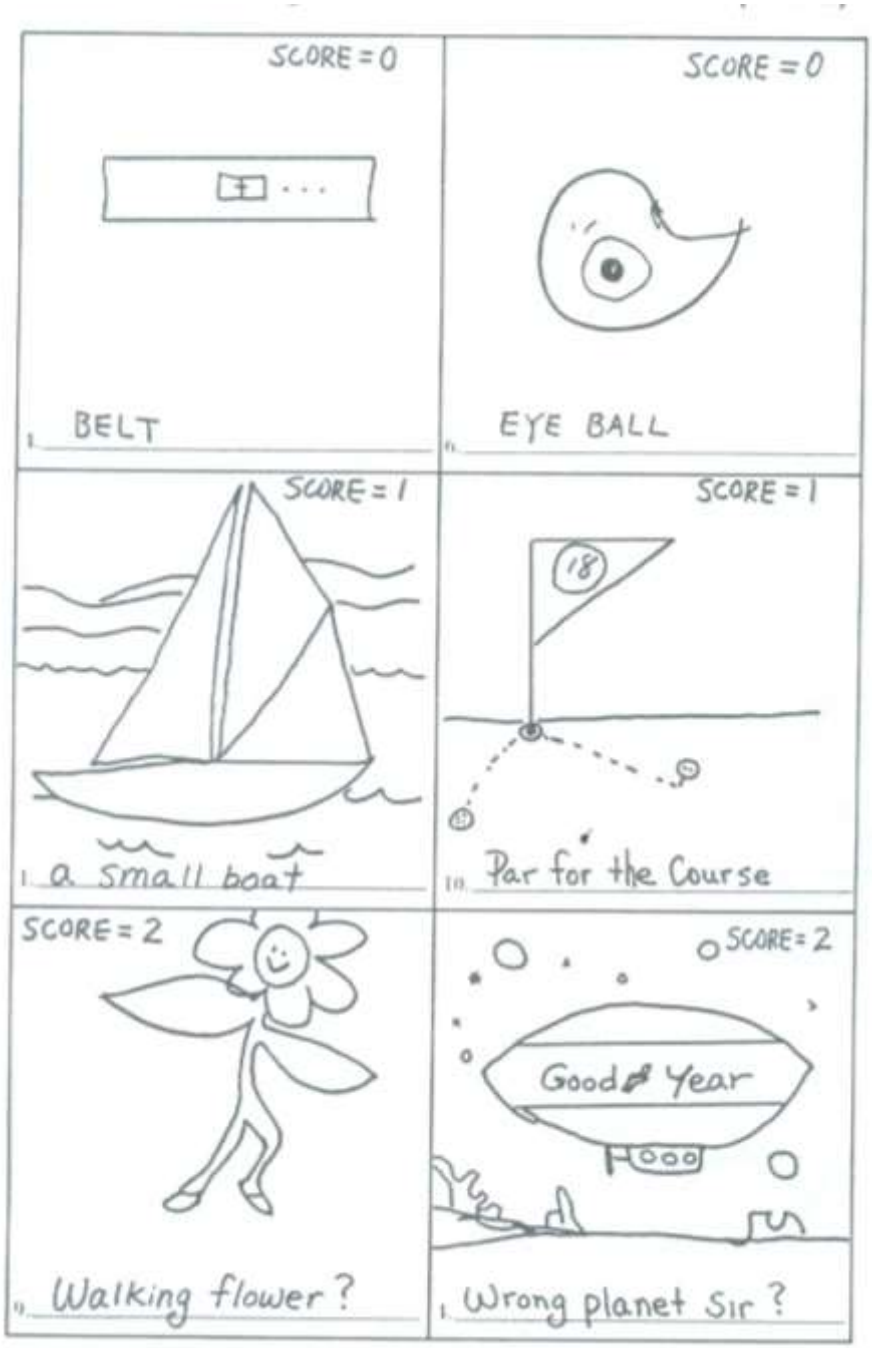
The score are recorded in the blanks for titles and summed:

Scoring for Resistance to Premature Closure (Activity 5). The basis of this score is a person's ability to keep open and delay closure long enough to make the mental leap that makes possible original ideas. Less creative persons tend to leap to conclusions prematurely without considering the availability of

information, cutting off chances of more powerful original images. In responding to activity 5, such people close the incomplete figures immediately with straight or curved lines, cutting off chances of more powerful, original images. Each response is evaluated according to the following scale.

Score	**Criteria**
0	The figure is closed by one of the quickest easiest, most direct routes with a straight line, simple curved line, solid shading or colouring, letters of the alphabets and numerals are also scored 0.
1	There is closure but the picture goes beyond the simple closing of the incomplete figures. The respondents may make a quick, direct closure and then add details outside of the enclosure.
2	Closure is never completed or is completed with irregular lines which form part of the picture rather than with straight lines or simple curved lines. Below are examples of scoring resistance to premature closure.

Examples of scoring resistance to premature closure



Task commitment/Motivation Scale (GAI-3)

There is direct and reverse scoring of the items. The total score was obtained by reversing the values of items 2, 4,7,9,10,14,17,19,21 and using direct scoring for the remaining items. The sum of the reverse and the direct score of the items

gave a participant's overall score in GAI-3, with higher scores indicating task commitment ability.

Administration

GAI should be administered in groups after establishing adequate rapport and ensuring that enough spacing is provided for the participants to avoid cheating. Please read the instructions to them and ensure they follow the instructions provided. The time limit for GAI-1 is 20 minutes, GAI-2 is 60 minutes and for GAI-3 there is no time limit.

Psychometric Properties

Norms: The norms reported here are the mean and standard deviation scores obtained using a sample of 600 primary six pupils from Lagos State Educational Districts (Public/Private Schools) with mean age of 10 years.

Overall GAI (GAI-1: Mean = 20.54, Sd=5.40

GAI-2: Mean 82.01, Sd 32.34

GAI-3: Mean 55.15, Sd 7.70

Reliability: The test developers reported a 2-week test retest, Cronbach's alpha and split-half reliability coefficients ranging from 0.71 to 0.91 for the three sub components.

Validity: The developers reported that GAI has adequate coefficients of concurrent and divergent validity with some standardized measures like GCSE – 1 & 2, TTCT, ITCMS and MAS. Also a factor analysis of the instrument resulted to the independent attributes.

Interpretations

The Nigerian norms or mean scores are the basis for interpreting the
Scores of participants. The test scores which were also transformed to standard scores (T-score) can also be used for further explanation.

SCORE SUMMARY TABLE FOR GAI -2

	FLU.	FLEX.	ORIG.	ELAB.	ABSTR.OF TITLE	RESIS. TO PREMTR. CLOSURE	
Act. 1							
Act. 2							
Act. 3							
Act. 4							
Act. 5							
Act. 6							
Total							**Average Score**
Standard Score							

COMMENTS:

References

Renzulli, J.S. (2005). The three-ring conception of giftedness: A developmental model for creative productivity. In R.J. Sternberg and J.E. Davidson (Eds.) *Conceptions of giftedness.* 53-92, New York: Cambridge University press.

Torrance, E.P (2008). *Torrance test of creative thinking*. Illinois: Scholastic testing service.