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Comparative Analysis of Intelligence of Twins in Public Secondary Schools in South-South, Nigeria

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Abstract

The purpose of the study was to carry out a comparative study of intelligence of monozygotic and dizygotic twins in public secondary school in south-south, Nigeria. The ex-post facto research design was adopted for the study. Subjects were selected using stratified and purposive sampling techniques. Relevant data for the study was collected from twins club Calabar, Uyo, Port Harcourt, Bayelsa and Delta States. The data collected were summarized and analyzed using descriptive (mean and standard deviation) and inferential statistics (independent t-test). Results of the findings revealed that; first and second monozygotic twins do not differ significantly in their intelligence as (t-cal=1.77; t-cri=1.994: P>.05), first and second dizygotic twins do not differ significantly in their intelligence as (t-cal=1.15; t-cri=1.994: P>.05). It was recommended among others that teachers as mediators and role models of learning in secondary schools should be properly trained on how to teach students to think analytically, strategically, and to understand and elaborate more efficiently concepts presented in classes and also learning better. Intelligence testing should be incorporated in secondary schools at both junior and senior secondary schools in Nigeria. Intelligence testing should be reconsidered by curriculum planners in the curriculum implementation in Nigeria.

Keywords: *Comparative Analysis, Intelligence, Mathematics achievement, Monozygotic and Dizygotic Twins .*

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Background to the Study

Over the years researchers have focused on trying to explain the causes of intelligence and its origin at various points in history. Psychological theorists have suggested that twin intelligence is primarily an inherited quality (that is biological and genetic, and inherited from one's parents) or primarily influenced by environment (e.g., something influenced by school and parental teachings and by exposure to life experiences and opportunities). Some researchers agree that genes contribute more to intelligence than environment while others are of the opinion that environment plays dominant role in the development of intelligence. No wonder the National Policy on Teacher Education (2009) is the training of the mind in the understanding of the world around and the acquisition of appropriate skills, ability and competence, both mental and physical, to help the individual contribute to the society. These can only be actualized maximally only when due attention is given to the learners' intelligence.

The word "intelligence" comes from the Latin verb intelligence, which means "to understand". By this rationale, intelligence (as understanding) is arguably different from being "Smart". A report of Gardner, (2006) sees intelligence as an umbrella term used to describe a property of the mind that encompasses many related abilities such as capacities to reason, plan, solve problems, think abstractly, comprehend ideas, use language, and to learn. Intelligence may include traits such as creativity, personality, character, knowledge or wisdom. Sternberg (2001) defined intelligence as mental activity directed toward purposive adaptation, selection and shaping of real-world environments relevant to one's life. Sternberg's definition shows that intelligence is broader than a single, general ability (individual talents). His definition shows that intelligence has three different factors namely: analytic, creative and practical skills. Analytical intelligence refers to problem solving abilities of the learners, creative intelligence involves the ability to deal with new situations using past experience and current skills, while practical intelligence refers to the ability to adapt to a changing environment.

Feldman, (2000) observed that the brain actually forms new connections every time you learn something new, which makes the child smarter in his/her level of understanding new concepts. It is a very useful variable with a powerful effect on twins' academic achievement. This is because an intelligent person is a creative person and can meet the problems of life through his divergent thinking. A highly intelligent person is nonetheless an intellectual leader with a great sensitivity to problems. He exhibits a high degree of self-assurance and autonomy, he is dominant and is relatively free of internal restraints and inhibitions with a considerable range of intellectual interest and shows a strong preference for complexity and challenge in the environment. A pertinent question is when a particular twin (student) achieves tremendous academic success, does he/she do so because he/she is genetically predisposed to be successful or is it a result of an enriched environment. Why are two set of twins not always similar in their intelligence quotient in school? Are these differences genetically or environmentally? It becomes significant to delve into finding out the root causes of this differences in twins' intelligence to meet with the demands of the gifted children.

Twins are of different categories namely monozygotic, dizyzotic, parasitic twins, conjoint twins but the present research study is concerned with; monozygotic and dizygotic twins this is because these are the commonest set of twins in Cross River State. Monozygotic or identical twins (MZ) occur when a single egg, fertilized by a single sperm, splits into two identical halves. In most cases they are always of the same sex and blood (Plomin, DeFries, Knopik & Neiderhiser, 2012). The split will most often take place within the first few days. But, here are some interesting facts; identical twins can be strikingly similar in their appearance, but this may change due to environmental factors and not genetics alone. Many identical twins are relatively easy to tell apart. Personal interactions with medical practitioner shows that indeed, majority of parents of twins will resort to twin Deoxyribonucleic acid (DNA) testing, for Twin Zygosity Testing which is a nucleic acid test that contains the genetic instructions used in the development and functioning of all known living organisms**.** This will determine if twins are identical or fraternal with overwhelming accuracy. This DNA testing for twin zygosity is easily done by taking swabs from the mouths of each twin and then sending to a laboratory for analysis.

According to Jang, McCrae, Angleitner, Riemann and Livesley (2002) dizygotic or fraternal twins (DZ) occur when two separate eggs are fertilized by two separate sperms. Two separate babies with no more in common than twins born at different times are formed. Fraternal twins can never be of the same sex. However situation may occur where they are the same sex but hardly share the same blood group and resemblance. They always have separate placentas, but their placentas may fuse together during the course of pregnancy and appear as one at birth. This implies that, fraternal twins can never share the same amnion. In almost all cases they are of different sex or have different blood types and are actually the most common type of twinning. Fraternal twins come about due to hyper-ovulation (releasing two or more eggs at one time). Observation has also shown that it is common to have several sets of fraternal twins throughout many generations in one family.

Intelligence is a very useful variable with a powerful effect on twins' academic achievement. This is because an intelligent person is a creative person and can meet the problems of life through his divergent thinking. A highly intelligent person (creative person) is nonetheless an intellectual leader with a great sensitivity to problems. He exhibits a high degree of self-assurance and autonomy. He is dominant and is relatively free of internal restraints and inhibitions with a considerable range of intellectual interest and shows a strong preference to complexity and challenge in the environment. It is on the basis of the backdrop that a comparative analysis of intelligence of twins was carried out in Public secondary schools in south-south, Nigeria.

Statement of the Problem

The curiosity that prompted the researcher to carry out this study was his visit to the yearly promotional debate by Promasidor Nigeria Limited (Makers of Cowbell Milk) on intelligence testing of monozygotic and dizygotic twins in south-south Nigeria. The debate showed an astonishing revelation of which first monozygotic (identical) twins performed intelligently high with exactly similar scores to that of their second monozygotic twins but the same result could not be replicated by their dizygotic counterparts as second dizygotic twins perform far better than the first dizygotic twins in the standardized Wide Range Intelligence test administered to them.

These discrepancies in the intelligence of monozygotic and dizygotic twins constituted a great source of concern to the researcher and scholars in the debate who have the notion of nature and nurture as the maxim and the guiding philosophy in the intelligence. It becomes worrisome that their level of intelligence has no similarity. It is therefore necessary to interrupt the ugly trend of differences in intelligence among twins (students) by developing and enhancing their intellectual skills which have been observed to be one of the major determinants of academic achievement. The problem of this study put in a sentence is: What is the comparative analysis of intelligence of twins in public secondary schools in south-south, Nigeria.

Purpose of the Study

The purpose of this study was to:

1. Compare the intelligence of first and second monozygotic twins
2. Find out the difference in the intelligence of first and second dizygotic twins

Research Questions

The following research questions were generated to guide this study:

1. What is the difference between first and second monozygotic twins in terms of their intelligence?
2. What is the difference between first and second dizygotic twins in terms of their intelligence?

Statement of Hypotheses

The following hypotheses were formulated to serve as a guide to this study.

1. First and second monozygotic twins do not differ significantly in their mean score on intelligence
2. First and second dizygotic twins do not differ significantly in their mean score on intelligence

Literature Review

Literature review was carried out based on the variables inherent in the study, thus:

Intelligence of First and Second Monozygotic Twins

There have been few studies that state that birth order of twins plays a vital part in their intelligence and that the first born will typically have a higher intelligence than the rest of their second siblings. The trend continues down the line with the difference approaching zero with the more children born into a family (Clark & Rice, 2002).

In a comparative study by Clark and Rice, (2002) on intelligence of first and second monozygotic (identical) twins using a sample of size of 120 twins in California to get a sense of how strongly their intelligence differs. Four hypotheses were formulated and tested at 0.05 levels of significant, stratified and purposive samplings were used. A well validated culture fair intelligence test was adopted in the study. The statistical analyses used were Pearson's Product Moment correlation co-efficient and simple regression analysis. the findings revealed that monozygotic twins begin as a single fertilized egg which then separates, they

are genetically equivalent human beings as such they share similar intellectual capabilities. According to De-Lint, (2006) who conducted a study in United States of American using 89 identical twins, the thrust of the study was to compare intelligence and Mathematics performance, two hypotheses were tested at .01 and .05 alpha levels, stratified, accidental and purposive samplings were used. An adapted instrument tagged the R. B Cattell and Cattell culture fair intelligence test was used in the study. The statistical analyses used were Pearson's Product Moment correlation co-efficient and simple regression analysis. The findings revealed that twins' intelligence is one of psychology's greatest achievements and one of its most controversial. Their study further found that no single test can capture the complexity of human intelligence, all measurement of twins' intelligence is imperfect, no single measure is completely free from cultural bias, and there is the potential for misuse of scores on tests of intelligence among twins hence, differences of twin intelligence will likely occur due to this misuse of scores. There is some merit to all these criticisms. But we would counter that the measurement of intelligence which has been done primarily by IQ tests has utilitarian value because it is a reasonably good predictor of grades at school, achievement at work, and many other aspects of success in life (Downey, 2001).

In another studies by Ernst and Angst, (2003) with 31 identical twins in Malaysia using two measure of intelligence (Raymond Cattell and Cattell culture-fair intelligence test and Wechsler's Intelligence test) found that almost all monozygotic (MZ) twins had similar scores in the test of their intelligence. Their findings revealed that twins who score high on tests such as Raymond Cattell and Cattell culture-fair intelligence test also scored high in Wechsler's Intelligence test. Galton, (2005) informed that intelligence test scores remain useful when applied in a thoughtful and transparent manner.

IQ is also important because some group differences are large and predictive of achievement in many domains. Intelligence tests help us to track the changes in intelligence of different groups and of entire nations and to measure the impact of interventions intended to improve intelligence. Page and Grandon, (2009) have studied practical intelligence among monozygotic twins, which they define as the ability to solve concrete problems in real life that require searching for information not necessarily contained in a problem statement, and for which many solutions are possible, as well as creativity, or the ability to come up with novel solutions to problems and to originate interesting questions. Sternberg (2007) maintained that both practical intelligence and creativity helps to improve and predict significant amounts of variance in academic and occupational achievement. Early claims by Sternberg were disputed by other intelligence researchers (Retherford & Sewell, 2001). Subsequent work by Sternberg (2007) improved on the original evidence base and showed that measuring monzygotic intelligence could help significantly in improving their achievement in school. Rodgers, Cleveland, van den Oord and Rowe, (2000) informed that many intelligence investigators place great importance on the difference between first and second monozygotic siblings on the grounds that measuring the intelligence tends to predict some academic and life outcomes and group differences. Galton, (2005) in a study with 16 first and second monozygotic twins on the controversy over whether genes influence intelligence, that controversy has faded still further in the intervening years, as scientists have learned that not only intelligence but practically every aspect of behaviour on which human beings

differ is heritable to some extent. Several strands of evidence, however, suggest that the effects of genes on intelligence of twins, though undeniable, are not nearly as determinative as heredity might have hoped or as environmentalists.

Birth order within the family has long sparked studies on intelligence of twins, a new study by Belmont and Marolla, (2003) with 10 monozygotic twins in Australia found that first monozygotic twins are typically smarter, while younger twins get better grades and are more outgoing. The findings have yet to draw any definitive conclusions. The results lend support to some previous hypotheses for instance, that the elder twins tends to have higher intelligence than the eldest. But the study also contradicts other proposed ideas, for example, that first-borns tend to be more introverted. Most previous studies on the influence of birth order have looked at children from different families. For instance, some studies have looked at U.S. presidents, Nobel Laureates to see whether they are mostly first-born children or later born children. U.S. presidents and science Nobel Laureates were found to be overwhelmingly first-borns, as were 21 of the first 23 Nobel Laureates. However, these studies cannot take into account influences that arise from children being in the same family, such as the competition that might exist between siblings.

In a current study, Schubert, Wagner and Schubert, (2007) surveyed 90 pairs of identical twins and other siblings in high school subjects. First monozygotic twins were asked to report their grades and rank themselves as compared with their second monozygotic twins' work ethic and academic achievement. The researchers also obtained intelligence tests scores to verify the twin owns report. First-borns received higher tests scores, in Mathematics and verbal ability, which correlates equally with that of second twins while later born children had lower intelligence grade point averages in Mathematics and verbal ability. In a similar study by Simonton, (2012) with 76 pairs of identical twins and their intelligence quotient, it was found that first and second monozygotic twins do not differ significantly in terms of their intellectual make up. Studies by Simonton (2009) using 25 first and second monozygotic twins found that first twins are generally more intelligent than their second twins. However, there are several reasons why this finding, if true, may not be very important. First, growing body of research suggests that intelligence is not the most important factor in the achievement (Sulloway, 2005).

Sulloway, (2006) with 19 identical twins was assessed using self-report measures and by intelligence testing using standard intelligence assessment tools. The five-item measure of self-reported intellect included items such as identification with the sentences all the data was collated, the researchers ran ordinary least-squares regression analyses to predict whether first monozygotic twins has similar intelligence quotient with their second dizygotic twins. This analysis allowed them to estimate the unique effect of intelligence on academic achievement. They also assessed differences in the intelligence quotient score and birth order. The data revealed no significant difference of birth order on intelligence of monozygotic twins. In contrast to the study Sulloway (2006) carried out a study with 14 monozygotic twins the result revealed that there was no significant influence of birth order on intelligence. This finding suggests that later-born children not only receive less intellectual stimulation from their familial environments, but they also receive and internalize messages that they are less intellectual than their older siblings.

Intelligence of First and second Dizygotic Twins

Intelligence is a concept which has affected the life of every individual in all spheres of life. It is responsible for the creativity and logical thinking and finally the success in life. There are individual differences in educational outcomes and to predict these differences, the first broad test of cognitive ability (Zenderland, 2008) was developed. Zimmerman, Barbara and Zaman (2006) carried a study on intelligence of first and second dizygotic twins. The implication of the study was that there are hereditary factors which are responsible for one's intelligence. The intellectual development at any stage is the inheritance from parents and sharing of experiences due to environmental exposures. Since we cannot control or modify the genetic factor hence a comfortable environment must be provided for the intellectual development of the children.

Fraternal twins (also called dizygotic twins) develop when two separate eggs are fertilized by two different sperm. Each twin usually has its own placenta. Fraternal twins (like other siblings) share about 50 percent of their genes, so they can be different sexes. They generally do not look any more alike than brothers or sisters born from different pregnancies. Fraternal twins are more common than identical twins.

According to Goleman, (2005) dizygotic (DZ) or fraternal twins usually occur when two fertilized are implanted in the uterus wall at the same time. When two eggs are independently fertilized by two different sperm cells, fraternal twins result. The two eggs, or ova, form two zygote, hence the terms dizygotic and biovular. Fraternal twins are, essentially, two ordinary siblings who happen to be born at the same time, since they arise from two separate eggs fertilized by two separate sperm, just like ordinary siblings. Instead of fraternal twins, this situation can also occasionally result in a chimera, someone colloquially described as their own fraternal twin. Dizygotic twins, like any other twins, have an extremely small chance of having the same chromosome profile. Even if they happen to have the same chromosome profile, they will always have different genetic material on each chromosome, due to chromosomal crossover during meiosis. Like any other siblings, dizygotic twins may look similar, particularly given that they are the same age. However, dizygotic twins may also look very different from each other. Studies show that there is a genetic basis for dizygotic twinning. However, it is only the mother who has any effect on the chances of having such twins; there is no known mechanism for a father to cause the release of more than one ovum. Dizygotic twinning ranges from six per thousand births in Japan (similar to the rate of dizygotic twins) to 14 and more per thousand in some African countries (Goleman, 2005).

Intelligence of dizygotic twins was one of the first human traits to be the target of genetic research even before psychology emerged as a scientific field. A year before the publication of Mendel's seminal article on the laws of heredity, Galton (2005) published a two-article series on high and low intelligence of first and second dizygotic twins intelligence and other abilities, which he later expanded into the first book on heredity and intelligence (Galton, 2005). He provoked a needless battle that raged through the 20th century by arguing that "there is no escape from the conclusion that nature prevails enormously over nurture" (p. 241), especially because his research on birth order and dizygotic twins intelligence shows that first twins are naturally intelligence than second. Though find it very difficult to associate with others in the environment. Ernst and Angst (2003) carried out a study using

senior high school twins and came up with the findings that both first and second twins perform significantly the same depending on environmental factors like the teacher personality, teaching methods, readiness and health status of students. According to them nature determines twins intelligence.

Research Methodology

This section provides a general framework for the study through indicating the procedures and techniques adopted in data collection and analysis. In specific terms, it addressed the following dimensions of the design and methods that were used in the study. The research design for this study was the causal comparative design of the descriptive research. Ex-post facto research design was adopted because the researcher was only interested in examining twins in the study area. The research area is south-south Nigeria. The accessible population of twins used in this study was 174 Junior Secondary two and three (JSS 2 & 3) twins in public secondary schools both dully registered and unregistered twins. The source of this information is from Twins Club: Calabar, Akwa Ibom, Rivers, Bayelsa and Delta States of Nigeria. The sampling technique for this study was the stratified, purposive and accidental sampling. The sample sizes of 126 first and second monozygotic twins were purposively and accidentally drawn from the target population of twins in south-south, Nigeria. The adapted Wide Rang Intelligence Test (WRIT) developed by Joseph Glutting, Wayne Adams and David Sheslow in the year (1997) was used to measure fist and second monozygotic and dizygotic twins' intelligence. The standardized WRIT was used to elicit information on intelligence from the respondents. The instrument has two parts, namely the Verbal (Crystallized IQ) and the Visual (Fluid IQ). The Crystallized IQ is made up of the Verbal analogue subscale (set) and the vocabulary subscale. The visual (Fluid IQ) is made up of Matrices Subscale and Diamond subscale. Each subtest is now explained.

1. Subtest 1: Matrices: Matrices was chosen as the first WRIT subtest because it requires minimal verbalization on the part of participants. Consequently, Matrices facilitates rapport building and allows participants to be comfortable as they actively engage in the testing process. The subset contains 7 items and employs a traditional matrix format. Participants choose one option from among 3 to 6 pictured choices which 'goes best' with visual stimulus array. Directions to matrices are verbal, but the subtest begins with simple items so that most participants can understand the task even without verbal instruction.
2. Subtest 2: Diamond subscale is a measure of Fluid IQ and requires participant to display spatial and manipulative skills. It consists of 20 chips and requires participants to use puzzle chips. Participants use the diamond-shaped pieces to construct a pictured 'standard.' Directions are verbal, but the Diamonds subtest begins with elementary items so that participants can easily understand the task without verbal instructions.
3. Subtest 3 Verbal Analogies: Verbal Analogies contains 11 items to which participants are requested to say a word that best completes an analogy. The Examiner reads, such as 'Cat is to kitten, as dog is to ____.' as it is true for all verbal tests of general intelligence. The Verbal Analogies subtests depend upon a participant's understanding of oral language. Moreover, the subtest requires the participant to

respond verbally. Therefore, the Verbal Analogies subtest is appropriate for individuals familiar with English language.

4. Subtest 4: Vocabulary is the WRIT's concluding subtest which consist of verbal measure similar to vocabulary subtests found on other ability tests. The Vocabulary subtest contains 9 items. A series of words are presented orally and participants define each word aloud. The subtest depends on a participant's understanding and production of oral language.

To measure Mathematics achievement an adapted instrument tagged Mathematics Achievement Test (MAT) for JSS 2 and JSS 3 was developed comprising 26 and 16 items respectively. The WRIT reliability was established using Cronbach coefficient alpha which ranges fom .98 and .93 for intelligence and academic pachievement respectively.The data gathered for this study were subject to both descriptive and inferential statistics. The mean (X), standard deviation (SD) was used to answer the research questions, while the independent t-test analysis was used to answer all the stated hypotheses.

Results and Discussion

The results of the data collected are now presented hypothesis-by-hypothesis.

Hypothesis one

First and second monozygotic twins do not differ significantly in terms of their mean score on intelligence. The independent variable in this hypothesis is monozygotic twins which was categorised into first and second twins; while the dependent variable is intelligence. To test this hypothesis, the independent variable is monozygotic (first and second) twins' and the dependent variable is scores in intelligence. These were analysed using independent t-test statistics. The result is shown in Table 1.

Table 1: Independent t-test Analysis of the Difference of First and Second Monozygotic Twins in their mean Score on Intelligence

Variables	N	$\overline{X}$	SD	t-cal
Intelligence score of first monozygotic twins	31	16.13	3.16	
Intelligence score of second monozygotic twins	37	14.92	2.31	1.77

P>.05 Alpha level; df= 66, Critical t=1.994

It is obvious from Table 1 that first monozygotic twins have a mean and standard deviation of 16.13 and 3.16 respectively while second monozygotic twins have a mean and standard deviation of 14.92 and 2.31 respectively. At 66 degrees of freedom, the t-calculated value was found to be 1.77 while the t-critical (table value) is 1.994. Since the calculated t-value (1.77)

was found to be less than the critical t-value (1.994) the null hypothesis that states first monozygotic twins do not differ significantly from second twins in terms of their intelligence score is accepted. Aptly put, there is indeed no significant difference in the intelligence score of first and second monozygotic twins.

Hypothesis Two
First and second dizygotic twins do not differ significantly in terms of their mean score on intelligence. The independent variable in this hypothesis is dizygotic twins which was categorised into first and second twins; while the dependent variable is intelligence. To test this hypothesis, the two independent dizygotic (first and second) twins scores on intelligence were analysed with independent t-test statistics. The analysis is clearly shown in Table 2.

Table 2: Result of the Analysis with Independent t-test Statistic of the Difference in First and Second Dizygotic twins in terms of their mean score on Intelligence

Variables	N	$\overline{X}$	SD	t-cal
Intelligence score of first dizygotic twins	23	18.51	5.85	
Intelligence score of second dizygotic twins	21	14.10	1.34	3.50

***P<.05 Alpha level; df= 66, Critical t=1.994**

It can be discerned from Table 2 that the mean and standard deviation for first dizygotic twins intelligence score is 18.51 and 5.85 respectively. A second dizygotic twin has a mean of 14.10 and standard deviation of 1.34 respectively. The independent t-test analysis reveals that the calculated t-value is 3.50; this was found to be less than the table value of 1.994 at 66 degrees of freedom and 0.05 level of significance. Statistically speaking, the null hypothesis of first dizygotic twins do not differ significantly from second twins in terms of their intelligence is rejected. This implies that first dizygotic twins differ significantly from second twins in terms of their intelligence

Discussion of Findings
The result emanating from the study was discussed hypothesis by hypothesis as presented below

Intelligence of First and Second Monozygotic Twins
The findings revealed that first monozygotic twins do not differ significantly from second twins in terms of their intelligence. This is because monozygotic twins begin as a single

fertilized egg which then separates. They are genetically equivalent human beings and share about 95 percent similarities of their genetic makeup. The finding is in line with that by De-Lint (2006) who conducted a study in United States of America using 89 identical twins and found that measurement of twins intelligence is one of psychology's greatest achievements and one of its most controversial. In the same vein, Ernst and Angst (2003) with 31 identical twins in Malaysia using two measure of intelligence (Raymond Cattell and Cattell culture-fair intelligence test and Wechsler's Intelligence test) found out that almost all monozygotic (MZ) twins share similar scores in the test of their intelligence. Their findings revealed that twins who score high on tests such as Raymond Cattell and Cattell culture-fair intelligence test also scored high in Wechsler's Intelligence. In consonance with the present study Belmont and Marolla (2003) found that first monozygotic twins are typically smarter, while younger twins get better grades and are more outgoing. The findings have yet to draw any definitive conclusions. The results lend support to some previous hypotheses for instance, that the eldest sibling tends to have higher intelligence. In agreement with the present finding Schubert, Wagner and Schubert (2007) found first-borns received higher tests scores, in math and verbal ability, which correlates equally with that of second twins while later born children had lower intelligence grade point averages in math and verbal ability.

The study contradicts with that by Simonton, (2012), Rodgers, Cleveland, van den Oord and Rowe, (2000) who found that many intelligence test investigators place great importance on the difference between first and second monozygotic siblings on the grounds that measuring the intelligence tends to predict some academic and life outcomes and group differences. Also in contrary to the present study Sulloway (2006) carried out a study with 14 monozygotic twins the result revealed that there is no significant influence of birth order on the intelligence. This finding suggests that later-born children not only receive less intellectual stimulation from their familial environments, but they also receive and internalize messages that they are less intellectual than their older siblings.

Intelligence of First and Second Dizygotic Twins

The result of the finding revealed that first dizygotic twins do not differ significantly from second twins in terms of their intelligence. Dizygotic twins are conceived as two separate fertilized eggs. They share about 50 percent of their genetic makeup, with the other 50 percent being unique to each twin as such we can reasonably conclude that heredity influences intelligence of fraternal twins. Dizygotic twins are unique individuals that establish their own individual likes and dislikes. The finding agrees with that by Zimmerman, Barbara & Zaman (2006) who studied intelligence of first and second dizygotic twins. An important implication of the study was that there are hereditary factors which are responsible for one's intelligence. The intellectual development at any stage is the inheritance from parents and sharing of experiences due to environmental exposures. Since we cannot control or modify the genetic factor, a conducive environment must be provided for the intellectual development of the children. The present finding is in harmony with that by Galton, (2005) whose research on birth order and dizygotic twins intelligence shows that first twins are more intelligent than second, though they find it very difficult to associate with others in the environment. The present findings disagree with that of Ernst and Angst (2003)

who found that both first and second twins perform significantly the same depending on environmental factors like the teacher personality, teaching methods, readiness and health status of students. According to them nature determines twins intelligence. The result may be surprising in that the environment where the study was conducted may be conducive enough to accommodate the set of twins.

Summary and Conclusion

Improvement of intelligence skills is important for achieving better academic results and for preparing proficient professionals." Student achievement can be improved effectively by integrating programs that develop intelligence that can be measured by various intelligence assessment tests. Intelligence test has not been given it full place in Nigerian curriculum as most emphasis is on academic achievement (achievement) is not yet on the right path despite the importance it has on human capital productivity and as well as academic results. Primary, secondary and even education Higher education structures, academic programs and teaching methods should promote the application of intelligence curricula and also the improvement of students' intelligence capabilities. The programs or curricula that improve students' skills and intelligence need to be integrated at least during the early periods in school to stimulate the learning process and improve students' academic outcomes and interdependently their career abilities.

Recommendation

Based on the findings of the study, the following recommendations were made;

1. Given that teachers are mediators and role models of learning in secondary schools, they should be prior trained on how to teach students to think analytically, strategically, and to understand and elaborate more efficiently concepts presented in classes and also learning better.
2. Since intelligent is related to academic achievement the government should encourage indigenous test experts to validate and standardize other test other than the CFIT and the Wide Rang Intelligence Test (WRIT) which are the intelligence that has the quality for use in Nigeria; with affordable prices so that they can be accessible for other researchers who may wish to embark on intelligence related students.
3. The government should integrate intelligence test in the school curriculum so as to help teachers, counsellors, administrators to know the students' progress and areas of need so as to offer the appropriate counselling services to the students.

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