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Influence of Gender on Cognitive Competence Among Pupils and Students in Abia State

Education

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ABSTRACT

This study examined the influence of gender on the cognitive competence of pupils and students in Abia State. Causal-comparative/ex-post-facto research was the design used for the study. The sample consisted of 360 pupils and students from primary five, JS II and SS II. The instrument used for data collection was a researcher developed cognitive competence test (CCT). Descriptive statistics were used to answer the research questions while ANOVA was used to test the null hypotheses. The result of the study showed that gender had no significant influence in predicting cognitive competence of pupils and students in Abia state at the primary and junior secondary level. At the senior secondary level, gender significantly influenced cognitive competence.

1. Introduction

Gender refers to the psychological and socio-cultural dimensions of being male or female. Over the past decade and in the recent time, differences between males and females have been highlighted in the media and academic conferences based on such popular literature as, "men are from Mars, women are from Venus" (Gray, 1992). The underscoring of human differences, rather than similarities, is a delicate matter hence, much of the information about differences in males and females as seen in gender studies appear to be based on gender rules/stereotyping. Gender stereotypes are broad categories that reflect people's impressions and beliefs about females and males while gender role is a set of expectations that prescribes how female and male should think, act and feel (Santrock, 2005; Glietman, 1995). However, Heidi (2009) opined that apart from the above assertions on gender, there are also differences in cognitive functioning and abilities of females and males while Kimura, (1992) earlier averred that the differences between the intellectual capabilities of the sexes appear to be a function of competence, rather than in overall intellectual functioning.

1.1a Definition of variables- Cognitive development

Cognitive development, an aspect of child development, is the construction of thought processes, including remembering, problem solving and decision-making from childhood through adolescence to adulthood (Peterson, 2008; Children's Health Encyclopedia, 2009). In addition, cognitive development refers to how a person perceives thinking and gains understanding of his or her world though the interaction of genetic and learned factors. Learned factors here are socially created symbol systems such as language, writing and number systems, which vary from one society to another. Piaget (1983) opined that cognitive development consists of a number of structural stages. By stages, he meant invariantly sequenced, qualitatively distinct levels that can meaningfully characterize developmental sequences of abilities across domains. Each of these stages form a developmental sequence that is characterized by qualitative re-structuring, hierarchical integration, sophisticated and abstract levels of though (Bjorklund, 1995; Pulaski, 1980). Some of the main domains of cognitive development are information processing, intelligence, reasoning, language development and memory development. however, since these domains require some mental and observable actions, an individual may be faced with the challenge of competence or incompetence in cognitive tasks at a stage in development.

1.1b Competence

The word "competence" is a direct derivative of the Latin word "competere", literally meaning "competing", an adjective indicating that one is able to engage in a competition (Encarta English Dictionary, 2009). In essence, the word – competence presupposes an action, a form of activity, not a state. Goldfried and D'Zurilla, (1961) defines competence as the effectiveness or adequacy with which an individual is capable of responding to different problematic situations; while Sternberg and Kolligan, (1990) defined it as a measure of ability, whether the observable performance of a person represent their underlying traits or capacity. In another perspective, Perrenoud (2000) defined competence as a capacity to mobilize diverse cognitive resources to meet a certain type of situation. In essence, the exercise of competence involves complex mental situations and schemes of though which allow a performance of action which is relatively adapted to a situation. On the other hand, the word "cognitive" is the adjectival form of the word "cognition". It is concerned with the acquisition of knowledge; relating to the processes of the use of reasoning, intuition and perception.

1.1c Cognitive competence

Cognitive competence is the degree of success in functioning within a specific environment with apparent discrepancy in age related trends (Birren and Schaie, 1990). Cognitive competence connotes the ability to carry out mental activities and process information as each stage of development demands (Nwachukwu, 2000). Furthermore, Wylie and Hodgen (2007) discussed cognitive competence as it applies to numeracy, literacy, logical problem solving, social and attitudinal skills. According to Nwachukwu (1995), cognitive competence can manifest in the form of fluency of language, literacy, well developed memory strategies, reasoning and problem solving. However, for Wylie, Ferral, Hodgen and Thompson (2006),

cognitive competence can be measured in reading, writing, comprehension, mathematics, standard progressive matric tasks, rating of core subjects, communication, social skills and self-management. The researcher operationally defines cognitive competence as the ability to perform and carry our measurable skills as in language, mathematics and moral reasoning tasks as developmental stage and age demand.

Changes which manifest in an individual's though, intelligence, reasoning and language as a result of development go with developmental task at each stage.A developmental task is a task which an individual has to and wants to tackle in a particular life period (Havighust, 1952). Havighust opined that the process of living from birth to death consists of people working their way through from one stage of development to another by solving their problems in each stage. He identified six major age periods and presented typical developmental tasks for each of these periods from infancy to later maturity period. In a similar manner, independent studies carried out by Piaget (1952) and Kohlberg (1958), showed that there were different stages of cognitive and moral development. Each of these stages goes with a measure of a developmental requirement or task which an individual has to accomplish at a given stage and age. A stage is a period of time, often associated with a known chronological age range, during which a behavior or physical characteristics is qualitatively different from what it is at other ages. It is assumed that developmental change runs parallel with chronological age; age itself cannot cause development. findings of accomplishment of many developmental tasks indicate typical chronological ages associated with developmental milestones (Cole 1986; Goetting, 1986). Milestones are changes in specific physical and cognitive abilities such as walking, understanding language, moral reasoning and calculation that mark the end of one developmental period and the beginning of another.

1.1d Gender variation in skills acquisition and competence

The researchers, however from their interactions with some male and female students in Abia state at different developmental stages perceived a gross decline in cognitive competence as the students advance in age and successive classes in school. There is a considerable literature on the idea that gender may influence cognitive competence and moral reasoning (Bussey and Bandura, 1999; Galligan, 1982; Gleitman, 1995). From the moment of birth, a child's gender influences the opportunities he or she will experience. Within a few ears of life, children begin to form their own ideas about gender that subsequently guide the types of activities they practice, what they find interesting and the achievements they attain. These activities reflect and perpetuate gender roles and stereotypes in the society (Wood and Eagly, 2002).

There are seemingly gender differences in computational tasks, verbal skills, and mathematics and conceptual abilities. However, while most studies (Linn and Hyde, 1989; Beller and Gafni, 1996) conclude in favor of males over females in cognitive competence, others submit that females perform better than males in cognitive competence and reasoning tasks. According to Nowell and Hedges (1998), science and mathematics are the academic areas in which boys have historically done better than girls in North America. However, gender differences in mathematics and science have narrowed over the recent years. Hyde (2004) believed that the cognitive differences between females and males have been exaggerated. In addition, Hyde points out that there is considerable overlap in the distribution of males and females scores on math and visuo-spatial task. However, Mundy-Castle and Bundy (1988) in another study concluded that there is no significant difference in males and females in moral reasoning. Independent studies on the influence of gender on cognitive competence and moral reasoning seemingly point to an indecisive conclusion while the debate lasts.

2. State of the Problem

It has been established though studies in human development that there are changes in a child's cognitive domain as he/she advances from infancy to adolescence. These changes are also accompanied by qualitative performance in reasoning, thinking, judging, evaluating, and decision-making in males and female students alike. However, the researchers' classroom experiences elicit much doubt on the extent to which gender influence students in Abia state as they respond to these changes in their cognitive competencies and reasoning at lower classes in school or at higher classes in accordance to their developmental demand in age and academic exposure.

Furthermore, it has been established that gender seemingly influences an individual's cognitive competence but no conclusion has been drawn on the superiority of males over female students and vice versa. Studies on the influence of gender on cognitive competence have not been explored across Primary 5, JS-2 and SS-2 classes in Abia state. Since cognitive test will yield base data for the cognitive competence of pupils and students in primary 5, JS-2 and SS-2 classes, a critical question would be: What is the influence of gender on cognitive competence of pupils in Primary 5, and students in JS-2 and SS-2 classes?

Research Questions

Three research questions guided the study:

1. What is the influence of gender on the cognitive competencies of pupils in primary five in Abia state?
2. What is the influence of gender on the cognitive competencies of students in JS 2 in Abia state?
3. What is the influence of gender on the cognitive competencies of students in SS 2 in Abia State?

Hypotheses

Three null hypotheses were tested at .05 significant level

HQ 1: There is no significant difference between the mean scores of male and female pupils in primary 5.

HQ 2: There is no significant difference between the mean cognitive scores of male and female students in JS 2.

HQ 3: There is no significant difference between the mean scores of male and female students in SS 2.

3. Method

The design of the study was causal-comparative or ex-post-facto research design. The population of this study consisted of all the pupils in primary 5, students in JSS 2 and SS 2 classes in public schools in Umuahia North Education Authority. The choice of students in Umuahia North Education Authority was because the schools are located within the capital city and its suburbs where the schools are monitored for efficient academic exposure and moral conduct. Furthermore, there were sixteen (16) Senior Secondary Schools, seventeen (17) Junior Secondary Schools and sixty-four (64) primary schools in Umuahia North Education Authority. There were 2755 students in SS-2, 4041 students in JS-2 and 2580 primary five pupils in the above education authority (SEMB; ASUBEB, Umuahia North LGEA, 2009). The sample of this study was 360 students, (120 students in SS-2; 120 students in JS-2; and 120 pupils from primary five) randomly composed.

Eight schools each were randomly selected from 16 Senior Secondary schools and 17 Junior Secondary Schools. Furthermore, 15 students were randomly selected from a stream in each of the schools. This gave 120 students from SS 2 and JS 2 respectively. For SS 2, there were 63 males and 57 females while for JS 2, 58 males and 62 females. Similarly, 20 primary schools were randomly selected from 64 primary schools in Umuahia North. Six pupils in Primary five were randomly selected from each of the selected 20 primary schools (making 120 pupils; 65 males and 55 females).

3.1 Instrument for Data Collection

The instrument was Cognitive Competence Test (CCT). The test comprised two sections: English and Mathematics. Each section had a set of 20 items of multiple choice questions for primary 5

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pupils, JS-2, and SS-2 students, respectively. The instrument was face validated separately by one expert in educational psychology, two experts in Measurement and Evaluation, an English teacher and a Mathematics teacher. The reliability coefficients were .88; .84; and .85 for primary five; JS-2; and SS-2 sets respectively.

The researchers administered the test personally. The tests (scripts) were retrieved immediately after administration. The mean scores of each group were calculated along the standard deviation. Each of the test sets had a maximum score of 100% and the mean scores were used the pupils'/students' cognitive competence score.

Data were analyzed using means, standard deviation, student-t and analysis of variance (ANOVA) statistics.

4. Results

The result of the study is presented thus:

Table 1: Mean scores and standard deviation of cognitive competence of male and female pupils in primary 5 Description for Primary Pupils

Status of respondents	N	Mean	Std. Deviation
Male Female	65 55	73.2064 69.9635	14.13080 13.18819

Data on Table 1 indicate the cognitive competence of male and female pupils in Abia State. From this table, it was shown that the males had a cognitive competence mean score of 73.20 and a standard deviation of 14.13. The mean scores in the cognitive competence of the female pupils were 69.96 with a standard deviation of 13.18. The indication is that the cognitive competence means scores of the males in primary 5 is higher than that of female pupils in primary 5.

Table 2: Summary of the t-test of the mean cognitive competence scores of males and female pupils in primary 5 Independent Samples Test

	Levene's Test for Equality of Variances		t-test for Equality of Means			
	F	Sig.	t	df	Sig. (2-tailed)	Mean Difference
Equal ariances assumed	.324	.580	1.649	118	.125	3.2429
Equal variances not assumed			1.649	110.70	.128	3.2429

From table 2, the significant value is .125. Since the significant value is more than .05, the level of significance at which the hypothesis was tested, the null hypothesis was not rejected. The researchers hereby conclude that there was no significant difference between the mean cognitive competences of male and female pupils in primary 5.

Table 3: Mean scores and standard deviation of cognitive competence of male and female students in JS-2 Description for JS-2

State of respondents	N	Mean	Std. Deviation
Males Females	58 62	65.8956 63.4562	12.7964 10.3456

Data on Table 3 indicate the cognitive competence of male and female students in JS-2. From this table, it was shown that the male students had a cognitive competence mean score of 65.89 and a standard deviation of 12.79. The mean scores of the female students were 63.45 with a standard deviation of 10.34.

Table 4: Summary of the t-test of the mean cognitive competence scores of male and female students in JS-2. Independent Samples Test

	Levene's Test for Equality of Variances		t-test for Equality of Means			
	F	Sig.	T	df	Sig. (2-tailed)	Mean Difference
Equal variances assumed	.7689	.6788	1.5455	118	.5456	2.4394
Equal variances not assumed			1.0656	113.22	.4665	2.4394

From Table 4, the significant value is .545. Since the significant value is more than .05, the level of significance at which the hypothesis was tested, the null hypothesis was not rejected. The researchers hereby conclude that there was no significant difference between the mean cognitive competence of male and female students in JS-2.

Table 5: Mean scores and standard deviation of cognitive competence of male and female students in SS-2 Description for SS-2

State of respondents	N	Mean	Std. Deviation
Males Females	63 57	68.4545 56.6591	10.8855 11.5555

The results on table 5 show that the mean score for the male students in SS-2 in the cognitive competence was 68.45 with a standard deviation of 10.88 while that of the female students was 56.65 with a standard deviation of 11.55. The indication is that the male students in SS-2 have a higher cognitive competence than the female students.

Table 6: Summary of t-test of mean cognitive competence scores of males and females in SS-2 Independent Samples Test

	Levene's Test for Equality of Variances		t-test for Equality of Means			
	F	Sig.	T	df	Sig. (2-tailed)	Mean Difference
Equal variances assumed	1.6516	.5152	2.5455	118	.0152	11.7954
Equal variances not assumed			2.4885	114.88	.0652	11.7954

From Table 6, the significant value is .0152. Since the significant value is less the .05, the level of significance at which the hypothesis was tested, the null hypothesis was rejected. The researchers hereby conclude that there was significant difference between the mean cognitive competence of male and female students in SS-2.

4.1 Discussion

Influence of gender on cognitive competence of pupils and students

Results indicated that the mean cognitive competence score of the males was 73.20 against 69.96 in primary 5. There is no significant difference between the mean cognitive competence of the male and female pupils in primary 5. Also in JS-2, the mean cognitive competence scores of the males were 65.89 against 63.45 of females. As such, there is no significant difference between the mean cognitive competencies of male and female students in JS-2. However, there is a significant difference between the mean cognitive competence of male and female students in SS-2 because the mean cognitive competence of the male stu-

dents was 68.45 against that of the females which was 56.65.

The results above align with the Women's Equity Act of the U.S. Department on the "Unpredictability of gender" (Campbell, 1994). In essence, the assumption that males perform far better than females in cognitive tasks appear not to be supported by the finding of this study. Petterson (2000) similarly submitted that boys and girls show some differences in their skills and preferences but there is a great deal of overlap between the groups. As such, difference in cognitive competence of different ethnic groups appears to result from cultural or other environmental factors. Nzewi (2010) reported several studies to aver that gender does not absolutely just by itself alone control achievement.

The significant difference between the cognitive competence score of the male students and the female students in SS-2 can be traced to other endogenous factors such as a curriculum than includes more spatially oriented mathematics at the higher school level, and also lower social expectations of females. Halpern (2000) opined that males tend to receive more teacher attention than girls, and teachers ask higher order questions of them. Boys tend to participate more in whole group activities and they often dominate class discussions. Gender stereotypes can also affect men's and women's performance. Stereotypes manifest as threats which is a heightened awareness about negative judgments about gender made by other persons (Lips, 2001).

Research indicates that stereotype threat can negatively affect performance by increasing anxiety. For example, Spencer, Steele, and Quinn (1999) found that women performed significantly worse than men on a mathematics test when the participants were led to believe that the test would probably produce gender differences. In contrast, women and men performed equally well when the participants were led to believe that the rest did not produce gender differences. Another exogenous factor may be traced to the transitive nature of the adolescent stage. Female students are more likely prone to emotional and psychological stress due to peer pressure and conformity. When this is carried over to the classroom, it may affect their cognitive competence.

4.2 Conclusions and Recommendations

Major findings indicate that gender influenced cognitive competence in an unpredictable manner at primary and junior secondary levels. The difference in the cognitive competence of male and female students at senior secondary level is traceable to some endogenous and exogenous factors namely: puberty, teacher's attitude to students and gender stereotypes. It is recommended that teachers create supportive classroom environments that will enhance equal classroom participation by the male and female students. Educators should be sensitive to gender issues in handling the boy child and the girl child. In essence, labeling on sex as inferior to the other due to over-riding cultural belief is no more tenable. The educative process should aim at gender equity in social intercourse.

REFERENCE

Beller A. and Gafni, N. (1998).Gender Differences in Mathematics Achievement Among High School, New York: Random house. | Bussey, K., Bandura, A. (1999). Social Cognitive Theory of Gender Development and Differentiation: Psychological Review, 106, 676 – 713. | Birren, J.E. and Schaie (1990).(Eds); Hand Book of the Psychology of the Aging.3rded. New York; Macmillan | Bjorklund D.F. and Hummer, P (1995).Physical Maturation and Information-Processing Speed in Middle Age.Retrieved on April 2nd 2011 from psyche.apa.org/journal/dev/31/16/967. | Campbell, P.B. (1994). Myths, Stereotypes and Gender Differences. Retrieved on March 11, 2010 from http//www.campbell-kibler.com/stereo.pdf | Children's Health Encyclopedia. Retrieved from: http//www.answers.com/topic/cognitive-development.23/1/2009 | Cole, C (1986). Developmental Task. Retrieved on November 22, 2008 from http//www.faculty.mdc.edu/smcnair/robeort%20harvighurst.htm | Encarta English Dictionary, 2009 | Galligan, C. (1986). In a Different Voice: Psychological Theory and Women Development. Harvard: Cambridge press. | Geotting, A. (1986). The Developmental Task of Siblings Over the Life Cycle. Journal of Marriage and Family. 48, 703 – 714. | Goldfried, M. and D'Zurilla (1961).Problem Solving Therapy; A Social Competence Approach to Clinical Intervention. New York; Springer Publishing Co. | Goswami, U. (2002). Blackwell's Hand Book of Childhood Cognitive Development. Oxford: Blackwells. | Halpern, D.F. (2000). Sex Differences and Cognitive Abilities.New Jersey; Mahwah, Erlbaum | Havighurst, R. (1952).Developmental Tasks and Education. Longman, Green, New York. Retrieved on May 8, 2009 from http//nonage.gsnu.ac.kr/bkkim/won/-177.html. | Health Encyclopedia (2009).Retrieved on January 23, 2009 from http//www.answers.com/topic/cognitive-development. | Hyde, J.S. (2004). Half the Human Experience. Boston: Houghton Millian. | Kimura, f. (1996).Sex, Sexual Orientation and Sex Hormones Influence on Human Cognition Function.Current Neurobiology, 6, 259 - 263 | Kohlberg, L. (1958). The Development of Modes of Thinking and Choices in years 10 – 16.Ph.D Dissertation, University of Chicago. | Lips S. (2001). Gender –gender Roles and Stereotypes. Retrieved on April 2nd from www.family.jrank.org/gender-gender.roles-stereotypes.html. | Linn, M.C. & Hyde, J.S. (1989).Gender, Mathematics &Science. New York: Random house. | Mundy-Castle, A. & Bundy, R. (1988). Moral Values in Nigeria.Journal of African Psychology. 1:25-40. | Nowell, A. & Hedges, L.V. (1998). Trends in Gender Differences in Academic Achievement from 1960 to 1994: An Analysis of Mean, Variance and Extreme Scores. Sex roles: 39, 21 – 43. | Nwachukwu, T.A. (1995). Child Development. Enugu: Desandex Nigeria Ltd. | Nwachukwu, V.C. (2000). Psychological Fundamentals in Nigerian Education.Enugu: Academic Publishing Company. | Nzewi, U.M. (2010). It's all in the Brain: Of Gender and Achievement in Science and Technology Education.51st Inaugural Lecture, University of Nigeria. | Perrenoud (2000).L'ecolesaisie par les competences.In C. Bosman, F.M. Gerard and X. Roeghers (Eds).QuelAvenir Pour les Competencies? (pp. 21 – 41). | Peterson, C. (2008). Child Development.New York: McGraw Hill. | Piaget, J. (1952 a).The Origin of Intelligence in Children. New York: International University Press. | Piaget, J. (1983). Piaget's Theory.In P. Mussen (Ed.).Handbook of Child Psychology. (4thed.). Vol. 1. New York: Wiley. | Pulaski, M.A.S. (1980). Understanding Piaget: An Introduction to Children's Cognitive Development. New York: Harper & Row Publishers. | Spencer, S., Steele C., and Quinn, D. (1999).Stereotype Under Achievement Gap. Retrieved April 2nd, 2011 from www.apa.org-research in psychology-Research in action. | Sternberg, R. &Kolligian, Jnr. (1990).Competence Considered. New York. Yale University Press. | Wood, A. &Eagly, A.H. (2002). A God – Cultural Analysis of the Behavior of Women and Men: Implications for the Origins of Sex Differences. Psychological Bulletin, 128, 699 – 727. | Wylie, C., Ferral, H., Hodgen, E., & Thompson, J. (2006).Competencies at age 14 and Competency Development for the Competent Children, Competent Learners' Study Sample. Retrieved October 20, 2008 from http://www.edueatrincounts.govt.nz/publications/2567/5467 | Wylie, C., Hodgen, E. (2007). The Continuing Contribution of Early Childhood Education to Young People's Competency Levels. Retrieved October 20, 2008 from http//www.educationcounts.govt/nz/publications/schooling/11780 |