

## Gender and Self-Concept as Correlates of the Psychomotor Performance of Students in Basic Electricity in Technical Colleges in Cross River State, Nigeria

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**Abstract** This was Ex-post Facto research design analyzed to determine effects of students' gender and self-concept on their psychomotor ability in technical colleges in the Central Senatorial District of Cross River State. Justification was based on recent lamentations in the state about poor performance capability of Power Holding Company of Nigeria (formerly NEPA's) technical staff since inception of tourism activities. Two null hypotheses were formulated, while the purposive, cluster and random sampling procedures were adopted in selecting 200 technical -II students as sample. Data generation was by use of a structured questionnaire and a practical performance test/exercise, while data analysis was by independent t-test of difference in mean performance among the subjects. It was revealed that both gender and self-concept significantly influence students' psychomotor performance in basic electricity; the males always out-performing their female counterparts in practicalities in the State. Furthermore, students (both males and females), but with more males than females, who possess positive self-concept performed significantly better than their counterparts who cultivate negative self-concept at the period of this study. Recommendation was that guidance counseling staff be employed to the technical colleges to counsel students to cultivate positive self-concept as well as other gender stereotype concepts as this will help to improve their performance in basic sciences and technical courses.

**Keywords:** Gender, self-concept, psychomotor performance, basic electricity, technical colleges

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### 1. Introduction

The National Policy on Education (FGN, 2005) enumerates that education is a veritable instrument per excellent for the development of the nation towards making her citizens self-reliant with regards to handling their technological, scientific and engineering projects. To this end, vocational and technical education is a major component of the basic technical colleges' curriculum as one of the strategies for realizing this noble quest.

Some of the aims/objectives of establishment of technical colleges in Nigeria according to the Federal Republic of Nigeria (FRN, 2004) are among others: to provide trained manpower in applied sciences, technology, commerce and industry, especially as sub-professional grades; to give an introduction to professional studies in engineering and other technologies; and to give training and impart necessary skills leading to the production of craftsmen and technicians, etc.

According to Mgbekem (1997), these aims of technical education were purposely and deliberately designed to form the basis for a technological take-off or serve as a preparation for an industrial revolution for Nigeria. Mgbekem (1997) further observed that at the take-off of these technical colleges, efforts were made

by the Federal Government in providing the requisite facilities and equipment such as laboratories and workshops for training both teachers (instructors) and students (the products).

However in very recent times, there has been lots of yearnings and lamentations about the steady falling standards of education, especially in the primary and secondary/technical colleges. This apparent falling standard in education is being linked to the mean performance of grandaunts from these technical colleges who form the nucleus of our industrial and technical sectors today (like the Power Holding Company of Nigeria formerly NEPA, the Water Board, the Nigerian Telecommunications Plc, among others). Indeed, Ndu (1991) and Mgbekem (1997) separately see this falling standard as largely caused by the early colonial education that was characterized by reading, writing, arithmetic and religion and thus causing early graduates to rely only on white collar jobs, with their orientation tilted toward this perception all along and up to date. This has caused a lot of Nigerians to look at engineering, science and technology (especially working in industry) as dirty job, and so prefer white collar jobs. Some even do not perceive a woman as working in a laboratory, in much the same way as to working in an organization as the PHCN.

In respect of gender specific roles influence in relation to students' psychomotor performance in technical courses, Muro (1997) holds that all along opportunities in technical education had been for men alone, thus creating an imbalance and inferiority complex in women. This is why the Common Wealth Association of Polytechnics in Africa (CAPA) sought to address this low representation of women in the polytechnic system by setting up Women in Technical Education (WITED) in 1988 with the main objective of enhancing attitudinal change in people and society in respect of the role of women in technical education as well as enhanced psychomotor competencies for national development. In line with the above, Etim (1997) asserts that there are many Nigerian women who are highly intelligent, but are not encouraged especially in the science-related and technical professions and thus not contribute to nation building. Bosurep (1997) and Nyambala (1999) separately reported that few students are into science-based and technical professions because of the erroneous perception that such jobs/professions are more masculine-related. Furthermore in countries like Egypt, Saudi Arabia, India etc, women's places are in the homes as wives and caretakers of children. The above authors thus suggest that for sustainable development to take place, efforts should be geared towards redressing this gender bias by providing more opportunities for girls to fully participate in technically-related professions as it is done in developed nations.

According to Mbang (2008), there is a lot of evidence of empirical studies towards the end of the last century by authors like Ogunloye (1990, Kayode & Akin Aine, 1999; Ladeke, 1997 and Ugwu, 2000), all of which emphasize the imbalances in representation and achievements of males and females in science, mathematics and technology courses. However, available literatures are sometimes conflicting, while some advocate male superiority (Ladeke, 1997), others take opposite view (Ogwu, 2000).

Much empirical evidence exist in respect of the influence of students' self-concept on their academic performance, especially in technical-related courses. Ames and Feller (1996), Brooker and his associates (1978) and Fontana (1981) separately define self-concept as a complete and dynamic system of beliefs in which an individual holds true about himself, each belief with a corresponding value. It is an important characteristic of the self that is organized and is dynamic. To Fontana (1981), the value we place on ourselves (self-concept) would appear to have a significant influence on our academic achievements.

Okwubunka (1997) asserts that the foregoing thus suggests that successful students may generally be characterized as standing high in their self-regard and possessing self-confidence in their ability to cope successfully with life. To Okoro (2002), self-concept is the image or picture an individual has of himself or herself. To Okoro, high self-concept individuals like students, are usually regarded as significant and interesting people; have respect for their opinions and points of view; parents of such children have more consistent standards and disciplinary methods that are less erratic (Ogbogor, 1997). Good behavior among such learners is reinforced and negative ones ignored. In direct contradiction to the above, low self-esteem learners often regard their parents as unfair, while discipline in the home range from restrictiveness to over-permissiveness. Ayang, (2004) quoting Okwubunka (1997) in Fontana (1981) asserts that with respect to self-

difference, girls have lower levels of self-concept than boys. In studies carried out on the influence of self-concept on academic achievement, evidence have been found for lower self-esteem in girls, for example, when girls were paired with boys in problem solving task, it was found that the girls sometimes artificially depress their performance level so as not to outshine the boys (a phenomenon that does not work in the reverse) (Brooker & associates, 1978). From the foregone, it follows that high self-concept goes with high academic performance, and low self-concept with low academic performance (Mbang, 2008).

## 2. Statement of the Problem

Consequent upon the new status of being the nation's tourism destination, Cross River State has witnessed increased economic activities requiring middle level technical manpower, but without commensurate hands to fill that niche. This scenario is unacceptable as it runs against government's desire to place the state in the league of the economically developed in Nigeria. Generally, although the importance of adequate middle technical manpower cannot be overstretched in any economy desirous of making technological breakthrough, as it is well documented in literature, the apathy given to practical application of technical knowledge among graduates of our technical colleges remains worrisome in the state.

To Okwubunka (1997), some of the debilitating factors of students' psychomotor performance in basic electricity in technical colleges are gender specific roles and self-concept of the learner, without recourse to gender. As concerned stakeholders in the technical education sector of society, these researchers sought to determine these students' characteristics of gender and self-concept as predictors of their psychomotor ability (being potential technical staff in the PHCN organization) in basic electricity as a means of enhancing human capital development in the nation.

## 3. Hypotheses

Therefore, the hypotheses that came to bear with this study are:

- (1) There is no significant difference in the psychomotor performance between male and female students in basic electricity in technical schools,
- (2) There is no significant difference in the psychomotive performance of male and female students, who cultivate positive and negative self-concept in basic electricity in technical colleges.

## 4. Methodology

The study followed the Ex-post Facto design, since the variables in the research (students' characteristics of gender and self-concept) was the independent variable, while psychomotor performance in basic electricity was the dependent variable. All these variables had already occurred in the subjects before this study was premeditated. The area of study was the central senatorial district of Cross River State with eight science and technical secondary colleges. The population of the study was the senior technical-II students numbering 500 from the eight (8) technical colleges in the study's area.

A sample of 200 technical-II students from 4 (out of 8) technical colleges in the area of study. The sample was stratified on 50 each of males and females from the 4 sampled schools technical-II students selected from intact classes. Two instruments were used for data generation: a 15-items self-rating inventory meant for the subjects to demonstrate the extent to which they view their academics as a positive or negative venture, and how they had been approaching their tasks; a 10-items questionnaire (Basic Electricity Psychomotor Test - BEPT) was also used to elicit information from the respondents on the perception of their practical abilities in electrical installation, distribution and maintenance. Generated data were then analyzed using the multiple independent t-test comparative analysis procedures (see tables 1 and 2).

Table 1. Independent t-test of difference in mean psychomotor performance in basic electricity of technical-II students by gender. N=200.

Variable (Gender)	N	SD	df	t-cal	P<.05
Male:	100	28.63			
Female:	100	23.25	198	11.52*	.000
Total:	200	25.94			

\*Significant at P<.05, df=198, Crit-t=1.968

Table 2. Independent t-test analysis of multiple comparisons of differences in the psychomotor performance of technical-II students in basic electricity by gender and nature of self-concept. N=200.

S/N	Variable (Gender)	Self-concept						df	t-cal	P<.05
		Positive			Negative					
		N	$\bar{X}$	SD	N	$\bar{X}$	SD			
1.	(Between groups) Male:	73	26.85	3.27	27	20.091	4.49	109	9.36	.000
2.	Female:	38	19.74	4.05	62	14.38	5.32	87	5.21*	.002
	Total	111	23.30	3.84	89	17.24				
3.	(Within Groups)									
	Male vs. Female:	73	26.85	3.27	27	20.091	4.49	98	5.18*	.001
4.	Female vs. Female	38	19.74	4.05	62	14.38	4.05	98	6.69*	.001
5.	General:									
	Male vs. Female:	100	23.41	3.88	100	17.06	4.69	198	14.42*	.000

\*Significant for all groups at P<.05, df=198, Crit-t=1.968

## 5. Results

Analysis of result for the two tables revealed higher values of calculated-t than the critical t-value. Precisely, from table 1, the calculated t-value of 11.52\* was far higher than the critical t-value of 1.968 needed for significance at P<.05, with df-198. Similarly, from table 2, all the calculated t-values of  $t_1$  and  $t_2$  (for between groups) namely:  $t_1$  for male Vs. female, positive self-concept = 9.36\* ( $\bar{X}_M=26.85^*$ ,  $SD_M=3.27$  and  $\bar{X}_F=19.74$ ,  $SD_F=4.05$ ); and  $t_2$  (for male Vs. female, negative self-concept = 5.21\*;  $\bar{X}_M=20.091$ ,  $SD_M=4.49$ ;  $\bar{X}_F=14.38$ ,  $SD_F=5.32$ , P<.05=0.002). For the within groups mean differences, male Vs. male differences gave a t-value of:  $t_3=5.18^*$  (for positive Vs. negative self-concept, while female vs. female on the same scale gave a t-value of

$t_4=5.69^*$ . Finally, on the general scale of male vs. female, self-concept influence on the psychomotor performance in basic electricity, the calculated  $t_5$  value was  $14.42^*$  (with  $\bar{X}_M=23.41$ ,  $SD_M=3.88$ ,  $\bar{X}_F=17.06$ ,  $SD_F=4.69$  at  $P<.05=.000$ ).

The calculated  $t_1$  value of  $11.52^*$  in table 1 indicated that there is significant mean difference in the psychomotor performance in basic electricity between male and female students in technical colleges. Here, the male students exhibited higher mean scores ( $\bar{X}_M=28.66$ ) with lower standard deviations ( $SD_M=2.99$ ) indicative of their high stability in their psychomotor abilities than their female counterparts with low means ( $\bar{X}_F=23.25$ ) and high standard deviations ( $4.34$ ) indicative of their high instability in the psychomotor abilities in basic electricity.

Similarly, the calculated  $t_1$  value of  $9.36^*$  was indicative that there is significant difference in the psychomotor performance of male and female technical-II students, who cultivate positive and negative self-concept in basic electricity in technical colleges in Cross River State. In this study, more (73 or 36.5%) males than females (38 or 19.0%) professed to always exhibit positive self-concept, while more females (62 or 31.0%) and less males (27 or 13.5%) possessed negative self-concept towards psychomotor performance in basic electricity; while on the general scale the male still exhibited higher mean score differences of  $\bar{X}_M=23.41$ ,  $SD_M=23.88$  as against their female counterparts with  $\bar{X}_F=17.06$ ,  $SD_M=4.69$ .

**Discussion of results:** The results as obtained in the study rejected the two hypotheses that directed the research; thus implying that high differences exist in the psychomotor performances of students in basic electricity courses in technical colleges, with regards to students' correlates of gender and self-concept. In all respects, the male students were found to portray higher psychomotor abilities in basic electricity than their female counterparts. Furthermore, the males exhibited higher and more positive self-concept towards basic electricity than their female counterparts.

These results which agree with Okwubunka (1997) have exposed us to the fact that most of our students in technical colleges (who are potential technicians, technologists and engineers) are dwelling in negative, unrealistic imagery about themselves and their incapacities in practical scientific/technical subjects. This is in high agreement with Okwubunka (1997), who in her study sees "the self" as a remarkable conservative aspect of the human organism; once a child has formed a negative image of himself as a learner, the task of the instructor becomes extremely difficult. This is why studies by Fontana (1981), Mbang (2008) and Okwubunka (1997) among others had findings in related works, which are highly consistent with this study. Therefore, the prevention of negative self-concept is a vital first-step in teaching (as asserted by Brooker and his associates, 1978). Hence there is need to build positive and realistic self-conception in students so that they can learn and perform better in life.

## 6. Conclusion and Recommendations

The study has proven that students' correlates of gender and self-concept significantly influence their psychomotor performance in basic electricity in technical colleges in the Central Senatorial District of Cross river state, Nigeria. That the male students perform better and higher than their female counterparts because of their high confidence and development of positive self-concept towards their studies. It was therefore recommended that guidance and counseling services be provided in technical colleges to build the confidence and break the disparity in psychomotor performance of students.

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