COGNITIVE ABILITY AS A PREDICTOR OF STUDENTS ACADEMIC PERFORMANCE AMONG STUDENTS OF FEDERAL GOVERNMENT COLLEGES IN NORTH-WEST NIGERIA

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Abstract

This study investigated cognitive ability as predictor of students' academic performance in Federal Government Colleges in North- West Nigeria. Correlation research design was used in the study. The population of the study is 3,090 senior Secondary Schools SS II students in FGC in North-West, Nigeria. A sample of 984 students was randomly selected from the 3,090 students.one research instruments is used, the Non-Verbal Reasoning Test (AH4 PART II) 0ne objectives and one hypotheses formulated and tested at 0.05 level of significance, data obtained was analyzed using Pearson Product Moment Correlation Coefficient (PPMCC) statistic and t –test for independent sample were used at.0.05 level of significance. The finding of the study indicated a strong positive relationship between cognitive ability and academic performance, (p –value .000 r-value .627 < 0.05). Although cognitive skills are seldom taught explicitly in schools, research indicates that schooling can promote cognitive skills. Thus attendance might improve cognitive abilities. Traditional schooling emphasize on academic scores. Since, cognitive skills are predictors of academic performance, schools that improve cognitive skills indirectly will improve academic performance. The study recommended that, curriculum developers should design programmes and subjects that will motivate students to think critically and to enhance their cognitive ability.

Keywords: Cognitive ability, Students, Academic performance, Non-Verbal Reasoning

Introduction

The function of education in influencing one's life for good cannot be overemphasized. It is a basis for living a stirring life in this world. Secondary education is the level of education where development of skills and mental faculty begin. The respect for the worth and dignity of the personality, conviction on one's ability to make realistic determinations and equipped with skills and attitudes for effective living and survival, as well as respect for dignity of labour all begin at secondary school(Isaac 2011). Attainment of successive education is predicted by some factors in which cognitive ability has been taking into consideration as a significant factor that influences students' academic achievement Pintrich, (2013).

Cognitive ability is the mental action or process of acquiring knowledge and understanding through, experience, and the senses (.Pintrich,2013), He further emphasized that cognitive ability encompasses processes such as knowledge and attention, memory, working memory, judgment and evaluation, reasoning and computation, problem solving and decision making, comprehension and production of language and others. Human cognition is conscious and unconscious, concrete or abstract, as well as

intuitive (like knowledge of a language) and conceptual (like a model of a language) Emily (2012).

One way in which talented individuals can be identified is through the evaluation of their general Cognitive ability; it is the ability that consistently differentiates individuals on mental abilities regardless of test or task (Jensen, 2017). Cognitive ability tests are also known more broadly as aptitude and ability tests or general intelligence assessments. These cognitive ability tests can help to show schools and educational institutions to know how quickly one can pick up task, how well an individual be able to make appropriate decisions in a timely manner, whether the individual be able to cope well with situations that are new to more complicated and whether one can exercise sound reasoning and provide suitable solutions to problems.

Ultimately, these cognitive ability tests can give a strong indication of likely overall academic performance, as well as identifying areas that require development and coaching. Sometimes cognitive ability tests can be used in schools, to give teachers an idea of where to focus teaching. Cognitive ability is assumed to be composed of a number of hierarchically ordered abilities with a very general cognitive ability factor at the top of the hierarchy (McCoach, 2003). Numeracy, literacy, and problem solving are probably strongly related to this general factor, but they do not capture all aspects of human intellect. Thus, numeracy, literacy, and problem solving might still be correlated with uncaptured ability in the error term and, through this, they might become endogenous variables. In addition, since education is highly correlated with ability, it might also be an endogenous variable. There is greater evidence for hereditary influences on cognitive ability than for the pinpointing of many specific influential genes. The level of influence has been found to vary with age and potentially other environmental factors (Deci & Ryan, 2000).

Cognition involves the capacity to make sense of the self and the world, through action and language. Meaningful learning is a generative process of representing and manipulating concrete things and mental representations, rather than storage and retrieval of information. Thinking, language (verbal or sign) and doing things are thus intimately intertwined. This is a process that begins in infancy, and develops through independent and mediated activities (Deci & Ryan, 2000).

Cognitive abilities play a prominent role in shaping an individual's career and academic performance. It is the ability to think intellectually. These abilities are brain-based skills that need to carry out any task from the simplest to the most complex.(Dickens, 2016), opined that cognition has to do with how a person understands and acts in the world. It is a set of abilities, skills or processes that are part of every human action that is the ability to learn, to process and apply knowledge, to analyse and reason and to evaluate and decide.

Cognitive skills are the core skills that the brain uses to think, read, learn, remember, reason, and pay attention. Working together, they take incoming information and move it into the bank of knowledge that is used in our every day at school, at work, and in life .McCoach (2003), observed that, psychometrics experts and psychologists use the word cognition for describing thought processes. It encompasses thought processes that lead to speed up information processing. This means looking at how quickly one can move from perception and acquisition of knowledge, to retaining it, organising it around the existing knowledge and then being able to take those concepts and apply them again in a different situation. This is related to problem-solving, analytic and reasoning skills.

Statement of the Problem

It is a general wish and aspiration of students, parents, educators and all stakeholders of education, that students at all levels of education, excel in their pursuance of academic work at all times. In view of

this, various attempts are being made by students, parents, teachers among others in Nigeria to ensure high academic performance among students, some of these attempts include the act of organizing extra classes for students by teachers, parents spending extra monies on their children's education, and government increasing teachers' salaries to motivate them to give off their best (FRN.2019).

Despite of all these, it appears some students continue to perform below average in educational institutions in Nigeria. It has been a general notion over the years that level of academic performance has been very low among Senior Secondary Schools students in Nigeria especially North West Nigeria ,(West African Examination Council WAEC,2022). This trend has been attributed to certain factors including social, economic, religion and psychological, under which Students cognitive ability finds expression (Villarroel, 2019).

Incidentally, most research works and findings on the influence of students' cognitive ability on their academic performance have been reported from Western cultures which may be different from related issues within the Nigerian cultural context. In Nigeria, little is known about the relationship student's cognitive ability on their academic performance, especially in the North- West Nigeria and most importantly the Federal Government Colleges. Based on the foregoing, the problem of this study put in question form as to what extent does cognitive ability predicts student academic performance in Federal Government Colleges in North-West Nigeria?.The gap as indicated motivated the researcher to examine students' perception on cognitive ability and the direct or indirect influence they have on students' academic performance in the North-Western region in Nigeria.

Objectives of the Study

The main objective of the study is to ascertain the relationships of cognitive ability and academic performance among SS II students of FGC in North-west Nigeria

Research Hypothesis

HO1: There is no significant relationship between Cognitive ability and academic performance of SS11students of FGC in North – West Nigeria. Scope of the study.

Methodology

This study covered only the psychological constructs of cognitive abilities of students as predictor of students' academic performance in Federal Government Colleges in North West Nigeria. Non-Verbal Reasoning Test (AH4 PART II) and the Student's Academic Performance Records (SAPR) as proforma.

Table 1. SS 11 Students Population of the Study

STATE	SCHOOL	MALE	FEMALE	TOTAL
Katsina	FGC Daura	61	84	145
	FSCT Dayi	96	38	134
	FGGC Bakori	-	198	198
KANO	FGC Kano	80	56	136
	FGC Munjibir	-	215	215
KADUNA	FGC Kaduna	96	74	170
	FGC Kafancan	-	181	181

	FGGC Zaria	-	226	226
ZAMFARA	FGCC Gusau	-	174	174
	FGC Anka	98	36	134
KEBBI	FGC Gwandu	-	218	218
	FGGC BirninYawuri	-	216	216
	FSCT Zuru	66	43	109
JIGAWA	FGC Kazaure	-	188	188
	FGC Kiyawa	73	54	127
SOKOTO	FSCT Sokoto	87	67	154
	FGGC Tambuwal	-	215	215
	FGC Sokoto	96	54	150
TOTAL		753	2337	3090

Source: From respective school principals/ State Zonal Offices, June 2021

Sample

Sample size for the study is nine hundred and seventy five (975) out of which five hundred and sixty one (561) are male while four hundred and fourteen (414) are females**.**The researcher arrive at this sample by taking the entire SS 11 Students from the seven schools selected for the study, one mix school from each state from North-West because they are available, convenient, and represent some characteristic of the study.

Table 2. Schools Sampled and their Population

State	School	Male	Female	Total
Katsina	FGC Daura	61	84	145
Kano	FGC Kano	80	56	136
Kaduna	FGC Kaduna	96	74	170
Kebbi	FSCT Zuru	66	43	109
Jigawa	FGC Kiyawa	73	54	127
Sokoto	FGC Sokoto	87	67	154
Zamfara	FGC Anka	98	36	134
Total		**561**	**414**	**975**

In order to obtain a representative sample size for this study, Purposive samplingTechnique was used for this study, in which seven (7) Schools were selected for the study, one mix school (Boys and Girls) from each state from the North-West Nigeria

The Non–verbal reasoning test (AH4 PART II) is adapted from Bakari and Balarabe (2013), this instrument has 65 items to be answered in 10 minutes and each item was equally scored at one (1) mark. The total marks were 65 marks and the cut-off point is 26 point. In view of this, any student that scored from 26 to above be considers as having higher cognitive ability. The test contains pictures that range from 1 to five; the right answer is one of the five options given for every question. Even though the instrument was adopted it was still subjected to reliability and validity testing and a reliability index

of the instrument Cronbach"s alpha value was established at .761. Data was analysed using Pearson Product Moment Correlation Coefficient (PPMCC) at 0.05 level of significance.

Results

HO1: There is no significant relationship between cognitive ability and academic performance of SS II students of FGC in North – West Nigeria.

Table 3: Pearson's Product moment Correlation Coefficient analysis between Cognitive ability and academic performance of SS II students of FGC in North – West Nigeria

		AP		CA
Academic Performance	R		.627*	
	R^2		.0.393(39.3%)	
	Mean	55.74		12.18
	SD	11.554		7.140
Cognitive ability	N	944		944
P-value			.000	

DF=942, AP= Academic Performance, CA= Cognitive ability

Table 1: was the result of the hypothesis testing the relationship between cognitive ability and academic performance. The result shows the mean of 55.74 with the standard deviation of 12.18 for academic performance (AP) and mean of 12.18 with the standard deviation of 7.140 for cognitive ability (CA). The computed r –value was .627 this shows that there is significant relationship between the cognitive ability and the students' academic performance. The p –value is .000 which is less than .05 alpha. In view of this the stated hypothesis was rejected. Indicated that, there is significant relationship between cognitive ability and the students' academic performance in both English language and mathematics for SS II students of FGC in North – West Nigeria.

Discussion of Findings

Cognitive ability has moderate relationship to their academic performance. Similarly, the corresponding hypothesis affirmed that, there is significant relationship between cognitive ability and the students' academic performance in both English language and mathematics for SS II students of FGC in North – West Nigeria. The finding is similar with the finding of Assouline et al (2012), who revealed that despite the restricted range of cognitive abilities, students diagnosed with Asperger syndrome had significantly higher Verbal Comprehension Index scores than did students diagnosed with autism. However, students with autism had significantly higher scores on tests of math fluency and written expression than did students with Asperger syndrome. The finding supported the findings of this study Warnimont, (2010), who that the CogAT is significantly related to the fourth and fifth grade Reading and Math performance tests, which indicates cognitive ability, and can be used to predict future academic performance, while supporting the importance of making data-driven decisions. This also indicate that The study showed that there is high relationship between Cognitive ability and academic performance of SS II students of FGC, that 39% of the variance observed in students' academic performance in Mathematics and English language in FGC students in North – West Nigeria, was as a result of students cognitive ability.

Conclusion

Based on the findings, the researchers concluded that, there is significant relationship between self -

concept, motivation and cognitive ability on student's academic performance in both English language and mathematics for SS II students of FGC in North – West Nigeria,

Recommendations

1. Curriculum developers should design programmes and courses that will motivate students to think critically and to enhance their cognitive ability.
2. Quiz competitions, class presentations and inter school debates should be organized for students in order to enhance their cognitive ability and their self-concept by the school management.

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