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INFLUENCE OF COGNITIVE LEARNING STYLE ON STUDENTS' ACADEMIC PERFORMANCE IN MATHEMATICS

Awwalu B. Habiba
Department of Economics and Social Research
National Institute for Legislative and Democratic Studies Abuja
Corresponding Author: iyamibbg@gmail.com

ABSTRACT

Cognitive learning style is a psychological variable that regulates students' cognitive functioning and performance in mathematics. Correlational research design was adopted in the study. Population consists of 140 Senior Secondary Two SS II students from three secondary in Kazaure Local Government Area. Sample of 87 students' who participated in the study was randomly selected. Instruments for data collection were Cognitive Learning Style Questionnaire (CLSQ) and Mathematics Performance Test (MPT). CLSQ and MPT were validated by experts in Mathematics Education. Cronbach's alpha reliability coefficient of 0.65 was obtained for CLSQ while 0. 74 was obtained for MPT using split half methods. Finding revealed cognitive learning style at F value as 43.587 at p, 0.014 significantly influence students'' academic performance in mathematics. Additional result of the revealed coefficient beta t value as 7.384, p 0.000 indicating cognitive learning style significantly predict performance in mathematics. Based on the finding the study recommends students' adoption of cognitive learning in learning considering it positive influence on their performance in mathematics.

K**eywords:** Cognitive, Learning, Performance and Mathematics

Introduction

Learning processes are regarded as significant factors influencing students'' academic performance. Cognitive ability, intellectual and capabilities are essential variable in students' learning (Shi & Qu, 2021). Raslan (2023) highlights critical thinking, comprehension, memory, creativity, ability to acquire knowledge as major determinants of cognitive learning style. Cognitive learning style is the psychological variable regulating students' cognitive functioning (Kholodnaya ,2002). Ifelunni (2019) opined that cognitive learning style differs in the way students' think, reason and translate problems. Cognitive learning style is categorized into Field Dependence (FD) and Field Independence (FI). Field dependent is particularly characterize as engaging in collaborative learning while the field independent involves engagement in individualize learning (Witkin in Lucas-Stannard, 2003).

Kholodnaya (2002) stated that field independent students distinguish figures as separate from their backgrounds compared to the field dependent students' who experience events in an undifferentiated way. Cognitive learning style takes into account desirable effects of problem solving. Based on the importance of cognitive learning style on students''

academic performance the present study explores the influence of cognitive learning style on students'' performance in mathematics and sought to: -

i) Determine the influence of cognitive learning style on students'' academic performance in mathematics.
ii) Determine the extent cognitive learning style predicts students' academic performance in mathematics.

Research Questions

i) What is the influence of cognitive learning style on students' academic performance in mathematics?
ii) To what extent do cognitive learning style predict students' academic performance in mathematics?

Hypotheses

H_{01}: There is no significant influence of cognitive learning style on students' academic performance in mathematics.

H_{02}: Cognitive learning style do not significantly predict student academic performance in mathematics.

Literature Review

Cognitive style is characterised by self-consistency and shows an individual's intellectual activities (Witkin,1964). Social cognitive theory considers unique way an individual acquires and maintain behaviour, skills and capabilities (Luszczynskaa & Schwarzer, 2020). Ponomarioviene and JakavonyteStaškuvien (2024) found cognitive learning style as students' decision making developed through competence in learning. Rubab, *et al*, (2024) in their research on social and emotional self-awareness skills among students' found knowledge, abilities, and good communication among students', teachers, family and community are the best skills and practices indicated for decision-making. Onyango and Aloka (2023) found significant positive relationship between social cognitive skills and delinquent behaviour modification among students' and the behaviour modification among students' is explained by social cognitive abilities.

Ramganesh and Reddy (2021) ascertained logical reasoning of students as predictor of academic performance in mathematics found logical reasoning as a significant predictor of performance in mathematics. Listiana, *et al.*, (2023) study on enhancing cognitive retention of different academic abilities of undergraduate students through problem-based learning found problem-based learning strategy as an effective learning strategy that increases students' cognitive retention.

Learning Styles

Learning styles is a term use to explaining various ways students acquire knowledge, it seeks to give an explanation on how learning occurs. Individual difference is very crucial in learning as it works under premise that no two persons learn in same way. Learning styles therefore is an individual's unique way of absorbing, processing, comprehending and retaining information. Hsieh *et al*., (2011) state that characteristics, strengths and preferences in which an individual receive and process information. Ghaedi and Jam (2014) defines learning styles as the changes among learners in using one or more senses to understand, organize, and, retain

experiences. Fatemeh and Camellia (2018) stated that students prefer learning with divergent learning styles, as it enhance their academic performance. Learning style is primarily concerned with how students learn and not what they learn (Fardon, 2013). Alavi and Toozandehjani (2017) revealed that learning style enhances students' academic performance. Barman *et al.* (2014) study on learning style and academic performance found students'' knowledge of learning style improves academic performance. Magulod (2019) conducted research on learning styles and academic performance and found a significant relationship between learning styles and students' academic performance. Dalmolin *et al.* (2018) found a positive connection between students' learning styles and their academic performance.

Methods

Correlational research design was adopted in the study. Population consists of 140 Senior Secondary Two SSII students from three schools in Kazaure Local Government Area. Sample of 87 students' who completed the questionnaire were randomly selected. Instruments for data collection were a 10 items statement Cognitive Learning Style Questionnaire (CLSQ) on five points Likert scale with five item statements measuring Field independent and another five item statements measuring Field Dependent. Mathematics Performance Test (MPT) consists of 10 multiple choice questions. CLSQ and MPT were validated by experts in field of Mathematics Education. Cronbach's alpha reliability coefficient of 0.65 was obtained for the CLSQ while 0. 74 was obtained for MPT using split half methods. Data were analysed using regression analysis at 0.05 significant level to determine the extent to which cognitive learning styles influence students' academic performance in mathematics.

Results

H_{01}: There is no significant influence of cognitive learning style on students' academic performance in mathematics.

Table 1: Regression Model on Influence of Cognitive Learning Style on Students' Performance in Mathematics

					Change Statistics				
Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	R Square Change	F Change	df1	df2	Sig. F Change
1	.264[a]	.69	.50	9.3627	.069	3.585	1	85	.014

a. Predictors: (Constant), Cognitive Learning Style

Table1 gives R square value as 0.69 indicating cognitive learning style contributed about 69 percent on students' performance in mathematics the remaining 31 percent would be attributed to other factor.

Table 2 : ANOVA on Cognitive Learning Style on Students' Performance in Mathematics

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	314.244	1	314.244	43.585	.014
	Residual	4207.756	85	87.662		
	Total	4522.000	84			

a. Dependent Variable: Performance in Mathematics

Table 2 gives the F value as 43.587 significant at 0.014 indicating cognitive learning style significantly influence students' academic performance in mathematics.

H_{02}: Cognitive learning style do not significantly predict student academic performance in mathematics.

Table3 : Coefficient Beta on Cognitive Learning Style and Students' Performance in Mathematics

Model		Unstandardized Coefficients B	Unstandardized Coefficients Std. Error	Standardized Coefficients Beta	t	Sig.
1	(Constant)	50.655	6.860		7.384	.000
	Cognitive Learning Style	.243	.128	.264	1.893	

a. Dependent Variable: Performance in Mathematics

Table 3 gives the coefficient beta t value as 7.384 significant at 0.000 indicating cognitive learning style significantly predict students' academic performance in mathematics.

Discussion of Findings

Cognitive learning style significantly influence students' performance in mathematics this finding agrees with Ifelunni, *et al*., (2022) who reports indicates cognitive style significant influence on students' academic performance. Altun and Cakan (2006) in a divergent view reported cognitive learning styles do not significantly influence students' academic performance. Cognitive learning style significantly predict students' performance in mathematics.

Conclusion

From results of the study, it was concluded that cognitive learning style influences students' academic performance in mathematics.

Recommendation

Based on the finding the study recommends the adoption of cognitive learning in learning considering it positive influence on students' academic performance in mathematics.

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