

RELATIONSHIP BETWEEN COGNITIVE STYLE DEVELOPMENT AND ACADEMIC PERFORMANCE AMONG JUNIOR SECONDARY SCHOOLSTUDENTS IN KADUNA METROPOLIS

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Abstract

The study examined relationship between cognitive styles and academic performance among students of junior secondary schools in Kaduna Metropolis, Kaduna State. The study was guided by four hypotheses. Correlational design was employed in the study. The target population for the study was 12,617 junior secondary school students and the samples of 375 students were drawn based on Crecjie and Morgan (1970). Herman Witkin (1996) reflectivity/impulsivity Cognitive Styles and Students Mock Examination were the instruments used for data collection. Mean, standard deviation and Pearson Correlation and t-test were used to test the null hypotheses that guided this study. The findings revealed that significant relationship exists between reflectivity and academic performance with r value of $-.548$ and (p) value of 0.005 , significant relationship exists between impulsivity and academic performance with r value = $.398$ and (p) value of 0.000 , significant difference between male and female students in reflectivity variable as female students with the mean = 30.3400 more of reflectivity than male students with mean = 27.2467 and p -value $.009$, there exists significant difference between male and female students in impulsivity variable as male students are more of impulsivity than females as shown by the mean of = 29.8400 for male students, 26.2333 for female students and $p = .000$. It was recommended that teachers should determine the cognitive styles of their students through employing cognitive style questionnaire directly and or applying its contents with a view to finding suitable ways of training them.

Keywords: cognitive styles (reflectivity/impulsivity) academic performance

Introduction

Each individual learns and processes information with regards to his own special style though, we share some learning patterns, preferences, and approaches. Theorists believed that, each individual is unique and we differ from each other. Thus, individuals have different characters, behavior and styles in learning new things. Each individual has a particular style in learning that is best suited to them which allows them to collect and process information successfully in order to learn. The principal idea is that, since these styles in learning differ from one individual to the next, theorists argued that school teachers should incorporate these different cognitive styles in to their lessons so that each student is catered for and everyone can learn effectively. Many educationists believed that differences in Cognitive

styles are responsible for some students' difficulties. For example, if a student is taught in the style he does not prefer he may not learn as successfully as those students being taught in their own preferred styles.

The nature of the learning process and the laws that govern its operation determines the type of teaching to be used by the teachers, as the learner is being recognized as the first principle of teaching and learning. According to Psychologists, learning is a process of growth and development through self-activity or experience. Every learning situation entails effect, and learning requires a response potential which is sufficient to allow various kinds of behavior. Learning is not complete until the individual learner receives satisfaction, reward or reduction of tension.

Cognitive learning styles refer to the preferred way an individual processes information. They are modes by which learners approach, acquire and process information as well as including the consistent ways in which an individual memorizes and retrieves information (Witkin & Ash, 2012). They are also thought of; as those information habits representing the learner's typical mode of perceiving, thinking, problem solving and remembering Messick, (2011).

Cognitive styles are highly relevant to many important educational concerns including teaching and learning. Although, there are a variety of motivational and environmental factors that influence learning and cognition that represents the core of learning process, Cognitive styles seem to be the most relevant to those associated with academic performance (Butler, O'Brien & Barnold, 2011). They are considered to be the overall pattern that provides direction to teaching and learning which are also seen as a set of factors and attitude that facilitate learning for an individual in a given situation and also influence the way students learn and also influence the way the two interact together.

According to Witkin and Goodenough (2013), people are termed impulsive if they are able to abstract an element from its context or background. In that case, they tend to be more analytic and approach problems in a more analytical way. Reflective people on the other hand are more likely to be better at recalling social information, conversations and relationships. Field dependence and field independence constitute an important aspect of individual differences among students with regards to the way they acquire and process information which appears to hold a promising potential for a design and development of effective instructional materials. Reflectivity/impulsivity dimensions refer to the extent to which individuals are influenced by biological or environmental factors in orienting themselves and at the extent to which they make fine differentiation in the environment, (Hayes, 2014). The more individuals are termed impulsive the greater their ability to achieve academic excellence.

Knowles (2014) observed that in the past, little or no attention was given to perception and cognition as an alignment to teaching and learning for academic performance, until many research work had been carried out to show the significance of the design in education and the training of teachers and instructors, it also demonstrated various links between the design and the alignment of training into a successful program. From therein further studies in the area suggested that optimum

students' performance occur when the students' cognitive styles and teacher instructional methods are aligned. Reflectivity/impulsivity constitutes an important aspect of individual differences among students regarding the way they acquire and process information which appears to hold a promising potential for the design.

Aziz (2014) opined that, students themselves play a crucial effort in making themselves to be high achievers, by having an effective learning styles, learning goals, learning strategies and also the ability to build on prior knowledge and strategic thinking as these students understand and use variety of strategies or styles to help them reach learning and performance goals, and are also able to supply their knowledge to various structures. Phijer (2009) found that, impulsivity learners recall significantly more from mathematics and science passages, while the reflectivity learners recall more from socially oriented passages. Hall (2014) observed that impulsivity learners recall more of the structural and functional information than the reflectivity learners. Riding (2014) on his discovery of the performance of two types of individuals i.e. The reflectivity and independent learners stated that impulsivity learners achieved more in performance based assessments than their counter parts of the impulsivity styles. Wilborn (2007) based on his observations concludes that the impulsivity learn more from an individualized paced than the reflectivity students.

When students gain admission into junior secondary school, they came in hopeful, eager and ready to perform any academic activities in realizing their educational ambitions, but faced with poor academic performance, most especially in the subjects of mathematics and English language which are compulsory subjects for admission into any higher institutions in Nigeria. The poor academic performance of students could be attributed to so many factors but one factor of concern here is their unidentified Cognitive Styles which is vital in the teaching and learning process.

Teachers adopt same methods in addressing the students without being aware of the learners' cognitive style, either as reflectivity or impulsivity learners. The teachers apply static methods in addressing all the learners irrespective of their different learning styles and expecting them to learn with maximum understanding to perform well academically. This concern forms the basis for the researcher to investigate into the relationship between cognitive style and academic performance of junior secondary students.

The study was guided by the following objectives, research questions and hypotheses:

- To find out the relationship between reflectivity and academic performance among JSSIII students in Kaduna metropolitan
- To find out the relationship between impulsivity and academic performance among JSSIII students in Kaduna metropolitan.
- To find out the differences between male and female student in reflectivity among JSSIII students in Kaduna metropolitan.
- To find out the differences between male and female student in impulsivity among JSSIII students in Kaduna metropolitan.
- What is the relationship between reflectivity and academic performance among JSSIII students in Kaduna metropolitan?

- What is the relationship between impulsivity and academic performance among JSSIII students in Kaduna metropolitan?
- What are the differences between male and female student in reflectivity among JSSIII students in Kaduna metropolitan?
- What are the differences between male and female student in reflectivity among JSSIII students in Kaduna metropolitan?
- There is no significant relationship between reflectivity and academic performance among JSSIII students in Kaduna metropolitan?
- There is no significant relationship between impulsivity and academic performance among JSSIII students in Kaduna metropolitan?
- There is no significant difference between male and female student in reflectivity among JSSIII students in Kaduna metropolitan?
- There are no significant differences between male and female student in impulsivity among JSSIII students in Kaduna metropolitan?

Method

Research design for this study was correlation design. Correlation design is a design that intends to determine the existence of a relationship between two or more quantifiable variables, and to what degree this relationship exists.

The population of this study comprised of all the students in the forty one (41) public junior secondary schools in their second year (JSSIII) in Kaduna metropolis. Kaduna metropolis consisted of two (2) educational zones namely Rigacikum zone and Kaduna north educational zones respectively.

Rigacikum zone consists of 28 junior secondary schools with a population of seven thousand eight hundred and forty (7,840) students, which comprised of four thousand two hundred and fifty three (4,253) male students, and three thousand five hundred and eighty seven (3,587) females students. While Kaduna north zone comprises of 13 junior secondary schools with a population of two thousand four hundred and eighty- four (2484), with males constituting one thousand two hundred and ninety four (1,294) and females at one thousand one hundred and ninety (1,190). The total population for this study is twelve thousand six hundred and seventeen (12,617) students, including both the males (five thousand five hundred and forty seven, 5,547) and the females (four thousand seven hundred and seventy seven, 4,777) all of whom are in their second year in the junior secondary school (JSS III).

Out of the population, the sample for this study consisted of the students in six (6) junior secondary schools in Kaduna metropolis. Three (3) schools were selected from each zone. Krejcie and Morgan table of determining sample size (1970) was employed by the researcher to determine the sample size of the population. The table indicated that a population of

12,617 requires 375 samples size which is adequate for representation of the population. The simple random sampling technique was used in the selection of the subjects for the study. All the selections were done on equal basis and each student stand equal chance of being selected.

For the purpose of collecting data for this study, two instruments were adapted for the study to measure each variable in focus on the reflectivity/impulsivity cognitive style scale was measured using the Herman Witkins' Scale (Cognitive Style Instrument). This scale has two sections, section (A) comprises of the demographic information of the respondents and section (B) comprises of twenty (20) items for the reflectivity and the impulsivity subjects. The scale was adapted from Herman Witkins' scale of Cognitive Style instrument. The scale is in a four (4) point Likert scale SA = Strongly Agree 4, A = Agree 3, D = Disagree 2, SD = Strongly Disagree 1. The items are presented in a statement and the students were asked to choose any of the four responses that best explain their feelings.

Result

Table 1: Pearson Product Moment Correlation statistics on relationship between reflectivity and academic performance

Variables	N	Mean	S.D	Correlation Index r	SIG (P)
Reflectivity	198	28.3521	6.2624		
Academic Performance	198	57.86	10.781	-.548	0.005
			7.3624		

The computed result of table 1 Pearson Product Moment Correlation statistics revealed that significant relationship exists between reflectivity and academic performance. This is because the calculated significant (p) value of 0.005 is lower than 0.05 alpha level of significance at inverse correlation r value =.548. This shows that the higher the reflectivity the lower the academic performance and vice versa. Therefore, the null hypothesis which states that there is no significant relationship between reflectivity and academic performance among JSS III students is hereby rejected.

Table 2: Pearson Product Moment Correlation statistics on relationship between impulsivity and academic performance

Variables	N	Mean	S.D	Correlation Index r	P'. SIG (P)
Impulsivity	177	30.1040	4.13688		
Academic Performance	177	57.86	10.781	.398	0.000

Pearson Product Moment Correlation statistics revealed that significant relationship exists between impulsivity and academic performance. This is because the calculated significant (p) value of 0.000 is lower than 0.05 alpha level of significance at correlation r value = .398. This shows that the higher the field independence the higher the academic performance. Therefore, the null hypothesis which stated that there is no significant relationship between impulsivity and academic performance among JSSIII students is hereby rejected

Table 3: t-test analysis comparing mean score of male and female students on reflectivity variable

Reflectivity	N	Mean	t-test	Df	P-Value	MD
Reflectivity Male	67	27.2467	2.639	373	.009	3.0933
Reflectivity Female	151	30.3400				

Table 4.3 shows that there is significant difference between male and female students in reflectivity variable because the p-value .009 is less than 0.05 level of significance at degree of freedom 373, $t=2.639$, mean score of male students =27.2467 while female students =30.3400. This means that female students are more reflectivity than their male counterparts. Therefore the hypothesis which says there is no significant difference between male and female in reflectivity variable is hereby rejected.

Table 4: t-test analysis comparing mean score of male and female students on impulsivity

Impulsivity	N	Mean	t-test	Df	P-Value	MD
Impulsivity Male	121	29.8400	3.894	373	.000	3.6067
Impulsivity Female	362	26.2333				

Table 4 shows that there is significant difference between male and female students in Impulsivity because the p-value .000 is less than 0.05 level of significance at degree of freedom 373, $t = 3.894$, mean score of male students =29.8400 while female students =26.2333. This means that male students are more Impulsivity than their male counterparts. Therefore the hypothesis which says there is no significant difference between male and female in Impulsivity variable is hereby rejected.

Discussions

This study found significant relationship between reflectivity and academic performance among SS 2 students. This finding corroborates the

study conducted by Arif and Mehtap (2012) that assessed reflectivity/impulsivity cognitive among junior secondary school Students' Academic Performance, and Attitude toward Computers. In this study, the Group Embedded Figures Test was used to assess reflectivity among 130 teacher trainees. Overall, it was found that there was significant relationship between cognitive styles and academic performance; cognitive styles and attitudes toward computers; and, cognitive styles and attitudes toward computers when their academic performance scores were covariate. It is also in line with the study of Hamidreza and Mahvash (2014) that investigated the causal correlation between reflectivity\ impulsivity cognitive style and vocabulary learning strategies among Iranian EFL learners. The results also revealed that reflectivity learners tended to use social strategies more than reflectivity individuals.

The study also found significant relationship between reflectivity and academic performance among JSSIII students. This finding is in consonance with Schmeck (2013) study that correlated the relationship between Students' Cognitive Style (reflectivity and impulsivity Cognitive Styles) with their Mathematic Performance in Primary School. The study also showed that there was a low positive correlation between students' cognitive styles and their mathematics performance. There was also a significant difference in cognitive styles between boys and girls in the school.

The finding equally corroborates Hamidreza and Mahvash (2014) that investigated the causal correlation between reflectivity/ impulsivity cognitive style and vocabulary learning strategies among Iranian learners.

The results showed that there was causal correlation between reflectivity/ impulsivity cognitive style and vocabulary learning strategies. The result also revealed that reflectivity learners tended to use social strategies more than impulsivity individuals while impulsivity learners used cognitive and metacognitive strategies more frequently than reflectivity counterparts.

The study found significant difference between male and female students in reflectivity. It confirms the research conducted by Yusof & Wan (2015) that investigated the relationship between students' cognitive styles and their academic performance. Result of study showed that there was no correlation between cognitive styles and students' academic performance. The study found that boys and girls significantly differ in cognitive styles with reflectivity more dominant among female students.

The study found significant difference between male and female students reflectivity. This finding is in incongruence with study by Ramlah and Masran (2007). The study found that there was positive and significant correlation between teachers' teaching style and students' cognitive style with

their mathematic performance. Coefficient correlation showed that the effect of teachers' teaching had greater influence than students' cognitive styles on their mathematic performance. The findings finally found that male students were more impulsive than female students.

Conclusion

Based on the findings of the study the following conclusions are drawn: negative relationship exists between reflectivity and academic performance; and positive relationship exists between impulsivity and academic performance; Difference also exists between male and female students in reflectivity variable in favour of the female students, and difference also exists between male and female in impulsivity variable in favour of the males respectively.

Recommendation

1. Teachers should teach their students according to their cognitive style to improve their academic performance. Teachers should give more attention to female students who were found to be more reflective by way of training to improve their academic performance.
2. Schools, Ministry of Education and other stakeholders in education should organize seminars and workshops to orient both teachers and students on cognitive styles and its relationship with academic performance.
3. Teachers should place more emphasis on female students this will enable them to improve or develop more reflectivity as well the academic out come.
4. Teachers should look at impulsive students and give necessary assistance where is needed in order to minimized the degree of impulsivity for better academic performance.

Reference

- Arif R, and Mehtap D, (2012). *Cognitive style and complexity: implications or I/O psychology*. In C.L. Cooper& I. Robertson (Eds.), *International review of industrial and organizational psychology*. Oxford, United Kingdom: Wiley
- Aziz L, (2014) *Thinking styles and the Big Five personality traits*. Educational Psychology, 22, 17 – 31.
- Borg C and Gall A,(2012) *Thinking styles across cultures: Their relationships with students learning*. In R.J. Sternberg & L.. Zhang (Eds),

- Perspectives on thinking, learning and cognitive styles. Mahwah, NJ: Erlbaum
- Grasha C, (2011) *Thinking styles and the Big Five personality traits*. Educational Psychology, 22, 17 – 31.
- Hall K, (2014) Individual differences in ease of perception on embedded figures. *Journal of Personality*.
- Hamidreza W, and Mahvash L, (2014) *Field- dependence – independence and brain organization: The confluence of two different ways of describing general norms of cognitive functioning? A theoretical review*. *Perceptual and Motor Skills*.
- Hayes, H, (2014). *Cognition, Theory. Research promise*. New York: Harper
- Honey V, and Mumford T, (2012) Thinking styles and the five factor model of personality, *European Journal of Personality*.
- Knowles F, (2014) *Are thinking styles and personality types related?* Educational Psychology, 20, 271 – 283.
- Messick Q, (2011) An organization of learning styles theory and constructs. *Paper presented at the Annual meeting of the American Educational Research Association, Montreal, Quebec, Canada*.
- Phijer B, (2009) *Cognitive style and complexity: implications or I/O psychology*. In C.L. Cooper & I. Robertson (Eds.), *International review of industrial and organizational psychology*. Oxford, United Kingdom: Wiley.
- Ramlah E, and Masran J, (2007) *Are thinking styles and personality types related?* Educational Psychology, 20, 271 – 283.
- Rayner, S. & Riding, R. (2013). *Towards a categorization of cognitive styles and learning styles*. Educational Psychology.
- Riding, R. & Cheema, I. (1991). *Cognitive styles – an overview and integration*. Educational Psychology.
- Schmeck M, (2013) *Personality through perception: An experimental and clinical study*. New York: Harper & Brothers.
- Wilborn A (2007) *Are cognitive styles still in style?* American Psychologist.
- Witkin D, and Goodenough F (2013) *Cognitive style: Essence and origins*. New York: International Universities Press.
- Witkin Z, & Ash L, (2012)). *Graphics for Learning: Proven Guidelines for Planning, Designing, and Evaluating Visuals in Training Materials* . San Francisco: Jossey-Bass/Pfeiffer.
- Witkin, H.A. & Goodenough, D.R. (2013). *Cognitive style: Essence and origins*. New York: International Universities Press.
- Yusof G, & Wan N, (2015) *Field dependent and field independent cognitive styles and their educational implications*. Review of Educational Research.