



Investigating the Relationship between Cognitive Learning Styles Components and Students' Academic Performance in Katsina Local Government Area, Katsina State

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Abstract

The study investigated the relationship between Cognitive Learning Styles and student's academic performance on Mathematics and English Language in some selected Junior Secondary Schools in Katsina Local Government Area of Katsina State. The population of the study consisted of all the junior secondary school students. Descriptive research design was used in the study. Two null hypotheses were formulated and tested at 0.05 level of significance. Krejcie and Morgan (1970) table was used to select three hundred and seventy seven (377) students from forty one thousand eight hundred and fifty eight (41,858) junior secondary school students as the sample size. Group Embedded Figure Test (GEFT) was used to collect data from the respondents. Spearman rank order correlation statistics was used to test the formulated hypotheses. The study found that, there is significant relationship between learning style in English and Mathematics academic performance (p -value .01 and .05); there is significant relationship between field dependence and mathematics and English academic performance (p - value.000 and .01). It was also found that there is significant relationship (very weak positive relationship) between the learning style of field independent learners and their academic performance in Mathematics ($R = 0.119$ at $P = 0.05$). Based on the findings of the study, it was recommended that teachers in secondary schools in Katsina Local government Area should make effort to understand their students cognitive style with the view to tailoring their teaching methods in line with the students' abilities and emphasis should be made by teachers in identifying students learning styles preference so that their potentialities can be fully developed

Keywords: Cognitive Learning Styles, Field-dependent, Field-independent Academic Performance

Introduction



Cognitive learning style is defined as “characteristic modes of functioning that we show throughout our perceptual and intellectual activities in a highly consistent and pervasive way. The cognitive styles accessible in this study are field dependent/independent. The cognitive style of field-dependent and field-independent is one area that drew researchers’ attention with its application to the educational contexts (e.g., Altun & Cakan, 2006; Ford & Chen, 2001).

Field-dependents rely on the surrounding perceptual field, have difficulty attending to, extracting and using non-salient cues, have difficulty providing structure to ambiguous information and forging links with prior knowledge and have difficulty retrieving information from long-term memory”.

On the other hand, field-independent person perceives part of a field as discrete from the surrounding field as a whole”. Messick (1976) has defined the field-independent as person who tends to articulate figures as discrete from their backgrounds and to easily differentiate objects from embedding contexts, Therefore, it can be predicted that both learners with these two types of cognitive styles use strategies that help them in the process of learning but have different preferences. In order to have successful learning, learners should learn some strategies to help them improve their learning; because the process of learning a language is a mental and the strategies for learning a language are actually different ways of thinking and information processing.

Learning styles and academic performance play a vital role in the learning process and contribute to the overall educational environment. This study reviews the two learning styles dimensions (Field dependence and Field independence learning styles), and academic performance of students in English Language and mathematics in an effort to bring to light their contribution to both the learning and teaching process. The information provided within this study can help educators develop teaching methods that best match each learner’s learning style. Understanding the characteristics of learners in each dimension will not only enhance teaching, but the overall learning process as well. Learning styles is based on the theory that individuals have different stimulus sense modalities from which they prefer to absorb, retain and process new information (Cassidy & Eachus, 2000; Harrison, Andrews & Saklofke, 2003)

Academic performance is defined as the observable or measurable behaviour of a person or an animal in a particular situation usually experimental situation (Simpson & Weiner, 1989). This means that performance measures the aspect of behaviour that can be observed at a specific period. To determine performance, a performance test is conducted. Singer (1981) defined performance test as the type of mental test in which the subject is asked to do something rather than to say something. Performance test is the type of test which throws light on the ability to deal with things rather than symbols (Drever, 1981). In relation to educational research, academic performance of a student can be regarded as the observable and measurable behaviour of a student in a particular situation. Therefore, we can equate academic performance with the observed behaviour or expectation of achieving a specific statement. Academic performance of students consists of scores obtained from teacher-made test, first term examination, mid - semester test. And so on.

Statement of the Problem



For the time being, secondary school students especially those in Katsina Local Government Area have been receiving their lessons in the usual traditional method. In this method, a group of students are usually placed together in a classroom. The teachers take turn to teach them using mostly talk-chalk method or lecture method irrespective of students' unique talents and differing cognitive styles; that is whether they are field independent or field dependent. In such situations, students are obliged to adjust their cognitive styles to whatever teaching approaches adopted by the teachers. No attempts are made by instructors to identify the cognitive styles of the students so as to integrate such styles with their teaching strategies.

This disregard of students' cognitive styles and inability of teachers to integrate them within their instructional strategies may be counterproductive. In recent times when secondary school students in Katsina Local Government Area of Katsina state in particular and Nigeria in general are faced with dwindling academic fortune, emphasis should be shifted to student-centred approaches in a bid to improve on their performance. The teachers should identify the cognitive styles (field independence or field dependence) of the students and integrate them in their instructional strategies. This is capable of making the teaching effective and result-oriented. In this work, efforts were geared towards investigating the relationships among cognitive styles (field dependence/field independence), and academic performance of secondary school students in Katsina Local Government Area of Katsina state.

Purpose of the Study

The main purpose of this study is to investigate the relationships among Learning styles components on academic performance of students in Katsina Local Government Area of Katsina State.

The specific objectives of this study include:

1. To determine the relationship between field dependent learning style and academic performance of students in Mathematics and English language.
2. To examine the relationship between field independent learning style on academic performance of students in Mathematics and English language.

Research Questions

The following research questions were raised to guide the study:

1. What is the relationship between learning styles of field dependent learners and academic performance in English language and Mathematics?
2. What is the relationship between learning styles of field independent learners and academic performance in English language and Mathematics?

Null Hypotheses

The following null hypotheses were tested in the study.

H₀₁: There is no significant relationship between the learning style of field dependent learners and academic performance in English language and Mathematics

H₀₂: There is no significant relationship between academic performance of field independence learners and academic performance in English language and Mathematics

Scope of the Study



This study examined whether there is a relationship in the learning styles, and academic performance of students in Mathematics and English Language in some selected junior secondary schools in Katsina Local Government area of Katsina state. The research covered five junior secondary schools in Katsina Local Government Area. The study is intended to cover only those in JSSI in the five schools.

Methodology

Descriptive research design was used to obtain the picture of the relationship between students learning styles and academic performance among junior secondary school students. The scope of the study comprised all the ten (10) junior secondary schools in Katsina Local Government Area, with a total population of forty one thousand eight hundred and fifty eight (41,858) students. Sample of 377 students was selected using simple random sampling techniques. The sample was arrived based on Krejcie & Morgan (1970) table for sample size. For the purpose of this study, the researcher uses one instrument titled Group Embedded Figure Test (GEFT). The instrument has 18-items test that requires participants to locate simple geometric figures embedded within progressively more complex ones. The real task begins at where the participants have to find the simple geometric figures. The time limit is five minutes for each. In all the 18 items, the simple forms are present in the complex figure. Based on the number of correct answers given by subjects, the scores on Group Evaded Figure Test (GEFT) range from 1 (the most FD) to 18 (the most FI). The instrument was validated by lecturers in the department of Educational Foundations Federal University Dutsin - Ma, Katsina State. The Group Embedded Figure Test (GEFT) was used for the identification of those that are field dependent participants from field independent ones. This figure test which is the most widely used version of pencil-and-paper tests in FD/FI investigations. The reliability of the instrument was established and the value reliability coefficient is 0.82. This indicated that, the instrument is reliable for measuring the search variable. The performance of students was used and correlated with the Group Embedded Figures Test (GEFT). Spearman rank order correlation was used for data analysis using statistical package for social science (SPSS) version 20.0 was used and analysed the formulated hypotheses.

Results

The following null hypotheses were formulated to guide the study and they were tested at 0.05 level of significance.

H0₁: There is no significant relationship in the learning style of field dependent learners on academic performance in English language and Mathematics.

Table 1: Correlation analysis between field dependent learners and their performance in English language and Mathematics

Variables	N	Df	r - value	p - value	Decision
Scores	377				
FD English					



Scores	377	375	0.817	.01	Sig.
FD Maths	377		-0.873	.05	Sig.

To test this hypothesis, Spearman rank correlation statistics was used and $R = 0.817$ at $P = 0.01$ which is < 0.05 significant level meaning that there is significant relationship (strong positive relationship) in the learning style of field dependent learners on their academic performance in English language. In other words, $R = -0.873$ at $P = 0.05$ which is $= 0.05$ significant level meaning that there is no significant relationship (strong negative relationship) in the learning style of field dependent learners on their academic performance in Mathematics.

H0₂: There is no significant relationship in the academic performance of field independence learners on academic performance in English language and Mathematics

Table 2: Correlation analysis between field independent learners and their performance in Mathematics and English language

Variables	N	Df	r - value	p - value	Decision
Score	377				
Field IND English	377	375	0.119	.000	Sig.
Field IND Maths	377		-0.966	.01	Sig.

To test this hypothesis Spearman rank correlation was used and $r\text{-value} = 0.119$ at $P = 0.05$ which is < 0.05 significant level meaning that there is significant relationship (very weak positive relationship) in the learning style of field independent learners on their academic performance in Mathematics. Furthermore, $R = -0.966$ at $P = 0.01$ which is < 0.05 significant level meaning that there is no significant relationship (very strong negative relationship) in the learning style of field independent learners on their academic performance in English language.

Discussion of the Findings

Hypothesis one which found out that there is no significant relationship in the learning style of field dependent learners and their academic performance in English language and Mathematics. This present finding is similar to that of Okwo and Otubah (2007) who found that field independent students performed significantly better than field dependent students in physics and biology respectively, in which field dependent students had a significantly higher mean achievement in arts than the field independent students. This finding supported that of Ndudi and Mkpa (2003) who found that overall, a significant difference in achievement was found between the field dependent and field independent learners.



Hypothesis two which stated that there is no significant relationship in the academic performance of field independence learners on academic performance in English language and Mathematics the hypothesis was rejected. Meaning that, there is significant relationship in the learning style of field independent learners on their academic performance in English language and Mathematics. The rejection was in view of the p - value .000 and $.01 < .05$ level of significant. Similarly the result of the present study supports the findings of Simonson (1985), Yea-Ru Chuang (1999), and also Miller (1997). According to them, FI learners, are more proactive and usually have a strong self-concept, and tend to solve problems through intuition and use trial-and-error strategies, as opposed to FD learners, who perceive objects as a whole.

Conclusion

Based on the findings of this study, the following conclusions were drawn: Field independent students had a higher mean achievement in sciences than the field dependent students while field dependent students had a higher mean achievement in arts than the field independent students. There is significant relationship in the learning style of field dependent learners on their academic performance in English language; also there is no significant relationship in the learning style of field dependent learners on their academic performance in Mathematics. There is no significant relationship in the learning style of field independent learners on their academic performance in English language; while in Mathematics, there is significant relationship in the learning style of field independent learners on their academic performance in Mathematics.

Recommendations

Based on the reviews and the findings of this study the following recommendations were made:

- 1) Teachers in secondary schools in Katsina Local government Area should make effort to understand their students' cognitive style with the view to tailoring their teaching methods in line with the students' abilities.
- 2) Emphasis should be made by teachers in identifying students learning styles preference so that their potentialities can be fully developed.

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