

INFLUENCE OF FIELD DEPENDENCE AND INDEPENDENCE LEARNING STYLES ON ACADEMIC PERFORMANCE OF SECONDARY SCHOOL STUDENTS IN KATSINA ZONAL EDUCATION**BY****Ahmed Alhassan: Department of Educational Foundations, Federal University Dutsin-Ma, Katsina State; E-mail: aalhassan1@fudutsinma.edu.ng****&****Aliyu Abubakar: Department of Education, Umaru Musa Yar'adua University, Katsina State; E-mail: aliyuabubakar936@gmail.com****Abstract**

This study examined the influence of field dependence and field independence learning styles on academic performance among Senior Secondary School Students in Katsina Zonal Education. The study employed descriptive survey research design. Nineteen Schools were randomly selected from the target population of 12,540 Students, 368 students were selected to make the sample for the study. The study adapted Witkin's Embedded Figure Test. and Academic Performance Test in Biology and English (APT_B and AP_{T_E}) at 0.87 reliability co-efficient. The statistics used for data analysis was the t-test for independent sample. Two hypotheses were tested at 0.5 level of significance, Result shows that the p-value (0.025) which is less-than the alpha value of 0.05, While null hypothesis 2 with p-value (0.056) is retained, it is therefore recommended that conducive environment must be created to generate new ideas and awaken curiosity and an innovative spirit. Teachers should try as much as possible to carry all students along using variety of teaching methods, irrespective of their styles of learning or course of study, teachers should try as much as possible to identify student learning styles.

Keywords: *Learning style, Field dependent, Field independent, Meta-learning*

Introduction

The main goal of educational researches is to ensure achievement of qualitative education and knowledge development, so as to achieve a self-reliant and creative society. Education is one of the vital sectors that contribute towards the development of any society. It has been universally recognized as the key to sustainable development and the enhancement of human welfare (Ahmad, 2013). A specific attention has been given to English and Biology, due to its wide Application in the Nigerian Senior Schools Science Curriculum, which made English as core Subjects at all levels of Education. It's one of the Universal Language in Nigeria and compulsory Subject offered at all levels of Education.

Most of the Courses at all levels of learning require good performance in English Language, since the Subject is the medium of instruction and information so also the National official language. Language is an important aspect of life in all beings especially now a days, where the human race needs a common and identifiable language for Communication and Information (Chan & Lau, 2011). Biology is an important aspect of life in all beings especially with the rise of Globalization where the human race needs a common and identifiable ways of interacting with other living organisms in his living environment. Most of the courses in higher education also require good performance in WAEC/NECO Biology at O' level, especially Science based Courses.

Learning styles have been shown to play an important role in the learning process. Each person has his own preferred learning style strategy which can serve as determinants of how he interacts with his learning environment, Individuals have different pattern of which they prefer to absorb, retain and process new information (Cassidy & Eachus, 2010). The outcome from learning styles researches provides researchers with knowledge that can help them in improving the overall quality of learning, the learning environment, as well as the overall improvement in the learners' academic performance. Learning style is

the characteristic cognitive, affective, social, and physiological behaviours that serve as relatively stable indicators of how learners perceive, interact with, and respond to the learning environment. Learning style of person is the preferred way through which he process information while learning. This includes Field dependence Versus Field independence, Convergent Versus Divergent learning styles, Reflective Versus Impulsive etc.in addition learning style: can also be defined as consistent preferences over time and subject matter of perceiving, thinking about, and organizing information in a particular way (Sternberg, 2014). Some students, for example, prefer to think about the nature of a task, collect relevant information, and formulate a detailed plan before taking any action, whereas others prefer to run with the first idea they have and see where it leads. Some students prefer to work on several aspect of a task simultaneously, whereas others prefer to work on one aspect at a time in a logical sequence.

Field dependence and field independence learning styles dimension was proposed by Herbert Witkin (Witkin, Moore, Goodenough & Cox, 1977) refers it as the extent to which a person perception and thinking about particular pieces of information are influenced by the surrounding context. For example, when some individual are shown a set of simple geometric figures and asked to locate each one (by outlining it with a pencil) within a larger and more complex display of intersecting lines. Those with field dependence style take significantly longer time to respond and identify fewer of the figures than individual with a field-independent style. The former are labeled field-dependent because their perception is strongly influenced by the prevailing field (Witkin, 1977) and the latter are called field independent because they are more successful in isolating target information despite the fact that it is embedded within a larger and more complex context.

In school settings, field dependent students are more likely to reflect the structure and sequence of ideas as presented by the teacher or textbook authors, whereas the notes of field-independent students are more likely to reflect their own ideas about structure and sequence, when reading, field-independent students are more likely than field dependents to analyze the structure of the story. The significance of this difference in approach is clearly seen with materials and tasks that are poorly structured. Field-independent students usually perform better in this situation because of their willingness to create a more meaningful structure. The positive effect of field independence on achievement is particularly noticeable in the sciences because of their emphasis on analyzing ideas into new configurations, and identifying potential new uses of that information (Joseph, 2015). Biology students, for example, need to be able to identify tissue, organs, and systems that are difficult to see at first glance because they are embedded in the surrounding tissue of an organism.

Moreover, field independence learners are defined as those learners who do not depend on the environment for reference and cues, but they are able to analyse information and solve problems independently. They appear active, autonomous, and self-motivated in their life approach. They prefer formal learning situations in which teacher are regarded as a source of information. And they are competitive, impersonal, and achievement-oriented (Joseph, 2015). When presented with a complex figure, the whole thing appears to be fused; he will have difficulty separating the parts from the whole because he is global in thinking. This group of thinkers is global in learning style; those that are relatively field dependent need to rely on the support of teachers and some external sources. The organization of the surrounding field controls the mode of perception. In the field dependent mode of perceiving, parts of the field are reflected as separated from the organized ground. Persons who are considered dependent learners depend on the environment of the learning situation for structure. They are interpersonally oriented and depend on external stimuli. In the learning environment, the teacher is viewed as simply another individual in given a sense of direction and instructions (Slavin, 2015). Field independence when the same complex figure is presented to students that are relatively field independence, they easily see the relationship between the whole and the units and thus can easily separate one from the other. They are more articulate.

Similarly, the Embedded-figure test determines a subject's field dependence/independence based on the time they take to find a simple figure in a more complex visual field (Witkin, Moore, Goodenough, & Cox, 1977). Subjects who were field dependent spent more time finding the figure while field independent subjects found the figure quickly. Most people fell on a continuum between being completely field dependent or field independent. The importance of this measure of cognitive style to problem solving soon followed. According to Witkin (1977), the individual who in perception, cannot keep an item separate from the surrounding field, in other words, who is relatively field dependent is likely to have difficulty with that class of problems where the solution depends on taking some critical element out of the context in which it is presented and restructuring the problem material so that the item is now used in a different context.

A research conducted by Sternberg (2014), titled the "impact of field dependence and field independence learning styles and Students' academic performance", founded that, learning styles can significantly affect student academic performance, he stresses that, teachers and administrators are able to improve the quality of instruction in their schools when they are aware of the learning styles of their students. More also, Research conducted in 2011 was an investigation of the difference between learning styles and academic achievement (Abidin, Rezaee, Abdullah, & Singh, 2011). In order to investigate this significant difference, a total of 317 students in an Islamic school in Malaysia participated in this survey study. It was also found that the high, moderate and low achievers have a similar preference Pattern of learning in all learning styles. Moreover, the learning styles framework does not change with subjects, where it actually plays an important role across all the subjects.

In another study conducted by Muhammad (2015) revealed that there is significant relationship between Male and Female students Field dependence and Field independence and their academic achievement, the findings also indicates that cognitive styles (Field dependence/Independence) is a significant predictor of scientific achievement in Male and Female student of Biology and Integrated science students of Zamfara State College of Education Maru. Therefore, the results here suggest avenues of future research to understand this phenomenon. And that's one of the reasons why this research work focused on the influence of Field dependent and Field Independent learning styles and students' academic performance in Biology and English language.

Statement of the Problem

Despite the parents' effort in guiding and helping the children at home, in their take home assignments, extra lessons and buying learning materials for the children, they still experience negative outcome with regard to their academic performance, this is because the children were guided using negative approach contrary to the student's preferred learning style. Lacking the knowledge of these learning styles would also lead the parent to direct their children using poor approach to the children style of learning, because they do not know how to best assist the children to excel in their academic performance.

Educational psychologist and Teachers that lack the knowledge of identifying one learning style with the other, will end up mixing between unrelated styles without paying independent attention to each category of students based on their preferred learning style, this will end up applying the same traditional methods and procedures of learning in dealing with the students in an academic setting. By not knowing that each learning style is independent on its own (Cassidy & Eachus, 2010). Mismatching between the teaching and students preferred learning styles is beyond reasonable doubt a factor that leads to students' poor academic performance. This may also resulted to students choosing a negative learning style unsuitable for the Discipline they were belongs to, most teachers do not have the knowledge of these suitable and the best learning styles for the students and how best learners learn through them. Teachers and educational psychologist who do not understand the diversity of their learners in a typical classroom, would end up embracing the same traditional teaching styles in every context, using the same method and materials of instruction, given the same test and examination conditions, and have general perception to all the

children regardless of their individual difference and learning style approach.. It is in view of the above that, this research work studies the influence of field dependent and field independent learning styles on students' academic performance in Katsina Zonal Education.

Purpose of the Study

1. To examine the significant difference in the academic performance between field dependence and field independence students in Biology.
2. To determine the significant difference in the academic performance between field dependence and field independence students in English Language.

Research Hypotheses

The study was guided by the following null hypotheses:

- Ho₁: There is no significant difference in the academic performance between field dependence and field Independence students in Biology.
- Ho₂: There is no significant difference in the academic performance between field dependence and field independence students in English language.

Methodology

Descriptive survey research design was adopted for this study. In descriptive survey research design, data collection is carried out in a structured process to describe the characteristics of a selected phenomenon. It involves the collection of data without manipulation of variables. Survey designed was used for this study because no variable was manipulated in the study; it is also an effective way of gathering data from different sources within a short period of time (Kothari, 2010). The population of this study was 12,540 students for the 21 Senior Secondary Schools in the three local governments of the Educational Zone. Namely: Katsina, Jibia, and Kaita Local Government Areas. The researcher restricted himself only to public schools because of their uniformity in standard and norms. The selection of the sample size was guided by the provision of Krejcie and Morgan table (1970) Sample of this study was drawn from the total population of 12,540, out of this number, 368 students were selected. The sample size for this study was drawn with the aid of Research Advisor (2006), which guided the researcher in the selection of the sample size to be used in each selected school using simple random sampling technique.

This study adapted Embedded Figure Test (EFT) developed by Witkin (1971), EFT is a validated and standardized instrument published by Witkin (1971) using simple geometric and non-geometric figures/ shapes embedded in a complex figure, in which the students were asked to identify as many simple figures and shapes as they could. Ten questions were raised to test the Embedded Figures Test (EFT) in this study. Students that scored above 5 marks are marked as field Dependent and below are field Independent. Thirty five minutes was given to the students to respond to the research instrument. The academic performance test contained 20 items multiple choice questions extracted from WAEC/NECO past Examination Questions. Aimed at assessing students' academic performance in Biology and English language as they were compulsory subjects offered in secondary schools (Both Art and Sciences).

The questionnaire was validated by team of experts, the instrument was also validated after a careful scrutiny and deliberations by the team of Experts of research methodology and expert in Educational psychology to ascertained the face and content validity of the instrument. To obtained the reliability coefficient, the instruments was tested using population other than the targeted population, and internal consistency co-efficient of 0.87 was obtained through Cronbach's alpha test. The statistics used for data analysis was the t-test for independent sample.

Results

Ho₁: There is no significant difference in the academic performance between field dependence and field independence students in English language

Table 1: Difference in academic performance between Field dependent and Field Independent students' in English language

VARIABLE	N	Mean	SD	df	t-value	p-value	Decision__
Field Dependent Learning style	206	4.029		366	-2.24	0.025	Sig
Field Independent Learning style	162	4.623	2.412				
TOTAL	368						

*significant at $p < 0.05$

Analysis shows that, the p-value (0.025) observed at a degree of freedom of 366. Since the critical p-value of 0.025 is less-than the alpha value of 0.05, the null hypothesis is rejected; this implies that, there was a significant difference in the academic performance between Field dependent and Field Independent Students' in English. More also, field independent learning style has higher mean score of 4.623, which implies that, field independent learners performed better in English.

Ho₂: There is no significant difference in the academic performance between field dependence and field independence students in Biology

Table 2: Result analyzing the difference in academic performance between Field dependent and Field Independent students' in Biology

VARIABLE	N	Mean	SD	df	t-value	p-value	Decision__
Field dependent Learning style	206	4.961	2.70	366	0.570	0.569	Not Sig
Field Independent Learning style	162	4.81	2.33				
TOTAL	368						

*significant at $p > 0.05$

Analysis shows that the p-value is 0.569 observed at a degree of freedom of 366. Since the critical p-value of 0.569 is greater than the alpha value of 0.05, the null hypothesis is here by retained, this implies that, there was no significant difference in academic performance between Field dependent and Field Independent Students' in Biology. Although from the analysis, Field dependent learners performed better in Biology with a higher means score of 4.961 when compared with the mean scores of the field independent learners of 4.808.

Discussion of Findings

Hypothesis One concluded that, there was significant difference in academic performance between Field dependent and Field Independent student in English. This finding agrees with Astin and Sharp (2010), who conducted a research to investigate the difference between learning styles (field dependence/independence) and academic performance in English between in Senior Secondary schools students in Ogun State, the finding of these study established a significant positive difference among students' learning styles and their academic performance in English language, and Field Dependents learners were found to performed better in English. In another dimension, Abubakar, (2014), founded that most of the students were field dependent and they were at the concrete level of cognitive thinking, there is also a positive difference between the students learning styles, the level of cognitive thinking and their

academic performance and the result revealed a significant difference between the learning styles, their level of cognitive thinking and their performance in English. This current research is in agreement with the study conducted by Muhammad (2015), who founded a significant difference between the learning style and their academic performance, the findings also indicates that learning styles is a good predictor of academic performance among Art students, This support the findings of Dragon (2009), who investigated the field dependence/field independence and student performance in technology based learning, and found that, performance is the same in favour of field dependence learners with a total means weighted effect size of 0.65 and pooled standard deviation of 0.311.

Hypothesis Two found no significant difference in academic performance between Field dependent and Field Independent students' in Biology. This finding agrees with Adams and Mcleod (2010), in a Correlational study titled Field dependent/Independent learning styles and academic performance in Biology, The sample of the study consisted of 130 undergraduate students ranging from freshmen to senior levels at a teacher training programme (Adams & McLeod, 2010), found significant difference between the participants' academic performance and their learning styles ($r = 0.14$; $P > 0.15$). In a similar study by Mokhtarian (2009), showed that there is no significant difference between learning styles field independent/dependent on students' performance in Biology, even though he concludes that , the experimental group significantly retained materials learned during the course of treatment at the retention stage better than the control group. Ololube (2007), found that field independent SS11 students performed not significantly different with their field dependent counterparts in demonstrating photosynthetic processes, as well in the essay test with cognitive style explaining 89.8% of similarity in essay scores of the students among the two groups. In another similar study, Madina (2007) found that, there was no significant difference between students' degree of field-dependence/independence and their performance in Biology examinations.

Conclusion

Teachers play an integral role in the education system in general. When they are provided with the opportunity to commit to professional development programs that make strong connections with theory, research and practice they are better prepared to influence the knowledge and skills of their students in a positive manner. Based on the result generated from the analysis of the data at 0.05 level of significant, it was concluded that, Field dependent/field independent learning styles has a significant influence on students' academic performance in English. And Field independent students performed better in English language. Field dependent and field independent learning styles have no significant influence on students' academic performance in Biology. Although field dependent students were found to performed better in Biology.

Recommendations

The following recommendations were made:

1. Field dependent learners should give freewill to operate in learning, while field independent learners should be guided appropriately, learning materials should also be provided that will carry all category of student along for self-discovery and independent learning.
2. A teacher should always be open to new ideas and ready to adjust to actual situations, Teachers should try as much as possible to carry all students along irrespective of their learning style, through using variety of teaching methods
3. A conducive environment must be created to generate new ideas and awaken curiosity and an innovative spirit. This can be achieved through integrative learning, which enables problem-solving in realistic and authentic situations.

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