

EFFECTS OF PICTORIAL ILLUSTRATIONS AND COGNITIVE STYLES ON SECONDARY SCHOOL STUDENTS' ACHIEVEMENT IN HISTORY

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Abstract

The main purpose of this study is to determine the effects of pictorial illustrations and cognitive styles on the secondary school students' achievement in History. A total of 64 students comprising 31 males and 33 females from two co-educational secondary schools in Abia North Education Zone of Abia state participated in the study. Five research questions and five null hypotheses guided the study. The study utilized non-randomized pretest – post test control group design. Two instruments Group Embedded Figures Test (GEFT) and History Achievement Test (HAT) were administered on the students to determine the students' cognitive styles and achievement in History respectively. Means were used to answer the research questions while Analysis of Covariance (ANCOVA) was used to analyze the hypotheses at the probability level of 0.05. The findings showed that: students taught with pictorial illustrations had higher post test mean score (19.80) than those taught conventionally (13.70), field dependent students exposed to pictorial illustrations had higher post test mean score (18.44) than field independent students (13.73) among others. The major recommendations of the study are that secondary school teachers should use pictorial materials in their teachings and also employ GEFT to determine the students' cognitive styles as they affect achievement.

Background of the Study

Over the years man has always asked questions about his identity, his environment and his predecessors. In doing this, he seeks to know about his total past and to acquire knowledge which will enable him not only to understand the past, but also to find a base on which he could build up his future. History as a discipline provided answers to these crucial questions.

History simply defined, is the study of past events, how those events happened and why they did happen. According to Crabtree, (1993) history is a story about the past

that is significant and true. Osuala, (1993) defined history as any integrated narration or description of past events or faiths written in a spirit of critical inquiry for the whole truth.

History is inescapable as a subject of serious study because it helps us to understand changes and how the society we live in came to be. Only through studying history can we grasp how things change, factors that cause change, and what elements of an institution or a society persist despite change (Stearns, 2007). The understanding of the origin of any concept will help to trace its development and provide the base for innovations. The value of history is endless as it cuts across all disciplines whether arts or sciences. History, therefore, is referred to as father of all disciplines.

It is quite amazing in Nigeria that the fate of history is very bleak. The study of history is in the verge of extinction particularly in the secondary schools as it has disappeared on their time tables. The interest of students in the subject has fallen. Only few students offer history at Senior Secondary Certificate Examination (SSCE) level. In 2010/11 academic session only eight students registered for SSCE in Nsukka Education Zone of Enugu State (Statistics Unit, Post Primary Schools Management Board Nsukka Zone). Three of this few that registered credited it in SSCE. These situations are worrisome not only to history educators and historians but to the society the study of history shapes. To revive the interest of students in this very important subject is the greatest task facing the teachers of history today. It is argued that students' interest and achievement in a subject could be improved if appropriate instructional media are selected and effectively utilized.

History as the study of past events actually requires instructional media to put life into the dead past. It has been observed by the researchers that history teachers use boring, abstract, verbal and teacher-centred methods which may have contributed to the poor performance of students in the subject or their avoidance of the subject completely. Instructional media simplify concepts and ideas such that students learn faster and retain longer (Asogwa and Dingwoke, 2008). Through the use of instructional media such as pictorial illustrations, students are provided with opportunity to form an opinion on the amount, value or quality of an event, issue and contradicting historical evidences or sources.

Pictorial illustrations are information in form of painting, drawing, photographs, carved objects or human beings. They are ironic signs. In other words, they attempt to resemble the object or thing they represent. Pictures can capture emotions and portray feelings of events or evidences. Learning the past events could be facilitated when visual media that have the potentials of re-creating the past are utilized.

Generally, learning demands certain qualities which have to do with the ability of the learner to process information. One of these qualities is cognitive style. Cognitive style is the characteristic way individuals think, process, perceive and remember information, or their preferred approach to using such information to solving problems. Cognitive style according to Gagne (1985) is the skill by which the learner regulates his internal processes of attending, learning, remembering and thinking. The student's cognitive style determines how he tackles learning activities. It is argued that under appropriate instructional conditions virtually all students can learn well most of what they were taught. Researchers (Tobias 1986, Eze, 2010) suggest that the mismatch between teaching practices and students' cognitive styles may account for students' poor academic achievement.

One of the most frequently examined dimension of cognitive style is field dependent (FD) and field independent (FI). Much of the work on this dimension was done by Witkin, Moore, Goodenough and Cox, (1999). FD and FI are also referred to as global and analytical thinking respectively. The field dependent learner is one who processes information globally. This learner is less analytical not attentive to details, and sees the perceptual field as a whole. This whole resists analysis or decomposition. They also need more explicit instructions when a material to be learned is disorganized. The field independent person on the other hand can easily break the field down into its component parts. He/she is typically not influenced by the existing structure and can make choice, independent of the perceptual field. According to Witkin and Goodenough (1981) children are more field dependent than adults. However, there is general movement toward field independent across development, but there are also great individual differences. Those who develop more rapidly toward field independence also develop greater competence in cognitive restructuring. That means that there are changes in cognitive acquisition.

The nature of history is such that stories often run counter to one's intuitive notions, and when new stories contradict prior beliefs, they are often rejected (Champaque, Gunstone and Klopter, 1985). An introduction of new story gives rise to cognitive conflict which in turn results to a state of disequilibrium. A state of equilibrium is returned after the individual have undergone the process of self regulation, involving cognitive restructuring and resulting in conceptual change. Effective learning of history topics therefore requires cognitive restructuring skills. Hence, the need to determine the cognitive styles of students and the effects on their achievement in history.

There are contradictory reports of female under achievement when compared with their male counterparts when exposed to equivalent learning conditions (Alonge and Ojorinde, 1987). Asogwa and Moses (2010), Asogwa and Dingwoke (2008), Oluikpe (2004) and Umo (2001) found gender as a factor that determined achievement, where as Uzoegwu (2004), Okoli (1995) found otherwise. This research intends to make its contributions to the ongoing debate. It is against this backdrop that this study is designed to determine the effects of pictorial illustrations and cognitive styles on the secondary students' achievement in history.

Statement of the Problem

The teaching of history has been characterized by talk and chalk approach. This approach which is teacher-centred makes the teaching of history dull, boring, and uninteresting and may have been responsible for students' low enrolment and poor performance in the subject.

It is believed that if teachers use visuals such as pictorial illustrations in presenting their lessons students' achievement in history (an abstract subject) may improve. Determining the influence of pictorial illustrations on the students' achievement thus becomes absolutely necessary.

Although, the study of Iorchugh (2004) found out the superiority of field independent cognitive style over field dependent in physics, no study appears to have been done to determine the influence of cognitive styles on students' achievement in history. The problem of the study stated in question form is: what are the effects of pictorial illustrations and cognitive styles on the students' achievement in history.

Purpose of the Study

The main purpose of the study is to determine the effects of pictorial illustrations and cognitive styles on students' achievement in history. Specifically, the study intends to:

1. Find out the effect of pictorial illustrations on the students' mean achievement in history.
2. Determine the influence of cognitive styles on the students' mean achievement in history.
3. Ascertain the influence of gender on the students' mean achievement in history.
4. Find out the interaction effect of modes of teaching and gender on the students' mean achievement in history.
5. Determine the interaction effect of modes of teaching and cognitive styles on students' mean achievement in history.

Significance of the Study

The findings of this study will be useful to students of history, teachers of history, educational policy makers, the government and the general public as a whole.

The finding of this study will help to restore students' interest in history as they are given opportunity to see or interact with instructional media like pictorial illustrations. When appropriate media are employed in teaching history the interest will rise with attendant improvement in academic achievement

The teachers of history will be conversant with the use of pictorial illustrations which has been restricted to only the sciences and few art subjects such as foreign languages. The results may equally provide information that will help characterize more efficiently field dependent – independent cognitive style especially with respect to history learning. This will improved their understanding of cognitive styles. The result of this study will further help the teachers of history to be conscious of gender and cognitive styles differences amongst the students and try to improve on their methodology of instruction to provide every student the opportunity to succeed. The finding of this study will also lead to useful recommendations which when properly adhered to, will bring about desirable changes and improvement on the teachers teaching methods and techniques, which invariably may help to change the negative attitude of students towards history.

The findings may sensitize the educational policy makers into sponsoring more gender and cognitive styles based researches and also organizing seminars for teachers especially on how to handle field dependent and independent learners.

The result may equally lead the government into deciding to invest more money in order to make available the necessary instructional media especially pictorial illustrations for the teaching of history and other subjects at the secondary school level.

To the general public, the results this research will teach them the need for Nigerians to embrace history as a major tool for building the type of society of their dreams. Many problems facing Nigerian society today like moral vices, economic depression, inter-ethnic conflicts, religious conflicts, general insecurity etc are results of our refusal to learn from the past.

Scope of the Study

The study focused on the effects of pictorial illustrations and cognitive styles on the academic achievement of history students in senior secondary one (SS1) in Abia North

Education Zone. Selected topics from the senior secondary school history curriculum (The land and peoples of Nigeria and centres of ancient civilization) were taught to the students using pictorial illustrations. The students' cognitive styles were determined using the Group Embedded Figures Test (GEFT).

Research Questions

The following research questions guided the study:

1. What is the effect of pictorial illustrations on the students' mean achievement scores in history?
2. How do cognitive styles influence students' mean achievement scores in history?
3. What is the influence of gender on the students' mean achievement scores in history?
4. What is the interaction effect of modes of teaching and gender on the students' mean achievement scores in history?
5. What is the interaction effect of modes of teaching and cognitive styles on students' mean achievement in history?

Research Hypotheses

The following null hypotheses were formulated for the study and tested at probability level of 0.05.

1. There is no significant difference in the mean achievement scores of students exposed to pictorial illustrations and those taught conventionally.
2. There is no significant difference in the mean achievement scores of students who have field dependent and field independent cognitive style.
3. There is no significant difference in the mean achievement scores of male and female students taught history using pictorial illustrations.
4. There is no significant interaction effect of modes of teaching and gender on the students' mean achievement scores in history.
5. Modes of teaching and cognitive styles do not interact significantly to affect students' mean achievement scores in history.

METHODS

Design of the Study

This study utilized quasi-experimental design. This was considered appropriate because intact classes were used as it was not possible for the researchers to randomize the subjects into groups without disruption of school activities. The study employed non-randomized pretest – posttest control group design.

Area of the Study

The study was carried out in Abia North – Educational zone of Abia state. There are four Local Government Areas in Abia North Education zone. The local Government Areas are Isuikwuato, Umunneochi, Ohafia and Arochukwu. The local governments are surrounded by Okigwe, Agwu, Arodiuzuogu, Oha-ozara, Bende, Umuahia and Ivo. The zone has records of poor performances in SSCE examinations especially in history.

Population of the Study

The target population of this study consisted of all the senior secondary One (SS1) History students in Abia North Education Zone. The population consisted of 350 students

from the 24 secondary schools in the zone (Source: Statistics Unit, Abia North Education Zone, 2011).

Sample and Sampling Techniques

The researchers used a sample size of 64 (sixty-four) students made of 33(thirty-three) female and 31 male students. The multi-stage sampling technique was used to draw out the participants of the study. Simple random sampling technique was used to draw one local government area – Isuikwuato Local Government Area. Stratified random sampling technique was used to draw one girls’ and one boys’ secondary schools that were used for the study. From each sampled school, a simple random sampling technique was used to select one intact class each from SS I classes. The two intact classes were assigned to treatment and control groups through randomization.

Instrument for Data Collection

Two instruments were used for data collection. They were the Group Embedded Figures Test (GEFT) and History Achievement Test (HAT). The GEFT is a non-verbal speed test published by Witkin, Ottman, Raskin and Karp (1971). It is a test of students’ ability to find a simple form where it is hidden within a complex pattern, hence is used to classify students into either FD or FI cognitive styles. The GEFT has three sections, the first section contains seven very simple items intended to provide practice. The second and third sections each contains nine more difficult items giving rise to 18 simple forms that are embedded as camouflaged backgrounds. The students’ possible raw score on the GEFT is 18. According to Witkin Ottman, Raskin and Karp (1971), individuals scoring greater than the mean (11.4) were considered to be leaning toward the field independent cognitive style, while those scoring below the mean were considered to be learning toward field dependent cognitive style. In this study, the researchers adopted the same benchmarks in classifying students into field dependent and field independent.

A History Achievement Test (HAT) was developed and used to collect data for the study. It has three sections that covered the topics studied. The HAT and lesson plans were developed by the researchers. The HAT consisted of 30 multiple choice objective test questions designed to measure students understanding of contents chosen for the study. Each question was assigned one mark thus bringing the total mark obtainable to 30 marks. The same test was administered to both groups. The posttest was administered after six weeks treatment.

Validation of the Instruments

The validation of the GEFT has been established by determining its relationship with its ‘parent’ test embedded figures test (EFT), (Witkin et al 1977). To ensure the validity of HAT, the instrument was face validated by one expert each from Education History, Educational Technology and Measurement and Evaluation in terms of content, clarity, appropriateness of the instructions to the students.

Reliability of Instrument

According to Witkin et al (1971) the GEFT has satisfactory reliability of 0.89 on test-retest over a three year period. The reliability of HAT was determined by administering it on students of Isiukwuato High School and Ovim Girls Secondary School that were not part of the study. A reliability of 0.80 was gotten for HAT using Cronbach Alpha method.

Method of Data Collection

The researchers collected the data by themselves. The same group of students responded to both GEFT and HAT. Time limits of 1 hour and 30 minutes were assigned to GEFT and HAT respectively.

Experimental Procedures

The subjects in both the experimental and control groups were pre-tested using the History Achievement Test (HAT) to determine the levels of the students' achievement prior to the treatment. The two groups: the traditional talk and chalk approach group and the pictorial illustrations group were taught the same history topics for six weeks. At the end of the six weeks of treatment the same test but now camouflaged was administered to both the experimental and control groups.

Control of Extraneous Variables

To make sure that the observed difference on the dependent variable was due to the influence of the independent variables only; the researchers took the following measures to control some of the extraneous variables in the study.

Prior to the commencement of the treatment, the experimental and control groups were pre-tested in order to establish their knowledge base. The researchers equally made every effort to ensure the homogeneity of instructional situation between the groups by making use of the same content units. The fact that the researchers made sure that the teachers who taught the two classes in the schools strictly adhered to the lesson plans removed the differentials arising from the teacher factor.

Method of Data Analysis

The students were categorized into FD and FI based on their scores on GEFT. Those who scored below 11.4 were grouped as FD while those who scored above 11.4 were grouped as FI. Mean scores were used to answer the research questions while Analysis of Covariance (ANCOVA) was used to test the null hypotheses at 0.05 level of significance.

RESULTS

Research Question 1

What is the effect of pictorial illustrations on the students' mean achievement scores in history?

Table 1: Mean response on effect of pictorial illustrations on students' achievement in History

Mode	N	Pre-test	Post-test	Mean gain/loss
Pictorial illustrations	35	14.57	19.80	0.98
Talk and chalk	29	13.59	13.70	0.90

From table 1, it is observed that students taught with pictorial illustrations have a higher post test mean score of 19.80 while those taught with the traditional talk and chalk have a post test mean score of 13.72.

Research Question II

How do cognitive styles influence students' mean achievement scores in History?

Table II: Mean response on influence of cognitive styles on students' achievement scores in History.

GEFT	N	Pre-test	Post-test	Mean gain/loss
Field Dependent	45	15.11	18.44	0.07

Field Independent	19	11.79	13.73	1.34
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Table II shows that field dependent students performed higher (18.44) than field independent students (13.73).

Research Question III

What is the effect of gender on the students' mean achievement scores in history?

Table III: Mean response on effect of gender on the students' mean achievement.

Gender	N	Pre-test	Post-test	Mean gain/loss
Male	31	13.81	16.48	3.6
Female	33	14.58	17.58	0.87

Table III shows that female students performed slightly better with mean achievement score of (17.58) than male students with mean achievement score of (16.48) when taught with pictorial illustrations.

Research Question IV

What is the interaction effect of mode of teaching and gender on students' mean achievement History?

Table IV: Interaction effect of mode of teaching and gender on students' achievement in History.

Mode	Gender	
	Male	Female
Pictorial illustrations	19.13	18.93
Talk and chalk	14.37	14.56

The results in table IV show that male students exposed to pictorial illustrations have higher mean score (19.13) than female students who have a mean score of (18.93). However, female students performed better (14.56) than male students (14.37) when taught with talk and chalk approach. Therefore, interaction is present.

Research Question V

What is the interaction effect of modes of teaching and cognitive styles on students' mean achievement in History?

Table V: Interaction effect of mode of teaching and cognitive styles

Mode	Cognitive styles	
	FD	FI
Pictorial illustrations	19.43	18.63
Talk and chalk	14.03	14.90

Table V revealed that field dependent (FD) students exposed to pictorial illustrations obtained a higher mean of (19.43) compared to field independent (FI) learners who scored 18.63. Field independent learners taught with the traditional talk and chalk

approach obtained a higher mean score (14. 90) than the field dependent learners who had a mean of 14. 03. Hence, interaction is present.

Hypotheses

Table VI: Analysis of Covariance (ANCOVA) of students scores by mode, gender and cognitive styles.

Sources	Type III Sum of squares	df	Mean Square	F	Sig.	Decision
Corrected model	1106.219	8	138.277	61.018	.000	
Intercept	.017	1	0.17	.008	.931	
Pretest	313.028	1	313.028	138.130	.000	
Mode	240.757	1	240.757	106.239	.000	S
Gender	.001	.000	.986	.000	.986	NS
GEFT	.009	1	.009	.004	.949	NS
Mode * Gender	.434	1	.434	.912	.663	NS
Mode * GEFT	7.739	1	7.739	3.415	.070	NS
Gender *GEFT	.408	1	.408	.80	.673	
Mod* Gender* GEFT	.276	1	.276	.122	.729	
Error	124.641	55	2.266			
Total	19829.000	64				
Corrected total	1230.859	63				

Key: S-Significant

NS-Not significant

Hypothesis 1

There is no significant difference in the mean achievement scores of students taught with pictorial illustrations and talk and chalk.

Table VI shows that modes of teaching is a significant factor in students' achievement in history. F (106.239) is significant at 0.000 which is far less than 0.05 level of significant the hypothesis was formulated. Therefore, the null hypothesis is rejected.

Hypothesis II

There is no significant difference in the mean achievement scores of the students who are field independent and those who are field independent as measured by HAT.

Table VI shows that F (.004) is significant at 0.949 which is above 0.05 the hypothesis was postulated. Therefore, there is no significant difference in students' achievement in history, though, field dependent learners performed slightly better than field independent ones.

Hypothesis III

There is no significant difference in the mean achievement scores of male and female students exposed to pictorial illustrations.

The result of the analysis as shown in table VI indicates that the influence of gender on students' mean achievement in history is not significant. F (.000) is significant at .986 which is above 0.05 level of significant, the hypothesis was formulated. The null hypothesis as stated is accepted.

Hypothesis IV

There is no significant interaction effect of modes of teaching and genders on the students' mean achievement scores in history.

The result of the analysis as shown in table VI indicates that interaction effect of modes of teaching and gender on students' mean achievement is not significant. $F (.192)$ is significant at 0.663 which is above 0.05 level of significant the hypothesis was postulated. Hence, hypothesis H_{04} , which states that the modes of teaching and gender do not significantly interact to affect students' mean achievement score is accepted. Male exposed to pictorial illustrations performed slightly better (19.13) than female students (18.93), while female students performed better (14.56) than male (14.37) when taught with talk and chalk method.

Hypothesis V

Modes of teaching and cognitive styles do not interact significantly to affect students' mean achievement in history.

The result on table VI shows that interaction effect of modes of teaching and cognitive styles is not statistically significant. $F (3.415)$ is significant at .070 which is above 0.05 level of significant the hypothesis was formulated. Therefore, H_{05} is accepted.

Summary of the Findings

1. Students taught with pictorial illustrations had higher post test mean score (19.80) than students taught with talk and chalk method (13.70).
2. Field dependent students exposed to pictorial illustrations had higher post test mean (18.44) than field independent students (13.73).
3. Male students taught with pictorial illustrations had higher post test mean score (19.13) than female students (18.93).
4. Modes of teaching and gender did not significant interact to affect students' mean achievement scores in history.
5. Modes of teaching and cognitive styles did not significantly interact to affect students' mean achievement scores in history.

Discussion of the Results**Effect of pictorial illustrations on the students' mean achievement in history.**

From the table IV, students taught using pictorial illustrations performed better than those who received instruction with talk and chalk approach. The results are in agreement with the findings of (Asogwa and Dingwoke 2008). Their result showed significant difference in the mean achievement scores of students taught with pictures and those taught without pictures. Through the use of instructional media such as pictorial illustrations, students are provided with opportunity to form an opinion on value, issues and events in history.

Influence of cognitive styles on students' mean achievement in history.

From the result in table IV, out of 64 students used for the study, 45 are field dependent learners while 19 are field independent. The mean score of the sample who are field dependent is 18.44 as against 13.73 of the sample who are field independent. The result of this study is in agreement with the finding of Witkin et al (1977) who found that the field dependent students are more interested in Arts or Social Sciences while field independent students like Mathematics and Sciences. The mean score of field dependent students was higher probably because history is an art subject.

Influence of gender on the students' mean achievement in history.

The results of the study indicate that female students achieved higher mean score than male students when exposed to pictorial illustrations as measured by the (HAT). This is contained in table III. The mean for female is 17.58 as against 16.48 for males. However, the ANCOVA analysis shows that the influence of gender on achievement was not significant. This finding supports Broadzinsky in Bull, Kamball and Montgomerger (2000); Sherif and William (1981) and Witkin et al (1977) that females perform better than males in arts related subjects while boys do better than girls in mathematics and sciences. The result is also in similarity with the study of Emeka in Okwuchi (1998) in which he noted that gender plays a very important role in the performance of students in any subject especially mathematics.

Interaction effect of the modes of teaching and gender on the students' mean achievement in history.

The result shows that male performed better than female when exposed to pictorial illustrations as measured by the (HAT). This is shown in table IV. The mean of males taught with pictorial illustrations is 19.13 as against 18.93 for females, while the performance of males taught with talk and chalk was 14.37 and that of females is 14.56. This indicates that interaction was present though insignificant. This is in support of the finding of Okeke (1989) that under normal classroom and with adequate instructional media, learning will be fostered for both male and female.

Interaction effect of modes of teaching and cognitive styles on students' means achievement in history

Results indicate that field dependent students exposed to pictorial illustrations performed better (19.43) than field independent students (18.63). Field independent learners taught with the traditional talk and chalk approach obtained a higher mean score (14.90) than the field dependent learners who had a mean of 14.03. Hence, interaction was present. However the interaction effect is not significant. This result showed that achievement of FD and FI was not influenced by modes of teaching. The result agrees with the longitudinal study conducted by Witkin et al (1977) in which they showed the tendency for the field dependent learners to do better than field independent in arts and humanities.

Conclusion

The use of pictorial illustrations effectively increased students' achievement in history. Either gender could benefit when taught with pictorial illustrations. Cognitive styles have influence on students' achievement in history.

Recommendations

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

1. Secondary school history teachers should use pictorial illustrations in their teaching since this study has shown that more desired knowledge is acquired in this manner.
2. Government should establish and fund educational technology centres in each education zones where teachers can go to borrow pictures and other media for their instructional purposes.

3. Government should provide in- service educational opportunities for history teachers to learn the basic skills in the production, selection and storage of instructional materials.
4. Workshop should be organized for teachers on the use of GEFT (the instrument for measuring the cognitive styles).

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