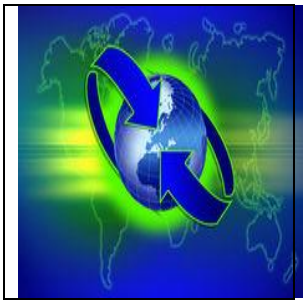

Effect of Integration of Photographic Album Teaching Strategy on Students' Performance in Environmental Education

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Received December, 2019, Accepted January, 2020, Published March, 2020

Abstract

This study investigated the effects of integration of photographic album on students' performance in Environmental Education in Gwagwalada Area Council, Abuja, Nigeria. Two null hypotheses were formulated for the study. The quasi-experimental research design was adopted for the study. Two junior secondary schools were selected for the study. Intact classes of thirty (30) students from each sampled school were used for the study. Environmental Education Performance Test (EEPT) was used for data collection. Descriptive statistics of Mean (x), median, mode, standard deviation and variance were used for data analysis and answering of research questions; while the t-test statistics was used for testing the formulated hypotheses at 0.05 level of significance. The study revealed significant effect of photographic album on students' academic performance in Environmental Education without gender-related difference. Based on the findings of the study, the following were recommended: integration of photographic album teaching strategy as method of teaching in schools especially for teaching and learning of environmental education, training and retraining of teachers in development and utilization of photographic album teaching strategy for teaching and learning of subjects at various levels of educational programmes in Nigeria.

Key Words: Environmental Education, Integration, Photographic Album, Performance.

Introduction

Environment is the global super-system in which every creation interacts interdependently with one another. It is the sum total of living organisms interacting with physical components including social and political factors which provide conditions for development and growth of those organisms (Ekpo & Is'haq, 2016). It is also referred to as the sum total of conditions that surround us at a given point of time and space which influences the growth and development of all living forms. It involves the interacting systems of physical, biological and cultural elements inter-related in various ways, individually as well as collectively (Singh, 2006). It could also be viewed as a set of interrelated systems – biophysical, social, economic, and political which man transforms to meet his needs (Fien & Gough, 1979 cited in Ekpo, 2016). Environment is therefore a super-system

which every other system on the planet earth depends on for their sustenance. Maintenance and sustenance of the environment is saddled on human-beings as the most intellectual creation in the world.

Environmental Education (EE) is a tool for conserving the environment through the cultivation of knowledge, skills, values, and positive attitudes towards the environment (Kimaryo, 2011). Environmental Education is a process of infusing into the educational system, environmental contents in order to enhance the awareness of humans on environmental issues at all levels of education, with the aim of bringing solutions to the deteriorated relationship between man and the environment (Erhabor & Don, 2016). Environmental Education (EE) as a learner-centered oriented programme affords students opportunities to construct their own understanding through hands on, and minds-on investigations which involve engaging learners in direct experiences and challenges thereby enabling them to use critical thinking skills to support the development of an active learning community where learners share ideas and expertise (North American Association for Environmental Education cited in Thompson & Hoffman, 2003). It is also aimed at imparting the knowledge of environmental laws and principles on the functioning of the natural ecosystem, and helps to develop practical skills and ability to make assessment of the state of the environment (Palmer 1997 cited in Erhabor & Don, 2016).

As teachers become the most dominant source of information, in teacher-centered learning, for example, all questions which are raised by students, if any, are answered directly by teachers without students' involvement. In designing the class activities, teachers control every single learning experience. The student-centered teaching approach gives students opportunities to improve their analytical skills, problem solving skills, as well as skills in deep learning, lifelong learning, self-directed learning, reflective learning, and motivation. This is aimed to achieve the learning outcomes that satisfy all the objectives of the learning process. As this has been employed, factors which may influence the implementation are identified. (Indrianti, 2012; Lestari & Widjajakusumah, 2009). According to Nagaraju (2013), student centered activities bring some

advantages to students such as when students are working together, they talk more, share their ideas, learn from each other, feel more secure and less anxious. To this end, a learner-centered teaching approach is advocated.

Looking at it from students' stand point, Environmental Education is concerned with modification and changing of the human behaviours and attitudes positively towards the environment and its sustainability. It is developed with the aim of improving achievement, retention and attitudes of students towards the environment as well as enhancing awareness about environmental concerns; developing understanding of ecological principles, arousing concern for environmental problems, stimulating commitment to environmental protection, and demanding action to promote conservation of natural resources (UNESCO, 1977 cited in Ekpo, 2016). To achieve these objectives, Environmental Education is integrated in the school curriculum across the world (Jensen & Schnack, 1984 cited in Arslan, 2012).

However, advance in science and technology which has turned the world to a "global village" has caused numerous problems to the environment. Among the environmental challenges faced by the world in the 21st century are global warming, ozone depletion, acid rain, depletion of natural resources, overpopulation, waste disposal, deforestation, and loss of biodiversity (Singh & Singh, 2016). With the increasing deterioration of ecological systems on which human beings rely and the aggravation of the environmental crises, human beings have realized that they cannot depend entirely on technological, economic, political and judicial methods alone to solve environmental problems (Ekpo, 2016). The most effective approach to solve environmental problems is through Environmental Education (Arslan, 2012).

Researches on the utilization of related innovative and computer-based instructional strategies such as audio-visual, and multimedia on students' academic performance in Nigeria revealed inconsistent results. These studies include Chukwu (2012) which revealed significant effect of imagery techniques (picture and visualization) on students' interests and achievement in English language essay writing without gender difference in Anambra state; Ode (2014) which

disclosed the impact of Audio-Visual (AVs) resources on teaching and learning in private secondary schools in Makurdi; and Idris (2015) that also disclosed the effects of audio-visual materials in the teaching and learning of English language in junior secondary schools in Katsina Local Government Area of Katsina State, among others. However, none of these studies integrated photographic album teaching strategy into the teaching and learning of environmental education related topics in junior secondary schools in Nigeria. This informed the necessity of this study.

Siti and Sumarsih (2011) examined the effect of using still pictures on students' achievement in writing procedure text. The study aimed at finding out whether students' achievement through using still pictures would be higher than those exposed to motion pictures in writing procedure text. The quasi-experimental research design was adopted for the study. Population of the study comprised of grade XI students of SMA Swasta Abdi Negara Binjai (2013/2014 academic year) which consisted of three classes with total number of 90 students. Two classes were chosen with simple random sampling technique with each class consisting of 30 students. The classes were grouped into experimental and control groups. The experimental group was taught how to write procedure text by using still pictures while the control group was taught how to write procedure text by using motion pictures. The data collected for the study were analyzed using t-test. It was discovered that teaching with still pictures had a significant effect on students' achievement in writing procedure text than motion pictures.

Rasul, Bukhsh and Batool (2011) analysed the effectiveness of audio-visual aids in teaching learning process at university level in Bahawalpur. Major objectives of the study were four (4). The survey research design was adopted for the study. One hundred and fifty (150) students and fifty (50) teachers were randomly selected for the study from faculty of arts and faculty of science of the Islamia University of Bahawalpur. Questionnaire, constructed in a 5-point likert scale format was used for data collection. The data obtained were analyzed using standard deviation and Z test. The findings of the study revealed that audio-visual aids play important role in teaching and learning process, they make teaching/learning process effective, provide knowledge in depth and detail,

bring change in class room environment, motivate teachers and students, and enrich academic performance.

Ghaedsharafi and Bagheri (2011) investigated effects of audio-visual, visual and audio on English as Foreign Language (EFL) learners' writing ability. The study was anchored on four research questions. Quasi experimental research design was adopted for the study. Forty-five (45) students, both males and females, aged between 23 and 38, were selected randomly out of advanced level EFL learners at an English Institute in Shiraz, Iran and they were also divided into three groups of 15. Three documentaries, *i.e.* stress, superstition, and nature tech, were selected as audio-visual materials. The texts of the very documentaries were used as the visual or reading materials and the listening forms of the same documentaries were applied as the audio materials. The participants were asked to write about the topics once before each mode of presentation and after. The writings were scored out of nine based on international English Language Testing System (IELTS) writing criteria by two raters. Inter-rater reliability was calculated between each set of scores. One-way ANOVA, matched *t*-test and the effect size were used. The results revealed that the audio-visual group performed better than the audio group and the audio group performed better than the visual group in their post-writings.

Quarcoo-Nelson, Buabeng and Osafo (2012) examined the impact of audio-visual-aided instruction on students' achievement in physics at Cape Coast township of Cape Coast Metropolis, Ghana. The study was a non-randomized pretest-posttest group design. A total of 65 students in Senior High School (SHS) formed the sample for the study. The students were fourth year science students from two purposefully selected co-educational SHS. The two selected schools were randomly designated experimental and control groups respectively. A validated physics achievement test instrument with a reliability coefficient of 0.76 was administered. Analysis of Covariance (ANCOVA) and t-test statistics were used to test the two hypotheses formulated to guide the study at a significance level 0.05. The results showed that SHS students taught with audio-visual aided instruction performed better than those taught with traditional method. The mean

achievement scores of both male and female students improved significantly by the use of the audio-visual aided instruction. It was therefore recommended that SHS physics teachers should explore the use of audio-visual-aided instruction to teach the subject, physics.

Gecu and Satici (2012) investigated the effects of using digital photograph on 4th grade curriculum. The study aimed at examining how to apply computer assisted instruction activities through dynamic geometry software more effectively. The study was anchored on two (2) research questions. Both quantitative and qualitative approaches were adopted in the research due to the nature of the research questions. The quasi-experimental research design was adopted for the study. Fifty (50) students were selected for the study. The students were grouped into two: experimental and comparison. The groups were taught "triangle, square, rectangle, perimeter and area" for five weeks with 2-lessons hour per week. However, the experimental group was taught using digital photographs with Geometer's Sketchpad (GSP) while the comparison group was taught with only GSP.

Geometry achievement test and interview form were used for data collection for research questions one and two respectively. Data obtained were subjected to t-test statistics. Findings of the study disclosed that using Geometer's Sketch Pad (GSP) as a virtual manipulative facilitates students learning. According to the interviews with students, the students have both positive and negative thoughts towards instructional software and GSP as a virtual manipulative. Chukwu (2012) examined effects of imagery (picture technique and visualization technique) and gender on secondary school students' achievement and interest in essay writing in Anambra state, Nigeria. The study adopted the quasi-experimental non-randomized control group factorial design involving two independent and two dependent variables. The groups are non-equivalent intact classes of subjects. The study was guided by six (6) research questions from which six (6) null hypotheses were formulated. Population of the study comprised of four thousand, three hundred and twelve (4,312) Senior Secondary two (SS 2) students in Onitsha North Local Government Education Zone. The sample size for the study was two hundred and seven (207) students from three (3)

governments owned co-educational secondary schools. The selection of the schools was done through simple random sampling technique. Selected students were grouped into experimental and control group. Two instruments - Essay Achievement Test (EAT) and Essay Interest Inventory (EII) - were used to collect data. The descriptive statistics of mean and standard deviation were used for answering research questions while the formulated hypotheses were tested with Analysis of Covariance (ANCOVA) at 0.05 level of significance. The study revealed significant effect of imagery techniques (picture and visualization) on students' interests and achievement in English language essay writing without gender difference.

Ashaver and Igyuve (2013) examined the use of audio-visual resources in teaching and learning process in Colleges of Education, Katsina-Ala. The study was guided by six (6) research questions. The survey research design was employed for the study. Two sets of questionnaires were administered to lecturers and staff in order to elicit the needed information. The researcher also went to the college to observe and also to administer the questionnaires. Through the questionnaires and observations made by the researcher, data were collected, organized and analysed using non-parametric statistical techniques like percentages and frequencies; mean was also used in research question three for easy analysis and discussion because of the number of the items involved. It was discovered that the College collection of audio-visual materials is fairly adequate, the lecturers in the college rarely use audio-visual resources in teaching, the chalkboard is the only material frequently used by the lecturers, non-availability, lack of supporting infrastructures and human factors are hindrances to the use of audio-visual aids in the college. There are numerous benefits that students derive from the use of audio-visual aids. The awareness of available audio-visual resources created by the librarian is not impressive.

Gul, Kiyani, Chuadhry and Liaqut (2014) investigated the role of audio-visual aids on the cognition of students at secondary level. The objective of this study was to find out the use of audio-visual aids in teaching of Pakistan students at secondary level and to find out the effect of audio-visual aids on the cognition of students. Quasi experimental research design was used for the

study. The population of the study comprised of all the Government Girls secondary schools. Government Girls High School Rawalpindi was selected through purposive sampling. Ninety (90) students from 9th class were randomly selected as a sample for the study.

The instruments of this study were an inventory of audio-visual aids and an achievement test. The test instrument reliability was found to be 0.75. The experimental group was taught by using technical audio-visual aids while the control group was taught with the traditional method. The results of pre- and post-test scores were calculated and analyzed through descriptive statistics. The mean achievement scores of students from experimental group was significantly higher than the control group. It was therefore recommended that Pakistan teachers should use the audio-visual-aids to teach students at 9th class.

Akinwole (2015) examined the effects of audio-visual materials in the teaching and learning of the speaking skills in junior secondary schools in Katsina Local Government Area of Katsina State. Three null hypotheses were formulated (and tested at the probability of 0.05 levels of significance) for the study. The research design for this study was quasi-experimental. A pre-test was administered on the subjects using Phonetic Assessment Test (PAT) to determine students' entry level in oral English and ensure that the samples were of comparable abilities. The sampled subjects were divided into experimental and control groups. The experimental group (treatment group) was exposed to rigorous teaching using Audio-Visual Material- designed Video Compact Disc while the control group was treated using the chalk-talk method of teaching without materials. These two groups were post tested using PAT to access if there was effect due to the treatment. After two weeks of the post-test, the students are re-tested to ascertain the retention level of the groups. The entire population for the study was 2,012 students obtained from two (2) junior secondary schools selected from the study area which were co-educational (mixed-male and female schools). Two hundred (200) respondents were sampled out of the total population using simple random sampling technique and were grouped into Control and Experimental groups. Thereafter, they were subjected to treatment for six (6) lessons of two (2) periods per week using Video

Compact Disc and Chart for Experimental and Control group respectively. The data collected for the study were analyzed using descriptive statistics, and the t-test was used for testing the null hypotheses. The study revealed that the use of Audio-visual materials in the teaching and learning of speaking skills is significantly better than the conventional method in the junior secondary schools of the Local Government Area under study; and the use of audio-visual materials used in the treatment has no gender effect on the junior secondary school students involved in the study.

Kaswa (2015) examined the effect of visual learning aids on students' academic performance in public secondary schools of Magu District, Tanzania. The study adopted both quantitative and qualitative research techniques. Population of the study comprised of the entire nineteen (19) public secondary schools in Magu District. Four schools were selected for the study. The four schools were divided into two schools per group, group 1-those using visual aids in learning (Magu and Kitumba) and the other group 2, as those not-using (Kandawe and Itumbili) visual aids. A sample size of one hundred and two (102) students was used for the study. Questionnaires, documentary reviews and cross-examination interviews were used to collect data. Obtained data were analyzed with descriptive statistics and thematic analysis for quantitative and qualitative data respectively. The study discovered that students who were exposed to visual learning aides performed better in the National Form Four Examination for 2013 and 2014 than their counterparts that were not exposed to visual learning aids.

Bello and Goni (2016) examined the relationship between audio-visual materials and environmental factors on students' academic performance in senior secondary schools in Borno State. The study was anchored on two hypotheses. The correlation research design was adopted for the study. Population of the study was made-up of one thousand nine hundred and eighty-seven (1,987) students from three purposively selected secondary schools in Maiduguri. The sample size for the study was one hundred and ten (110) students. The instruments used in this study consisted of Effect of Audio-Visual and Environmental Influence on Student Academic Performance Questionnaire (EAEIAPQ). Data collected for the study was analyzed using Pearson's Product

Moment Correlation Coefficient, 'r'. The results of the study revealed that there was a significant relationship between students' academic performance and instructional materials, and there was significant relationship between students' academic performance and environmental factors.

Ekanem and Obodom (2017) investigated the impact of audio-visual resources on the academic performance of secondary school students in science in Ukanafun Local Government Area. Two research hypotheses were formulated to guide the study. Quasi experimental design was adopted for the study. A sample size of hundred (100) science students from a population of one thousand and fifteen (1015) responded from 10 selected secondary schools. The instrument used for data collection was titled "Biology Achievement Test (BAT)". The data gathered for the study were analyzed with independent t-test statistics. Findings of the study showed that audio-visual (AV) has a significant impact on the academic performance of science students. It was recommended among others that science teachers should constantly use audiovisual facilities in their teaching to bring about improvement in the academic performance of science students.

Akinoso (2018) investigated effectiveness of multimedia on students' performance in mathematics. Quasi experimental design was adopted for the study. The population of the study comprised the entire Senior Secondary School II in Lagos State. Sample of the study comprised 60 senior secondary school II students randomly selected from two schools from Educational District V. Intact classes were purposely assigned into experimental and control. Mathematics Achievement Test (MAT) was adopted for data collection with reliability coefficient of 0.81 using Kuder Richardson 20 (KR-20). Data collected were analyzed using ANCOVA. Results of the study showed that significant effect exists between the treatment and experimental group in terms of achievement in mathematics, the mean achievement score of the experimental group was higher than that of the control group. Also, male have higher achievement mean score than female counterparts. It was concluded that multimedia instructional aids positively influenced the academic performance of students in mathematics.

Objectives of the Study

Specifically, the objectives of the study were to:

i. Investigate the mean difference in the academic performance scores between students exposed to photographic album strategies and those who were not exposed.

ii. Determine gender-related mean differences in the academic performance scores in Environmental Education between male and female students exposed to photographic album strategy.

Research Questions

To achieve the above stated objectives, the following research questions were posed to guide the study:

i. What is the mean difference in the academic performance scores between students exposed to photographic album strategies and those who were not exposed?

ii. What is the difference in mean score between male and female student exposed to photographic album strategies in teaching Environmental Education concepts?

Hypotheses

In line with the above research questions, the following hypotheses were formulated:

Ho_1: There is no significant difference in the academic performance scores between students exposed to photographic album strategies and those who were not exposed.

Ho_2: There is no significant difference in the mean performance scores of male and female students exposed to photographic album strategies in teaching Environmental Education concepts.

Methodology

The quasi-experimental design was adopted for the study. Quasi-experimental design is a non-experimental design which gives the experimental purists a quasi-feeling, and frequently implemented than the randomized design - experimental. It is commonly employed in the evaluation of educational programs when random assignment is not possible or practical (Gribbons,

& Herman, 2004 cited in Creswell, 2013). It also identifies a comparison group that is as similar as possible to the treatment group in terms of baseline (pre-intervention) characteristics (Howard & Shagun, 2014). Hence, the reason for adoption of the design.

Two junior secondary schools were randomly selected in Gwagwalada Area Council of the FCT, Abuja, Nigeria using the simple random sampling technique. These formed the experimental and control groups. Intact classes of thirty (30) students from each sampled school were used for the study. Hence, the sample size of the study comprised of sixty (60) students. Instrument for the study was titled "Environmental Education Performance Test (EEPT)" designed by the researcher in line with the scheme of work for the topic "sanitation" as well as "solid wastes management". It was constructed using four sets of questions namely: multiple choice of 3 options of A to C; 2 options of True or False; as well as open-ended questions; all together comprising of twenty (20) questions. The instrument was validated by three experts in environmental education, and basic science. A co-efficient index of 0.79 was obtained from pilot test of the instrument which was conducted using fifteen (15) students who are not part of the sample of the study. Data obtained were subjected to descriptive statistics – mean (x), percentage, standard deviation, etc - for answering research questions and, t-test for testing the formulated hypotheses at 0.05 level of significance.

Data Presentation and Analysis

Analysis of Research Questions

Research Question One: What is the mean difference in the academic performance scores between students exposed to photographic album strategies and those who were not exposed?

Table 1 showed performance scores of participants in experimental and control groups. From the table, the mean, median, mode, range, minimum and maximum scores of participants in the experimental group were greater than their counterparts in the control group, except for standard deviation and variance. This implied difference in performance of students in environmental

education between those exposed to integration of photographic album teaching strategy and those who were not.

Table 1: Environmental Education Performance Test Scores

Percentage Score	Experimental Group	Control Group
41 – 50	0	4
51 – 60	0	11
61 – 70	3	13
71 – 80	16	2
81 – 90	11	0
91 – 100	0	0
Mean	**77.10**	**57.67**
Median	**78.00**	**60.50**
Mode	**81.00[a]**	**61.00**
Std. Deviation	**5.44**	**6.46**
Variance	**29.610**	**41.68**
Range	**22.00**	**26.00**
Minimum	**65.00**	**45.00**
Maximum	**87.00**	**71.00**

a. Multiple modes exist. The smallest value is shown **Source:** Field Survey, 2019

Research Question Two: What is the difference in mean score between male and female student exposed to photographic album strategies in teaching Environmental Education concepts? The result is shown on table 2.

Table 2: Experimental Group's Scores

Percentage Score	Male	Female
41 – 50	0	0
51 – 60	0	0
61 – 70	1	2
71 – 80	6	10
81 – 90	6	5
91 – 100	0	0
Mean	**78.69**	**75.88**
Median	**80.00**	**76.00**
Mode	**82.00**	**81.00**
Std. Deviation	**5.91**	**4.88**
Variance	**34.89**	**23.86**
Range	**22.00**	**16.00**
Minimum	**65.00**	**66.00**
Maximum	**87.00**	**82.00**

Source: Field Survey, 2019

Table 2 showed performance scores of male and female participants exposed to integration of photographic album teaching strategy. The mean, median, mode, range, standard deviation, variance, and maximum scores of participants in male participants were greater than their female counterparts, except for minimum score. Hence, there is a difference between male and female junior secondary school students' performance in environmental education of those exposed to integration of photographic album teaching strategy in favour of male students.

Test of Hypotheses

Hypothesis One: There is no significant difference in the academic performance scores between students exposed to photographic album strategies and those who were not exposed.

Group	No	Mean	Variance	df	t-stat.	t-crit.	Decision
Experimental	30	77.10	29.61	58	12.61	1.67	Rejected
Control	30	57.67	41.68				

The t-statistics value is 12.61 while the t-test table value at degree of freedom of 58 is 1.67. It is clear that the t-test calculated value is greater than the t-test table value; therefore, the null hypothesis one is rejected. This implies that there is significant difference in performance of students in environmental education between those exposed to integration of photographic album teaching strategy and those who were not in favour of the experimental group.

Hypothesis Two: There is no significant difference in the mean performance scores of male and female students exposed to photographic album strategies in teaching Environmental Education concepts.

Gender	No	Mean	Variance	df	t Stat.	t-crit.	Decision
Male	13	78.69	34.89	28	1.43	1.70	Not rejected
Female	17	75.88	23.86				

The t-statistics value is 1.43 while the t-critical value (t-test table value) at 28 degree of freedom is 1.70. It is clear that the t-test calculated value is less than the t-test table value; therefore, the null hypothesis is retained. This implies that there is no significant difference between male and female junior secondary school students' performance scores in environmental education as a result of exposure to integration of photographic album teaching strategy.

Discussion of Findings

The study revealed significant effect of integration of photographic album teaching strategy on junior secondary school students' performance in environmental education which invariably also influenced their comprehension. It is evident that those exposed to integration of photographic

album teaching strategy performed better than those who were not. This finding agreed with the findings of Siti and Sumarsih (2011) who found that teaching with still pictures has a significant effect on students' achievement in writing procedure text. It also supports the findings of Chukwu (2012) who revealed that imagery techniques (picture and visualization) has effect on students' interests and achievement in English language essay writing. It corroborates the study of Gecu and Satici (2012) who disclosed that digital photograph facilitated students' performance in geometry.

Furthermore, Rasul, Bukhsh & Batool (2011), Quarcoo-Nelson, Buabeng and Osafo (2012), Ashaver and Igyuve (2013), Gul, Kiyani, Chuadhry and Liaqut (2014), Akinwole (2015), Kaswa (2015), Bello and Goni (2016), Ekanem and Obodom (2017), and Akinoso (2018) respectively foundthat audio-visual, a component of photographic album, influence students' academic performance in various subject areas. This present study agrees with these findings.

In terms of differences in the performance of male and female junior secondary school students taught environmental education with integration of photographic album strategy of teaching, the present study revealed insignificant different, although male students performed a little better than their female counterparts, but the difference is very insignificant. This finding is supported by the study of Chukwu (2012) which revealed significant effect of imagery techniques (picture and visualization) on students' interests and achievement in English language essay writing without gender difference.

Conclusion and Recommendations

From the findings of the study; it can be concluded that integration of photographic album teaching strategy has significant effect on junior secondary school students' performance in environmental education without gender bias. Hence, this study recommends integration of photographic album teaching strategy as instructional technique in schools, especially in the teaching and learning of environmental education as well as organization of workshops and conferences for teachers on

developing and integrating of photographic album for teaching and learning of subjects at various levels of educational programmes in Nigeria.

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