

ASSESSMENT OF STUDENTS PERCEPTION ON IMPACT OF FIELD-TRIP, METACOGNITION AND SELF-EFFICACY ON PRE-SERVICE TEACHERS ACADEMIC ACHIEVEMENT IN ECOLOGY

BY

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Abstract

This study examined the Students' Perception on Impact of Field-Trip, Metacognition and Self-Efficacy on Pre-Service Teachers' Academic Achievement in Ecology. The research adopted multi-stage research design which involved quasi-experimental of Pretest and posttest, descriptive survey and quantitative design. Four instruments were constructed and used for this research. The instruments were validated through specialists and the reliability was determined using Cronbachs' Alpha at 0.89, 0.86 and 0.84 respectively. The sample involved 100 levels students of Biology in three Colleges of Education. The experimental group involved two Colleges of Education; Federal College of Education, Abeokuta in Ogun State and Emmanuel Alayande College of Education in Oyo State 263 while the control groups were Tai-Solarin College of Education, Ijebu-Ode with sampled of 61 students' intact classes. Statistically measures were applied to determine the mean scores, the standard deviation, T-test and Analysis of Covariance (ANCOVA) using SPSS version 26. This was done to establish the robustness of data used and ascertained the parametric assumptions of using the t-test and ANCOVA. The intervention used was field trip and was more effective on the research. The t-test results for hypothesis 1 was [$t(15.030 = 0.000)$; $P < 0.05$]. The t-test established the preferableness of pre-service teachers of field trip as a teaching pedagogy to convectional method on the teaching and learning of Ecology The ANCOVA result for hypothesis 3 was [$F(1, 321) = 0.031$; $P < 0.05$], [$F(3, 319) = 0.000$; $P < 0.05$],,for hypothesis 4 [$F(2, 320) = 0.000$; $P < 0.05$],for hypothesis 5 was [$F(2, 320) = 0.001$; $P < 0.05$] and [$F(2, 320) = 0.005$; $P < 0.05$] for null hypotheses six, all the null hypotheses were rejected. The research recommends field trip as a teaching pedagogy to teach Ecology effectively. The pre-service teachers who will graduate to teach the foundational level of our educational system cannot give what they do not have. Hence, curriculum in science in Colleges of Education should be exposed to field- trip to teach from real-life experiences reference to ecological concept in Biology.

Keywords: Field trip, Self-efficacy, Metacognition, Pre-service teachers, Ecology

Introduction

Adeniji (2018), established that the significant and usefulness of fieldtrips in the learning of biology proofs that field trips will attain the three domains in course of real-life experiences in ecology. Which were cognitive, psychomotor and affective. The most important usefulness of field trips lies in the basic fact that they provide the most realistic means for meeting organisms in their actual environments. This enables students gain first-hand information, and provides opportunities for them to see and possibly touch and feel what they have heard and read about them. Field trips afford the students the opportunity of employing various senses in the process of learning biology as a science. This makes topics or concepts and principles taught more vivid and retention better. The field trip method is particularly suitable for a number of learning principles such as dialogical-critical learning, direct experiences, collaborative and cooperative. This learning method once again refers to basic learning principles.

Durowoju (2019), opined that field trips help in enriching, vitalizing and complementing content areas of the curriculum by means of first-hand observation and direct experience outside the classroom. Justifying the above assertion, Anumudu, Adebayo, Gboyega-Tokunbo, Awobode & Isokpehi (2019), stated that

educational field trips give students the opportunity to have first-hand experiences and to explore their world. It helps students to interact with what they were learning. It also allows for practical experiences, students were able to see things, manipulate it or participate in it physically. In view of the above, academic performance or achievement manifests itself in what one can do after a given academic programme thus; effective teachers' attribute could enhance academic performance which represents a bench mark test for the capabilities, efficiency and accuracy of the degree of attainment of student in academic task hence the need to investigate the effects of field trips on students' performance in biology. To this end, the purpose of the present study is to investigate the influence of field trips on students' performance in biology.

Statement of Problem

Oyewo & Akanbi (2021), also, Tadu & Eze (2012), Zhang (2017), Agbeniga, Oyerinde, Oyewole, Raheem, and Olaoye (2017), Durowoju (2020), all so worked on self-efficacy on students in science education but not using fieldtrip as a teaching strategy rather they assessed students' behaviour and self-efficacy based on Traditional method of teaching. Researchers such as Ike, Paulinus, Nzewi, Uche, Ukamaka, Ejike, Kama and Amarachi (2016), used field trip as a teaching strategy to teach Ecology, Banjoko (2010), Ajaja (2014), Okebukola (2015) and Durowoju (2020), also used field trip as a teaching strategy to teach Ecology in Ecology. There was no research conducted on the metacognitive levels and students' efficacy of students after exposure to the treatment called field trip. The available results from aforementioned researchers established that pre-service teachers were not taught properly using field trip as a teaching strategy to make the teaching of Ecology real to the learners. This research, therefore used field trip as a treatment and establish its impact on self –efficacy, metacognition and all-encompassing on academic achievement in Ecology. The gap to be filled by this research is to further expand the boundary of knowledge of teaching strategies to impact of field trip combine with metacognition and self-efficacy of students, all-encompassing on academic achievement in Ecology, hence, the boundary of knowledge in Ecology is expanded.

Purpose of the Study

The purpose of this study is to assess Students' Perception on Impact of Field-Trip, Metacognition and Self-Efficacy on Pre-Service Teachers' Academic Achievement in Ecology. Specifically, the objectives of the study as follows;

1. To examine pre-service teachers' achievement in Ecology before treatment
2. To examine pre-service teachers' academic achievement in Ecology after treatment
3. To examine the impact of real-life experience on pre-service teachers' achievement after treatment.
4. To examine the pre-service teacher's metacognition level before treatment.
5. To examine the pre-service teacher's metacognition level after treatment.
6. To examine the impact of self-efficacy on pre-service teachers' achievement in Ecology.

Research Questions

The following research questions were raised:

- i. Is there any statistically difference in the achievement of students in Ecology before and after the treatment?
- ii. Is there any statistically difference between location of institution and achievement in ecology?
- iii. Is there any statistically difference between students' gender and field-trip on achievement in ecology?
- iv. Is there any statistically any impact of real-life experiences on pre-service teachers' achievement after the treatment?
- v. Is there any statistically impact of metacognition levels on pre-service teachers' achievement in Ecology?
- vi. Is there any impact of self-efficacy on pre-service teachers' achievement in Ecology?

Research Hypotheses

The following hypotheses were raised and will be tested.

- Ho₁ there is no statistically significant difference between the achievement of students in ecology prior and after the treatment.
- Ho₂ there is no statistically significant difference between location of institution and achievement in ecology
- Ho₃ there is no statistically significant difference between students' gender and field-trip on achievement in ecology.
- Ho₄ there is no statistically significant impact of real-life experiences on pre-service teachers' achievement in ecology after the treatment.
- Ho₅ there is no statistically significant impact of metacognition levels on pre-service teachers' achievement in ecology
- Ho₆ there is no statistically significant impact of self-efficacy on pre-service teachers' achievement in ecology

Methodology

The research adopted multi-stage research design. The design for the field trip which was the treatment was quasi experimental, since the intact class was required for field trip. The first stage involved quasi-experimental of pre-test and post-test; this was used to examine the impact of the treatment on ecology. The second stage of multi-stage design on impact of metacognition and self-efficacy covered descriptive design that was used to examine the impact of metacognition and self-efficacy on pre-service teachers' achievement in Ecology. The third stage of multi-stage design was the qualitative which was carried out to examine pre-service teachers' opinion and views on the impact of field trip on academic achievement in ecology as related to real life situation. This was done through the use of video tape, both video and audio recording, using students' interview protocol. The qualitative was transcribed by the researcher. Creswell (2013), established that the study which followed a pre-test, posttest, quasi experimental design maintains the intact class. Notably, the choice of this type of design allows investigation of intact groups in real life situation of field trip. The design was used to increase the external validity of the findings Creswell & Piano (2013). It also allows the researcher to guide against the influence of extraneous variable on the relationship.

The study population consists of pre-service teachers (students) of colleges of education in Ogun and Oyo state, south-west of Nigeria, (who were in Biology department). The colleges were; Federal College Education, Abeokuta (experimental group) Emmanuel Alayande College of Education, Oyo (experimental group) and Tai-Solarin College of education, Ijebu-Ode (control group) Nigeria. The population of the pre-service teachers were students under training in colleges of education who intend to become professional science teachers. The sample include three colleges of education two for experimental group namely Federal Colleges of Education Abeokuta, Ogun state (FCE, AB) and Emmanuel Alayande Colleges of Education, Oyo, Oyo state (EACOED). The control group was Tai-Solarin College of Education, Ijebu Ode (TASCE). The sample were students of first year pre –service teachers of mentioned colleges of education. The samples were at far distance to each other to avoid contamination. The sampled population met on ground (intact class) for experimental group was 263 students, (FCE, ABEOKUTA, 142) and (EACOED, 121) while the control group was 61 students. Therefore, the total sample used for this research was 324 students. The rationale for the sample was that the experimental groups were closer a little to the research Centre, which was Ogun-Osun River Basin Authority and Oyan dam both in Ogun and Oyo state respectively. The basin consists of all Ecological environment needed for the research. The FCE Abeokuta students were on field trip to Ogun-Osun in Abeokuta and EACOED students went to Oyan dam in Oyo State.

The research instruments listed were attributed to each of the independent variable based on what each of the independent variable based on what each instrument measure. Research instrument for the study that was used to collect data for the study were;

Students' Achievement Test on Ecology (SATE);
 Students' self-efficacy questionnaire (SSQ);
 Group Metacognition Assessment Scale (GMAS) and
 Student Interview Protocol (SIP).

The achievement test was aimed at measuring the student academic achievement on Biology 115, course titled Ecology; among the pre-service teachers. The course examiners (sometimes two or more lecturers were taking the course) produced /set the questions. The head of department moderated and finally the external moderator who was a specialist on the field of Biology from other sisters' colleges of education moderated the questions to meet up with standardized regulated order of National Commission for Colleges of Education. The experts were not less than chief lecturers. These experts followed the standardized regulated order by NCCE. Hence, the achievement test was validated by the experts. In order to determine the reliability of the instruments, a pilot test was conducted within the targeted population but outside the school sampled for the study. The result obtained from pilot test conducted was used as reliability test of the instruments. The test was administered to SS II Ecology students, randomly selected using test re-test method. Pearson Product Moment Correlation formula was used to determine the reliability coefficient of BAT which yielded 0.78 while, Cronbach Alpha formula was used for QPSAB which yielded 0.88 indicating that the instrument is reliable for the study. The Cronbach's alpha results was electronically obtained at 0.89 which was considered high enough for the research. Therefore, the result established that the instrument was reliable to determine their self -efficacy levels of high, medium and low. The instruments were given to the group at two-week interval for the same set of students and same items on GMAS. The correlation was electronically calculated using Cronbach's Alpha with trial test result of 0.86.

Null Hypothesis 1: there was no statistically significant difference between the achievement of student in ecology prior and after the treatment

*confidence level/alpha (α) level = .05

Table 1 Shows Preferableness of Field trip to Lecture method on Achievement

	Paired Differences	Mean	Std. Deviation	Std. Error Mean	95% Confidence Interval of the Difference		T	df	Sig. (2-tailed)
					Lower	Upper			
Pair 1	Pretest – posttest	-30.11420	28.19145	1.56619	-33.19542	-27.03297	-19.228	323	.000

T-test was used in hypothesis one to test the preferableness of students on field trip teaching pedagogy to lecture method. Table 1 described the t-test result on the null hypothesis one tested on achievement of students in ecology prior and after the treatment intervention.

H₀₁: there was no statistically significant difference between the achievement of student in ecology prior and after the treatment.

There is statistically significant difference between the student's achievement in Ecology prior and after the treatment [$t(-15.030) = 0.000 < 0.05$], therefore the null hypothesis one is hereby rejected. With the level of significant of t-value at 0.000 (100%) less than 0.05 alpha level of significant

Hypothesis 2: There will be no statistically significant difference between location of institution students' gender and achievement in Ecology

Table 2: Analysis of Covariance (ANCOVA) on Pre-test and Posttest Achievement test on Ecology for the Field Trip and Lecture Method groups

Dependent Variable: posttest

Source	Type III Sum of Squares	Df	Mean Square	F	Sig.	Partial Eta Squared	Noncent. Parameter	Observed Power ^b
Corrected Model	69654.705 ^a	2	34827.352	10520.361	.000	.985	21040.722	1.000
Intercept	120054.247	1	120054.247	36265.002	.000	.991	36265.002	1.000
Pretest	25266.353	1	25266.353	7632.253	.002	.960	7632.253	1.000
Gender	2.208	1	2.208	.667	.415	.002	.667	.129
Error	1059.351	320	3.310					
Total	889755.000	323						
Corrected Total	70714.056	322						

a. R Squared = .985 (Adjusted R Squared = .985)

b. Computed using alpha = .05

*confidence level/alpha (α) level = .05

The ANCOVA results showed no significant difference in Ecology achievement of students on school location using field trip as a teaching pedagogy ($F(1, 320) = 0.415$; $P > 0.05$)

Table 2 Analysis of Covariance (ANCOVA) on pre-test and posttest achievement test on ecology for the field trip and convection method groups.

Ho2: There will be no statistically significant difference in Ecology achievement of students based on location of institution using field trip as a teaching pedagogy.

HO2 is not rejected since the research study a statistically significant difference in biology achievement of students based on location of institution using field trip as a teaching pedagogy with no significant of 0.415 greater than alpha level of 0.05. This implies that location have no significant impact on achievement in ecology when field trip was used as an intervention for experimental group.

Hypothesis 3: There will be no statistically significant impact of real-life experiences on pre-service teachers' achievement in Ecology after the treatment

*confidence level/alpha (α) level = .05

Table 3 Analysis of Covariance Conducted on Pre-test of Students on Impact of Real-Life Experiences on Pre-service Teachers in Ecology

Dependent Variable: posttest

Source	Type III Sum of Squares	Df	Mean Square	F	Sig.	Partial Eta Squared	Noncent. Parameter	Observed Power ^b
Corrected Model	69711.385 ^a	2	34855.693	10546.201	.000	.985	21092.401	1.000
Intercept	406925.399	1	406925.399	123122.412	.000	.997	123122.412	1.000
Pretest	65945.125	1	65945.125	19952.853	.000	.984	19952.853	1.000
Method	.766	1	.766	.232	.031	.001	.232	.077
Error	1060.920	321	3.305					
Total	893119.000	324						
Corrected Total	70772.306	323						

a. R Squared = .985 (Adjusted R Squared = .985)

b. Computed using alpha = .05

[F (1,321) = 0.031, P < 0.05]

Analysis of covariance was conducted on pre-test and post test scores of students on impact of real-life experiences on pre-service teachers in ecology.

Ho3: There will be no statistically significant impact of real-life experience on pre-service teachers' achievement in ecology after the treatment

*Confidence Level/Alpha (α) level = 0.05

Ho3 is rejected since the research found a statistically significant difference on the impact of real-life experience on pre-service teachers' achievement in ecology after the treatment with significant impact of intervention in relation to students' achievement with 0.031 at P-Value of 0.05.

Hypothesis 4: There will be no statistically significant impact of metacognition levels on pre-service teachers' achievement in Ecology

*confidence level/alpha (α) level = .05

Table 4 Analysis of Covariance Conducted on Posttest Scores of Students Application of Metacognition on Pre-Service Teachers in Ecology

Dependent Variable: posttest

Source	Type III Sum of Squares	Df	Mean Square	F	Sig.	Partial Squared	EtaNoncent. Parameter	Observed Power ^b
Corrected Model	69793.790 ^a	4	17448.448	5688.267	.000	.986	22753.066	1.000
Intercept	246560.856	1	246560.856	80379.865	.000	.996	80379.865	1.000
Pretest	67164.385	1	67164.385	21895.869	.000	.986	21895.869	1.000
GMAS	83.171	3	27.724	9.038	.000	.078	27.114	.996
Error	978.515	319	3.067					
Total	893119.000	324						
Corrected Total	70772.306	323						

a. R Squared = .986 (Adjusted R Squared = .986)

b. Computed using alpha = .05

[F (3, 319) = 0.000; P < .05]

Analysis of covariance was conducted on pre-test and post test scores of students' application of metacognition on pre-service teachers in ecology

There will be no statistically significant impact of metacognition levels on pre-service teachers' achievement in Ecology.

*Confidence Level/Alpha (α) = .05

Ho4 is rejected since the ANCOVA established that there was statistically significant difference of impact of real-life experiences (field trip) on pre-service teachers' achievement in Ecology after the treatment with significant impact of 0.000 (that 100%) less than alpha level of 0.05.

Null Hypothesis Five: there was no statistically significant impact of self-efficacy on pre-service teachers' achievement in ecology.

*confidence level/alpha (α) level = .05

Table 5 Analysis of Covariance Conducted on Post-Test Scores of Students on Impact of Self-Efficacy on Pre-Service Teachers Achievement in Ecology using Field Trip as a Teaching Pedagogy

Dependent Variable: posttest								
Source	Type III Sum of Squares	Df	Mean Square	F	Sig.	Partial Eta Squared	Noncent. Parameter	Observed Power ^b
Corrected Model	69787.724 ^a	3	23262.575	7560.595	.000	.986	22681.786	1.000
Intercept	356302.454	1	356302.454	115802.256	.000	.997	115802.256	1.000
Pretest	68055.388	1	68055.388	22118.757	.000	.986	22118.757	1.000
SE	77.104	2	38.552	12.530	.000	.073	25.060	.996
Error	984.582	320	3.077					
Total	893119.000	324						
Corrected Total	70772.306	323						

a. R Squared = .986 (Adjusted R Squared = .986)

b. Computed using alpha = .05

[F (2, 320) = 0.000; P < 0.05]

Analysis of covariance was conducted on post-test scores of students on impact of self-efficacy on pre-service teachers' achievement in ecology using field trip as a teaching pedagogy.

Ho5: there was no statistically significant impact of self-efficacy on pre-service teachers' achievement in ecology

*Confidence Level/Alpha (α) level = .05

Ho5 is rejected since the analysis established that there was statistically significant impact of self-efficacy on pre-service teachers' achievement in ecology when field trip was used as a teaching pedagogy.

Null Hypothesis Six: there was no statistically significant difference in contribution of real-life experience, metacognition and self-efficacy on pre-service teachers on the effect of real-life experience on their achievement in ecology.

*confidence level/alpha (α) level = .05

Table 6: Analysis of Covariance on the three Independent Variables of this Research (Field trip, Metacognition and Self-Efficacy) on Dependent Variable Achievement Test on Pre-Service Teachers in Colleges of Education

Dependent Variable: posttest							
Source	Type III Sum of Squares	Df	Mean Square	F	Sig.	Partial Eta Squared	Eta
Corrected Model	19320.129 ^a	3	6440.043	20.305	.000	.160	
Intercept	401891.828	1	401891.828	1267.145	.000	.798	
Pretest	11086.399	1	11086.399	34.955	.000	.098	
Group	3393.182	2	1696.591	5.349	.005	.032	
Error	101492.201	320	317.163				
Total	710551.000	324					
Corrected Total	120812.330	323					

a. R Squared = .160 (Adjusted R Squared = .152)

The three Independent variables all-encompassing on achievement of pre-service teachers on ecology

[F (2, 320) = 0.005; P < 0.05]

Analysis of covariance was conducted on the three independent variables of this research that field trip, metacognition and self-efficacy on dependent variables achievement test on pre-service teachers in colleges of education. The three independent variables all-encompassing on achievement of pre-service teachers on ecology

Ho6: there was no statistically significant difference in contribution of real-life experience, (field-trip), metacognition and self-efficacy on pre-service teachers on the effect of real-life experience on their achievement in ecology.

Ho6 is rejected since the ANCOVA analysis established that there was statistically significant difference of the three independent variables on academic achievement of pre-service teachers in Ecology with significant impact of 0.005 less than alpha level of 0.05.

Discussion of Findings

The findings of the study established that there was a significant impact of the treatments on the teaching and learning of ecology for Pre-service teachers. The field-trip motivated the students. They were able to interact within and among the group. The Students Interview Protocol (SIP) established that the self-efficacy and metacognition of students was improved based on the exposure. The (SIP) established that students preferred field-trip to convectional method on the teaching and learning processes of Biology reference to Ecology. The findings of this study indicated there was significant impact of treatments in the teaching and learning of ecology for pre-service teachers. The scores of respondents exposed to the treatment (experimental group) were better than the control group. Therefore, the first hypothesis was rejected. The homogeneity of variance was tested using the Levene's test which gave us 0.062 and 0.284 of level of significant to 0.05 alpha level (pre and post-test) respectively which prove the normality of population of the respondents was appropriate to meet up with the parametric assumption. The t-test results established that the treatment was mostly preferred 100% with 0.000 significant levels by the respondents to convectional method.

The findings of this study corroborate Mohammed and Khan (2012) and Anumudu, Adebayo, Gboyega-Tokunbo, Awobode & Isokpehi (2019), each of those researchers discovered that students with high metacognitive ability performed better in achievement test especially when the students were exposed to certain task to demonstrate their skilfulness. In this study the test of normality of population was conducted using Kolmogorov at 0.473 and 0.273 and the test of homogeneity of variance was done using Levene's test at 0.142 to determine the parametric assumption of using ANCOVA. The findings established that metacognition has (100%) significant impact on students' academic achievement in ecology at 0.000 significant less of 0.05 alpha level of significant. Adeniji (2016) in his study on cognitive domain and metacognition established that while cognitive emphasized the ability of individual to regurgitate facts and putting up ideas in black and white, metacognition contains more than that it involved thinking and re-thinking based on an exposure or reasoning from abstract to create or generate new things based on exposure. Anumudu, Adebayo, Gboyega-Tokunbo, Awobode & Isokpehi (2019), used metacognitive awareness inventory on secondary school students in biology and discovered that a significant impact of positive relationship between student's academic achievement and metacognitive awareness, there was metacognition awareness and differences in student's achievement from S.S.S1 to S.S.S3.

The findings corroborated Bandura the father of self-efficacy on researches conducted in 1977, 1982, 1983, 1984 and 1987. Bandura formulated self-efficacy measurement instrument such as Andrela, Margarreth, Barnard (2020) conducted research on self-efficacy scale for the establishment of good relationship with families. Their findings were in agreement with this research that students with high level self-efficacy performed better in academic achievement. The finding of this research also corroborated Adeniji, Banjoko and Akintoye (2020) on a research conducted on influence of self-efficacy

on academic achievement of secondary school students in ecology in Abeokuta metropolis. The findings established that students with higher level of self-efficacy tend to be more self-regulated and persistent in their learning, experiences less stress and anxiety and consequently have higher academic achievement than their counterparts.

The students were highly motivated with field-trip. Their interest was very high with high curiosity for scientific discovery within society. The Students Interview Protocol reports as interpreted established students' absolute interest for field-trip to learn science in real sense. The experimental group was of the opinion that Ecology must be taught using field-trip to students' immediate environment. "What you see, you believe", "what you touch, you do not forget", the experiences during the field-trip went through the assertions. The bar-chart on hypothesis seven established that field-trip is very robustly. The intervention embraces other teaching strategies such grouping, interaction, discussion, demonstration, discovery, practical and play-way method. With the use of field-trip, the strategy exposed the respondents to real-life experiences. The real-life experiences eventually improved students' self-efficacy and metacognitive capacity. The finding was in accordance with Nnamonu, Anih, Nzewi, Ogbodo, Aleke, Kama and Ndukwe (2016) in a research titled; The Influence of Field Trip on Students' performance in Biology; Educational and Counselling Implications in Nigeria. The researchers established that field trip had very high influence on student's achievement in Biology corroborated by Raheem (2011), Auwalu, Mohd and Gasim (2014), Auwalu (2014), Afolayan (2019), Amakiri, Eremma and Ukwuije (2016) all aforementioned discovered that students had good perception, good influence and interest on field trips, the findings of this research is not exceptional. The results on hypothesis seven established that students with a very high interest on field trips of possible to be conducted every day for their lectures especially on ecology

Conclusion

In line with the findings of this research, the following conclusions were made; That hypothesis one tested was achieved which established that the pre-service teachers prefer field trip as a teaching pedagogy to lecture/traditional method. That hypothesis three established the significant impact of real-life experiences on teaching and learning of ecology from pre-service teachers' immediate environment. That the hypothesis two established no significant effect of location of the institution and gender on the impact of field trip on the research. In that the institution location where, pre-service teachers were moved to the field trip has no effect since all the institutions were in urban area. Also, the gender (female or male) does not determine what the pre-service teachers observed or their involvement in all activities undergone. The hypothesis four established that there was significant impact of metacognition on the academic achievement of pre-service teachers is that the students were able to think and re-think on the intervention or exposure and thereby construct ecological instruments from local materials. That hypothesis five was achievable where the significant impact of students' self-efficacy (weakness and strength) to identify living organisms, pick living organisms, interact with other students to do activities were measured and the determined using achievement test on ecology using the real-life experiences within their immediate environment. That hypothesis six was achieved where the significant impact of the three independent variables were felt on the dependent variable without the intervention of field trip/task/exposure the self-efficacy and metacognitive capacity of the pre-service teachers would not have been developed.

Recommendations

Based on the major findings of this study, the following recommendations are proffered as follows:

1. Policy makers should legislate the teaching of science through real life experiences using materials within the students and teacher's environment. Field trip should be made mandatory for the teaching and learning of ecology especially for pre-service teachers in colleges of education who always graduate to teach at the primary school level (foundational level of our educational system).
2. The National Commission for Colleges of Education (NCCE) should build up a curriculum that emphasis learning science from indigenous materials.

3. They must be ready to engage in series of intervention/exposure/field trip as stipulated by the lecturers/instructors.
4. They must bear the pains of learning through real life experiences from their immediate environment to make teaching and learning a reality not the write learning of cramming and pouring of facts and principles they have never seen.
5. The pre-service teachers should be ready to carry out researches relevant to the need of their immediate social through adequate teaching strategy and curiosity to put their lecturers on task to lecture them ecology/biology sciences in real-life situations of their immediate environment.

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