



Efficacy of Online Facilitation Mode on Pre-service Teachers' Attainment in Biology Education in Southwest Nigeria

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ABSTRACT

This study examined the efficacy of online facilitation mode on pre-service teachers' attainment in Biology in Federal Colleges of Education in South West, Nigeria. Two research questions and two null hypotheses tested at a 0.05 level of significance guided the study. The population for the study comprises all 200 level pre-service Biology teachers from the Federal Colleges of Education offering (BIO 213) Population education. A simple random sampling technique was used to select a sample of 173. The design of the study was quasi-experimental design. The reliability of the instruments was determined using the Kuder-Richardson formula (Kr 20) and a coefficient of 0.78 was obtained. The data collected from the field was subjected to analysis using mean and standard deviation, while analysis of covariance (ANCOVA) was used to test the hypotheses. The results showed that the achievement of pre-service NCE 2 Biology teachers taught with the online facilitation were encouraging compared to those who had physical contact with the facilitators. Based on the findings, it was recommended that stakeholders need to simplify the online facilitation mode and make it comprehensible by organising workshops and conferences to prepare the facilitators and the pre-service teachers with the necessary skills in the Federal colleges of Education in Nigeria.

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INTRODUCTION

The world is progressively linked to the internet through several devices, and online education in several formats has captured the interactive mode of students in their various institutions. Online facilitation (teaching and learning virtually) involves the use of the internet and other vital technologies to produce learning materials for the learners, this may be the reason Bello, Alabi, Ahmed, Sulaiman, Bello, and Bello, (2020) pronounced the current generation of Nigerian graduates as digital natives because they are born in the era of modern digital Information, and Communication Technologies (ICTs). Bello (2021) saw online facilitation as the act of managing the learners and learning resources through an online learning platform. He emphasized that online facilitation is rapidly creating a pedagogical shift in the mode of engagement, collaboration, interaction, and

discussion in online learning. Huang, (2016) described online learning, as web-based and self-directed learning either synchronously or asynchronously at computers. Online facilitation involves the use of various virtual resources and tools such as online course materials, chat, message boards, and net meetings. Opeyemi, Adeyemi, Olajuwon, Oloruntosin, and Oladeji (2019) explained that in the online learning environment, learning takes place within a flexible timeframe that students develop without the constraint of a pre-set classroom or organization's schedule. Apena (2019) described online facilitation as the way out for learners because it gives them the opportunity to showcase their ideas and experience during discussions. She further explained that the online mode of teaching is friendlier than the traditional mode that everybody is used to; the moderator is usually liberal, attentive, impartial, patient, and

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affirmative. Meanwhile, it has been established that pre-service teachers' attainment in Biology education in Colleges of Education in Southwest Nigeria seems worrisome and this has affected their achievements in the subject. FME (2019) posited that ICT occupies a very strategic place in information and communication technologies in Education in the country and that modern education techniques shall be increasingly used to improve all the levels of the educational system. Biology is the study of living and non-living things which helps us to appreciate the function of living and non-living worlds that evolve and mutually interact with one another. Biology is so important to all living organisms and their entire community and this may be the key to the development of a healthy environment in which all living and non-living beings interact in a stable manner. The use of online facilitation might go a long way to help both the lecturers and their students to cover a lot of ground in learning some of the concepts in Biology. Kurawa (2021) affirmed that Biology teacher and students can obtain information or access activities from the net in and outside the classrooms using computers, tablets and their smartphones to enhance participation, interaction and searching skills of the students. The task of sharing biological knowledge, its unique philosophy and methodology with learners lies within the field of biology education. Bello, Alabi, Ahmed, Sulaiman, Bello, and Bello, (2020) posited that Biology education is an established discipline and a profession concerned with facilitating the meaningful acquisition of biological knowledge, method, and philosophy by the learners and the general public. Therefore, biology education ensures the steady production of generations of research scientists in the field of biology and equips citizens with biology literacy required for making informed decisions on personal and societal issues based on sound biological knowledge. The general aim of biology education is to stimulate and sustain curiosity about biological events and phenomena.

Opeyemi et al (2019) confirmed that not all students learn the same way and for the sake of flexibility, the traditional approach is not ideal for all students. This is applicable to biology

education which some pre-service teachers might grab easily whereas some do not assimilate at the same pace. From the above narrative, the study looks at the efficacy of online facilitation mode on pre-service teachers' attainment in biology education in Federal Colleges of Education. In essence, an online facilitation platform has been perceived as an instructional delivery channel that learners could easily navigate to participate in video conferencing, discussion forums, submission of assignments, and quizzes to enable them attain better in their learning.

Statement of the problem

In Nigeria, pre-service teachers in colleges of education have been using the conventional methods in the learning of biological science. The introduction of online facilitation in teaching and learning in most of the colleges of education changed the face of learning. Yet, the application and the effectiveness of the use of online resources for learning among pre-service teachers seem worrisome. It would thus, be necessary to introduce more innovative and creative strategies suitable for improving learning outcomes in colleges of education Family life education. One of the innovative strategies is the adoption of online facilitation without the presence of the lecturers and enables the pre-service teachers to learn at their comfort zones. This would bridge the gap between suitable exposure to instructional strategies as well as training the teachers in accepting technology in classroom instruction. Therefore, it seems to reason empirically to investigate the efficacy of an online facilitation mode on pre-service teachers' attainment in Biology in the Federal Colleges of Education in South West, Nigeria.

Purpose of the study

Specifically, the study sought to:

1. Determine the effects of online facilitation and conventional methods on pre-service NCE teachers' achievement taught Family Life Education in southwest Nigeria.
2. Determine the effect of online facilitation on male and female pre-service NCE teachers'

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retention taught Family Life Education in southwest Nigeria.

Research Questions

1. What are the mean achievement scores of pre-service teachers taught Family Life Education using online facilitation and conventional methods in south west Nigeria?
2. What are the mean retention scores of pre-service teachers taught Family Life Education using online facilitation and conventional methods in south west Nigeria?

Statement of the Hypotheses

The following null hypotheses were tested at a 0.05 level of significance.

H₀₁: There is no significant difference in the mean achievement scores of pre-service teachers taught Family Life Education using online facilitation and conventional methods.

H₀₂: There is no significant difference between male and female pre-service teacher level of achievement regarding online facilitation.

METHODOLOGY

The study adopted a quasi-experimental research design of pre-test and post-test research design.

The target population consisted of all 200 level Biology education pre-service teachers in the Federal college of education in South West Nigeria. Two intact classes of 200 level Biology students totaling 173 were randomly selected for the study.

The instruments were subjected to face and content validity were established by the opinions of three experts in Measurement and Evaluation and Biology Education, to ascertain the clarity of purpose in the instrument in measuring what they were supposed to measure. Pilot test was carried out by

administering instrument to 20 pre-service teachers who were not part of the study to test the reliability and the coefficient of 0.78 was obtained.

The instrument for data collection for this study was a forty (40) Test items self-structured multiple-choice achievement test in family life education achievement test (FLEAT). The FLEAT was divided into two sections (A and B). Section A contained items seeking information about the personal data of the respondents while section B consisted of the achievement test items made up of 40 multiple-choice questions. The instrument FLEAT was used for pre-test and post- test to obtain data on pre-service teachers' achievement in family life education concepts taught. After a week the 40 multiple-choice questions were reshuffled to check the retention of the pre- service teachers in family life education. Each item of FLEAT has four options (A-D) as plausible answers to the question. A score of „1“ was awarded for each answer got right and „0“ for each wrong answer. The instrument was appropriately validated, and pilot tested and a reliability index of 0.78 was obtained using Kuder-Richardson (Kr21) Correlation coefficient.

The data collected from this study were analyzed using descriptive statistics (mean and standard deviation) to answer research questions while Analysis of Covariance (ANCOVA) was used to test the hypotheses. The hypotheses were tested at a 0.05 level of significance.

This study examined efficacy of online facilitation instructional mode on pre-service teachers' attainment in Biology education in South West, Nigeria. The test items were sent to the pre-service teachers via "moodletrain22" to check their performance. The online facilitation for the pre-service Biology teachers through a learning platform called "moodletrain22" is a platform that housed the online facilitation class for the pre-service teachers.

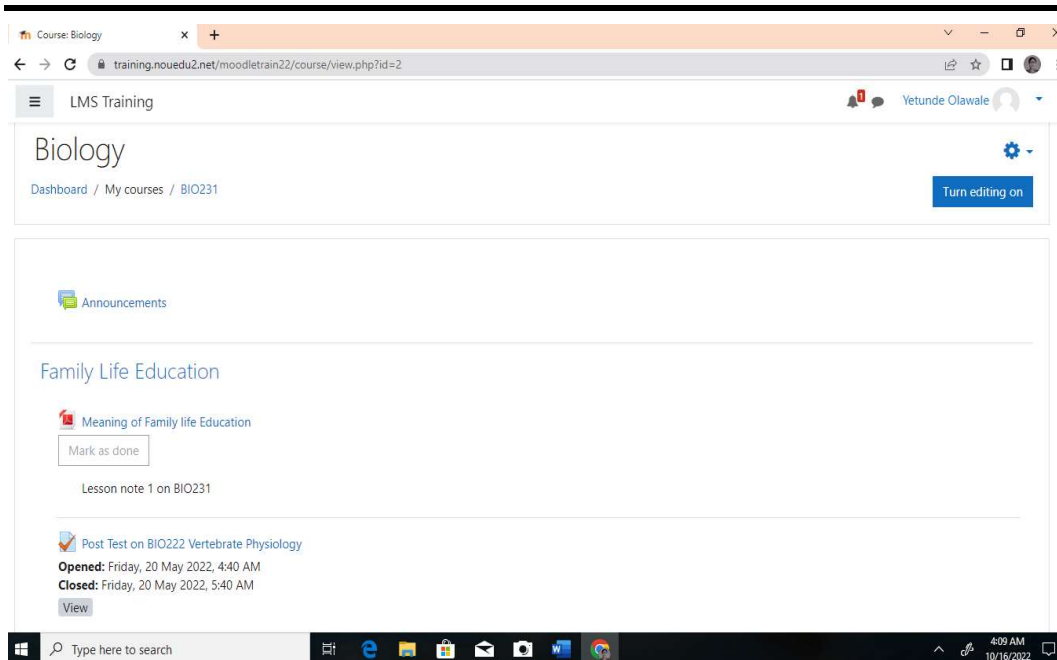


Figure 1: Moodletrain 22 login page

At the beginning of the session, pre-service teachers were encouraged to log in to <https://training.nouedu2.net/moodletrain22/login/index.php#section-1> and before the online facilitations started a forty test items of self-structured multiple-choice achievement test in Family Life Education Achievement Test (FLEAT) was sent to the pre-service teachers who participated to check their background knowledge in the family life education, therefore, the pre-service teachers later received their lessons in the online platform where the lesson notes on BIO213

and discussion forum were uploaded. Pre-service Biology teachers were trained on how to navigate the platform and access the course as indicated in the figure 1. This intervention lasted six weeks. At the end of the exercise, 173 pre-service Biology teachers were encouraged to attempt the quiz of forty (40) items of multiple-choice in Family Life Education Achievement Test (FLEAT).

RESULTS

Tables are used to present the results.

Table 1: Mean achievement scores and standard deviation of pre-service teachers exposed to online facilitation and conventional method in federal college of education in south west Nigeria

Group	N	Pre-test		Post-test	
		M	S.	M	S
Online facilitation	6	1	4.	37	2
Conventional Method	1	1	3.	18	4

S.D- Standard deviation

Table 1 shows the pre-test and post-test scores of pre-service teachers' attainment in online facilitation in Family life Education using

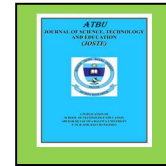
online facilitation and Physical class. The pre-test mean score for the online facilitation is 17.96 and the mean score for post-test are 37.67. While the

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pre-test mean score for the physical class attainment 15.98 and the mean score for post-test was 18.82. This shows that there was a significance difference between achievement

scores of pre-service teachers" taught Family life education using online facilitation and Physical class.

Table 2: Mean retention scores and standard deviation of pre-service teachers exposed to online facilitation and conventional method in federal college of education in southwest Nigeria

Group	N	Post-test		Retention	
		Mean	SD	Mean	SD
Online facilitation	69	37.67	2.411	37.977	2.320
Conventional Method	104	18.82	4.208	14.77	4.668

SD- Standard deviation

Table 2 shows the pre-test and post-test scores of pre-service teachers" retention in online facilitation in Family life education using online facilitation and Physical class. The post-test mean score for the online facilitation is 37.67 and the mean score for retention is 37.97. While the pre-test mean score for the conventional methods

attainment 18.82 and the mean score for retention was 14.77. This shows that there is significance difference between retention scores of pre-service teachers" taught Family life education using online facilitation and Physical class.

Table 3: Analysis of covariance on students' Achievement in FLE using online facilitation

Source	Type III Sum of Squares	df	Mean Square	F	Sig.
Corrected Model	19414.643 ^a	3	6471.548	538.713	.000
Intercept	12153.624	1	12153.624	1011.708	.000
Pre-test	5.756	1	5.756	.479	.489
*Method	18926.182	2	9463.091	787.739	.000
Error	3051.295	254	12.013		
Total	244226.000	258			

Corrected Total 22465.938 257

Table 3 reveals a significant difference in the achievement of pre-service teachers taught Family life education exposed to online facilitation and conventional methods. F= ratio of 787.739 was obtained with an associated exact probability value of 0.000. Since the associated probability (0.000) is less than 0.05 set as the level of significance, the null hypothesis was rejected. The result implies that online facilitation improved pre-

service teachers" achievement in Family life education more than the conventional method. The null hypothesis which states that there is no significant relationship between pre-service teachers" achievement and retention towards learning of Family life education in College of Education in South west Nigeria is rejected while the alternate hypothesis is accepted.

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Table 4: Analysis of covariance of pre-service Biology teachers' achievement in Family life Education based on gender and online facilitation

Source	Type III Sum of Squares	df	Mean Square	F	Sig.
Corrected Model	.865 ^a	2	.432	.072	.930
Intercept	4413.684	1	4413.684	738.470	.000
Pre-test	.065	1	.065	.011	.917
*Gender M	.857	1	.857	.143	.706
Error	394.469	66	5.977		
Total	98291.000	69			
Corrected Total	395.333	68			

Table 4 reveals the ANCOVA table on male and female pre-service teachers' achievement in FLEAT F = ratio of .143 with associated probability of .706 which is greater than the bench mark probability value of 0.05. There was no significant difference in the mean achievement scores of male and female pre-service teachers taught family life education using online facilitation method and the null hypothesis was accepted.

DISCUSSION

The findings of this study revealed that pre-service teachers' achievement and retention in Family life education in online facilitation was very high. This implies that the pre-service teachers' achievement and retention improved in Family life education with the use of online facilitation classroom than their conventional group. It can therefore be referred to that the use of online facilitation enhanced the pre-service NCE teachers' Achievement and Retention in family life education. These results are in line with the earlier findings of Bello (2021) who showed that the level of acceptance of online facilitation among students was high. Also, Muir, Douglas and Trimble (2020) who posited that focusing on social, managerial and technical facilitation strategies resulted in an increased

instructor presence and active involvement, which in turn were influential in motivating students to engage with learning online. Fayomi, Ayo, Ajayi, and Okorie also showed improved learning process and high academic performance with the use of e- learning in their study.

The result also revealed that there is no significant difference in the mean achievement scores of male and female pre-service teachers taught family life education using online facilitation method. This is against the study of Chukwuma, (2020) who concluded that the male adult learners been more motivated than their female counterpart. While, Owolabi and Adeyinka found out that female participants had higher scores in their various studies. Nevertheless, the increasing adoption of online learning across higher institutions in the world exclusively with the global disease outbreak like COVID-19 pandemic, doubt surrounding its level of attainment remains one of the major obstructions as indicated by many stakeholders in learning. However, the advancement in internet technology has brought about online learning that could be used to manage the learning process and stimulate active communication between learners and facilitators. Thus, the pre-service teachers who participated in this study have recognized the usefulness of online facilitation and would close the

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instructional openings in the learning process and allow them to interact with their lecturers and colleagues participating from different location at the same time. This has made online facilitation an encouraging response to process the quality of online learning specifically.

RECOMMENDATIONS

This study, recommended that

1. Management at the Federal Colleges of Education should make a stern effort to provide more online learning environments that would enhance students' achievements.
2. The lecturers in Federal Colleges of Education should also adopt the use of different multimedia to deliver the lectures for the pre- service teachers so that they can practice the same when they get to the field.

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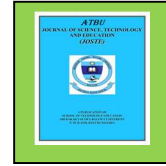
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Assessment of Online Facilitation
Processes in the National Open
University of Nigeria (Noun).

<https://oasis.col.org/colserver/api/core/bitstreams/f76fc6a4-bd97-4d84-930b-294477f6a53e/content>