

PHYSICAL AND VIRTUAL LEARNING ENVIRONMENTS: STUDENTS' PREFERENCE



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ABSTRACT

Most Nigerian Universities were forced to adopt Virtual Learning because of the COVID-19 pandemic. When it was adopted, it was strange and new to most students and caused a lot of differences among the students because the effect on students' academic performance and pocket were different, as it favored some and affect others. In this paper, the regular (Physical Classroom) and the newly adopted method (Virtual) were compared and contrasted based on their effect on student's academic performance, cost, and preference of the students in the College of Physical Sciences, Funaab. The cost of running the two methods and the GPA (Grade Point Average) obtained from the students using an online questionnaire were considered. 300-level and 400-level students were sampled being the only level that has partaken in the two methods. 50 students each from five departments in the college given a total sample of 250 respondents. Paired difference test, two-sample z-test, and Analysis of Variance were used for the analysis of the data. The analysis reveals that there is a significant difference in the cost of running the methods and also shows a significant difference in the GPA of the students. The results obtained also reveals that no department performed better than the other during the two methods of teaching. Also, many students preferred Physical Classrooms to Virtual.

1.0 INTRODUCTION

The COVID-19 epidemic has had a tremendous impact on the education sector and has compelled colleges and universities to embrace new teaching and learning Methods [1]. The transition to virtual learning environments, where students attend classes remotely using online platforms and technological resources, has been one of the most noticeable transformations. [2] This method offers advantages like flexibility and accessibility, but it also has drawbacks including technological issues, a lack of social engagement, the cost of maintenance, and social amenities for effectiveness like power supply and Internet; especially, on this side of the world. Educators and policymakers are debating how to strike a balance between the benefits and drawbacks of virtual learning and the conventional physical learning environment as the world continues to recover from the pandemic. Understanding students' choices between physical and virtual learning in this setting is essential for developing successful and engaging learning experiences.

1.1 AIM AND OBJECTIVES OF THE STUDY

The study aims to compare and contrast the physical and virtual learning environments based on their effect on student's academic performance and any other related factors.

Specifically, this paper sought to:

- Determine the effect of virtual classrooms on students' academic performance.
- Verify if the cost of running the two methods is the same
- Ascertain the one that the students prefer the most

1.2 LIMITATION OF THE STUDY

Initially, the idea of the researcher is to capture the effect of the virtual learning environment on students' academic performance, but due to the nature of the students, the actual data needed may not be obtained as most students will be given data based on their preference. This changes the idea to preference. The study will be based on the data generated, and a conclusion will be made on the data generated.

2.0 APPRAISAL OF LITERATURE REVIEW

It is impossible to overstate the importance of science and technology to national development; any country that fails to incorporate technology into even one of its sectors intends to lag in every area of growth [3]. The viable growth needed in the education sector can be achieved if Information and Communication Technology is adequately adopted. This can be adopted through virtual classrooms which are technologically-driven classrooms that support self-directed and self-regulated learning.

The review of related literature identified the effect of the learning environment, the impact of the virtual classroom, teaching during the COVID-19 crisis, and virtual learning in Nigeria Universities but this present study narrowed the topic down to students' perspective on the newly adopted method by comparing it with the conventional method and also to determine their preference.

3.0 METHODOLOGY

The participants of this study were 300 and 400-level Students of the College of Physical Sciences, Federal University of Agriculture, Abeokuta, Nigeria. 250 students were surveyed in total, which comprises 50 students from the five departments in the College. A short and precise google form was designed to obtain the necessary response from the students, which covers questions on the GPA (Grade Point Average), the average amount spent weekly on each method, the preference, and the reason for preference. Exploratory data analysis was performed on the data to have an overall insight into the data, a paired difference test was used to test if there was a significant difference in GPA before and after the Virtual Learning, Two-Sample Z test was used to test the significance difference in cost of running the two methods, and Analysis of Variation was used to confirm if one department performed better than the other significantly.

4.0 RESULTS

4.1 SUMMARY STATISTICS

Table 4.1 Summary Statistics

SUMMARY STATISTICS	AVERAGE AMOUNT SPENT ON PER WEEK (PHYSICAL)	AVERAGE AMOUNT SPENT PER WEEK (VIRTUAL)	GPA (PHYSICAL)	GPA (VIRTUAL)
Minimum	0	0	1.45	1.5
Mean	1800	2200	3.43	3.31
Median	1500	2000	3.44	3.33
Mode	1000	1000	3.00	3.5
Maximum	5000	6000	4.92	4.83

The total number of students sampled is 250, students staying on campus claim not to spend any money on physical classes because transportation is not involved, the highest amount spent per week on both physical and virtual classes are \$5,000 and \$6,000 respectively. The lowest and highest CGPA in the survey is 1.45 and 4.92 during physical classes and 1.5 and 4.83 during virtual. The average amount spent on physical and virtual classes per week is \$1800 and \$2200. The most common amount i.e. the mode is \$1000 for the two methods.

4.2 DATA VISUALIZATION

Preference Chart

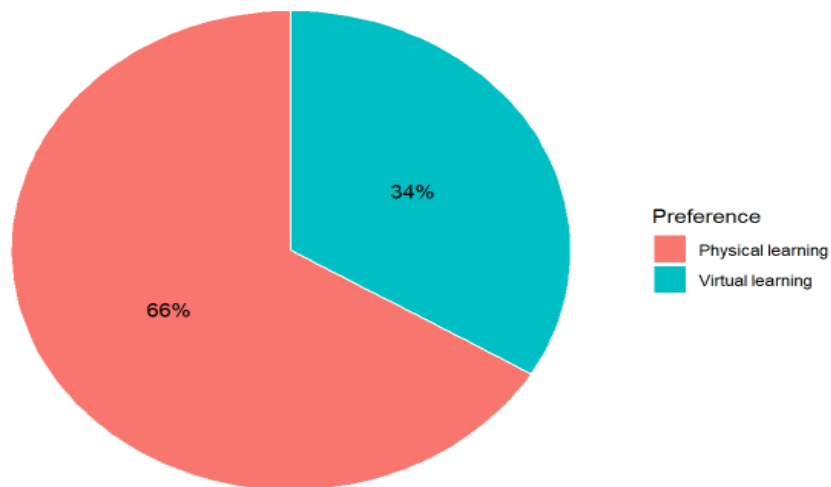


Figure 4.1: Preference

Based on this research the ratio of preference for the virtual to physical class is 1:2. Meaning that before one person will prefer virtual two students would have gone for physical.

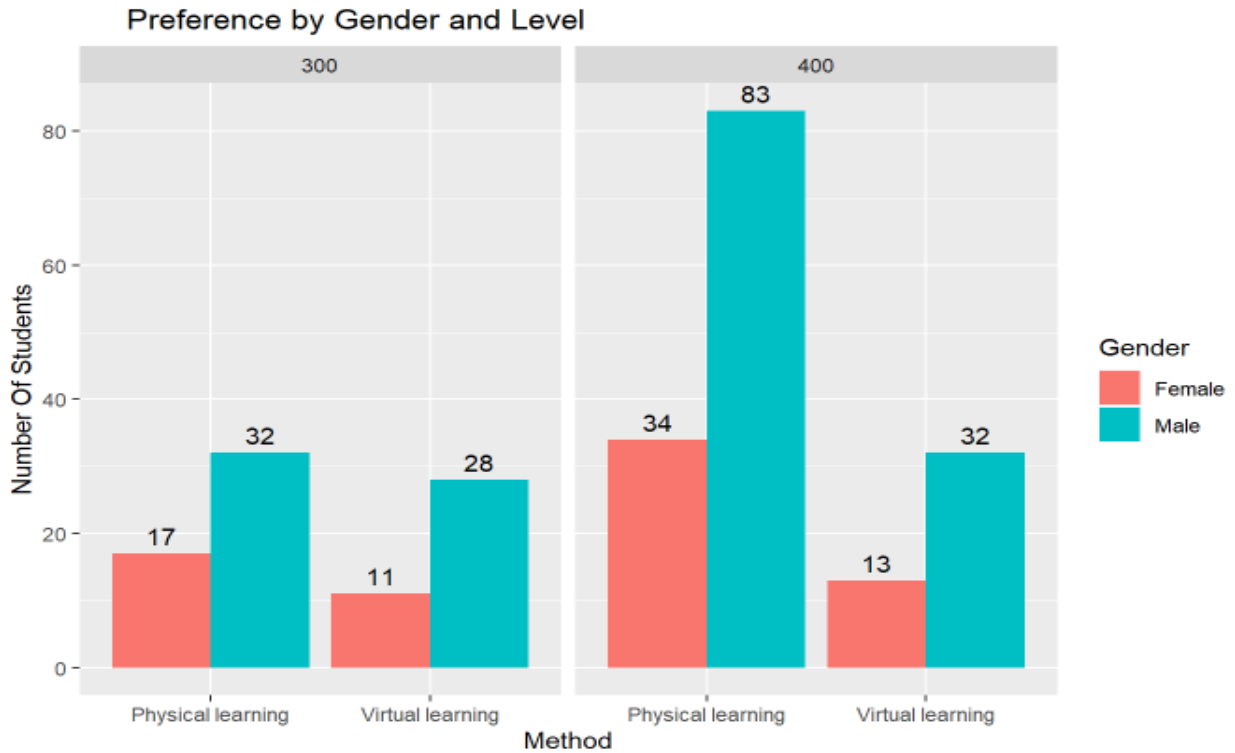


Figure 4.2: Preference by Gender and Level

The chart above shows that there is more male than female in this research which is a true representation of the population and more 400-level than 300-level students. Additionally, the chart reflects the ratio of preference above in all both the gender and the level.

For full EDA click [here](#):

4.3 TO DETERMINE THE EFFECT OF VIRTUAL CLASSROOMS ON STUDENTS' ACADEMIC PERFORMANCE.

H₀: The newly adopted method of learning does not affect students' academic performance.

H₁: The newly adopted method of learning affect students' academic performance

PAIRED DIFFERENCE TEST ON GPA DURING PHYSICAL AND VIRTUAL LEARNING

$$Z = 3.8774$$

$$p\text{-value} = 0.0001351$$

Conclusion: From the test above the p-value ($0.0001351 < 0.05$), which implies that we will reject the null hypothesis. I.e. the student performance (measured by GPA) was better before the Virtual learning method

4.4 TO VERIFY IF THE COST OF RUNNING THE TWO METHODS IS THE SAME

H_0 : There is no significant difference in the cost of running the two methods

H_1 : There is a significant difference in the cost of running the two methods

TWO SAMPLE Z-TEST FOR THE AMOUNT SPENT ON PHYSICAL AND VIRTUAL CLASSES

$$Z = -5.0791$$

$$p\text{-value} = 6.713e-07$$

Conclusion: From the test above the p-value < 0.05 , which implies that we fail to accept the null hypothesis i.e. there is a significant difference in the cost of running the two methods

4.5 STUDENTS' PERFORMANCE BASED ON DEPARTMENT PHYSICAL CLASS

H_0 : Students' performance is the same across departments

H_1 : Students' performance is not the same across departments

Table 4.2 ANALYSIS OF VARIATION

SOV	SUM OF SQUARE	DF	MEAN SQUARE	F VALUE	P VALUE
Department	0.88	4	0.2196	0.536	0.71
Residual	100.41	245	0.4098		

CONCLUSION: From the test above the p-value $(0.71) > 0.05$, which implies that we accept the null hypothesis i.e. students' performance is the same across the department during physical classes.

VIRTUAL CLASS

H_0 : Students' performance is the same across departments

H_1 : Students' performance is not the same across departments

Table 4.3 ANALYSIS OF VARIATION

SOV	SUM OF SQUARE	DF	MEAN SQUARE	F VALUE	P VALUE
Department	3.1	4	0.7746	1.447	0.219
Residual	131.2	245	0.5355		

CONCLUSION: From the test above the p-value $(0.219) > 0.05$, which implies that we accept the null hypothesis i.e. that students' performance is the same across the department during Virtual classes.

4.6 RESPONDENTS' OPINION

There is an open-ended question in the survey questionnaire which ask the students why they prefer one method to the other:

PHYSICAL CLASS

“Physical lectures help with a more accurate prediction of possible exam questions and a better relationship with lecturers”

“The cost of data is high and network issue is a problem for VLE”

“It really affects CGPA badly in the sense that some tests done virtually are not okay.”

“No knowledge is acquired during virtual classes, we will stay online and be doing something else ”

“Both are good, just that in physical classes you have a better understanding and can easily meet up with friends to explain some problems”

VIRTUAL CLASS

“The VLE stands as the best way to Education, especially in this country. Time is being wasted on physical classes as not everyone tends to grab the knowledge being passed in class at once, e.g myself. The time spent in classes that are of no benefit would rather be spent studying and extending the Axis of my knowledge sources”

“I won't say better understanding, but the virtual class gave room for other things apart from schooling “

“There's more time to achieve reading and better understanding due to lesser time spent on first walking to the school gate and then transportation to school and waiting for the lectures to arrive”

“VLE makes me focus, and the fear of missing any note kept me from lagging compared to the physical class that we just go and cruise sometimes.”

5.0 DISCUSSION OF FINDINGS

The summary statistics in table 4.1 indicates that more money was spent during the virtual than physical learning method and also the GPA during the Physical is better than the Virtual method. The Two sample z-test and the paired difference test carried out ascertained that there is a significant difference in the cost and GPA respectively. The Analysis of Variance in Tables 4.2 and 4.3 above indicate that the performance of students is not different significantly across departments during the conventional and the newly adopted method. Figure 4.1 indicated that the ratio of preference for physical to Virtual Learning is 2 to 1. Based on findings, many students would prefer the Virtual method if the cost of running it is bearable and there are basic amenities like internet, and Constant Power Supply, for its effectiveness. The majority of the students that prefer Virtual Learning Environments lay emphasis that it gives room for other things.

6.0 CONCLUSION AND RECOMMENDATION

Since the major reason for attending federal universities is to cut costs and achieve good education; the newly adopted method (Virtual) fails in these two aspects, based on the findings in this paper. Although, some students prefer it as it gives room for other activities. If those reasons are to be considered then the physical method should prevail until the education system can guarantee the effectiveness of the method by not leaving the students to bear the setbacks alone. Also, the school may consider mixed methods which will be more physical than virtual to prepare the students for outside school and to avoid the loss of knowledge.

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