Statistical Analysis of the Effect of Reduced Lecture Duration on Teaching and Learning Process During Covid-19 Pandemic

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Abstract— *The study examined the effect of reduced lecture duration on teaching and learning process during COVID-19 pandemic in The Federal Polytechnic Offa. A random sample of 80 students was selected in School of Applied Science and Technology for the study. Data were collected through questionnaire and semester Grade Point Average of students before reduced and during reduced lecture hour was also obtained. The GPA was used as a measure of student's academic performance. Descriptive Statistics and Paired Sampled T-Test were used to analyze the data. Results showed that, majority of the respondents indicated that the reduced lecture hours affect various teaching and learning process. However, it was found that, most of the respondents still prefer reduced lecture hour to continue. The result of the paired sample t-test revealed that, there was no significant difference in students' academic performance before and during reduced lecture hour. The study concluded that, the reduced lecture hour does have effect on teaching and learning process in the school, but not to the extent of affecting academic performance significantly. It was recommended that, the school should implement another method of adhering to COVID-19 preventive measures that will not have effect on teaching and learning process in the institution.*

Keywords— *Grade Point Average (GPA), Pandemic, COVID-19.*

I. INTRODUCTION

The outbreak of coronavirus (COVID-19) created disruption in education, and global health issues that proved very difficult to manage by global health systems. In the world history, COVID-19 pandemic has caused the largest disruption in education, having already had a global effect on teachers and learners across the world, from pre-primary schools to secondary schools, technical and vocational education, tertiary institutions, adult learning, and skills development establishments (Edeh et al. 2020). By mid-April, 2020, according to report by United Nation (2020), 94 per cent of learners across the world were affected by the pandemic, representing 1.58 billion children and youth, from pre-primary to higher education, in 200 countries.

In many countries face-to-face teaching and examination were suspended as well as restricting international and interstate migration which affect both foreign and local students. In some regions, traditional classes are being replaced with books and materials taken from school. Also, various e-learning platforms were introduced to enable interaction between teachers and students, and, in some cases, social media platforms or national television shows are being used for teaching and learning (Gonzalez et al, 2020).

Nigeria is not exempted from the countries across the world that experienced disruption in education system. The country is first reported its first case of coronavirus in March, 2020 and subsequently, the virus keeps increasing on a daily basis. As at 23rd October, 2020, the country has recorded over 190 cases with over 2000 deaths (NCDC, 2021). The Nigerian government announced lockdown in the country in April and this has affected many activities including the education system in the country. There was gradual easing of lockdown in the country, whereby schools were later given the chance to open up with assurance of adhering to COVID-19 guidelines

(NCDC, 2020). However, various schools implemented the measures in different ways which might have different effect on teaching and learning process. Thus, this study sought to investigate the impact of COVID-19 measures adopted by Federal Polytechnic Offa on teaching and learning process.

Few weeks after the first case of coronavirus was reported in Nigeria. The Nigeria government took a swift action to contain the spread of the virus. All non-essential activities was shut down including schools, restriction was placed on interstate travel and subsequently, nationwide lockdown was announced. After many months, Nigerian government ordered every school in the country to put in place all necessary COVID-19 measures for safe reopening of school activities. Thus, schools implemented different policies to maintain the guidelines. Among many measures, in order to avoid crowding and maintain social distancing on campus, the Federal Polytechnic Offa reduced the days in which students have lecture per week thus leading to reduction in lecture duration per course. Perhaps, the shift from the usual two hours lecture to one hour lecture has impact on the teaching and learning process in the institution. Thus, this paper examines the effect of the reduction in lecture hours caused by COVID-19 pandemic on teaching and learning process in Federal Polytechnic Offa.

II. STATEMENT OF THE PROBLEM

Few weeks after the first case of coronavirus was reported in Nigeria. The Nigeria government took a swift action to contain the spread of the virus. All non-essential activities was shut down including schools, restriction was placed on interstate travel and subsequently, nationwide lockdown was announced. School remain closed for many months and only few of the schools were able to continue the academic activities during the lockdown. During this period, government ordered every school in the country to put in place all necessary

COVID-19 measures for safe reopening of school activities. Thus, schools implemented different policies to maintain the guidelines. Among many measures, in order to avoid crowding and maintain social distancing on campus, the Federal Polytechnic Offa reduced the days in which students have lecture per week thus leading to reduction in lecture duration per course. Perhaps, the shift from the usual two hours lecture to one hour lecture has impact on the teaching and learning process in the institution. Thus, this study sought to determine the effect of the reduction in lecture hours caused by COVID-19 pandemic on teaching and learning process in Federal Polytechnic Offa.

III. SIGNIFICANCE OF THE STUDY

This study would help in providing information about the extent to which educational sector of Nigeria has been affected by the COVID-19 pandemic. This would expose more of the problems and lapses being suffered in the country education system. By doing so, government and various educational agencies would be aware of needful intervention to improve the standard of the country's education system. Also, the result of this study would provide information to the institution about the effectiveness of the measures adopted and gives them the opportunity to take appropriate step in accordance to the study findings. Furthermore, result of this study would make the institution take cognizance of the extent to which reduction in lecture duration affects teaching and learning process and its consequence on students' performance. This would give the school management a chance to rectify any negative effect on students' academic achievement and sort for proper ways of adhering to the COVID-19 guidelines without negative impact on the students' academic achievement. Lastly, this study would add to plethora of researches which have been carried out to investigate various impact of COVID-19 on education.

IV. AIM AND OBJECTIVES

This study main aim is to know the effect of reduced lecture duration caused by COVID-19 on teaching and learning process in Federal Polytechnic Offa. The study objectives are:

i.   To examine the level of satisfaction on the reduced lecture duration.
ii. To examine how reduced lecture duration affect teaching and learning process during and after class.
iii. To investigate the academic performance of students before and during reduced lecture duration.

V. METHODOLOGY

Descriptive Statistics

This is a term given to the analysis of data that helps describe, show or summarize data in a meaningful way. Presenting raw data would be hard to understand and visualize, thus, descriptive statistics enables us to present the data in a more meaningful way, which allows simpler interpretation of the data. Various descriptive analyze methods used in describing the data in this study are: Tabular presentation, percentage distribution, bar charts and pie chart

Tabular Presentation: This is a systematic and logical arrangement of data in the form of rows and columns with respect to the characteristics of data.

Percentage Distribution: This is a frequency distribution in which the individual class frequencies are expressed as a percentage of the total frequency equated to 100.

Graphical Representation of Data: This is one way of analysis numerical data. A graph is a sort of chart through which statistical data are represented in the form of lines or curves drawn across the coordinated points plotted on its surface. The charts used in this study are simple and pie chart, these enable us to visually and easily assess and described the personal information of respondents.

Simple bar chart: This consists of series of bar each of length and height equal to the size of a figure it represents.

Pie chart: This chart is drawn in from a circle showing part of a total. it is an effective diagram used for presenting data of proportion or percentage of a whole.

Paired Sample T-Test

The paired sample t-test is a statistical method used to determine whether the mean difference between two sets of observations is zero. In a paired sample t-test, each subject is measured twice, resulting in pairs of observations. The null hypothesis assumes that the true mean difference between the paired samples is zero. Conversely, the alternative hypothesis assumes that the true mean difference between paired samples is not equal to zero. In other word, the null hypothesis assume that, there is no significant difference between the paired observations while alternative hypothesis assume otherwise. In this paper, the semester GPA of each students before and during reduced lecture hour are paired and subjected to paired sample t-test and decision are being made at 5% level of significance. The paired sample t-test hypothesis procedure is as follows:

H_0: There is no significant difference in student's academic performance before and during reduced lecture hour.
H_1: There is significant difference in student's academic performance before and during reduced lecture hour.
$\alpha = 0.05$

Test Statistic:

$$t = \frac{\bar{d}}{s_d / \sqrt{n}}$$

Computation
Decision rule: Reject H_0 if p-value< 0.05, if otherwise do not reject
Conclusion: Draw conclusion from decision rule.

VI. RESULTS AND DISCUSSION

Presentation of Personal Characteristics

Figure presents the gender distribution of respondents. The chart shows that, 46% of the respondents were female and 54% of the respondents were male. This revealed that, male students were to somewhat more involved in the study than female students.
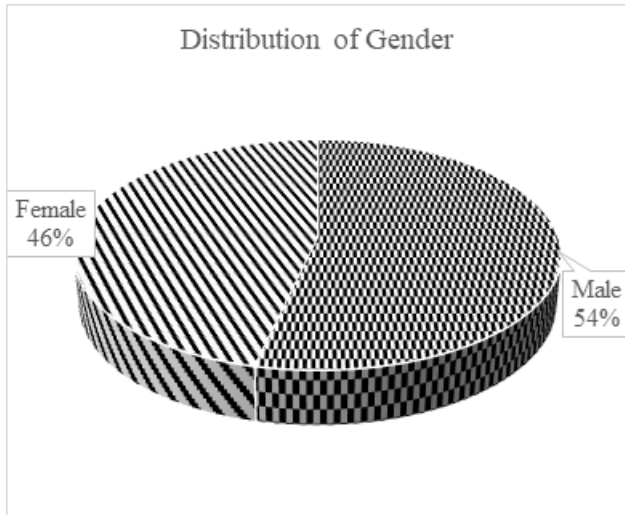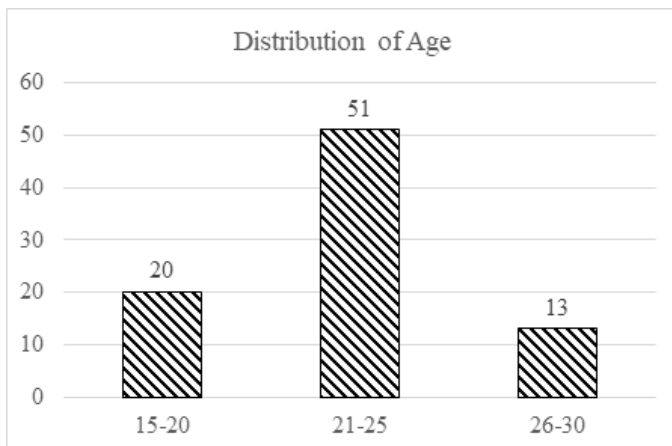
Figure 1: Chart of Gender Distribution

Figure 2: Chart of Age Distribution

Figure 2 presents the age distribution of the respondents. Out of 84 respondents, 20 were 15-20 year-old, 51 were 21-25 year-old and 13 were 26-30 year-old. This shows that, majority of the students involved in this study are 25 years and below.
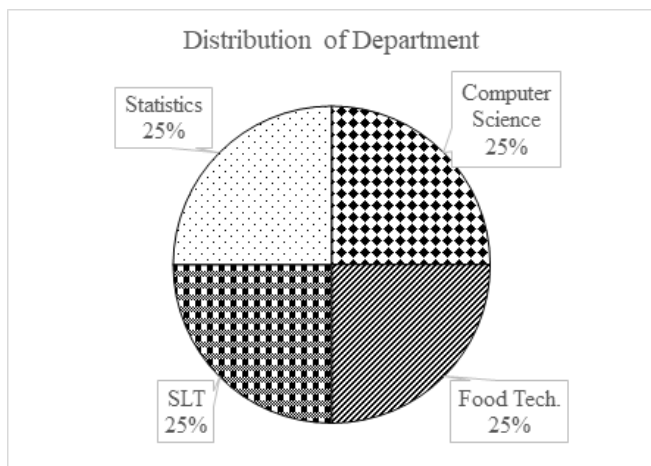

Figure 3: Chart of Department Distribution

Figure 3 presents the department distribution of the respondents. The chart shows that, 25% were from Computer

Science, 25% were from Food Technology, 25% were from Science and Laboratory Technology and 25% were from Statistics. This indicates that, the four departments are equally represented in the study.
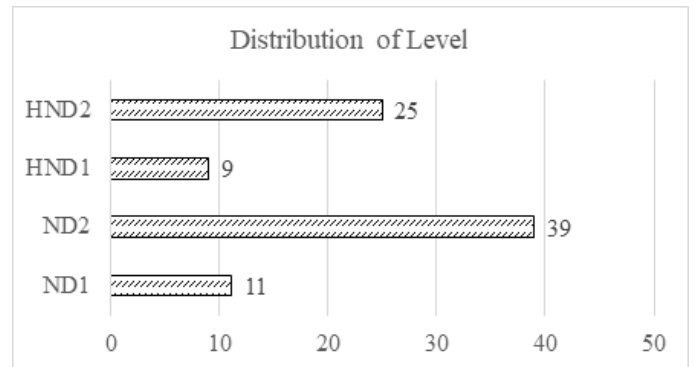

Figure 4: Chart of Level Distribution

Figure 4 presents the level distribution of the respondents. Out of 84 respondents, 25 were HND2 students, 9 were HND1 students, 39 were ND2 students and 11 were ND1 students. This revealed that, most of the respondents involved in this study were ND2 students followed by HND2 students.

Descriptive Analysis

TABLE 1: To what extent are you satisfied with the reduction in lecture hour?

Response	Frequency	Percent (%)
Very dissatisfied	1	1.2%
Dissatisfied	11	13.1%
Neutral	17	20.2%
Satisfied	27	32.1%
Very satisfied	28	33.3%
Total	**84**	**100.0%**

Source: Survey 2021 by Adewoye K.B, Onikola I.O, Salau, G.M and Ojo O.D

Table 1 presents the distribution of respondents' level of satisfaction on the reduced lecture hour. It shows that, 33.3% of the respondents were very satisfied, 32.1% were satisfied, 20.2% have a neutral satisfaction level, 13.1% were dissatisfied and 1.2% were very dissatisfied. This indicates that, majority of the respondents were very satisfied with the reduced lecture hour.

TABLE 2: Would you like the school to continue with the reduced lecture hour?

Response	Frequency	Percent (%)
Yes	49	58.3%
I can't say	9	10.7%
No	26	31.0%
Total	**84**	**100.0%**

Source: Survey 2021 by Adewoye K.B, Onikola I.O, Salau, G.M and Ojo O.D

Table 2 presents the distribution of respondents' response on whether or not they like school to continue with the reduced lecture hour. 58.3% of the respondents liked the school to continue with the reduced lecture hour, 10.7% couldn't say while 31% didn't like the school to continue with the reduced lecture hour. This indicates that, most of the respondents like the reduced lecture hour to continue in the school.

TABLE 3: What is your level of agreement to the following statements about reduced lecture hour?

Statements	SA (%)	A (%)	N (%)	D (%)	SD (%)
1. It doesn't give opportunity to lecturers and students to interact for a longer period of time.	20 (23.8)	31 (36.9)	12 (14.3)	17 (20.2)	4 (4.8)
2. It is not comfortable for students to learn easily.	14 (16.7)	31 (36.9)	12 (14.3)	21 (25.0)	6 (7.1)
3. It doesn't give students more chance to share knowledge on their courses.	14 (16.7)	34 (40.5)	12 (14.3)	19 (22.6)	5 (6.0)
4. It doesn't give lecturers opportunity to assess student.	13 (15.5)	29 (34.5)	13 (15.5)	23 (27.4)	6 (7.1)
5. It doesn't enable curriculum to be covered faster.	16 (19.0)	30 (35.7)	12 (14.3)	19 (22.6)	7 (8.3)
6. It prolong the time length of the semester.	10 (11.9)	22 (26.2)	17 (20.2)	24 (28.6)	11 (13.1)
7. It causes work overload for lecturers and students.	19 (22.6)	38 (45.2)	11 (13.1)	13 (15.5)	3 (3.6)
8. It has a negative impact on students' academic performance.	16 (19.0)	27 (32.1)	14 (16.7)	20 (23.8)	7 (8.3)

Source: Survey 2021 by Adewoye K.B, Onikola I.O, Salau, G.M and Ojo O .D

Table 3 presents the distribution of respondents' response on their agreement level to various facts about reduced lecture hour. Only 60.7% of the respondents agreed that, reduced lecture hour doesn't give opportunity to lecturers and students to interact for a longer period of time, 53.6% agreed that, reduced lecture is not comfortable for students to learn easily. 57.2% agreed that, reduced lecture doesn't give students more chance to share knowledge on their courses. 50% agreed that, reduced lecture hour doesn't give lecturers opportunity to assess student. 54.7% agreed that, reduced lecture hour doesn't enable curriculum to be covered faster. 38.1% agreed that, reduced lecture hour prolong the time length of the semester. 67.8% agreed that, reduced lecture causes work overload for lecturers and students. 51.1% agreed that, reduced lecture hour has a negative impact on students' academic performance. The results revealed that, majority of the respondents agreed on various effect of reduced lecture hour. However, half of the students agreed that it doesn't give lecturers opportunity to assess students and majority disagreed that, it prolong the time length of the semester.

Testing of Hypothesis

In this section, test is being conducted to check if there exist a significant difference between students' academic performance before reduced lecture hour and during reduced lecture hour. The performance of students are being measured by their semester's GPA obtained before and during reduced lecture hour and this is subjected to paired sample t-test.

H_0: There is no significant difference in student's academic performance before and during reduced lecture hour.

H_1: There is significant difference in student's academic performance before and during reduced lecture hour.

Level of significance: 0.05

Test Statistic:

$$t = \frac{\bar{d}}{s_d / \sqrt{n}}$$

Computation:

TABLE 4: Paired Sample T-test

Paired Group	Sample No.	R	Paired Differences		Df	T	p-value
			Mean	Std. Deviation			
Before reduction During reduction	92	0.737	-0.498	0.452	91	-1.058	0.293

Table 4 presents various statistics for the paired group (before reduction and during reduction GPA). The table shows that, there were 92 paired GPA (before and during reduction GPA), the r is the Pearson correlation coefficient between the before and during reduction GPA, r = 0.737 indicates that, there was high positive relationship between students' GPA before and during reduction. The mean of the paired difference, mean = -0.498 indicates that, the average difference between before and during reduction GPA was 0.498 with 0.452 standard deviation, the negative revealed that, on average, the GPA during reduction was higher than GPA before reduction.

In taking decision about the hypothesis, the decision rule is to reject H_0 if p-value < 0.05, if otherwise, the H_0 is not to be rejected. From the table, p-value = 0.293 < 0.05, indicating H_0 is not to be rejected. Thus, it can be concluded that, there is no significant difference in student's academic performance before and during reduced lecture hour.

VII. CONCLUSION

This research was conducted to examine the effect of reduced lecture duration on teaching and learning process during COVID-19 pandemic in Federal Polytechnic Offa. Results revealed that, the reduced lecture hour have negative effect on various teaching and learning process in the institution. However, it was observed that, majority of the students were satisfied with the reduced lecture hour and would like the school to continue with the one hour lecture duration. The result of the paired sample t-test revealed that there was no significant difference in the students' semester GPA before and during reduced lecture hour (p>0.05). Based on the findings, it can be concluded that, the reduction in lecture duration have negative effect on teaching and learning process, nevertheless, this doesn't have significant effect on the students' performance in the institution. However, it is recommended that, the school should implement another method of adhering to COVID-19 preventive measures that will not have effect on teaching and learning process in the institution.

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