

A Comparison of Students' Mean Achievements before and during the Covid-19 Pandemic: A Case Study

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Abstract—The Covid-19 pandemic brought about the closure of schools throughout Nigeria. It was expected that the closure of schools would result in students' poor performance in school. For this reason, this study aims at comparing students' mean achievements before and during the Covid-19 pandemic. An *ex post facto* survey design was used in the study. One hundred and forty-three students admitted for 2019/2020 session participated in the study. Students' grade point average before and during Covid-19 pandemic were used in the study. The first GPA was obtained through face-to-face classroom interaction while the second resulted from an examination taken after online classes necessitated by the Covid-19 lockdown. The two GPAs were compared using correlated samples t-test. Students' mean achievements before and during the Covid-19 pandemic were statistically significant across the three departments used in the study. Students achieved more from online classes, contrary to people's expectations that school closure would result in students' poor performances in school. The correlations between the two measures were also significant. It was concluded that school closures caused by the Covid-19 lockdown did not affect first-year undergraduate students' academic achievements. The improvement in achievements was remarkable.

Index Terms—Covid-19, pandemic, compare, students' achievement

I. INTRODUCTION

The Covid-19 pandemic is impacting the global community in an unprecedented manner (World Bank Group, 2020) [1]. Most countries suffered internet availability and quality. Not only has the outbreak of the pandemic caused havoc in the society, it affected education so adversely that many countries suspended face-to-face teaching and examination Gonzalez *et al.* [2]. Others made use of virtual laboratories Major and Hubáňovská *et al.* [3]. Educational Institutions in the United Arab Emirates, for instance, were forced to adopt online platforms for the safety of their students and teachers Ali [4]. Also in Nigeria, most educational institutions (at different levels) resorted to on-line and distance academic activities by making use of several e-learning mechanisms, including social media apps Ossai *et al.* [5]. Delta State University, Abraka (where this study was based) was one of such institutions that suspended face-to-face academic activities. No sooner did this institution conclude the first semester's examination than the nationwide (or global?) lockdown began. The second semester's end-of-course examinations were taken in

shifts—first- and second-year students, also known as 100 level and 200 level respectively, took their examination amid Covid-19 in October 2020. The third- and fourth-year students often referred to as 300 level and 400 level respectively, took their turn in the month of November, 2020.

It is expected that tests taken before the outbreak of the corona virus disease may produce higher scores compared to the ones administered amid Covid-19 pandemic. A look at some studies conducted in relation to academic activities in the midst of Covid-19 pandemic shows that on-line gave rise to some gains and drawbacks. Human Rights Watch (2020) conducted an interview on "Impact of Covid-19 on children's education in Africa" [6]. The interviewees were students, parents, teachers and education officials drawn from Burkina Faso, Cameroun, Congo DR, Kenya, Madagascar, Morocco, Nigeria, South Africa and Zambia. The result showed that Covid-induced school closure worsened already existing inequalities in children's academic work. Also adversely affected were children who were already at the risk of being deprived of quality education.

Other studies showing the adverse effect of Covid-19 pandemic in academic activities were separately conducted by Mahdy [7] and Ossai *et al.* [4]. Mahdy investigated "The Impact of Covid-19 pandemic on the academic performance of veterinary medical students" with a sample size of 38 participants made up of veterinary students and researchers in veterinary face book groups and veterinary Whatsappgroups. The population consisted of 1392 individuals from 92 different countries. Data analysis revealed that Covid-19 pandemic lockdown affected the academic performance of most participants with varying degrees. The study also showed that on-line education also provides opportunity for self-study but it was difficult for veterinary students to have practical lessons online.

Likewise, Ossai *et al.* [5] conducted a study involving biochemistry students in Delta State University, Abraka. The objective of the study was to find out the disposition and challenges of alternative to physical classroom teaching and learning in a pandemic. It specifically appraised biochemistry students' Covid-19 learning with Whatsapp. A total of 173 undergraduate students (86 from the second year and 87 from the fourth year) took part in the study. There were also 48 male students and 125 female students. The data collected through questionnaire were analyzed and the result showed that students were willing to have online lessons in biochemistry. However, the students did not believe that the use of Whatsapp teaching and learning biochemistry is a viable alternative to face-to-face classroom interaction in the teaching and learning of biochemistry. Similarly, the study of Muhammad *et al.* [8] implicated some media applications in the Indonesian language learning. The authors reported,

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among others, that WhatsApp, Instagram and Facebook could be applied in teaching Indonesian language in the face of the Covid-19 pandemic.

The work of Mohamed [9] also portrays the negative effect of the corona virus disease on academic activities. The objective of the study was to compare mean scores in chemistry before and during Covid-19 pandemic in senior secondary schools in Gashua town in Yobe State, Nigeria. From a population of 289 students, a sample of 20 students was drawn from two senior secondary schools in the study area. Data analysis showed that students' mean scores in chemistry before and during the Covid pandemic differed significantly. Students performed better before the outbreak of the pandemic.

This finding is similar to that of Uwaifo [10] who compared the performance of secondary school students in social studies before and after the Covid-19 lockdown. The author reported that students did better before the Covid-19 era. Also in agreement with the finding are the works of Aiyedun and Ogunode [11], Hammerstein and Dreisorn *et al.* [12], and Baloch *et al.* [13].

As opposed to the foregoing, Gonzalez *et al.* [2] and Ghada [14] separately conducted studies which showed that online academic activities occasioned by the Covid-19 pandemic did not short-change students. Gonzalez *et al.* [2] studied the influence of Covid-19 confinement on students' performance in higher education. A total of 458 students from Universidad Autonoma de Madrid in Spain participated in the study. The study was an experiment involving two groups of students. The first group had normal academic activities in the year 2017/2018 and 2018/2019 while the second group (2019/2020) consisted of students whose academic activities were disrupted by the Covid pandemic. The finding indicated that there was a significant positive effect of the Covid-19 confinement on students' performance. It also revealed that students' learning strategies improved significantly.

Similarly, Ghada [14] investigated how Covid-19 pandemic impacted on higher education experience. Based in Egypt, the study compared the grades of 376 business students who completed a face-to-face course in 2019 and 372 students who took the same course online during the lockdown of 2020. The grades obtained by the two groups from quizzes, course work and final examination were analyzed using t-test. The result was not significant. It was also discovered, contrary to people's expectation, that online distance learning at the pandemic did not result in a poor learning experience. The author inferred that online distance learning can lead to a larger learning population besides its cost-effectiveness and the likelihood of being a source of revenue for the institution.

As shown, students' performances in academic subjects before and after the Covid-19 lockdown appeared to be concentrated at the secondary school level in Nigeria. In particular, there have been no studies comparing students' examination scores before and after the pandemic at the faculty of education, Delta State University, Abraka, Nigeria. The choice of the faculty of education is important because the students take courses from other faculties in the university. In other words, the faculty provides essential

services to the entire university. Thus, this study is different in the sense that the focus is on undergraduate students of a servicing faculty [8, 14]. The result of this study will go a long way in helping guidance counsellors in the faculty to provide guidance and counselling services to staff and students of the university.

Like the studies reviewed, this research focused on the students of Delta State University, Abraka, Nigeria. Delta State University, Abraka is a state-owned university in Nigeria's south-south geopolitical zone. The State is a miniature Nigeria in the sense that there are many ethnic groups. Although consideration is given to Nigerians outside the State during admission exercises, the different ethnic groups are given priority attention.

Three departments (Business Education, Library and Information Science and Guidance and Counselling) domiciled in the education faculty, were considered. The objective of the study was to compare students' grade point average (GPA) before and during the Covid-19 pandemic. The following research questions directed the work: What are the mean achievements of Business Education students before and during the Covid-19 pandemic? What are the mean achievements of Guidance and counselling students before and during the Covid-19 pandemic? What are the mean achievements of Library and Information Science students before and during the Covid-19 pandemic?

Three null hypotheses were generated as follows:

Students' mean achievements before and during the Covid-19 pandemic do not differ significantly among Business Education students. Students mean achievements before and during the Covid-19 pandemic do not differ significantly among Guidance and counselling students. Students' mean achievements before and during the Covid-19 pandemic do not differ significantly among Library and Information Science students.

II. METHODOLOGY

The study employed an *expost facto* survey design. First year's undergraduates of the department of Guidance and Counselling, the department of Business Education and the department of Library and Information Science, Delta State University, Abraka constituted the population for the study. The population is made up of 88 students for Guidance and Counselling, 68 students for Business Education and 123 students for Library and Information Science. Sample sizes of 46, 35 and 62 were drawn through simple random sampling technique, from Guidance and Counselling, Business Education and Library and Information Science respectively. The participants in the study were students admitted into the university for the 2019/2020 session. The students took the examination for the first semester before the lockdown caused by the Covid pandemic. The second semester examinations were taken during the lockdown necessitated by the corona virus disease. This was preceded by online teaching and learning. The students from the Department of Guidance and Counselling took 9 courses, totaling 20 units in the first semester. In the second semester, the undergraduates also took 9 courses leading to 18 units. In the Business Education Department, 8 courses and 10

courses were taken in the first and second semesters, respectively. The units were 20 for each of the semesters. For Library and Information Science, 7 courses (17 units) were offered in the first semester while 7 courses, making 15 units, were also taken in the second semester. Thus, each department had two sets of GPAs. The GPAs for each of the semesters were converted to single scores using the following grading system by the University (see Table I).

TABLE I: RANGE OF SCORES IN DELTA STATE UNIVERSITY, ABRAKA

Range of scores	letter grade	point
70% to 100%	A	5
60% to 69%	B	4
50% to 59%	C	3
45% to 49%	D	2
0% to 44%	F	0

Since each participant had two GPAs (one for the first semester, the other for the second semester), the t-test for related samples was used to find the difference in achievements in the first semester (no lockdown) and the second semester (online teaching and learning). While the research questions were answered using mean, the hypotheses were tested at 0.05 level of significance using t-test of means for correlated samples.

III. DATA ANALYSIS

Research questions were answered and hypotheses tested at 0.05 level of significance as following Table II:

Table II indicates that the performance of Business Education students was better during the Covid-19 pandemic, compared to the students' performances after the Covid-19 pandemic. The mean difference of 6.3 is a pointer to this. This trend is contrary to people's expectation.

TABLE II: THE MEAN ACHIEVEMENTS OF BUSINESS EDUCATION STUDENTS BEFORE AND DURING THE COVID-19 PANDEMIC

Pair 1	N	\bar{X}	SD	MD	Std error
Before Covid	35	56.5	13.7		2.32
				6.3	
During Covid	35	62.8	15.97		2.70

Table III demonstrates that Guidance and Counselling students' performances were better during the Covid-19 pandemic when compared to students' performances after the Covid-19 pandemic. This is clearly shown by the mean difference of 5.61; it was generally expected that students' performances would be poor after the pandemic.

TABLE III: THE MEAN ACHIEVEMENTS OF GUIDANCE AND COUNSELLING STUDENTS BEFORE AND DURING THE COVID-19 PANDEMIC

Pair 1	N	\bar{X}	SD	MD	Std error
Before Covid	46	63.08	14.32		2.11
				5.61	
During Covid	46	68.69	14.62		2.16

TABLE IV: THE MEAN ACHIEVEMENTS OF LIBRARY AND INFORMATION SCIENCE STUDENTS BEFORE AND DURING THE COVID-19 PANDEMIC

Pair 1	N	\bar{X}	SD	MD	Std error
Before Covid	62	52.58	12.98		1.65
				4.74	
During Covid	62	57.32	20.89		2.65

Table III portrays the fact that Library and Information Science students had a better performance during the Covid-19 pandemic compared to the students' performances after the Covid-19 pandemic. This is buttressed by the mean difference of 4.74 points. The trend is contrary to the widely held belief that school closure would give rise to low academic performance.

TABLE IV: THE CORRELATED T-TEST OF BUSINESS EDUCATION STUDENTS' MEAN ACHIEVEMENTS BEFORE AND DURING THE PANDEMIC

Period	N	\bar{X}	SD	Std error	t	Df	Sig.
Before Covid	35						
		-6.3	9.64	1.63	-3.86	34	0.000
During Covid	35						

Table IV shows a t-value of -3.86 and a p-value of 0.000. At an alpha level of 0.05, the p-value is less than the alpha level of significance. This means that the null hypothesis which states that "students' mean achievements before and during the Covid-19 pandemic do not differ significantly among Business Education students" was rejected. Therefore, mean achievements before and during the Covid pandemic are statistically significant. There was a gain of 6.3 points in the 4 mean achievements during the pandemic.

TABLE V: THE CORRELATED SAMPLES T-TEST OF GUIDANCE AND COUNSELLING STUDENTS' MEAN ACHIEVEMENTS BEFORE AND DURING THE PANDEMIC

Period	N	\bar{X}	SD	Std error	T	Df	Sig.
Before Covid	46						
		-5.61	5.76	1.44	-3.895	45	0.000
During Covid	46						

Table V shows a t-value of 3.895 and a p-value of 0.000; at an alpha level of 0.05, the p-value is less than 0.05 level of significance. This implies that the null hypothesis which states that "students' mean achievements before and during the Covid-19 pandemic do not differ significantly among Guidance and Counselling students" was rejected. Hence, mean achievements before and during the Covid pandemic are statistically significant. There was a gain of 5.61 points in the mean achievement during the pandemic.

Table VI shows a t-value of -2.185 and a p-value of 0.033; at an alpha level of 0.05 the p-value is smaller than the alpha level of significance. This means that the null hypothesis which states that "students' mean achievements before and during the Covid-19 pandemic do not differ significantly

among Library and Information Science students' was rejected. Hence, mean achievements before and during the Covid pandemic were statistically significant. There was a gain of 4.74 points in the students' mean achievements during the pandemic.

TABLE VI: THE CORRELATED SAMPLES T-TEST OF LIBRARY AND INFORMATION SCIENCE STUDENTS' MEAN ACHIEVEMENTS BEFORE AND DURING THE PANDEMIC

Period	N	\bar{X}	SD	Std error	t	Df	Sig.
Before Covid	62						
		-4.74	17.09	2.17	-2.185	61	0.033
During Covid	62						

TABLE VII: PRODUCT MOMENT CORRELATION ANALYSIS OF RELATIONSHIP BETWEEN STUDENTS' ACHIEVEMENTS BEFORE AND DURING COVID-19 PANDEMIC

Department	N	R	Sig.(2tailed)
Business Education	35	0.80	0.000
Guidance and Counselling	46	0.77	0.000
Library and Information Science	62	0.58	0.000

Table VII indicates that the r-values from the Pearson's product moment correlation analysis were statistically significant in the three groups used in the study. For each of the three departments, there was a rise in students' performances during the Covid-19 pandemic. Therefore, the pairs of scores correlated well.

IV. DISCUSSION OF FINDINGS

The main objective of this study was to compare the differences in students' mean achievements before and during the Covid-19 pandemic. The findings were discussed in line with this major objective.

Research question one showed that students' mean achievement before the Covid-19 pandemic was 6.3 points less than their mean achievement during the pandemic. In addition, the mean achievements before and during the pandemic were 56.5 and 62.8 respectively. In this order, these correspond to "C" and "B" grades, in line with the university's grading pattern.

Research questions two and three also showed gains in students' achievements before and during the Covid pandemic. In favour of achievement during the Covid, there were gains of 5.61 and 4.74 points for research questions two and three respectively. While a "B" grade was obtained before and during the Covid, as shown in Table II, the mean achievements with respect to research question three were both "B" grades.

Answers to the three research questions were justified by the statistically significant results in the three null hypotheses that were tested. Each of the null hypotheses was rejected. Thus, students' mean achievements before and during the Covid-19 pandemic were statistically significant. The

implication of the results is that students achieved more during the pandemic. This is contrary to people's expectations that academic work would adversely be affected given the ravaging pandemic.

The findings of this study are similar to that of Gonzalez *et al.* [2] who reported that the Covid-19 confinement had a significant positive effect on students' academic performance. The scholars investigated the influence of Covid-19 confinement on students' performance in higher education at Universidad Autonoma de Madrid, Spain. The finding of the study is also supported by the result of the study carried out by Ghada [14]. Ghada [14] in an empirical study involving students who had face - to - face contact with their professors and those who completed the same course online discovered that online distance learning during the pandemic did not give rise to poor learning experience, contrary to what was widely expected. The scholar opined that online learning could lead to larger learning population, besides being a source of revenue for the university.

This study is at variance with the earlier ones conducted by Ossai *et al.* [4], Mahdy (2020) [7], Human Rights Watch [6] as well as Sut and Oznacar [15]. Ossai *et al.* [4]. reported in their study that biochemistry students of the Delta State University, Abraka did not believe that the use of Whatsapp could be compared to face - to - face interaction between students and their lecturers in the effective teaching and learning of biochemistry. Likewise, Mahdy [7] in a study involving veterinary students and veterinary researchers, reported that the Covid lockdown affected the academic performance of most subjects with varying degrees; however, the challenge faced was how to give practical lessons online. The author acknowledged that online education is a good opportunity for self-study. In the same vein, Human Rights Watch found in its study involving many countries in Africa that school closures caused by the pandemic worsened previously existing inequalities in children's academic work.

The findings of Kuhfeld *et al.* [16] also contradict the result of the present study. In the study concerning test score patterns in the Covid-19 pandemic, the scholars reported substantial decrease in mathematics test scores and reading test scores in grades 3 to 8.

Apart from the statistically significant results in the t-test analysis, the correlations between the two measures in this study also further buttress the findings of this study. The correlations between the two measures in each of the departments used in the study showed significant results

The result of the present study can be attributed to some factors. The first is that the University established an effective online system. Secondly, only few courses in Business Education and Library and Information Science were practical, such practical courses are introductory and could be done without face-to-face interaction between students and lecturers. Thirdly, it can be inferred that the students must have worked very hard to make up for their lapses in the first semester.

V. CONCLUSION

The major finding from the study is that students' mean achievements before and during the Covid-19 pandemic were

statistically significant in the three departments chosen for the study.

The participants in this study performed better in the courses students took examinations in during the Covid-19 pandemic, compared to their performance before the outbreak of the deadly disease that necessitated nation-wide lockdown. The improvement in the performances was contrary to people's expectation.

The implication of this study is that online academic activities caused by the Covid-19 lockdown is a wake-up call for many institutions of learning to improve on their existing e-learning facilities. Action in this direction should be urgent because online academic activities appear more convenient than ordinary classes, besides time-saving and provision of opportunity for self-study Mahdy [7]. This notwithstanding the present researcher wishes to suggest that other departments in other faculties should be used to conduct the same study.

The uniqueness of the findings of this study lies in the fact that students' performances during the Covid-19 pandemic were better than pre-Covid-19 performances. This contradicts people's expectation that students' academic performances during the Covid-19 pandemic would be poor. However, the limitation of this study cannot be ignored. The scores used in this study originated from examinations based on multiple choice test items. Multiple choice test items impact negatively on examinees in areas such as guessing, reduction in writing skills and examination malpractice Ossai [17]. It is possible that the subjects used in this study must have guessed right in some of the test items. Scores obtained through guessing do not truly reflect the ability of test-takers Ossai [18]. The use of essay type questions in subsequent levels at Delta State University may go a long way in getting valid scores from the responses made by the test takers.

CONFLICT OF INTEREST

The author declares no conflict of interest.

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