



THE IMPACT OF COVID-19 PANDEMIC ON STUDENTS' ACADEMIC PERFORMANCE IN SECONDARY SCHOOL PHYSICS IN EKITI STATE, NIGERIA

BY

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Abstract

This study examined the impact of COVID-19 Pandemic on students' learning outcomes in Secondary School Physics in Ekiti State, Nigeria. The study adopted the descriptive survey and expo facto design. The population of the study consisted all the public Senior Secondary School Three (SSS III) Physics students who sat for WAEC in all the 205 public secondary schools spread across the 16 local government Areas of Ekiti State. The sample for this study was 966 students selected from six secondary schools across the state. Multi-stage procedure which involved, simple random and stratified sampling techniques was used to select sample for the study. The instrument tagged pro-forma was used for data collection of the study. The instrument was validated by experts. Using descriptive and inferential statistics, the data gathered were analysed. The descriptive statistics of frequency counts, percentages, mean and standard deviation were used to answer the research questions while the inferential statistics involving t-test and Analysis of Covariance (ANCOVA) were used for testing the hypotheses. All the hypotheses were tested at 0.05 level of significance. The finding of the study revealed that students' performance in Physics was noticeably higher before the arrival of the Covid-19 pandemic than it was after the pandemic. This might be as a result of the senior secondary school student's inability to continue with the learning activities and they could not get support from their teachers during the school closure due to Covid-19 pandemic. Also, the study revealed that there is no significant difference between male and female students' performance in Physics before and after the lockdown due to covid-19 pandemic. Based on the finding of the study it was recommended that Physics teachers should ensure that students are involved learning activities even when there is extended length of time when students are not in school, such as during long vacations. Also, students should be encouraged by parents and teachers to get involved in the learning of Physics beyond the four wall of the classroom most especially when they are on long holiday.

Introduction

The COVID-19 pandemic caused unprecedented disruption to education systems worldwide, leading to prolonged school closures that affected over 1.6

billion learners across more than 190 countries. These disruptions significantly altered teaching and learning processes and raised global concerns regarding learning

loss and widening educational inequalities (Donnelly & Patrinos, 2022; Hammerstein et al., 2025). Evidence from international large-scale studies indicates that students experienced measurable declines in academic achievement following school closures, with average learning losses equivalent to several months of schooling (Betthduser et al., 2024).

Science education is particularly vulnerable to instructional disruption because it relies on continuous engagement, experimentation, and practical activities that are difficult to replicate in remote learning environments. During the pandemic, many schools—especially in developing countries—were unable to transition effectively to online learning due to limited technological infrastructure, poor internet connectivity, and inadequate teacher preparedness (Angrist et al., 2025). Consequently, students in public schools experienced reduced instructional time, limited feedback, and diminished academic motivation.

In Nigeria, pre-existing challenges in physics such as inadequate laboratories, insufficient instructional materials, and overcrowded classrooms already contributed to persistent underachievement. The COVID-19 school closures compounded these issues, restricting access to hands-on learning experiences and structured academic support (Awofala & Lawal, 2023). Empirical studies have shown that learning disruptions disproportionately affected students in low-resource settings, widening achievement gaps and reducing overall performance levels (Peters et al., 2024).

Although emerging studies have examined COVID-19-related learning loss globally, limited research has used standardized examination data to quantify its impact within the Nigerian physics context. Therefore, this study investigates the effect of COVID-19 school closure on students' academic achievement in physics, providing empirical evidence to inform educational recovery strategies and policy interventions.

Statement of the Problem

Stakeholders in Nigerian secondary schools are outraged by the rising failure rate and lack of enthusiasm in science, particularly physics. In Nigeria, students who want to pursue a degree in science must offer physics in secondary school. In addition, admission into most science and technology-based programs requires at least

a pass in Physics on the senior secondary certificate examination and the undergraduate entrance exam in this subject.

2020 saw the declaration of Covid-19 as a pandemic, a disease caused by a coronavirus that has spread around the world. More than one million people from both developed and developing nations died as a consequence of this terrible disease. When the virus is isolated from the host, it may be decreased and eliminated. Policies of social and economic segregation are counterproductive. This caused governments throughout the globe to declare lockdowns that varied from partial to complete lockdown.

It was observed that schools in Nigeria were shut down as a result of this lockdown, from elementary to university levels. Schools in the country were closed to curtail the spread of the deadly virus COVID-19. The schools were closed when students, particularly the certificate classes were preparing for the external examination for about six months (March to October 2020). Students were isolated from the daily school routine learning; during this period, many students took a break from learning and could not access online classes, which became the new order of learning during the period. These are some of the main reasons that motivated the researcher to investigate the impact of COVID-19 Pandemic on students' learning outcome in Secondary School Physics in Ekiti State, Nigeria.

Purpose of the Study

This study examined the impact of COVID-19 Pandemic on students' learning outcome in Secondary School Physics in Ekiti State, Nigeria. Specifically, the study:

- i. examined secondary school students' performance in Physics before the emergence of Covid-19 pandemic;
- ii. determined the impact of Covid-19 pandemic on secondary school students' performance in Physics after the lockdown due to Covid-19;
- iii. examined the difference in male and female students' performance in Physics before and after the lockdown due to Covid-19.

Research Questions

The following research questions were raised for the study:

- i. What is the academic performance of students in Physics before the lockdown due to Covid-19 pandemic?
- ii. What is the academic performance of students in Physics after the lockdown due to Covid-19 pandemic?

Research Hypotheses

- i. There is no significant difference in the academic performance of secondary school students in Physics before and after the lockdown due to Covid-19 pandemic.
- ii. There is no significant difference between male and female students' performance in Physics before and after the lockdown due to Covid-19 pandemic.

Delimitation of the Study

This study was delimited to the impact of COVID-19 on students' learning outcome in Secondary School Physics in Ekiti State, Nigeria. The focus of the study was on the Senior Secondary School Three (SS III) students offering physics in public secondary schools in Ekiti State, Nigeria. The study was also delimited to one learning outcome; academic performance. Also, the study was delimited to gender as the extraneous variable that could influence students' performance in physics.

Methodology

This chapter presents the research design, population, sample and sampling techniques, research instruments, validity of the instruments, reliability of the instrument, administration of the instrument, and data analysis.

Research Design

The study is descriptive research that adopted expo facto designs. Expo facto is considered because the results of students in west African Examination Council (WAEC) examinations sat for before and after the Covid-19 pandemic which cannot be manipulated were used. The researcher does not have direct influence on the independent variable/s. The expo facto was employed to obtain the Physics Grade Point (PGP) of the

students which exist in the schools selected for the study.

Population

The population for the study comprises all the public senior secondary Three (SS III) Physics students who sat for WAEC in all the 205 public secondary schools spread across the 16 local government Areas of Ekiti State in the 2018, 2019, 2021 and 2022. The students in senior secondary three (SS III) were preferred for the survey because they have spent reasonable number of terms in senior secondary school before setting for the WAEC examination.

Sample and Sampling Techniques

The sample for this study consisted of 966 students results of two years before and two years after Covid-19 selected from six secondary schools across the state. The schools were chosen from the three senatorial districts of Ekiti State using a multi-stage sampling procedure. The first stage involved selecting one local government area from each of the three senatorial districts through simple random sampling, resulting in a total of three local government areas. In the second stage, two secondary schools were selected from each of the previously chosen local government areas, making a total of six secondary schools. The researcher employed a purposive sampling technique for the selection process, taking into account the requirement for the school to be a mixed-gender institution. Finally, the students who registered and sat for Biology in the SSCE were selected from each of the selected schools using purposive random sampling technique. This process ensured the inclusion of students who had Biology WAEC results from both genders.

The results of students who sat for the WAEC examination were obtained for four years, including two years before and two years after the COVID-19 pandemic. The years considered were 2018, 2019, 2021, and 2022. A total of 240, 242, 229, and 255 students were selected respectively from the six secondary schools, resulting in a total of 966 students' results being obtained from the selected schools. The students' grades in Physics were converted into grade points called Physics Grade Points (PGP), which were later used for data analysis.

Research Instrument

Physics Performance Pro-forma (PPP) designed by the researcher was used for collecting data for the study. The pro-forma was used for obtaining the Physics grades and gender of students whose WAEC grades were collected from the secondary schools sampled in Ekiti State. The grades obtained were rated to obtain the Physics Grade Point (PGP); A1 was rated as 9 points, B2 as 8 points, B3 as 7 points, C4 as 6 points, C5 as 5 points, C6 as 4 points, D7 as 3 points, E8 as 2 points, and F9 as 1 point.

Validity of the Instrument

Experts in Physics education, Educational Psychology, test, measurement and evaluation and the researcher's supervisor certified the instrument for face and content validity. In addition, their suggestions were applied in restructuring the instrument used for the study.

Reliability of the Instrument

The study employs a proforma as its primary data collection instrument, eliminating the need to assess its reliability since it is utilized solely for gathering pre-existing data.

Administration of Instrument

The researcher was responsible for the administration of the instrument. The researcher visited the selected schools and used the pro-forma to collect data related to the gender and grades of students who sat for WAEC in 2018, 2019, 2021, and 2022.

Data Analysis

Data collected were analysed using appropriate descriptive and inferential statistics. The research questions were answered using mean, standard deviation and charts, while t-test and analysis of covariance (ANCOVA) were used to test the hypotheses. Hypotheses 1, was tested using t-test while hypotheses 2 was tested using ANCOVA. All hypotheses were tested at 0.05 level of significance.

Results

Research Question 1: What is the performance of students in Physics before the lockdown due to Covid-19 pandemic? In answering the research question 1 raised for the study, the results of students in Physics before the Covid-19 pandemic were gathered, converted to grade points called Physics Grade Point (PGP) and analysed with the result presented in table 1.

Table 1: Academic Performance of students in Physics before the lockdown due to covid-19 pandemic

PGP	Frequency	Percentage	Mean	S.D.
9	0	0		
8	8	1.7		
7	16	3.3		
6	27	5.6		
5	54	11.2	3.50	1.63
4	146	30.3		
3	97	20.1		
2	68	14.1		
1	66	13.7		
Total	482	100.0		

Table 1 present the performance of students in Physics before the lockdown

due to Covid-19 pandemic. It shows that none of the students had the grade point

of 9(A1), 1.7% of the students had grade point of 8(B2) in Physics, 3.3% had 7(B3), 5.6% had 6(C4), 11.2% had 5(C5), 30.2% had 4(C6), 20.1% had 3(D7), 14.1% had 2(E8) while 13.7% had 1(F9). Also revealed from the table is the mean grade point of 3.50 with the standard deviation as 1.63. Considering the usability of the grades in making academic progress or gaining admission into tertiary institutions, 47.6%

had grades below the least credit (C6) which is the minimum grade required to gain admission into tertiary institution, these grades would not earn the students' academic progress. This is an indication that the performance of students in Physics before the lockdown due to Covid-19 pandemic is poor. The pattern of the performance is further explained in figure 1.1

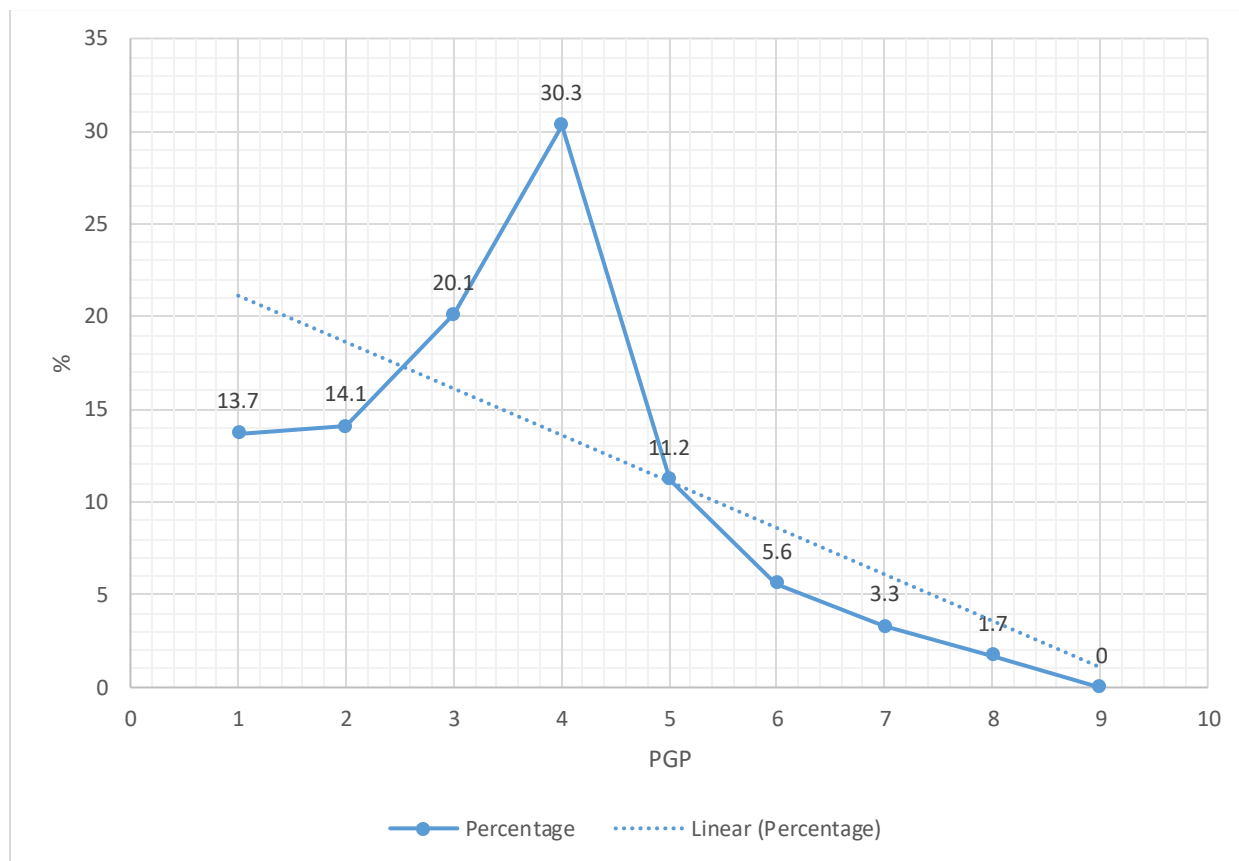


Figure 1.1: Graph showing the pattern of performance of students in Physics before the lockdown due to Covid-19 pandemic

Research Question 2: What is the performance of students in Physics after the lockdown due to covid-19 pandemic? To answer research question 2 raised for the study, the results of students in Physics

after the covid-19 pandemic were gathered, converted to grade points called Physics Grade Point (PGP) and analysed with the result presented in table 2.

Table 2: Performance of students in Physics after the lockdown due to covid-19 pandemic

PGP	Frequency	Percentage	Mean	S.D.
9	0	0		
8	6	1.2		
7	13	2.7		
6	34	7.0		
5	46	9.5	3.25	1.70
4	115	23.8		
3	97	20.0		
2	76	15.7		
1	97	20.0		
Total	484	100.0		

Table 2 shows the performance of students in Physics after the lockdown due to Covid-19 pandemic. It reveals that none of the students had the grade point of 9(A1), 1.2% of the students had grade point of 8(B2) in Physics, 2.7% had 7(B3), 7.0% had 6(C4), 9.5% had 5(C5), 23.8% had 4(C6), 20.0% had 3(D7), 15.7% had 2(E8) while 20.0% had 1(F9). Also, the mean grade point is 3.25 and the standard deviation is 1.70. Looking at the usability of the grades in making academic progress or gaining admission into tertiary institutions, 55.7% had grades below the least credit (C6) which is the minimum grade required to gain admission into tertiary institution, these grades would not earn the students' academic progress. This is an indication that the performance of students in Physics after the lockdown due to Covid-19 pandemic is poor. The pattern of the performance is further explained in figure 2.1

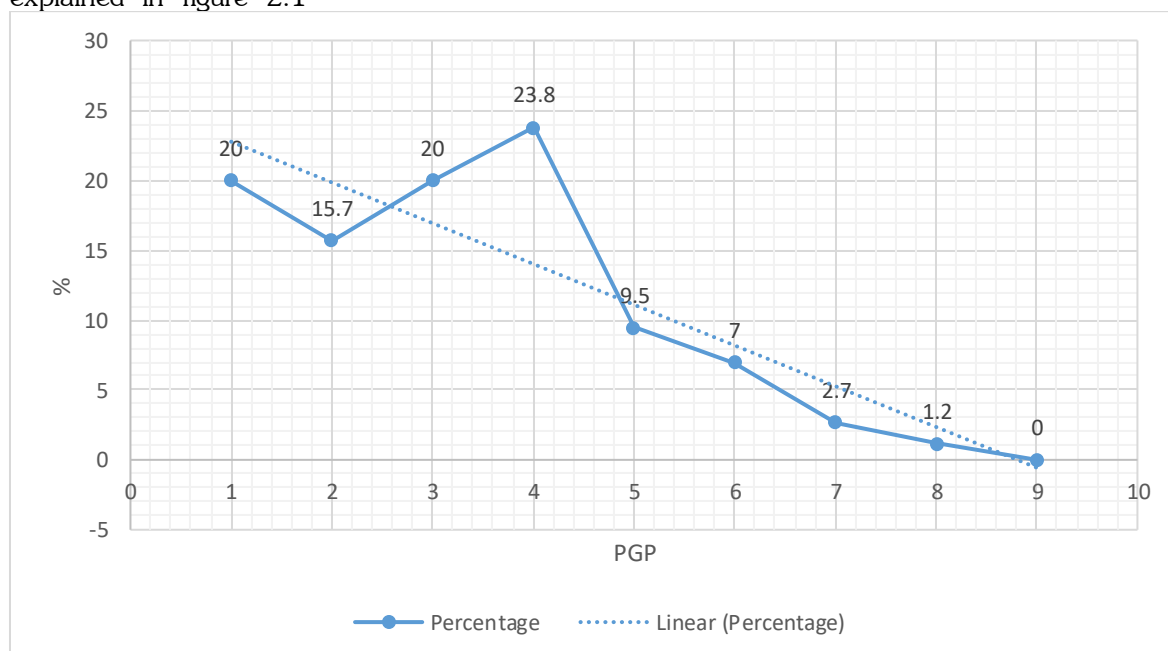


Figure 2.1: Graph showing the pattern of academic performance of students in Physics after the lockdown due to Covid-19 pandemic

Hypotheses Testing

Hypothesis 1: There is no significant difference in the academic performance of secondary school students in Physics before and after the lockdown due to covid-19 pandemic.

In testing the hypothesis, the Physics Grade Point (PGP) of secondary school students before and after the lockdown due to covid-19 pandemic were collected and afterward compared for statistical significance using t-test statistics at 0.05 level of significance. The result is presented in Table 3

Table 3: t-test analysis of academic performance of students before and after Covid-19 pandemic

Performance	N	PGP Mean	SD	df	t	P
Before Covid-19 Pandemic	482	3.50	1.63	964	2.333	.019*
After Covid-19 Pandemic	484	3.25	1.70			

* $p < 0.05$

Table 3 shows the result of the t-test analysis of academic performance of students before and after lockdown due to Covid-19 pandemic. The result shows that before the Covid-19 pandemic the students had higher mean Physics Grade Point (3.500) on performance than after the covid-19 pandemic (3.25). It was further shown from the result that the computed t-value (2.333) with degree of freedom 964 was statistically significant at 0.05 level of significance as $p < 0.05$. The null hypothesis was rejected. Hence, there is significant difference between the academic performance of secondary school students in Physics before and after the lockdown due to covid-19 pandemic.

Hypothesis 2: There is no significant difference in male and female students' performance in Physics before and after the lockdown due to covid-19 pandemic. In testing hypothesis 2, the academic performance scores of male and female students in Physics before and after the lockdown due to covid-19 were collected and analysed for statistical significance using Analysis of Covariance (ANCOVA) statistics at 0.05 level of significance. The result is presented in Table 4.

Table 4: ANCOVA of Male and Female Students' Academic Performance before and after Covid-19 Pandemic in Physics

Source	Type III Sum of Squares	Df	Mean Square	F	Sig.
Corrected Model	139.460 ^a	3	46.487	17.562	.000
Intercept	10563.837	1	10563.837	3990.927	.000
COVID-19	14.108	1	14.108	5.330	.021
GENDER	124.753	1	124.753	47.131	.000
COVID-19 * GENDER	.085	1	.085	.032	.858
Error	2546.379	962	2.647		
Total	13674.000	966			
Corrected Total	2685.839	965			

a. R Squared = .052 (Adjusted R Squared = .049)

Dependent Variable: PGP

Table 4 shows that there is no significant difference between male and female students' performance in Physics before and after the lockdown due to covid-19 pandemic ($F_{1,536} = 0.032$, $p > 0.05$). The null hypothesis is not rejected. Similarly, the

main impact of gender ($F_{1,536} = 47.131$, $p < 0.05$) on the academic performance of students is statistically significant at 0.05 level while the impact of Covid-19 ($F_{1,536} = 5.330$, $p < 0.05$) on the academic performance of students is statistically

significant at 0.05 level. It implies that with the lockdown due to Covid-19 pandemic, gender has no statistical impact on the academic performance of students in Physics.

Discussion

The findings of the study revealed that the students' level of performance in Physics was noticeably higher before the arrival of the Covid-19 pandemic than it was after the pandemic. Students were forced to take an unexpectedly long break from their studies owing to a lockdown that was implemented because of the Covid-19 pandemic. This is, without a doubt, one of the variables that could be accountable for the recent decline in students' academic performance. This finding is consistent with the submission of Mendoza-Lizcano *et al.* (2020), Engzell *et al.* (2020) and Abiona and Falebita (2020) that the academic performance of students in science has decreased since the outbreak of the Covid-19 pandemic.

It has been observed in alliance with the submission of Abiona and Falebita (2020) that most students in public secondary schools could not continue with the learning activities during the Covid-19 pandemic. This could be that most public secondary schools are not prepared and not having ICT facilities that could support the teaching and learning of Physics outside the school. Most students have lost the rhythm to learning due to the long break from academic activities and they are now struggling to gain the academic stamina needed for progressive academic performance.

The study revealed that significant difference exists between the academic performance of secondary school students in Physics before and after the lockdown due to covid-19 pandemic. Students had fallen out learning due to lockdown brought by Covid-19 pandemic. This was in agreement with Abiona and Falebita (2020) who came up with the conclusion from the study conducted on the impact of the covid-19 pandemic on senior secondary school student's academic performance that the covid-19 pandemic, which resulted in a long break and school closure, had a negative impact on students' performance.

The study revealed that there is no significant difference between male and female students' performance in Physics before and after the lockdown due to covid-19 pandemic. The main impact of gender on the academic performance of students is not statistically significant while the impact of Covid-19 on the academic performance of students is statistically significant. It is observed from the study that with the lockdown due to Covid-19 pandemic, gender has no statistical impact on the academic performance of students in Physics.

Summary

This study examined the impact of COVID-19 Pandemic on students' learning outcome in Secondary School Physics in Ekiti State, Nigeria. The study specifically examined secondary school students' performance in Physics before and after the emergence of covid-19 pandemic. The study investigated the secondary school students' experiences in learning Physics during the lockdown due to covid-19 pandemic.

The study adopted the descriptive research that adopted expo facto designs. The population of the study comprises 12,585 students from all the public senior secondary school Three (SSS III) Physics students in all the 205 public secondary schools spread across the 16 local government Areas of Ekiti State. The sample for this study was 966 SSS III students selected from six (6) secondary schools across the state. Multi-stage procedure which involved, simple random and purposive sampling techniques was used to select sample for the study. The instrument tagged Physics Performance Pro-forma was used for data collection. The instrument was validated by experts and PPP had a reliability coefficient of 0.731. Using descriptive and inferential statistics, the data gathered were analysed. The descriptive statistics of frequency counts, percentages, mean and standard deviation were used to answer the research questions while the inferential statistics involving t-test and Analysis of Covariance (ANCOVA) were used for testing the hypotheses. All the hypotheses were tested at 0.05 level of significance. The study revealed that:

- i. students' performance in Physics was noticeably higher before the

- arrival of the Covid-19 pandemic than it was after the pandemic.
- ii. significant difference exists between the academic performance of secondary school students in Physics before and after the lockdown due to covid-19 pandemic.
 - iii. there is no significant difference between male and female students' performance in Physics before and after the lockdown due to covid-19 pandemic. The main impact of gender on the academic performance of students is not statistically significant while the impact of Covid-19 on the academic performance of students is statistically significant

Conclusion

On the basis of the findings of this study, it is concluded that the Covid-19 pandemic had impact on the secondary school students' performance in Physics. Gender does not have impact on the secondary school student's academic performance in Physics either before or after the lockdown" due to Covid-19 pandemic. However, male and female students differ in their experiences in learning Physics during the lockdown due to covid-19 pandemic.

Recommendations

Sequel to the findings of the study, the following recommendations were made;

1. Physics teachers should ensure that students are going through various learning activities even when there is extended length of time when students are not in school, such as during long vacations;
2. Teachers should adopt strategies that would motivate students to learn Physics so that they can improve learning outcomes in Physics;
3. Parent should create enabling environment for students to engage in the learning activities during the long vacation;
4. Government should create enabling environment for teachers to stay

connected with the students even when they are on holiday by motivating the teachers and providing ICT infrastructures in school for use.

References

- Abiona G.O. and Falebita O.S. (2020) Impact of Covid-19 Pandemic on Senior Secondary School Students' Academic Performance and Self-Concept in Biology and Mathematics in Northwestern Nigeria. *Journal of the Social Sciences*. 48(4) 2038 – 2049.
- Angrist, N., Bergman, P., & Matsheng, M. (2025). Learning loss and recovery from the COVID-19 pandemic: A systematic review of evidence. *International Journal of Educational Development*.
<https://doi.org/10.1016/j.ijedudev.2025.102000>
- Awofala, A. O. A., & Lawal, R. F. (2023). Changing the narratives of science learning in secondary schools. *Education Sciences*, 13(2), 146.
<https://doi.org/10.3390/educsci13020146>
- Bethzuser, B., Bach-Mutze, S., & Zierer, K. (2024). A meta-analysis of the impact of COVID-19 on student achievement. *Educational Research Review*, 44, 100624.
<https://doi.org/10.1016/j.edurev.2024.100624>
- Donnelly, R., & Patrinos, H. A. (2022). Learning loss during COVID-19: An early systematic review. *Prospects*, 51(4), 601–609.
<https://doi.org/10.1007/s11125-021-09582-6>
- Engzell, P.; Frey, A.; Verhagen, M. (2020). Learning Inequality During the COVID-19 Pandemic. SocArXiv.
- Hammerstein, S., Kunig, C., Dreisurner, T., & Frey, A. (2025). A meta-analysis of students' academic learning losses during the COVID-19 pandemic. *Learning and Instruction*, 102111.



<https://doi.org/10.1016/j.learninstruc.2025.102111>

- Mendoza-Lizcano S.M., Palacios Alvarado W. and Medina Delgado B. (2020). Influence of COVID-19 confinement on physics learning in engineering and science students. *Journal of Physics: Conference Series* 1 – 7 doi:10.1088/1742-6596/1671/1/012018
- Omotayo, K.A. (2016). Need to Cultivate Appropriate Science Culture in the Nigerian Child. *Journal of Research in Science Education*, 1(1), 1-7
- Omotayo, K.A., Adedayo, J.O and Ayeni, M.F. (2014). Science Education Reform Effort: Effect of Utilizing Laboratory Method of Instruction on Students' Academic Performance in Science. *Asian Journal of Education and e-Learning* 2(3); 245 -249
- Owolabi O. T. and Oginni O. I. (2013). Assessing the Relative Effectiveness of Three Teaching Methods in the Measurement of Students' Performance in Physics. *International Journal of Materials, Methods and Technologies*, 1(8); 116 – 125
- Owolabi O.T and Adedayo, O.J. (2012). Effect of Teacher's Qualification on the Performance of Senior Secondary School Physics Students: Implication on Technology in Nigeria. *Canadian Center of Science and Education*.5 (6) 72 – 77
- Peters, S. J., Langi, M., Kuhfeld, M., & Lewis, K. (2024). Unequal learning loss: How the COVID-19 pandemic influenced academic growth. *Gifted Child Quarterly*, 48(1), 3–18. <https://doi.org/10.1177/00169862241301079>
- Subedi, S., Nayaju, S., Subedi, S., Shah, S. K., & Shah, J. M. (2020). Impact of e-learning during COVID-19 pandemic among nursing students and teachers of Nepal. *International Journal of Science and Healthcare Research*, 5(3), 9.
- UNICEF. (2020, August 24). 'What will a return to school during the COVID-19 pandemic look like?'. *UNICEF*. Retrieved from <https://www.unicef.org/coronavirus/what-will-return-school-during-covid-19-pandemic-look>