



Assessment of Impact of COVID-19 Pandemic on Teaching and Learning of Basic Science and Technology in Gombe State, Nigeria.

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Abstract

The study assessed the impact of COVID-19 pandemic on teaching and learning basic science and technology in Gombe State, Nigeria. Descriptive survey design was adopted with numerical population of four hundred and twenty eighty Junior Secondary School (JSS) in Gombe State. One hundred and twenty teachers were selected for the study, using simple random sampling techniques. The participants responded to a 10- item structured questionnaire. Data were analysed with the use of frequency counts, percentages and mean while the hypotheses were analyzed with Mann Whitney statistical test. The results indicated that teaching and learning of basic science and technology were negatively affected in JSS school. It is recommended that uniform academic plan for schools should be available and accessed by the teachers and students for continuity of proper education plan to continue teaching-learning processes during pandemic, among others.

Keywords: Assessment, Impact, COVID-19 Pandemic, Teaching and Learning, Basic Science and Technology.

Introduction

Corona Virus Disease 2019 (COVID-19) was identified in December 2019, Wuhhan, China. As a result of its high contagiousness, the World Health Organization (WHO) declared it as a global health emergency on 30th January, 2020 and as a pandemic on 11th of March, 2020 (WHO, 2020). Since then, the infection has spread worldwide and more than 15.6 million cases and 638 thousand deaths have been reported. In Nigeria, 90,413 cases have been diagnosed with Covid-19 with 4480 deaths reported in July 2020 (WHO 2020). The symptoms of the pandemic disease include, fever, cough, fatigue, myalgia headache, among others (Wang et al. 2020). Children, especially school-age and older adult are more susceptible to the pandemic disease.

It is worthy to know that coronavirus is different when compared with the plagues and epidemics that have ravaged humanity throughout its existence, in the sense that none has greatly affected the educational sector in the world like COVID19 (UNESCO, 2020). The COVID-19 outbreak affects all segments of life and all categories of people including older persons, persons with disabilities, youth, and indigenous peoples (Gonzalez et al., 2020). The health, social, cultural and economic impacts of the virus are being borne disproportionately by people. Besides, the restriction was placed on interstates movement, market places were locked, religious gatherings of more than ten persons were banned, social activities such as ceremonies and club meetings, among others (Gonzalez et al., 2020). As part of the

measures to curtail the spread of COVID-19 in Nigeria, the Federal Government of Nigeria, on 19th March, 2020 ordered the immediate closure of educational institutions across the nation (Goyal, 2020; UNESCO, 2020). Hence, all public and private schools have to be shut down following the government directive, which led to disruption of school activities including basic science and technology curriculum implementation.

The importance of basic science and technology curriculum implementation cannot be over-emphasized: they are course design to develop interest in the teaching and learning that is to encourage pursuing further students' experience in a scientific discipline. Curriculum implementation and especially science curricula that involved practical were halted in the country. Although, online teaching through virtual meetings with Web-based conferencing was suggested, most teachers found it difficult to interact with students' face-to-face classes (Abidah, Hidayatullaah, Simamora, Fehabutar, & Mutakinati, 2020). The question one may ask is how prepared were the teachers, students, school management and the governments in employing on-learning during the COVID-19 pandemic? Government teachers, school management and students were not adequately prepared to employ e-learning for teaching-learning process during COVID-19 pandemic (Ogundare & Maigari, 2021). Apart from teaching, learning effectively at home was adversely affected (Kapasia et al.2020). Learning is a permanent change in behavior (Bateman &



Waters, 2013). Learning is the process of interaction of students with educators and learning resources in a learning environment. The closure of the educational institution due to the pandemic lead to an unbearable impact on education. During the lockdown, teachers are instructed to teach through online platforms (Abidah, Hidaayatullaah, Simamora, Fehabutah & Mutakinati, 2020).

A Study of Gonzalez et al. (2020) of influence of COVID-19 confinement in students' performance in higher education in India reported significant positive impact on learning efficiency and performance in adopting online strategies. However, Manzoor (2020) in a similar study of online teaching and challenges of COVID-19 inclusion of person with disabilities in higher education remarked that closure of educational institutions during lock down hampered educational system and the teaching-learning process.

Kapasias et al (2020) who conducted a survey study on the impact of lockdown on the learning status of undergraduate and postgraduate students during COVID-19 pandemic in West Bengal, India found out that students faced a lot of challenges such as anxiety, depression and poor internet connectivity at home for learning. Owusu-Fordjour, Koomson and Hanson (2020) who also conducted a study on the impact of COVID-19 on learning in Ghana discovered that the pandemic negatively affected learning in Ghana as students were unable to study effectively at home due to inability to have access to the internet at home and parents were not able to help their children because of the technical knowhow of the new technology. Goyal (2020) also carried out a study on the impact of coronavirus on higher education in India and discovered that teachings were negatively affected in all types of schools. Added to this, Gonzalez et al. (2020) who conducted a survey the study on influence of COVID-19 confinement in students' learning and performance observed that students' learning and performance in both public and private higher institutions were negatively affected.

Statement of the Problem

The closure of educational institution as a result of the outbreak of COVID-19 lead to an untold impact on education. The outbreak of COVID-19 affected many Nigerians in their daily activities, such as social interaction, business, religious activities, educational activities, among others. In order to facilitate learning continuity, teachers were instructed to teach through on-line platforms. In spite of the learning options,

many school learners could not participate in learning during this era because of inherent factors in a growing country like Nigeria. With this backdrop, the present study aims to examine the impact of the Covid-19 pandemic on the teaching and learning basic science and technology in junior secondary school in Gombe State, Nigeria.

The purpose of the study was to assess the perceived impact of the COVID-19 pandemic on teaching and learning of basic science and technology in Gombe State, Nigeria. Specifically, the objectives are:

1. To find out the perceived influence of Covid-19 pandemic on teaching of basic science and technology in junior secondary schools in Gombe State.
2. To assess the perceived influence of Covid-19 pandemic on learning basic science and technology in junior secondary schools in Gombe State.
3. To find out if the impact of COVID-19 pandemic on teaching basic science and technology is significantly different in public and private junior secondary schools in Gombe State.
4. To find out if the impact of COVID-19 pandemic on learning basic science and technology is significantly different in public and private junior secondary schools in Gombe State.

Research questions

The following research questions were raised:

1. To what extent is the impact of Covid-19 pandemic on teaching basic science and technology in junior secondary school in Gombe State?
2. To what extent is the impact of Covid-19 pandemic on learning basic science and technology in junior secondary schools in Gombe State?

Hypotheses

HO₁: The impact of COVID-19 pandemic on teaching basic science and technology is not significantly different in public and private junior secondary schools in Gombe State.

HO₂: The impact of COVID-19 pandemic on learning basic science and technology is not significantly different in public and private junior secondary schools in Gombe State.

Method

The study adopted a descriptive survey research design. The design enabled the researcher to be able to describe, explain and validate the results on the sample studied. The study was carried out in Gombe State, Nigeria.

Population, Sample and Sampling Techniques

The numerical strength of the study population of this study comprised of four hundred and twenty eighty (428) Junior Secondary School (JSS) in Gombe State. One hundred and twenty (120) basic science and technology teachers were randomly selected for the study, using simple random sampling techniques from the three senatorial districts in Gombe State (Cohen, Manion, & Morrison, 2008). Forty schools each were randomly selected from Gombe North, South and Central Senatorial Districts making up to 120 schools. Besides, one basic science and technology teacher was selected from each of the selected schools making a total of 120 basic science and technology teachers.

Research Instrument

One structured questionnaire was developed and constructed and used for the collection of data. The instrument was made up of close-ended items titled: Perceive Impact of COVID-19 Pandemic on Teaching and Learning Basic Science and Technology Questionnaire (PICPTLBSTQ) for the

participants to respond to. The purpose of the study was explained to them and the confidentiality assured on the attached sheet. It was a structured questionnaire based on rating scale of “Strongly Agree”, Agree, Disagree and “Strongly Disagree” closed-ended questions of how articulate the respondents are (Cohen, Manion, & Morrison, 2008). The instrument was validated by experts in the Department of Science Education, Federal University of Kashere and two basic science and technology teachers in Junior Secondary School, Gombe to ensure that it collected the required information. The reliability of the questionnaire was ensured through the use of Cronbach alpha coefficient and was computed to be 0.87 and which was considered high enough for the instrument to be used for the study.

Data Collection Procedure

The researchers employed google forms to design the questionnaire and were administered to 120 basic science and technology teachers in the 120 junior secondary schools through e-mail and WhatsApp platforms sampled for the study. Only 100 questionnaires were completed and returned via e-mail and WhatsApp platforms by the respondents. Data were analysed with the use of frequency counts, simple percentages and mean, while the hypotheses were analyzed with Mann Whitney statistical test.

Results

Table 1: Teachers’ Perceived Impact of COVID-19 Pandemic on Teaching of Basic Science and Technology

S/N	Item Statement	SA %	A %	D %	SD %	Mean	Std. d
1	The lockdown hindered the teachers from going to school for teaching.	57 (57.0)	25 (25.0)	7 (7.0)	11 (11.0)	3.28	1.006
2	Teachers covered their syllabi within expected academic session	9 (9.0)	4 (4.0)	14 (14.0)	73 (73.0)	2.70	.882
3	Teachers opted for virtual instructions for teaching during pandemic	11 (11.0)	7 (7.0)	19 (19.0)	63 (63.0)	2.60	1.128
4	Teachers were well trained and readied for virtual teaching for curriculum instructions	6 (6.0)	3 (3.0)	56 (32.0)	35 (35.0)	2.51	.969
5	The virtual instructions used for teaching were effective	2 (2.0)	3 (3.0)	72 (72.0)	23 (23.0)	2.50	1.159

Table 1 reveal the impact of COVID-19 pandemic on the teaching of basic science and technology curriculum. In item 1, 82% of the respondents claimed that the lock down as a result of COVID-19

pandemic hindered teachers from going to school for teaching. 87.0%, 82%, 91.0%, 95.0% of the respondents in items 2, 3, 4, 5 claimed that they disagreed that teachers covered their syllabus within



the academic session, teachers opted for virtual instructions during the pandemic, teachers were well trained and readied for the use of virtual instruction and virtual instructions suggested by the government were effective. The implication of this is that teaching

of basic science and technology were not effective during COVID-19 pandemic, hence, the pandemic had negative impact of teaching of basic science and technology.

Table 2: Teachers' Perceived Impact of COVID-19 Pandemic on Learning of Basic Science and Technology

S/N	Item statement	SA	%	A	%	D	%	SD	%	Mean	S. Dv
6	The lockdown hindered students from effective and personal contacts with their teachers for learning in the school	36	(36.0)	42	(42.0)	15	(15.0)	7	(7.0)	2.44	1.200
7	Students were unable to carry out practical classes effectively at home	59	(59.0)	37	(37.0)	3	(3.0)	1	(1.0)	3.22	1.106
8	Students were able to study effectively at home	14	(14.0)	19	(19.0)	27	(27.0)	40	(40.0)	2.61	.898
9	The students were able to learn effectively through the internet	9	(9.0)	5	(5.0)	52	(52.0)	34	(34.0)	2.51	1.105
10	Students were proficient and prepared for virtual learning	17	(17.0)	5	(5.0)	43	(43.0)	35	(35.0)	2.44	1.095

Table 2 shows the impact of COVID-19 pandemic on the learning of basic science and technology in junior secondary school in Gombe State. In items 6 and 7, 78.0% and 96% of the respondents indicated that the students were not able to have personal contact with their teacher for learning and they could not effectively involved in science practical classes during the lockdown as a result of COVID-19 pandemic. While for the remaining items 8, 9 and 10

the respondents claimed that 67%, 867% and 78% of the learners were not able to learn at home effectively, not capable to learn and study through internet and were not proficient and prepared for virtual learning respectively. This indicated that COVID-19 pandemic adversely affected the learning of basic science and technology in junior secondary school in Gombe State.

Table 3: Mann-Whitney Analysis of Impact of COVID-19 on Teaching of Basic Science and Technology According to School Type

School type	N	Mean value	U	P value	Remark
Public	60	54.50	960.00	.090	Not significant
Private	40	44.50			

Significant at $P < 0.05$

Table 3 reveals Mann Whitney test analysis of the difference between public and private JSS of the impact of COVID-19 pandemic on teaching basic science and technology. It indicated that was no statistically significant difference between public and

private JSS in the impact of COVID-19 pandemic on teaching basic science and technology ($U = 960.00$, $N_1 = 60$, $N_2 = 40$, $P = .090$, two-tailed). Therefore, hypothesis 1 is not rejected.

Table 4: Mann-Whitney Analysis of Impact of COVID-19 on Learning of Basic Science and Technology According to School Type

School types	N	Mean value	U	P value	Remark
Public	60	49.67	1150.00	.724	Not significant
Private	40	51.75			

Significant at < 0.05



Table 4 shows Mann Whitney test analysis of the difference between public and private JSS of the impact of COVID-19 pandemic on learning basic science and technology. It revealed that there was no statistically significant difference between public and private JSS in the impact of COVID-19 pandemic on learning basic science and technology ($U = 1150.00$, $N_1 = 60$, $N_2 = 40$, $P = .724$, two-tailed). Therefore, hypothesis 2 is not rejected.

Discussion

The result showed that teaching of basic science and technology was not effective during COVID-19 pandemic, hence, the pandemic had a negative impact on the teaching of basic science and technology. The findings of the study support the study of Manzoor (2020) who observed that COVID-19 pandemic negatively influenced the teaching-learning process of person-impaired disabilities in higher education.

The finding also revealed that COVID-19 pandemic adversely affected learning of basic science and technology in junior secondary school in Gombe State. The finding is conformity with Owusu-Fordjour, Koomson and Hanson (2020) who discovered that the pandemic negatively affected learning in Ghana as students were unable to study effectively at home due to inability to have access to the internet at home and parents were not able to help their children because of technical knowhow of the new technology. Similarly, the finding of this study is in agreement with the findings of Kapasia et al (2020) who noted that undergraduate students faced a lot of challenges such as anxiety, depression and poor internet connectivity at home for learning in India. However, the study negates the findings of Gonzalez et al. (2020) who reported that using online learning devices during COVID-19 pandemic in India had a significant positive impact on students' learning efficiency and performance.

Besides, the finding shows that there was no statistically significant difference between public and private JSS in the impact of COVID-19 pandemic on teaching basic science and technology. The study corroborates the finding of Goyal (2020) who reported that Coronavirus had negative impact on both public and private higher education in India. Similarly, the finding revealed that there was no statistically significant difference between public and private JSS in the impact of COVID-19 pandemic on learning basic science and technology. This was in agreement with Gonzalez et al. (2020) who remarked

that COVID-19 confinement had a negative influence on students' learning in both public and private educational institutions in India.

Conclusion

The study established the facts that COVID-19 amidst lockdown negatively had an impact on teaching and learning of basic science and technology. Although few private schools and their students made use of digital platforms for teaching and learnings, this posed a lot of challenges to them.

Recommendations

Based on the findings of this study, the followings recommendations are made to the government, policy makers and educational institutions:

Educational stakeholders should provide adequate and appropriate infra-structural facilities to educational institutions which can facilitate the teaching-learning process during future disease pandemic.

Seminars, workshops and conferences need to be organized for practicing teachers on the use of innovative instructional and learning strategies.

Finally, educational institutions responsible for the training of teachers should ensure that in-service teachers are well trained in the ICT resources usage for curriculum instruction when they are undergoing their studies so that they can effectively go online teaching during future health emergencies.

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