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Teachers Perception of the Impact of Covid-19 Pandemic on Biology Instruction in Secondary School

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Abstract:

For more than 20 weeks, secondary schools in Nigeria experienced a forceful shutdown due to the covid-19 pandemic. In the study, the impact of the covid-19 pandemic in Biology instruction as perceived by teachers was examined. A sample of 86 Biology teachers were drawn from three local government areas across the senatorial districts of Ekiti State, employing a multistage sampling procedure. The instrument used to collect data is the Biology Teachers Perception on Impact of Covid-19 Questionnaire (BTPICQ). The face and content validity of the instrument was ensured. A reliability coefficient of 0.751 using the Cronbach Alpha formula of testing internal consistency was obtained. Three research questions were raised and answered using mean and standard deviation. The findings showed the Covid-19 pandemic had a negative impact on the teaching and learning of Biology during the era. It was also found that the Covid-19 pandemic positively impacted the teaching and learning of Biology in the post-pandemic era. It was revealed that the covid-19 pandemic was perceived to affect students' performance in Biology as students were found to have performed better in the pre-pandemic era than the post-pandemic era. It was recommended that the school, teachers and parents should help in filling the vacuum created by the pandemic. It was also recommended that teachers adopt innovative teaching and learning strategies that would make learners actively engage in the learning activities even outside the school wall.

Keywords: Covid-19, Pandemic, Teacher, Perception, Biology Instruction,

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Introduction

Transiting to the long-awaited year 2020 comes with the declaration of covid-19 as a pandemic; the disease which first emerged in Wuhan, China, in December 2019 caused by coronavirus was freely penetrating through the nations of the world. As a result, the developing and developed countries both suffer the loss of lives of citizens. Various measures were tried to stop the spread and save the human race from extinction. The prominent among them was lockdown, first introduced as partial before transiting to total lockdown.

In the wake of the COVID-19 pandemic, partial or complete lockdowns were imposed, requiring individuals to remain at home. This lockdown resulted in the total closure of all schools in Nigeria, from elementary to postsecondary institutions. The obligatory school closure in reaction to the outbreak of COVID-19 came when most Nigerian schools had just completed their second continuous assessment test and were preparing for their second term examinations. At the same time, students enrolled in certificate programs were preparing for external tests. Due to the abruptness of the shutdown, both learners and educators were left ill-prepared for the impending shift. The system's relevant stakeholders were unable to devise a timely fix. The pandemic-related school shutdown lasted more than two months. This period in which teachers and students could not physically gather to interact constituted a significant barrier to science learning.

Science and technology education are critical instruments for promoting sustainable development and laying the groundwork for global socioeconomic advancement. Additionally, it is regarded as one of the most powerful instruments for enabling society members to confront and fulfil their obligations as productive members of society in the face of changing obstacles and situations (Ibrahim, Adamu & Ibrahim 2018). Science contributes to a country's transition from developing to developed status. Science education is intended to foster the development of skill, talent, and attitude, and a work habit and appreciation for the knowledge and information essential for a functioning community (Ibrahim et al., 2018). Therefore, science and technology are critical to Nigeria's and any other nation's future development. According to Egbogah (2012), Nigeria has to recognise that its path out of poverty is contingent on its science and technology education investment. Science education in schools should assist students in having a thorough grasp of science to facilitate the transfer of knowledge to real-world problems.

The teacher significantly impacts students' academic achievement and ability development (Abiona &Falebita, 2020; Ayeni, 2014). Students' quality of active learning experiences while engaged in a science education dictates academic performance (Omotayo, Adedayo, &Ayeni, 2014). Teachers are ultimately accountable for transforming policy into action and concepts into practice via their interactions with students; successful science teaching and learning seem to rely more on the teacher (Popoola & Falebita, 2016). Opara&Uwah (2018) identify vacation/holiday as an environmental component that affects students' performance. During planned extended vacations, which often last six to seven weeks, students are out of school and may be unable to participate in academic activities that would require them to study academic material. This gap often disturbs the learning rhythm and may result in skill and knowledge loss. When observed, this prolonged absence from school often has a detrimental effect on kids' academic performance, especially when the services of a teacher are used to keep the student engaged to the academic subject (Moore, 2010; Alexander, Entwisle & Olson, 2012; Opara & Uwah, 2018). Additionally, the lengthy vacation may have influenced students' self-perceptions of their academic ability.

The use of online learning as an emergency form of distant education rather than a planned manner of learning has become prevalent amid the pandemic. According to Adeoye Adanikin & Adanikin (2020), there must be a way for students to continue their education despite the difficulties brought by COVID-19. To ensure that education does not stop, various stakeholders in the educational sector have taken immediate action to bridge the gap that the pandemic might create. Online learning is the only viable alternative for ensuring educational institutions' long-term viability, particularly amidst pandemics. If schools are closed, students and instructors should access educational possibilities at home via online education (UNESC0, 2020).

According to Schleicher (2020), rethinking teaching, learning and curriculum via open educational resources (OER) and digital learning platforms (DLP) could have lessened the effect of the pandemic on education for students as well as their parents and teachers. Unfortunately, students who are not afforded the same educational chances may suffer due to the Covid outbreak's school shutdown. One of the most challenging aspects of this process has been students and teachers studying and teaching online across the nation.

To continue the education process, several nations throughout the globe have come up with a variety of options, such as television broadcasts and online libraries (Basilaia & Kvavadze, 2020). The following are some additional benefits for students that Anderson (2008) points out when discussing online learning: Asynchronous online learning allows students to access the online materials at any time, while synchronous online learning provides real-time interaction between students and teachers, the students can use the internet to access up-to-date and relevant learning materials, and they can communicate with experts in the field they are studying. Tutoring can be done at any time, from any location, and students can see the changes in online materials immediately; teachers can direct learners to appropriate information based on their needs when learners can access materials on the internet; online learning systems can be used to determine the needs of learners, assign suitable materials, and help learners reach their learning goals (Adeoye, Adanikin & Adanikin, 2020).

Falebita and Abiona (2020) revealed that most secondary school students could not engage in online classes due to the difficulties associated with e-learning, among which include; lack of technological skills, infrastructure and facilities, instructors' instructional strategies, and economic issues. Adeoye, Adanikin & Adanikin (2020) also stressed that online schooling in the pandemic age was hindered by a lack of infrastructure, high internet costs, and a family financial crisis.

According to Abiona and Falebita (2020), the Covid-19 pandemic, which resulted in a lengthy school suspension, has a detrimental impact on student performance in Biology and Mathematics. Oyinloye (2020), in a study, indicated in the findings that COVID-19 would have a negative impact on educational institutions. Students in secondary school have lost contact hours and e-learning tools that they might have used to communicate with their teachers, leading to this projected trend in the future.

Statement of the Problem

In order to stop the spread of the virus (coronavirus) that causes the terrible sickness that claims many lives within a short time, the onset of the covid-19 pandemic halted academic activity inside the four walls of the school (Covid-19). Most schools were preparing for internal and external examinations at the time of this unexpected school shutdown, which lasted for 20 weeks. During the whole 20-week period, students were not allowed to learn from the school walls through the well known physical interaction with the teacher and their

counterparts. Since students could no longer gather on school grounds, the academic learning experiences of individual students during the unexpected break varied from student to student. The SSS 3 students were requested to return to school after the 20th week, obligated to begin their SSCE a week later. It was unclear if the children participated in academic activities that may help them prepare for the examinations while out of school. This study purposefully investigated the perception of teachers on the impact of the covid-19 pandemic on Biology instruction in secondary schools.

Objectives

This study finds out the perception of teachers on the impact of the covid-19 pandemic on biology instruction in secondary schools. Specifically, the study examined:

1. The teachers' perception of the impact of covid-19 on the teaching and learning of biology during pandemic era.
2. Teachers' perception of the impact of covid-19 on the teaching and learning of biology in the post-pandemic era.
3. The teachers' perception on the impact of covid-19 on the academic achievement of students in Biology.

Research Questions

The following research questions guided the study:

1. What are teachers' perceptions about the impact of covid-19 on the teaching and learning of biology during the pandemic era?
2. What are teachers' perceptions of the impact of covid-19 on the teaching and learning of biology in the post-pandemic era?
3. What is teachers' perception of the impact of covid-19 on students' academic performance in Biology?

Methodology

A quantitative approach at a descriptive design was adopted. As a descriptive survey, the data are gathered directly from the primary source at a precise point in time and without any modification of the variables, and a comprehensive descriptive analysis is conducted of them. The population consisted of all Biology teachers in Ekiti State, Nigeria. A sample of eighty-six (86) Biology teachers was used for the study. For the selection of the sample, a multistage sampling procedure was employed. A simple random sampling technique was used to select three local governments from each of the three senatorial districts of Ekiti State. Also, a simple random sampling technique was used to select five schools from each of the selected local government areas to make a total of 45 schools. Then, a purposive random sampling technique was used to select the available biology teachers in the selected schools. The biology teachers were selected because they are the major target of the study.

A research instrument tagged Biology Teachers Perception on Impact of Covid Questionnaire (BTPICQ) was used to gather information on the teachers' perceptions of covid-19 on the teaching and learning of Biology during and after the pandemic. BTPICQ is a self-developed instrument consisting of two sections, A and B. Section A sought for the biodata of the respondents, while section B consisted of 10 items. The instrument's validity, both in terms of its appearance and content, had been confirmed. The instrument's reliability was tested on 10 respondents who were also Biology teachers outside of the study area using Cronbach Alpha, which yields a reliability coefficient of 0.751. The researcher administered the instruments to the respondents. The BTPICQ has a range of scores between 15 and 60.

Result

Table 1: Demographic Profile of Respondents

Charateristics	Dimension	Frequency	Percentage (%)
Gender	Male	47	54.7
	Female	39	45.3
	Total	**86**	**100**
Experience	1 – 5years	9	10.5
	6 – 10years	20	23.3
	11 – 15years	37	43.0
	16 – 20years	13	15.1
	Above 20years	7	8.1
	Total	**86**	**100**
Highest Qualification	NCE	5	5.8
	B.SC	21	24.4
	B.SC.ED	48	55.8
	POSTGRADUATE	12	14.0
	Total	**86**	**100**
Teaching during Pandemic	Yes	17	19.8
	No	69	80.2
	Total	**86**	**100**
Proficiency in ICT	Yes	57	66.3
	No	29	33.7
	Total	**86**	**100**

Table 1 shows that most of the respondents who are about 54.7% are male, while the remaining 45.3% are female. Also, the larger percentage of the respondent, which represented 43.0%, had 11 to 15years working experience, 23.3% had 6 – 10years experience, 15.1% had 16 – 20years teaching experience, 10.5% had 1 – 5years teaching experience, while the remaining 8.1% had over 20years teaching experiences. Also, by qualification the respondents which is about 5.8%, 24.4%, 55.8%, and 14.0% had NCE, B.Sc, B.Sc S(Ed) and Postgraduate degree as their highest qualification respectively. The table also indicates that most of the Biology teachers did not engage in teaching during the pandemic; this represents about 80.2%, while the remaining 19.8% responded to be actively involved in the teaching of Biology during the pandemic era. The table also shows that 66.3% of the respondents are proficient in ICT while only 33.7% are not.

Research Question 1: What are teachers' perceptions about the impact of Covid-19 on the teaching and learning of biology during the pandemic era?

Table 2: Percentages, Mean and Standard Deviation Responses on teachers' perceptions about the impact of Covid-19 on the teaching and learning of biology during the pandemic era

No	Item	N	SA (%)	A (%)	D (%)	SD (%)	Mean	S.D.	Remark
1	COVID-19pandemic was NOT a major barrier to teaching and learning	86	2.3	9.3	48.8	39.5	1.744	0.723	Disagreed
2	The lockdown did NOT	86	4.7	16.3	44.2	34.9	1.907	0.835	Disagreed

	hinder the teaching of Biology due to pandemic								
3	Most students were busy learning during the pandemic era	86	10.5	32.6	41.9	15.1	2.384	0.870	Disagreed
4	During the pandemic, ICT/online classrooms were the primary means of instruction for most students.	86	12.8	60.5	24.4	2.3	2.837	0.666	Agreed
5	Most students benefited from the online class during pandemic	86	3.5	37.2	29.1	30.2	2.140	0.897	Disagreed

Mean Cut-off: 2.50

Result put together on table 2 reveals the extent of the perception of Biology teachers on the impact of Covid-19 on the teaching and learning of biology during the pandemic era. Item 1, 2,3,4 and 5 has mean scores of 1.744, 1.907, 2.384, 2.837, and 2.140, respectively. The table also indicates that the items have a standard deviation of 0.723, 0.835, 0.870, 0.666, and 0.897, respectively. Subject to the mean cut-off of 2.50, the respondent disagreed with all the items except item 4, which has a mean score higher than the mean cut-off. This indicates that the teachers perceived Covid-19 pandemic to have more of a negative impact on the teaching and learning of Biology during the era.

Research Question 2: What are teachers' perceptions of the impact of covid-19 on the teaching and learning of biology in the post-pandemic era?

Table 3: Percentages, Mean and Standard Deviation Responses on teachers' perceptions about the impact of Covid-19 on the teaching and learning of biology in the post-pandemic era

No	Item	N	SA (%)	A (%)	D (%)	SD (%)	Mean	S.D.	Remark
1	Pandemic has brought about improvement in the mode of instruction for Biology teachers	86	12.8	43.0	39.5	4.7	2.640	0.766	Agreed
2	Teachers now give assignments or interact with the students through online platform even after the pandemic	86	20.9	40.7	24.4	14.0	2.686	0.961	Agreed

Mean Cut-off: 2.50

Table 3 shows the extent of responses on Biology teachers' perception of the impact of Covid-19 on the teaching and learning of biology in the post-pandemic era. The two items on the table were agreed to. Having had mean scores higher than the mean cut-off. Item 1 and 2 had mean scores of 2.640 and 2.686, respectively, with standard deviations of 0.766 and 0.961.

This indicates that the Biology teachers perceived the Covid-19 pandemic to positively impact the teaching and learning of Biology in the post-pandemic era.

Research Question 3: What is teachers' perception of the impact of covid-19 on the academic performance of students in Biology.

Table 4: Percentages, Mean and Standard Deviation Responses on teachers' perceptions on the impact of covid-19 on the academic performance of students in Biology.

No	Item	N	SA (%)	A (%)	D (%)	SD (%)	Mean	S.D.	Remark
1	The school closure due to pandemic caused skills and knowledge losses for many students	86	23.3	44.2	27.9	4.7	2.861	0.828	Agreed
2	Teaching through ICT helps to improve the performance of students	86	18.6	53.5	19.8	8.1	2.826	0.830	Agreed
3	Students performance in the pre-pandemic era is better than the post-pandemic	86	47.7	48.8	2.3	1.2	3.430	0.605	Agreed

Mean Cut-off: 2.50

Table 4 reveals the responses on teachers' perception of the impact of covid-19 on the academic performance of students in Biology. It shows that items 1, 2 and 3 had mean scores of 2.861, 2.826, and 3.430, respectively, with their standard deviation of 0.828, 0.830, and 0.605, respectively. Based on the cut-off of 2.50, all the items were agreed on. This implies that the covid-19 pandemic was perceived to impact students' performance in Biology.

Discussion

The study's finding revealed that the teachers perceived Covid-19 pandemic to have a negative impact on the teaching and learning of Biology during the era. It disagreed with these statements that the Covid-19pandemic was NOT a major barrier to teaching and learning; the lockdown did not hinder biology teaching due to pandemic; most students were busy learning during the pandemic era; most students benefited from the online class during the pandemic. It was only agreed that ICT/online classrooms were the primary means of instruction for the vast majority of students during the pandemic. This implies that the pandemic halted the interactions between the teacher and the students within the four walls of the classroom. It also implies that most students could not learn as online classes were the primary avenue for learning. This concurs with the finding of Falebita and Abiona (2020) and Adeoye, Adanikin and Adanikin (2020), who revealed that most secondary school students could not engage in online classes due to the difficulties associated with e-learning. The finding of this study is also in line with Oyinloye (2020), who in her study indicated that COVID-19 would have a negative impact on educational institutions because students in secondary school have lost contact hours and e-learning tools that they might have used to

communicate with their teachers are not readily available at their disposal. This could also indicate that online classes gained popularity, particularly at the secondary level of education in Nigeria during the pandemic without much access to them.

It was found from the study that the Biology teachers perceived the Covid-19 pandemic to have a positive impact on the teaching and learning of Biology in the post-pandemic era. It agreed to the statements that: pandemic has brought about improvement in the mode of instruction for Biology teachers; teachers now give assignments or interact with the students through online platform even after the pandemic. Furthermore, it could imply that the pandemic has served as an eye opener to education stakeholders, particularly the teachers, in looking out of the conventional way of engaging in teaching and learning.

The study found that the covid-19 pandemic was perceived to impact the performance of students in Biology. It agreed to the statement that; the school closure due to pandemic caused skills and knowledge losses for many students; teaching through ICT helps improve students' performance; students' performance in the pre-pandemic era is better than the post-pandemic. This could imply that the unexpected long vacation that lasted for the longest period in history makes students forget the educational content previously learned. This conforms with the finding of Opara and Uwah (2018), who identified vacation/holiday as an environmental component that affects students' performance; during planned extended vacations, which often last six to seven weeks, students are out of school and may be unable to participate in academic activities that would require them to study academic material.

Conclusion

Sequel to the findings of this study, it was concluded that the Covid-19 pandemic had a negative impact on the teaching and learning of Biology during the era when teachers and students could not physically gather for productive interactions. Also, the Covid-19 pandemic has positively impacted the teaching and learning of Biology in the post-pandemic era as new ways of teaching and learning were explored. It was also concluded that the covid-19 pandemic was perceived to impact the performance of students in Biology as students were found to have performed better in the pre-pandemic era than the post-pandemic era.

Recommendation

Based on the finding of the study, it is recommended that:

1. Teachers, parents and the school should help in filling the vacuum created by the pandemic.
2. Teachers should adopt innovative teaching and learning strategies that would make the learner actively engaged in the learning activities even outside the school wall.
3. Government or school administrators should adequately equip schools with resources that could make them actively involved in teaching and learning activities outside the school or on holiday.
4. School administrators should ensure that teachers are adequately trained on the use of ICT facilities in the teaching and learning of Biology.

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