Perception of Teachers and Students on Online Classes in Biology at Ogun State Senior Secondary Schools in Covid-19 Era

Oni, Matthew Kolawole Ph.D.,
Oni, Temitayo Kehinde
Ajayi Crowther University, Oyo, Oyo State.
Federal Polytechnic, Ado-Ekiti
*Corresponding author: e-mail: kennyoni18@gmail.com

ABSTRACT
This study examined the perception of students and teachers on the use of online classes for Biology during the lockdown period in Ado Odo Ota Local Government Area of Ogun State in Nigeria. Four research questions guided the study. 292 students and 8 Biology teachers constituted the sample and the questionnaire was adopted as the research instrument. Frequency and percentage were used to analyse the data gathered. Anchored in Technological Determinism, the study found that coverage of the curriculum was above average. majority of respondents had access to online platforms and the internet and adjudged the exercise effective. Others in the minority however believed otherwise. The study, therefore, recommended an increased adoption of educational technologies among Nigerian students and teachers as well as the acquisition of expertise to use them.
Keywords: Lockdown period, Online Classes, Biology

Introduction

Education in Nigeria is faced with a myriad of obstacles like poor funding from the government, lack of infrastructure, lack of sustainable structure and the diminishing power of the western education to provide means of livelihood for the educated ones. Additional obstacles have unfortunately been provided by the COVID-19 pandemic, which necessitate instructors to adjust to teaching online, according to Konig, Jager-Biela and Glutsch (2020). It was until March 2020 that students and instructors gathered in classrooms to cover the basic material of their disciplines, sometimes through formal lecture, in the traditional school teaching environment. Students had to pay attention to what their professors had to say, work alone or in groups, and recite facts and figures for examinations (Lipowsky, 2015). As a result of the lockdown, children, instructors, and even parents were all thrust into a new position (Huber and Helm 2020). For the sake of continuing education and learning, there was no choice but to use alternate educational methods. Since the advent of online learning, educators have had to adapt their methods and methods of teaching and learning in order to take advantage of the many digital resources at their disposal (Eickelmann and Gerick, 2020). Teachers were also expected to stay in touch with their pupils in order to account for the social integration of their learning groups, in addition to achieving educational objectives.

Although the move to online instruction was unexpected and quick because of COVID-19, it was part of a broader educational system ICT transformation process (Selwyn, 2012; McFarlane, 2019). In the last several years, the use of technology in education has risen to prominence. Increasingly, the school curriculum should incorporate ICT, and students should be given the opportunity to use advanced technological tools and digital resources for creative and innovative problem solving. (Kozma, 2013).

Literature Review

"Adapting to online teaching during COVID-19 school closure: teacher education and teacher competence implications among early career teachers in Germany" is the title of a study by Konig, Jager-Biela and Glutsch (2020). It was a survey of early-career teachers which was done in May and June of 2020. They and the results are looked at how well they maintained touch with students and dealt with the most difficult aspects of their job. This was followed by an examination of possible influences (such as school-based computers, teacher competency in technological pedagogy, and possibilities for teacher education to better prepare teachers for digital teaching and learning). Regression analyses reveal that ICT tools, notably digital teacher competence and chances for teacher education to develop digital competence, are crucial in

adjusting to online teaching during COVID-19 school closures, according to their results.

Oni (2021) in a study carried out on the use of ICT by the Nigerian book editors in the editorial processes submits that there appears to be a dearth of technological know-how in Nigeria. According to him, Nigerian book publishers lack experience in the use of Information and Communication Technology (ICT) for editorial functions. The foregoing study is relevant to the present one because this researcher intends to analyze the level of competence in the use of digital platforms as a factor in the utilization of these platforms for online teaching and learning.

Eyles, Gibbons, and Montebruno (2020) wrote on the "Effects of unexpected shutdown on educational attainment and wages" and argued that teaching may have taken place in various ways during school closures. To them, it was now possible for schools to use online learning platforms to replace classroom education with home-based training. Students at different schools would have varying abilities to be taught remotely because of the lack of a national regulation on this matter. Assessing a school's ability to seamlessly move between in-person classroom instruction and online learning was easy with information from the OECD's PISA program. PISA included a variety of questions about the use of technology in the classroom, both for students and for school administrators. An online learning platform was the closest question to asking if teachers would be able to utilize computers to teach their pupils remotely. Online learning platforms were available to about 65 percent of secondary school pupils in the UK according to an OECD (2020) review of the 2018 PISA results. However, there was a severe socioeconomic gradient to its accessibility. Only a little more than 40% of students from low-income backgrounds got access to higher education. More than 70 percent of their better-off classmates were said to have access to this information. In the course of this study, it will be fascinating to see how many of the students in Nigeria have access to online learning platforms.

Mishra (2020) in "Online teaching – learning in higher education during shutdown phase of COVID-19 epidemic" offered a bleak image of the Indian system of education during the lockdown. An investigation of the opinions of educators and students on online education revealed that a pandemic-induced lockdown has caused an educational system-wide breakdown from elementary school to tertiary level. An online teaching-learning process should be linked to change management in order to overcome academic disturbances, he concluded his article.

Khalil, Mansour, and Al Wutayd (2020) in their study titled "The abrupt change to synchronized online learning during the COVID-19 epidemic in Saudi Arabia: A qualitative research analyzing medical students' experiences," criticized the abrupt cessation of educational activities in the Kingdom of Saudi Arabia and the unprepared transition from conventional to digital education. Undergraduate medical students at Qassim University's Unaizah College of Medicine and Medical Sciences were asked about their opinions on the usefulness of synchronous online learning. They determined that thematic content analysis generated four major themes: educational influence, time management, problems encountered, and preference for the future. However, despite the positive reception of the online modality, students reported encountering a number of difficulties during sessions and online exams. These included difficulties with methodological issues as well as issues with their understanding of content and with technical and behavioral issues.

Theoretical Framework: Technological Determinism

Technological Determinism is a reductionist theory, one which does not replace or absorb an older one but reduces it to more basic terms. The term is believed to have been coined by an American Sociologist, Thorstein Veblen, who lived between 1857 and 1929 and the theory itself was believed to be elaborated upon by the German philosopher and economist, Karl Marx (An internet of everything, n.d, para. 40).

This theory presumes that a society's technology drives the development of its social structure and cultural values. Beard (1927, p. 4) provides a metaphorical explanation of the theory by saying that technology marches in seven league boots moving from one revolutionary conquest to the other, tearing down old industries and factories and rapidly flinging up new processes. Echoing this position, Croteau and Hoynes (2003, p. 345) believe that Marx's idea that fast-changing technologies alter human lives is all pervasive.

Technological Determinism is a theory that tries to show that technical developments, media or technology as a whole is the key mover in history and social change (Williams, 2006, p. 2). Technological determinists view

technology as an autonomous force, beyond direct human control, and see technology as the prime cause of social change (Chandler, 1995, para. 4). Growth occasioned by technology is not gradual but in leaps (McCormack, 1994, p. 47). Toffler (1971) graphically lays out the philosophy of the technological determinists after citing copious examples of accelerated economic growth thus: "Behind such prodigious economic facts lies that great, growling engine of change-technology". He goes on to ascertain that while it might not be possible to deny the fact that technology works in tandem with other factors to bring about economic growth, it still remains the major force (p. 25).

There are, however, multiple faces of technological determinism (Bimber, 1990, pp. 333-351). The first two of such faces are the dystopian and utopian opinions on technology, and the third is the instrumentalists. The utopian determinism is the view that technology is a positive force that will eventually uplift humanity, and overtime, eliminate or at least mitigate most, if not all, of the ills afflicting humanity (Kaplan, 1996, p. 287). The works McLuhan (1964) and Toffler (1971) are expressions of utopian determinism. Marshal McLuhan's popular axiom "the medium is the message" (pp. 1-18) and Alvin Toffler's creative work: *Future Shock*, provide some of the best examples of utopian determinism. By McLuhan's axiom, it is meant that the medium through which a particular message is relayed is so powerful as to trigger a chain of mental consequences in the audience which will in turn colour the message or heighten or diminish its credibility.

The dystopian determinists like Ellul (1964) and Orwell (1949) believe that technology is evil and dehumanising and will inevitably lead to the moral, intellectual and physical destruction of human kind.

Taking a mid-position between the utopian and dystopian determinists are the technological instrumentalists who view technology basically as a tool. The instrumentalists (Levinson, 1996, pp. 301-313; Huesemann and Huesemann, 2011, pp. 235-241) often cite the knife to illustrate their position. A knife, just like technology as a whole, is a tool which can be deployed for a good or bad use. To them, therefore, technology remains under human control and the most powerful instrument of change is not technology but social conditions and human aspirations. Change, to the instrumentalists, is gradual or evolutionary and not in leaps (Levinson, 1996, p. 310). Scholars like Mackenzie and Wajeman (1999, pp. 19-21), however, believe that technology can be neutral only if it has never been used before or if people do not know to what use it can be put. Green (2001, p. 15) also holds a similar view that such a society where the use of a technology that has already been invented is not known does not exist. If anyone believes that technology is neutral, she opines, they will be disregarding the cultural and social conditions that technology has produced. Table 1 summarises the positions and prevailing views of the three groups and their relationships to instructional technology.

Table 1: Three Faces of Technological Determinism

Philosophy of Technology	**Philosophical Premise**	**Notable Advocates**	**Examples from IT**
Utopian Determinism	Technology is an inevitable autonomous force that will lead to prosperity and be the salvation of humanity.	Karl Max Marshall McLuhan Alvin Toffer Technology Zealots	RDD Paradigm ID Models Systemic Change
Dystopian Determinism	Technology is an inevitable force that morally corrupts and will lead to the destruction of humanity.	Jacques Ellul George Orwell Unabomber (Theodore J. Kaczynski)	Change Resistors

		Luddite Movement	
Instrumentalism	Technology is under human control and its use can lead to beneficial or disastrous consequences.	Daniel Chandler Paul Levinson Donald Mackenzie	Ernest Burkman

Source: Surry & Farquhar (1997, p. 6)

The first two of the six laws of technology as written by Kranzberg (1986) seem to be capable of laying to rest the controversies arising from the standpoints of the three faces of technology: "Technology is neither good nor bad; nor is it neutral, invention is the mother of necessity" (p. 41).

Hard determinism views technology as the sole panacea to social, economic and physical problems. Technology, independent of other factors, creates the forces required to regulate social activity and its meaning and we only organise ourselves to meet the needs of technology with outcomes that are beyond our control (Ellul, 1964). Another scholar thought to be a hard determinist is Theodore J. Kaczynski (the Unabomber) who claims that material factors are the principal determining factors in the evolution of social systems (Surry and Farquhar, 1997, p. 6). Soft determinism takes a rather passive standpoint of the way technology interacts with socio-political situations. Soft determinism acknowledges the active role people play in the outcome of a situation even though it believes that technology is still the guiding force in our evolution.

Technological Determinism has been adjudged inaccurate in some respects. Murphie and Potts (2002) reject the motion that the relationship between technology and society can be reduced to a simplistic cause-and-effect formula but rather intertwined where technology is not determinant but is a factor that operates and is operated upon in a complex social field (p. 87).

Feenberg (1999, pp. 210-212) argues that technological determinism is not a very well-founded concept and that two of its founding thesis are questionable. He questions the thesis of unilinear progress – the belief that technological progress follows a direct and predictable down to up vertical path with each stage along this path being necessary for progress to occur. He argues that through constructivist studies of technology, it is easy to realise that there is no set path by which development of technologies occurs, rather, several similar technologies might emerge at the same time leading to the availability of multiple choices. These choices are then made and they are non-deterministic in nature. He also questions the thesis of determination by the base which is hinged on the belief that society must adapt itself to the technology introduced into it. He sees this as being incorrect, citing situations such as the governments mandating reforms that will in turn compel the adaptation of technology and not the other way round.

Mackenzie and Wajeman (1999) believe that, through the influence of culture, politics, economic arrangement and regulatory mechanisms, it is the society that strongly, if not entirely, shapes the path of innovation and its social consequences and not technology (p. 21). The view of Schroeder (2018) sums it: "Users don't just passively assume technology, but actively transform it" (p. 54). This is especially true of the book publishing industry in Nigeria where the availability of the pieces of technology for electronic acquisition and processing of scripts does not necessarily guarantee use or prohibit the deployment of the traditional pen and paper method. The extent of use also depends on a number of factors and this negates the idea of automatic and wholesale adoption. It is true also that society can mandate reforms by insisting on top-notch books and their timely arrival. This will in turn compel the use of technology in the editorial processes of book production.

Methodology

The survey design was adopted. The data gathering instrument designed for this study is the questionnaire. The questionnaire was divided into two parts. The first part was

expected to elicit demographic information from the respondents to provide the background for discussion. The second part contained specific items to answer the research questions. Most of the questions were close-ended with four options provided against each question for the respondent to choose from. The students and instructors of biology at private schools in the Ado-Odo Ota Local Government Area of Ogun State were the sample of this study. The largest LGA in Ogun State, Ado-Odo Ota, was chosen for the research because of its prominence. Ado Odo Ota Local Government Area covers 234,647 square kilometers whereas Ifo Local Government Area covers 215,055 square kilometers. Five senior secondary schools were selected using the convenience sampling approach.

Results

The tables below show the results:

RQ1: To what extent was the scheme of work covered by virtual teaching and learning during the lockdown period?

Table 1: Volume of scheme of work covered

Above Average		**Below Average**	
Frequency	Percentage	Frequency	Percentage
190	63.3	110	36.7

63.3% of those polled believed that more than average of the set curriculum was covered while 36.7% chose below average. This shows that virtual teaching and learning covered an above average portion of the plan of work during the lockdown time. The researcher checked the contents of work done against the curriculum and was able to ascertain that more than average work was actually done. The 36.7 percent that opted for below average must have factored in their own frequency of non-participation in the online lessons.

RQ2: What is the level of students' participation in the virtual teaching classes of Biology during the lockdown period?

Table 2: Level of students' participation

High		**Low**	
Frequency	Percentage	Frequency	Percentage
199	66.3	101	33.7

Only 66.3 percent of respondents believed their participation level was high while 33.7 percent admitted theirs was low. In other words, throughout the lockdown, there was a high degree of student involvement in Biology's virtual teaching sessions.

RQ3: What is the perception of students on the effectiveness of virtual teaching of Biology during the lockdown period?

Table 3: Perception of students on effectiveness

Excellent/Good		**Fair/Poor**	
Frequency	Percentage	Frequency	Percentage
198	66.0	102	34

From Table 4. one can deduce that 66% of the respondents picked the excellent and good option while the remaining 34% selected the fair and poor option. This means that the majority of students were of the opinion that the virtual teaching of Biology was effective during the lockdown period.

RQ4: What is the level of students' accessibility to online platforms and internet during the virtual lessons on Biology?

Table 4: Students' Accessibility to online platforms and the Internet for the virtual lessons

High		**Low**	
Frequency	Percentage	Frequency	Percentage
203	67.7	97	32.3

From Table 5, one can see that there is a difference in the opinion of respondents on their accessibility to online platforms and internet for teaching Biology. 67.7% of the respondents High while the remaining 32.3% Low. This implies that majority respondents had access to online platforms and internet for teaching Biology.

Summary of Findings

The findings of this study are as follows:

1. Virtual lessons on Biology in Ado Odo Ota Local Government Area of Ogun State were above average of the requirements of the stipulated curriculum.
2. Majority of the respondents (66.3%) believed that their participation in the virtual lessons was high while the remaining 32.7 believed it was low.
3. Majority of the students (66%) believed that the virtual lessons on Biology during the lockdown were effective while the remaining 34% believed they were just fair or poor.
4. Majority of students (67.7%) rated their accessibility to online platforms and the Internet as being high while the remaining 32.3% said it was low.

Discussion of Findings

From the various findings listed above, it is clear that the online lessons on Biology in Ogun state were moderately successful during the COVID-19 lockdown. It is also clear, however, that a lower percentage of the target audience did not get the full benefit of the programme due to low participation occasioned by contingencies and low accessibility resulting from low expertise and lack of required equipment.

The study therefore recommends that:

1. Teachers and students alike should be trained in the use of educational technologies for a full deployment of same either exclusively during emergencies or in blended mode.
2. There should be an improvement in the supply of internet and electricity to remove them as obstacles to the smooth running of online lessons.
3. Teachers and students should be encouraged to adopt technology and stop being conservative especially where the use of the computer and the cell phone is concerned.

Conclusion

COVID-19 pandemic has exposed the Nigerian stakeholders in education to the advantages of online lessons and adoption of technologies for educational purposes. To perfect this teaching and learning mode, infrastructure has to be improved upon and potential players have to undergo constant and relevant training in technology use.

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