Influence of Virtual Learning on Secondary School Students' Academic Performance during the Pandemic in Nigeria

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Abstract

Virtual learning involves instructional delivery using all available online technological tools, thereby bridging the barriers of distance and time. Learners in this case have the opportunity to learn curriculum-based contents remotely, which made teaching and learning activities possible during the pandemic era. However, learners in the developing world are still facing certain challenges around the implementation of such methods. Hence, this study investigated the influence of virtual learning on secondary school students' academic performance during the pandemic era in Ilorin south by examining the virtual learning tool(s) that was utilized for learning during the pandemic; learners' attitude and academic performance. 419 respondents participated in the descriptive study design while the data was being gathered. The results showed that Moodle and other virtual learning technologies were utilized for instruction. The academic performance of secondary school students was positively impacted by virtual learning environments. The study came to the conclusion that virtual learning could encourage educational institutions to adopt a 21st-century curriculum. When virtual learning is incorporated into the classroom, gender has no discernible impact on students' academic achievement. Given that virtual learning platforms help students overcome time and distance limitations, it was suggested that school pupils receive training in their use.

Keywords: academic performance, internet, pandemic, virtual learning

1. Introduction

Education is the delivery of knowledge, skills and information from teachers to students. Teachers in most cases are given discretion in selecting appropriate modes of delivery, which can contribute to nation-building. The significance of education, particularly in a developing country like Nigeria, has increased in order to catch up with the developed world in areas of global competitiveness and best practice. This is because 21st century education aims to make learners global citizens as the world grows into innovation in teaching practices, leveraging the rapid development in Information Communication Technologies (ICT).

ICT have become one of the basic building blocks of modern society. Several countries of the world now use ICT in teaching the mastery of basic skills and concepts. In addition, organizations, experts and practitioners in the education sector increasingly incorporate ICT in supporting educational improvements and reforms via e-learning, blended learning and distance learning approaches.

Blurton (1999) asserted that it is imperative for schools to incorporate a diverse set of ICT into the curriculum in ways that communicate, create, disseminate, store, and manage information in order to be a part of the 21st century world. When teachers are digitally literate and trained to use ICT, these approaches can lead to higher order thinking skills, provide creative and individualized options for students to express their understandings, and leave students better prepared to deal with ongoing technological changes in society and the workplace. As a result of the global pandemic caused by COVID-19, secondary education has been affected around the world, particularly in Nigeria, wherein mid-March of year 2019 the state of alarm was declared, with the state and federal academic authorities decreeing that, for the remainder of the 2019/2020 academic year, teaching and learning processes had to be carried out using online technology.

Although teaching and learning processes in education were already in continuous evolution in relation to the influence of emerging technologies leading to incorporation of newer methodologies, the truth is that due to the confinement caused by the coronavirus, it seems the full use of ICTs in methodological adaptation has been enforced and its inclusion accelerated, as a test of organizational agility (Wu, 2020).

Monroy Garcia *et al.* (2020) identified that education faced certain challenges in the process of transforming learning models to satisfy new demands. In its continuous scientific and pedagogical actualization, secondary education is the processing of mastering new methodologies using ICTs, specifically the internet, to achieve instructional processes which lead to improvements in digital competence among teachers and students. These allowed teachers and students to hold virtual class sessions thereby solving the barriers of distance and time caused by the COVID-19 pandemic.

Through these means, virtual learning gained more popularity among secondary schools as it became prominent among stakeholders and was fully adopted for learning experiences. This also led to enhanced utilization of internet-enabled computers and smartphones, among others, within and outside the facilities of educational organizations.

In addition, the pandemic influenced activities at primary, secondary and tertiary levels on the modus operandi which made the need for innovative solutions to optimize educational endeavors paramount. Thereby, making educational institutions become proactive in embracing an online education system through the introduction of virtual classes is the best solution for the continuation of learning processes (Mishra, Gupta & Shree, 2020). Online video technologies such as Zoom, Google Meet, Slack and Edmodo had to be incorporated for virtual class sessions. A great deal was achieved by adequate provision of these technologies. This was corroborated by Surkhali and Garbuja (2020), who observed that with the availability of technology, online learning can be advantageous and effective in numerous ways since they can offer a great deal of content, interactions, flexibilities and reinforcements. Learners can keep themselves engaged from any place using devices such as mobile phone, laptop or computer at their convenience. In general, online learning was beneficial in accelerating learning and reinforced students and teachers in the comfort of home during the time of global crisis.

People all throughout the world were affected by the COVID-19 lockdown. Despite the drawbacks, this situation provided fresh experiences and insights, as well as propelling educational advancements forward like never before. Instructors of all topics and levels of education were immediately relocated to a virtual environment. People all throughout the world were affected by the COVID-19 lockdown. Despite the drawbacks, this situation provided fresh experiences and insights, as well as propelling educational advancements forward like never before. Within a few days, something that appeared unreal became a universal reality.

In the current dispensation, educators have realized that traditional educational techniques no longer equip students with all of the abilities needed in work places. The 21st century is driven by a competence-based content that will enable learners to be able to become self-sustaining. The pandemic, coming with its many challenges, led to a massive shift in the education sector whereby students and teachers had to leverage available technology tools to achieve educational objectives by shifting from physical classroom settings to virtual learning environments.

Studies like Chick (2020) among others claimed that the use of virtual learning has tremendously influenced the academic performance of student during the pandemic era as well as enhancement of teaching and learning processes. Huber and Helm (2020) stated that the concept of virtual learning was brought out vividly by many researchers in reaction to school lockdowns confronting teachers, students and parents with an entirely new situation, which has given birth to a new educational form. You can sit in the comfort of your own environment and listen to lectures. You can participate in the lab exercises, ask questions and effectively interact with the teacher as if the action taking place in a conventional classroom but it is done with the convenience of technological gadgets connecting to a desktop that has an internet and phone connection.

According to a review performed for this study, virtual learning, which became popular during the pandemic, affected student academic performance from a gender perspective. Having said that, if properly applied in the teaching of the subject, it would enhance the teaching and learning posture of the teacher and the secondary school student. However, this inquiry will look into how virtual learning platforms affected junior secondary school students' academic performance during the pandemic era and what might be done to make virtual learning more appealing in the future. The affected regions should practice the use of educational technologies at scale and install ICT infrastructures (Chick, 2020). Also, schools should enable the students to access educational websites and applications without charge because the resources are zero-rated, in other words when the student access educational websites and applications they do not have to pay data charges, using universal service funds to scale internet access for students, teachers, and societies. Access to online learning content from free open educational resources provided by non-profit publishers and private companies should also be considered, as well as increasing the accessibility of educational resources on mobile phones. Parents should keep track of their children and avoid bad practices in mobile learning. They should use the radio and television teaching approach, particularly where students cannot access other technologies at home. It would be better to install ICT infrastructure and educational technologies to reach students in rural and the most challenging areas (Tiruneh, 2020), while using virtual classes to promote the progress and educational achievement of students. This helps to know about what works, and what does not when it comes to the virtual class.

In spite of the benefits of ICTs and its infiltration into all human endeavours, including health and education among others, Nigerian university systems still lack the prowess to adopt fully the use of virtual learning platforms for learning. To this end, as in the studies of Wu (2020), Monroy Garcia *et al*, (2020), Mishra *et al.*, 2020), Huber and Helm, (2020) and Chick (2020) which established that the use of virtual learning has tremendously influenced the academic performance of students. However, looking at available ICT infrastructures, educational technologies had been greatly affected by various issues. It is on this note that the study seeks to examine the influence of virtual learning on secondary school students' academic performance during the pandemic in Nigeria

1.1. Purpose

The study specifically examined:

i. virtual learning technologies utilized during for teaching and learning during COVID-19;
ii. attitude towards the use of virtual learning technologies during the pandemic; and
iii. students' academic performance having utilized virtual learning technologies.

Hypothesis one

The following

H_{01} There is no significant difference between male and female secondary school students' academic performance based on the influence of Virtual learning.

2. Literature Review

2.1. COVID-19 and Education

The accelerated expansion of the pandemic resulted in strict steps taken to shut down schools and universities across the country. This affected the entirety of the populace, including health workers and elders also leading to a delay in the reopening of schools and a pause in academic activities including examinations. The shift from face-to-face class to virtual class had a serious impact on assessments and evaluation. This was dependent on the course nature and the assessment type applying assessments and evaluation online is a challenging task which made teachers change their assessment types to fit the

online mode. Another is on monitoring students in order to curb students from cheating (Basilaia & Kvavadze, 2020). Additionally, laboratory tests, practical tests, and performance tests are impossible to conduct online. Moreover, students who do not have internet access will suffer to take assessments and evaluations (Sahu, 2020). Even for students, teachers, and parents in countries with reliable ICT infrastructure and internet access, the rapid transition to online learning has been challenging. Students, parents, and teachers also require training to deliver online learning effectively, but such support is particularly limited in developing countries.

Everyone has a right to education which is the best weapon in terms of national policy to enhance skills. Human rights organizations emphasize creating uninterrupted schooling activities in a bid to protect children's right to education by leveraging technological equipment. This led nations to design best policies to maintain the continuity of education and has since then become part of a nation's education system. The school closure brought difficulties for students, families, and teachers of developing countries. Students from poor families with lower educational levels and children with poor learning motivation suffered most during COVID-19. The children may have higher dependence than younger students on parents and they need guidance in their learning process, internet access, and usage of digital devices and applications (Tzifopoulos, 2020). Furthermore, poor and digitally-illiterate families' children are further suffering (Tiruneh, 2020). There were already inequalities before coronavirus in access to quality education between students in urban and rural areas, and students from families with higher and lower socioeconomic status. Education inequalities are a threat to education system continuity at a time of unexpected educational system closures. Since there are a limited number of computers, internet access, mobile network access, and lack of ICT trained teachers in developing countries (O'Hagan, 2020), even if online teaching and learning are a good opportunity to continue education during the pandemic it is challenging for developing countries (Sun, Tang & Zuo, 2020).

However, more expertise and competencies in the area of ICT management are required to guarantee high-quality education. Regarding the purpose of such technology, researchers and educators concur by highlighting the necessity of a shift from a teacher-centered learning model to a student-centric learning strategy where learners can set their own goals and track their progress. The response to the coronavirus has demonstrated how technology can help transform how we teach and learn. But the push for change started long before the pandemic struck, and it went on even after the threat subsides. For years, policymakers have been exploring new transformative approaches to education in terms of having online lessons.

As lockdowns eased and schools started to reopen in some places across our region, schools saw the future of education as technology usage took centre stage. New data-based technologies are opening up ways to transform practices, structures, and even cultures in schools. Real-time data, innovations like artificial intelligence (AI), and a range of new devices and tools have transformed the roles and relationships of students, teachers, and parents. Students have been empowered to learn for themselves in flexible individually and collaboratively ways, within and outside physical classrooms. Teachers have access to individualized real-time data on students' progress so as to offer appropriate support to learners.

According to a study by Di Pietro *et al.* (2020), the COVID-19 pandemic affected schools, students, teachers, and parents which increased social inequalities in schools and society at large. Students from more advantaged parents attend schools with better digital infrastructure and teachers have higher levels of digital technology skills. While some schools were better equipped in digital technology and educational resources. The report showed a significant difference between private and public schools in technology and educational resources with private schools having better technology. Students' have not equal access to digital technology and educational materials. The physical school closure also birthed implementation of distance education.

Some challenges spring up as result of the mode of studying. The paper posited that studying from home commonly requires greater self-discipline and motivation to follow through online lessons, particularly in the earlier period when students are getting used to the new system, which might affect the feeling

of an increase in study obligations. On the other hand, lecturers unfamiliar with the new mode of delivery could overload their students with study materials and assignments. In the study, students were asked to compare their workload before the onsite classes were cancelled with the new circumstances after the lockdown. Although online learning has many difficulties and weaknesses, but there was no choice but to prevent the spread of COVID-19. Studying online had to be encouraged. Here, teachers and students were equally challenged in creating an active online learning environment. In Nigeria, some of the most important challenges are the stability of the internet network, inadequate devices or computers, inaccessibility to applications, and issues around sustainability.

These aforementioned challenges are prominent in developing countries like Nigeria such as lack of the necessary ICT infrastructures. However, virtual learning is a solution to achieving an uninterrupted educational system. Access to internet enabled computers is basic to successful virtual or online learning but not guaranteed for all students in developing countries (Zhang, 2020).

The pandemic forced people to spend more time with themselves than ever, which is called the new normal. Maru (2020) declared that the emergence of COVID-19 as a global pandemic with its social and physical distancing consequence had affected educational practices. The COVID-19 pandemic has forced educators to convert their lessons to online versions in real-time. There were many difficulties faced in the global pandemic, so it became something interesting for researchers to research and analyze, especially in online learning. Previous studies have also researched and provided statements relevant to online learning and pandemics. Online learning means a learning process on a virtual basis such as the internet. Online learning is learning that is a trend amid a pandemic. There are lots of media and applications offered to support online learning. The massive spread of the Coronavirus in various countries forced us to see that the world is changing. We can see the changes in technology, economy, politics, and education amid the crisis due to Covid-19 (Rondonuwu, 2022). These changes require us to be prepared and respond with attitudes and actions while constantly learning new things.

The COVID19 pandemic has forced many educators to need urgently to teach online, which provides an opportunity to reshape education, teacher education and educational institutions declared by Cucinotta & Vanelli (2020). In this case, education cannot stop the process of transforming knowledge and academic activities. Because many students and teachers cannot carry out the online teaching and learning process, a support system such as technology requires high technology. In big cities, high technology capacity is not a big challenge, but in areas with limited technology and network capacity, it will be a big challenge for teachers in the learning process. Since the emergence of the coronavirus outbreak, various problems have arisen, because the virus does not only attack humans but also has an impact on the world economy and affects social life in various countries.

2.2. Theoretical Framework

The advent of the internet and online platforms provided access to a lot of views and opinions of a wide range of people from around the world. This also provides opportunities in every sector with education not an exemption. Instructors and learners have the avenue to send and receive curriculum-based contents irrespective of time and distance. This is further ensured by the connectivism theory of learning as regards the arousing interests of learning towards the use technologies for learning. This was discussed extensively in the study of Kop and Hill (2008) leading to provision of answers to questions specifically on a new theory that encompasses new developments in digital technology be more appropriate, and would it be suitable for other aspects of learning, including in the traditional class room, in distance education and e-learning? It was further established that connectivism theory has basic elements that match the 21st century education demands.

3. **Method**

This study adopted a descriptive survey design of the survey type. A researcher-designed questionnaire and validated was used to gather data. The instrument was piloted in a location outside the research

area. Cronbach alpha was used for a reliability test and a 0.93 internal consistency result indicated valid use of the questionnaire.

Senior secondary students formed the population, with an estimated total of 2,498 across 72 senior secondary schools in Ilorin South. A purposive sampling technique was used to select schools based on the availability of internet enabled computer laboratories while a random sampling technique was used to acquire 419 respondents. The data collected was analyzed using SPSS 23.0 using descriptive statistical tools such as frequency counts, percentages, and means and these were used to answer research questions.

4. **Data Analysis**

The data collected were analyzed to answer the research questions and to test the research hypothesis respectively. The Four hundred and nineteen (419) copies of questionnaire that were administered were all retrieved. This gave a response return rate of 100%.

4.1. Analysis of Demographic Information

Table 1: Gender Distribution of the Respondents

Gender	Frequency	Percent (%)
Male	181	43.0
Female	238	57.0
Total	**419**	**100.0**

From table 1, result shows that the male respondents are 43.0% (181) while the female respondents are 57.0% (238) which makes the total number of respondents to be 419. The result implies that female respondents are more than the male respondents.

4.2. Results

This part presents the result of the analysis on the influence of virtual learning on undergraduate students' performance in University of Ilorin, Kwara state, Nigeria.

P1: Learning tool(s) that was utilized during the process of teaching and learning?

Table 2: Mean Score of Learners' Utilization of Virtual Learning.

S/N	Items	Mean
1	Moodle	3.49
2	Edmodo	3.45
3	Zoom	3.36
4	Whatsapp	3.26
5	Microsoft Teams	3.21
6	Google Classroom	3.14
7	Blackboard Learn	2.86
8	SkyPrep	1.60
9	ATutor	1.47
10	Canvas	1.39

Grand Mean: 2.72.

Table 2 showed the response on the virtual learning tool(s) that was utilized during the process of learning. As reflected in the table, majority of the respondents Moodle, followed by Edmodo and least used Canvas. This inferred that the virtual learning tool(s) that was utilized the most during the process of learning are Moodle, Edmodo, Zoom, WhatsApp, Microsoft Teams, Google Classroom and Blackboard Learn.

P2: Learners' attitude towards the use of virtual learning during the pandemic?

Table 3: Mean Score of Learners' Attitude towards the Use of Virtual Learning

S/N	Items	Mean
1	Using virtual learning tools can make understanding of a concept faster	3.52
2	Using virtual learning tools, I can freely interact with my instructor	3.38
3	Virtual learning tools help me in keeping good records of my lectures	3.21
4	Using virtual learning tools can make learning easier	3.16
5	Virtual learning tools make learning accessible and adaptive	3.12
6	Using virtual learning tools can improve my academic performance	3.12
7	Virtual learning tools help me to prepare for my tests and examinations	3.08
8	Misconceptions on learning concepts can easily be corrected using virtual learning tools	3.08
9	Marking attendance on virtual learning tools platforms is easy for me	3.04
10	Using virtual learning tools, I can freely interact with my course mates.	2.65

Grand Mean: 3.14

Table 3 showed the response on the learners' attitude towards the use of virtual learning during the pandemic. As reflected in the table, all the items were agreed upon by the respondents with grand mean score approximately 3.14 which was above the benchmark mean of 2.5. Hence, there is positive learners' attitude towards the use of virtual learning during the pandemic.

P3: Influence of VLPs on the academic performances of learners during the pandemic

Table 4: Mean Score of the Influence of Virtual Learning on the Academic Performance of Learners

S/N	Items	Mean
1	Virtual learning tools help to improve my focus	3.66
2	Virtual learning tools help me to study better on my own	3.56
3	Virtual learning tools help to improve my study motivation	3.40
4	Virtual learning tools help me perform better in my examination	3.37
5	Virtual learning tools help me increase my studying hours	3.19

Grand Mean: 3.44

Table 4 showed the response on the academic performances of learners through the usage of virtual learning during the pandemic. As reflected in the table, all the items were agreed upon by the respondents with grand mean score approximately 3.44 which was above the benchmark mean of 2.5. Hence, the academic performances of learners through the usage of virtual learning during the pandemic

enables them to improve their study motivation, perform better in examination, and increases their studying hours.

Hypothesis Testing

Hypothesis One: There is no significant difference between male and female secondary school students' academic performance based on the influence of Virtual learning.

H_1: Mean, Standard Deviation and t-value on the influence of virtual learning on undergraduates' academic performance based on gender

Gender	No	Mean	SD	Df	Cal .t-value	Crit. t-value	P-value
Male	181	17.53	4.40	93	0.32	1.96	0.74
Female	238	17.19	5.55				

As shown, the calculated t-value was 0.32 while the critical t-value is 1.96 (0.00 < 0.05 level of significance). Since the calculated t-value is less than the critical value, the null hypothesis was not rejected. This implies gender has no significant influence on the academic performance of students when using virtual. It further means that both male and female students have the potential to excel when virtual learning is implemented in school.

4.3. Summary of Findings

The following are the findings from this research

- The findings revealed that the virtual learning tool(s) that were utilized during the process of teaching and learning are Moodle, Edmodo, Zoom, Whatsapp, Microsoft Teams, Google Classroom and Blackboard Learn;
- The findings indicated that there is positive learners' attitude towards the use of virtual learning during the pandemic;
- The study found that, regardless of gender, students' academic achievement during the epidemic improved their study motivation, helped them score better on exams, and increased the amount of time they spent studying.

5. Discussion

The results of this study revealed that the virtual learning tool(s) that were utilized during the process of teaching and learning are Moodle, Edmodo, Zoom, Whatsapp, Microsoft Teams, Google Classroom and Blackboard Learn. This corroborated the study of Zhu and Liu (2020) that virtual learning is a good opportunity for teachers, students, and families to develop actions such as introducing online learning platforms, use Blackboard, Zoom, TronClass, Classin, and Wechat group platforms, and conduct online training, and collect information about all courses. Online teaching and learning are not a new mode of delivery for developed countries and some developing countries. However, shifting from face-to-face class to online learning was challenging for teachers, students, families, and the countries government due to lack of finance, skill, ICT infrastructure, internet access, and educational resources (Basilaia & Kvavadze, 2020).

The result of the finding indicated that there is positive learners' attitude towards the use of virtual learning during the pandemic. This is in line with the study from Abidoye (2015) that technologies improve the academic performance of students and get them interested in school subjects. Virtual learning enables learning to take place according to the elements present in the learning, based on a continuous scale ranging from the elements specified in the to the elements emerging from use. (Zitter

et al., 2011). All aforementioned literature is in agreement with the fact the virtual learning is a panacea to creating better learning condition for learners and that, therefore, should be encouraged.

Regarding gender, this study's findings are consistent with those of Chick (2020) and Huber and Helm (2020), who found that the use of virtual learning significantly improved teaching and learning processes while also having a significant impact on students' academic performance during the pandemic. These are all better for women. Pupils might participate in lab exercises, ask questions, and have productive interactions with lecturers while lounging in their own comfortable surroundings and listening to lectures.

6. Conclusion and Implication

We may conclude that, among other virtual learning platforms, Moodle, Edmodo, and Zoom were used for instruction during the pandemic. Students demonstrated a good attitude and the ability to learn remotely, as seen by their improved performance. Furthermore, virtual learning has the power to encourage schools to adopt a 21st-century curriculum. This suggests that virtual learning improves students' academic performance. Both male and female students benefitted from the increased quality and efficiency of teaching and learning brought about by the use of computers and internet technology.

6.1. Limitations of the Study

The limitations in this study are pointers to the fact that:

- This study only focused on influence of virtual learning platforms on academic performance of secondary school students;
- The sample for this study was focused primarily on secondary school students;
- Only a public secondary school students within the north central region of Nigeria was selected for the conduct of this research, so results may not be generalizable to the wider educational system and
- This study only considered gender, as a moderating variable, other researchers could consider variable like age of students, level of academics among others.

6.2. Suggestions for Further Studies

Based on the outcomes of this study, the following were suggested for future research on the influence of virtual learning on students' performance;

- Secondary school students' self-efficacy and competence on the use of virtual learning platforms
- Undergraduates at Universities, monotechnics, polytechnics and colleges of education can also be researched
- Secondary school students in other regions of Nigeria most especially private universities can also be investigated.

6.3. Recommendations

It is therefore recommended that:

- The government (at all levels, federal, state and local) should provide adequate ICT facilities in secondary schools. However, this software should be affordable or be free for school use. Through this, the problem of insufficient computers and facilities will be minimized and
- Students should be trained on how to use the virtual learning technologies provided effectively.

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