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ONLINE TEACHING AND LEARNING OF SCIENCE EDUCATION IN TURBULENT TIMES: IMPLICATION FOR STUDENTS OF RURAL AND URBAN RESIDENCE

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Abstract

The study looked into the experiences of university science students from five Nigerian universities who are rural and urban residence during the turbulent times. A descriptive survey research design was used in this study. The technique of purposeful sampling was used. The sample size was 500 students. A self-created questionnaire was used to collect data. Using the Pearson moment correlation of test-retest before eventually administering, the reliability value was 0.75. Findings revealed that there is inequality in teaching and learning between students in urban and rural areas. They were not exposed to the same conditions. Rural residential students were deprived of teaching and learning. Sequel to the findings, it is recommended that, for future turbulence, Media Technology should be used to get good coverage for the students in addition to any other ICT Technologies. Government should train personnel and send them to our rural areas as trainers to train the rural dwellers. Teachers should constantly train the students in schools on how to develop their digital skills etc.

Keywords: *T*urbulent Times, Technology, Science Education, Rural, Urban, Online Education.

INTRODUCTION

Any nation's ability to prosper economically over time depends on its level of education. This is due to the fact that it can provide the trained labor that any nation requires for prosperity. The process of teaching or learning, particularly in a school or college, or the knowledge you acquire from your home, country, teacher training institution, etc., is defined by Cambridge Dictionary as education. However, the World Bank characterizes it as a potent development driver and one of the tools for enhancing agriculture, health, gender equality, peace, and stability. Given that education equips people with the knowledge and skills they need, the United Nations considers a world that is skillful, knowledgeable, peaceful, and affluent to be the result of providing quality education to all citizens. Science education, on the other hand, is the teaching and learning of science to students in schools, who may be in the primary, secondary, or university levels. Biology, chemistry, and physics are the three subfields that make up science education. Science education aims to inspire students to study science, educate them for careers in science or fields related to science, Boris (2016). Work in science process, science content, and certain teaching pedagogy are all included in science education. It is a crucial topic that influences and shapes the personality of contemporary society

Science education can also be seen of as a method of instructing or training people, particularly within the school system, to increase their environmental knowledge and to enhance their skills in systematic inquiry as well as their innate altitudinal trait, Humbe and Pembe (2009) It is a requirement for technological advancement and entails, in addition to academic knowledge and

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concepts, the study of an in-depth science, Humbe and Pember (2009). In a similar vein, Badmus & Omosewo (2018) noted that science and technology play important roles in national development all over the world and that science education is essential for developing nations to compete favorably with developed nations. Nigeria has not been able to live up to expectations in terms of the human resources required for transformation into national prosperity, notwithstanding the function and significance of science education. This is so disturbing, especially when one looks at what is happening in our rural areas, even at the urban centers where we have most of our schools (universities), Boris (2016). We still found most of our scientific equipment's and gadgets to be in obsolete conditions. A lot of challenges are faced in science education in Nigeria. Any society needs the government and other stakeholders to be sufficiently committed for it to develop. Therefore, without adequate science education, Africa, and particularly Nigeria, may not experience substantial technological growth (Badmus and Omosewo, 2008).

Education requires appropriate planning, teacher learning, curriculum adaptation among other conditions that were impossible to meet in the situation educational systems met when faced with the lock-downs, Boris (2016). Despite all the challenges and limited resources, government schools and teachers rose to the occasion, quickly implementing online learning. There was a lack of research concerning online learning in the early years. On the other hand, learning and teaching go hand in hand. One definition of teaching is the dissemination of knowledge through interaction with students to help them comprehend and apply ideas, concepts, and procedures. While learning is a process that results in change as a result of experience and increases the potential for better performance and future learning, it also encompasses design, material selection, delivery, assessment, and reflection. The learner's behavior, attitude, and level of knowledge may all change. The goal of scientific education in schools is to generate scientists who can create the technical innovations that make daily life more convenient and comfortable. Thus Science teaching need serious attention most especially during turbulent times. It is a well-established assumption that no pedagogical approach can replace the peak position of formal education due to the fact that teacher taught direct interaction but the aftermath of COVID–19 crisis, online calculation became a pedagogical shift from traditional to the modern approach of teaching – learning from classroom to zoom etc.

Schools were closed nationwide in 190 countries with more than 90% of the world's students affected by the closures (UNESCO, 2020). The move to remote learning environments was unfamiliar to expose wide gaps in access to technology (Kulifield et al 2020). Boris (2021) . In Nigeria, with a population of 1.3 billion, approximately 16% of the world's population, the first case COVID - 19 pandemic was reported in Egypt on February 14, 2020, involving a Chinese national, and the first case was reported in Sub-Saharan Africa in February 27, 2020, involving an Ethiopian citizen. On March 18, 2020, the Nigerian government imposed a travel ban on 13 countries considered high risk for the spread of covid-19, with more than 1000 confirmed cases as of March 18, 2020 (Boris, 2021). With the community spreading of the Covid-19 pandemic becoming a major issue in Nigeria, the government of Nigeria declared a total lockdown of 3 states; Lagos State, Ogun State and Abuja State for 5 weeks from March 23rd to May 4, 2020.

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In order to further contain the spread of Covid-19, the Nigeria governor's forum announced an interstate lockdown as part of the curbing measures. As the pandemic spread, the government declared primary, secondary and tertiary institutions closed and restricted the number of individuals and various gatherings to not more than 50 persons, which was later reduced to 20-10 persons before the final closure. This led to online learning. Since the onset of the COVID pandemic, governments around the world have had to take extreme measures to contain the spread of the virus. These measures have included restricting the movement of people, imposing city-wide lockdowns (Koh, 2020) and closing schools and universities. With the closure of educational institutions, the transition from face-to-face learning methods to either online or distance learning methods to ensure the continued delivery of learning has been accelerated (Marinoni, Land & Jensen 2020; Crawford, Butler-Henderson, Rudolph, Malkawi, Glowatz, Burton, Magni, & Lam, 2020). According to the International Association of University (2022) and UNESCO (2021) estimates that 60% of global students have been impacted by the nationwide closure of educational institutions. The adoption of online learning methods has been particularly difficult for developing countries, where financial constraints, accessibility and connectivity issues impede the transition to online learning. However, despite the inherent challenges, educators and students have been able to explore more flexible learning options with blended method (synchronous) as well as asynchronous method (Marinoni et al, 2020).

The lessons learned from this transition process will help educational institutions around the world to be more resilient and better prepared to face such a crisis in the future (2017), especially in terms of rural and urban development where various student lived, this makes the study unique (location of students' residence), which makes this research unique. This is because during these turbulent times, students are not in the schools they are found at their different homes located in rural or urban centres. Because of this sudden, careful consideration had to be given to whether students had equal access to online education during this pandemic. It was implemented without proper planning and deliberation with shortcomings. A lot of researchers have used "emerging remote teaching" to refer to the education that was provided during this pandemic. Prior to this, several studies have looked at the various aspects of E-learning and The information and communication technology (ICT) infrastructure that underpins online education is not the same in developed as it is in developing countries (Iqbal, Ashiq. Rehman, Rashid, & Taylyab, 2022). To better understand and generalize research in this field, further research should be conducted to understand what the situation is with the students living in rural and urban residential areas. A lot of studies have been published in the literature on online education during Nigeria's pandemic, but most of them focus on academic achievements or specific disciplines. This study seeks to fill the gaps in this literature. This study is important because no such research has been conducted to analyses online education provision and students' satisfaction with their residential location and online education access in Nigeria.

Teachers and students find themselves in the situation where they felt embarrassed in the digital academic experience. Online teaching learning became a massive challenge to deal with. A vacuum must not be created most especially when the turbulent times is lasting for so long. It

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also demands equality between students of rural and urban residents. In times like this, for continuity of teaching and learning in order to enhance a sustainable technological development in Nigeria teachers need to update themselves about best practices most especially during turbulent times in case of future occurrences.

Tubulent Times In Nigeria (Covid-19 and insecurity)

The two major ones that pose massive challenges to Educational system in Nigeria was covid-19 and insecurity. The research is concern about the major challenge which was COVID-19. Turbulent times is a time with a lot of changes, confusion and disorder. Year 2020 to 2021 in Nigeria can actually be described as turbulent times with emergence of Covid-19, insecurity (insurgency, terrorism, Banditry, kidnapping etc. which actually led to poverty, corruption, closing of schools etc.). All these had posed as the latest challenges to education in Nigeria. Weiner et al (2020) stated that our institutions had to close due to a dilemma of the need to make hasty decisions in order to protect the students, particularly during the COVID-19. The global educational system has also faced a tremendous challenges as a result of this. Government had to strike a balance between eliminating uncertainty for schools and, on the other, swiftly developing and releasing new methods of teaching and learning.

Schools had to learn to make quick decisions about how to protect pupils while also adapting to conditions that were continuously changing, which presented a challenge to educational institutions. 90% of the world's pupils were impacted by the closure of 190 national schools in April 2020 alone (UNESCO 2020). The Covid-19 problem really gave instructors a rare opportunity to show initiative, ingenuity, and leadership. The pandemic has forced teachers to reevaluate their methods of instruction and leadership. It therefore became an alternative to traditional learning. Some of the challenges faced by teachers during this turbulent times were;

1. There was no adequate preparation from the part of the teachers, hence low teacher's responsiveness and flexibility to the turbulent times.
2. Nigerian government was busy caring for how to rescue the citizenry.
3. There was no coverage and steadfastness on the part of teachers.
4. There was chaos and confusion in the atmosphere.
5. On the part of the students, no one can actually say all the students had the same experience with the dramatic shift in education. (Boris, 2021). This classroom teaching suddenly became unavailable forcing transition to online remote learning. Globally, this was done by trial and error. There was little or no preparation to accommodate digital learning and the pandemic exposed the shortcomings, inadequacies and unpreparedness of our higher institution to shift to online based learning (Anifowose, Aborade, Ayodele, Iretiayo and David, 2020; Boris 2021).

Online Teaching and Learning

While online learning instructions are carried out using a variety of electronic devices, online teaching is handled using a variety of learning management systems or learning platforms. It

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is also known as remote learning. The online teaching and learning here was done through the use of Android phone. Teaching over Zoom was not common during these period in Nigeria but it was later used by some schools, either through Zoom or WhatsApp or otherwise there were plenty of downsides (Boris 2020). Thus when, where and how we teach varied from our typical patterns and require a different mixture of pedagogies and teachers had to be adequately prepared. Teachers worked in team and individually to find solutions to new learning to ensure that learning can continue in a meaningful way.

E-learning means using information on computer technologies and systems in order to build and design learning experiences, (Horlon, 2006). Also (Engelbrecht,2005) describes e-learning as a concept that uses electronics media represented by the internet, CDs, mobile phones or even television in order to provide distance learning and teaching, whereas (Allo, 2020) defines it as transferring knowledge and education by utilizing various electronics. E-learning does not only focus on instructions but also on learning that is adjusted to individuals (Oye, Salle, Lahad, 2012). While traditional method is more teacher centered, e-learning shifts towards student centered education (Gallie, Joubert, 2004). Cheung and Cable (2017) identified and describe eight principles that stand at the core of effective online teaching ,such as encouraging contact between students and the department, collaborative learning ,quick feedback ,activity learning ,task time for completing tasks ,high expectations ,diversified learning and technology application (Cheung and Cable, 2017). COVID-19 online learning emerged as a hasty and necessary response to a crisis activities and curricular planned of face to face education to distance environments without the necessary planning or conditions, including infrastructure or teacher training (Survey Online and Distance Learning Results, 2020)

Online teaching creates a lack of physical, temporal or psychological boundaries. Some computer illiterate teachers found themselves been forced to teach digital literate students. The curriculum had to be condensed to accommodate these methods of Teaching. It was even difficult for teachers to teach practical aspect of science at this period because they were still battling with the theoretical aspect. However studies have shown that E-learning has merits as Facilitating the distribution of content at the same time to a large number of users,

Positive impact of online education to students

It is student centeredness more flexible (Dhanvan, 2020). It provides a synchronous and asynchronous tools such as E-mail, forums, chats, video conferences (Marinomi, Vantland and Jensen, 2020; Anwar, and Adnan, 2020; Suresh, Priya, Gayathri, 2018). To the learners, it allows them to have control over the content, time on learning hence can be adapted ccording to the learner needs and objectives (Suresh, Priya, and Gayathri, 2018). Intrinsic motivation, in particular, good time management, and active involvement in class activities, have been identified as key determinants of student success during online education (Hullet, 2018). Students tend to see flexibility and convenience as an advantage in online education (Ternus, Palmer and faulk 2007; Toiufairly, Zalan and Lee 2018; Muthuprasad, Aiswarya, Aditya and Jha, 2021; Alexander, Truell and Zhao, 2012) and also see online education as beneficial for them as it allows them to take on additional job opportunities or maintain existing ones (Alshamrani, 2019). Other advantages include cost effectiveness, time saving (Alshamrani,

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2019; Manea, Macavel and Pribeanu, 2021) and a reduction aspect as well as a reduction in the cost of transportation (Hussain, Hussain and Ramzon, 2019) self-centered learning (Mukhtar, Javed, Arooj and Sethi, 2020). While online education during crisis situations received less satisfaction from students, it can therefore be concluded that it enhances the learning process of students.

Negative impact of online education

E-learning on the other hand had its demerit such as less motivation on the part of students ,delay in feedback or help due to the fact that the teachers are not always available at the time students may need help while learning or feelings of isolation, Unavailability of electricity has been identified as one of the major challenges in online learning, especially in an underdeveloped country. Poor satellite connections and poor or no Internet access can also impede students' performance in online learning. Collaboration with peers can also have a negative impact on students' satisfaction and academic performance. Lack of clear course design and layout can also lead to confusion among students (Abramenka, 2015). Social media platforms can also lead to students' distraction if high-quality content is not created. Researchers have found that online programmes are not always effective in motivating students (Ogunleye, 2010), and that it is easy for students to become distracted in online environments. Online learning can also cause students to feel isolated (Mayes, Lueveck, Ku, Akarasriworn and Korkmaz, 2011, Hussain et al, 2019, Serwatk, 2002, Abramenka , 2015, Hussain 2012, Sevile, Hawker and Little, 2012) and can lead to procrastination. Distraction, workload, technological problems (Hussein et al,2020), connectivity issues (Muthuprasad et al, 2021) and anxiety due to the uncertainty of the situation (Rajab et al, 2020), social distancing isolation and uncertainty related to the pandemic may also impact the mental health of student and staff (Merchado et al, 2020).

There are reports that in most schools, online platform for teaching was used for the first time (Survey On Online And Distance Learning Results, 2020), according to (Mishra, Gupta, Shree, 2020) said the organization for economic cooperation and development mentioned that some of the challenges universities have to face were; Many hours were spent on the screen ,non-digital activities ,analyzing and focusing on students emotional heat, providing them with support throughout the process of learning, managing and monitoring this access to devices in order to effectively collaborate with them. Keeping an equilibrium between online courses that could affect students' health (Education Response to COVID-19, 2020) besides keeping the content of the course consistent and relevant with communicating clearly with the academic community. On the part of the students according to (Abaaagye, Yawson, Appiah,2020) were connectivity, accessibility, lack of appropriate devices, social issues represented by the lack of communication and interaction with the teachers and peers. The lmportance of this research is to actually see whether the students of rural and urban had the same equal education during this period. Effective Online learning requires several complicated and balanced decisions about several aspects, including modality, pacing student-instruction role online, students role online, online communication synchrony and source of feedback, all of which requires planning (Coman, Tiru, Mesesan, Schmitz, Stanciu, & Bularca, 2020).

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Science Teaching in Turbulent times

The lack of hands-on and practical training was cited by the majority of students as the most significant factor in the closure of schools nationwide in 190 countries as a result of the pandemic, with over 90% of global students affected as a result (UNESCO, 2020). Many schools did not prepare for the transition to remote learning environments, and the lack of access to technology was also cited as a major factor. The idea of traditional education is progressively evolving with the emergence of the internet and new technology, being physically present in a classroom is no longer the only choice for teaching and learning. Insecurity and COVID-19 have really spurred a revolution in online learning. Even though virtual laboratories can be a better option in difficult times, practical traditional science laboratories are still superior in the field of science. Virtual labs are digital, interactive activities simulations actually take place in the physical Laboratory, while Traditional science laboratory refers to a physical hand – on laboratory with real objects, reagents, and materials (Hawkins & Philips, 2013). The teaching of complex concepts, student comprehension, and the development of a positive attitude toward the course, all benefit greatly from the use of visual instructional resources.

Science experiments should be carried out in a way that is supported by a variety of sound, image, and animation, which are perceived as more effective, fun, and long-lasting. In order to foster a thorough awareness of current sustainability challenges, science education must be taught with a relevant curriculum. Sometimes, teaching science can be a subject with a practical focus. Since students spend the majority of their class time working or finishing projects, established procedures can aid schools in times of uncertainty. Therefore, an establish method of teaching both theoretical and practical aspect of science during turbulent times should be established. Science lessons should be developed as one that are supported by materials to draw student's attentions and so provide lasting learning because the growth and development of most nations are dependent on science and technology.

Effects of turbulent times on Locations of student's residents

According to the Digital Global Overview Report (2023), 6.8% of the world's population, or 5.44 billion people, will be using mobile phones in early 2023. In the world's current online population, there are 5.16 billion internet users. The overall number of people using social media worldwide is 60%. Looking at the digital landscape of Nigeria, there were 122.5 million internet users there at the beginning of 2023, with a penetration rate of 55.4%. 14.3% of the world's population, or 31.60 million people, used social media in January 2023 (13th Feb. 2023). Early in 2023, there were 193.9 million active mobile phone connections in Nigeria, which is 87.7% of the country's population. Additionally, according to data from https//data reportal.com, 53.8% of Nigeria's population lived in cities as of the beginning of 2023, compared to 46.2% who resided in rural areas. This has actually shown that a lot of people live in rural area.

Kasha (2012) characterizes rural areas as being impoverished, lacking numerous government developmental interventions like electricity, and having a high level of poverty. Rural areas and

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urban areas differ from one another. There should be opportunity for all students. During the turbulent times, adopting online process as a means of teaching is good but is it appropriate for students who are from rural area settlement during the turbulent times. This, we will found out in this research. The importance of ICT in education and rural areas was highlighted by Urika, Kujur, Swati and Bareth (2021) as; Improve the standard of living, Gives adequate infrastructure and technical support, Increase different types of education services, Promote equal opportunity to obtain education and information, Helps teacher for organization preconditions, Helps in classroom effectiveness and as well as innovative teacher, Helps teachers train both before and during their employment. ICT consists of both software and hardware. A decade ago, ICT equipment included hardware and software including radio, television, motion picture and projector coders. Today hardware and software include PCs, netbooks, mobile phones, MP3 players, E-book readers, personal digital assistants, interactive whiteboards, email, video conferencing, and visual aids are now considered. Omoniyi & Quadri, (2013). Of all of these how many can we found in the rural areas. The question is what then happens if there is another turbulent time. Student satisfaction in rural and urban areas (Qazi, Naseer, Qazi, Salman, Naseem, Yang, Hargaker and Gumaei, 2020), particularly in Developing Countries, is disturbed by the availability of Electricity (Hussain et al, 2019), weak satellite connection (Mackey and Freyberg, 2010), Poor or no Internet Access (Hulett, 2018, Ogunleye, 2010). Students may easily lose focus in an online environment (Govindarajan and Srivastava, 2020, Martin, 2022).

Besides For any location to have the best use of the ICT use during turbulent times. The following should be available. Good power supply, Availability of Funds, Access to internet, Technical personnel for Technical issues, Trained personnel, Access to Laptop or Smart phone, Quite room with suitable chair, High level of computer literacy on the part of the student etc

Teachers role in online education

It is clear that there is a strong relationship between the actions of the teacher and the satisfaction of the students in online education (Jackson, jones and Rodriguez, 2010). (Brocato, Bonanno and Ulbig, 2015) found that although students' perception of traditional and online learning settings may vary, they were mainly interested in achieving mastery through relevant learning experiences. Estelami (2014) found that students' satisfaction was directly influenced by the content of the course, the communication of the student teachers, the use of relevant learning tools, and the instructor's style of presentation. Responses to course activities were also timely and constructive. Students found timely and constructive feedback to be beneficial when studying in an online environment. If the instructor is accessible and the responses are timeless, students' positive perception of value of the online courses can be improved. Jackson et al (2010) found that during the COVID pandemic, face-to-face contact with the students was very important in terms of their effective learning, but it was seen as challenging during distance learning. More recent research (Rajab and Gazal, 2020, Bao, 2020, Martin, 2022) reiterating the importance of concise feedback when transitioning to remote modes in the COVID pandemic

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Study environment and resources Reading for online teaching Students satisfaction with online systems may depend on their potential attributes environment pressures e-learning facilities they have access to (Kundi, Nawaz and Khan, 2010) (Callo and Yazon, 2020) learner familiarity capability learner preparation learner device and access connectivity, self-efficacy, learner experience with technology, learner preparedness and conduct during online learning. Participants of a study by (Paudel, 2021), computer literacy, techno-linguistic preparedness and time management skills are important for online learning. Students' home-study environment or other demographic characteristics may have a significant positive or negative impact on their study processes or experiences. (Aristornsk et al, 2020) recently conducted a study, found that students with certain demographic characteristics showed significantly less satisfaction with their academic work /life during the COVID – crisis.

Purpose of The Study

1. To find out whether urban & rural residential students have equal access to ICT technology.
2. To find out whether parents of students from rural and urban residents can afford ICT Technology.
3. To investigate if all the parents (from rural and urban) have these ICT tools at home.
4. To examine the best means of Teaching during turbulent times that is in the favour of the two groups.
5. To investigate the digital skills level of the students

Research Questions

1. Does Students living in urban centre have access to digital Technology facilities than students living in rural centre during the turbulent times?
2. Can most parents from rural areas afford the requirement of digital technology?
3. Do most parents in rural areas have available technology that can be used at home during the turbulent times?
4. What is the best means of teaching and learning that is available and affordable during the turbulent times considering your location?
5. Does the students from both residences have the digital skills require for twenty first century?

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METHODOLOGY

i. The problem the researches aim to find out is the experiences of students that are living in rural and urban residential centres, to find out whether they have equal science education during the turbulent times with the use of online learning

ii. The sample (500) for the study comprised students from five universities from the southwest part of Nigeria. A purposive random sampling was done to get residential students for urban and rural centres

iii. A descriptive cross sectional survey design was chosen, an instrument was developed and validate by expert after reviewing the relevant literature with focus on the home, parents, student skills, accessibility to online tools, available technology

iv. The reliability of the instrument was established through Cronbach's alpha (0.88).

v. The target population of the study comprised of all students in southwest universities in Nigeria (undergraduate) where online teaching and learning was done during COVID-19 pandemic

vi. The sampling was done in two stages

The first stage, a list of universities who had online teaching during covid 170 was identified out of all the universities (both private & public) in Nigeria from the southwest out of which 80 from southwest offered online teaching, from this the researcher randomly selected five universities, then researchers contracted various departments of this universities to administer the questionnaire personally in the five universities with the assistance of all the heads of department(science oriented areas) and research assistants .

A total of five hundred and sixteen was retrieved while sixteen out of it was not well filled, therefore a total of five hundred was used. The data analyzes was performed using frequency and percentage.

RESULTS

Section A

Section A consists of student's location and other questions,

Name of the Town of Student's Residents ----------

State/Local Government ----------

Location (Urban/Rural) ----------

Father's Profession ----------

Mother's Profession ----------

In the absence of a mother or father, the profession of the guardian----------

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Rural Residents

Research Question 1: Does Students living in urban centre have access to digital Technology facilities than students living in rural centre during the turbulent times?

S/N	During the turbulent times I have access to	A	%	SA	%	D	%	SD	%
1.	Electricity	0	0%	20	8%	50	20%	180	72%
2.	Network	5	2%	10	4%	85	34%	150	60%
3.	Computer	10	4%	20	8%	55	22%	165	66%
4.	Android phone	10	4%	20	8%	40	16%	180	72%
5.	ICT Technology personnel	5	2%	25	10%	55	22%	165	66%
6.	Learning software	0	0%	0	0%	120	48%	130	52%
7.	Alternative light (solar)	10	4%	15	6%	80	32%	145	58%
8.	Alternative light (Generator)	10	4%	20	8%	85	34%	135	54%
9.	Data	30	12%	40	16%	80	32%	100	40%

Research Question 2: Can most parents from rural areas afford the requirement of digital technology?

S/n	My parent were able to afford buying	A	%	SA	%	D	%	SD	%
1.	Data on my phone	10	4%	20	8%	50	20%	135	54%
2.	Computer for me	0	0%	10	4%	90	36%	150	60%
3.	Android phone for me	35	14%	20	8%	80	32%	115	45%
4.	Simple phone for me	10	4%	70	28%	110	44%	60	24%
5.	all the ICT Technology tools for me	5	2%	10	4%	200	80%	35	14%

Research Question 3: Do most parents in rural areas have available technology that can be used at home during the turbulent times?

S/n	The following were available in my house during the turbulent times	A	%	SA	%	D	%	SD	%
1.	Desktop Computer	5	2%	15	6%	105	42%	125	50%
2.	Television	45	18%	120	48%	50	20%	35	14%
3.	Radio	70	28%	170	68%	10	4%	0	0%
4.	Personal computer (laptop)	10	4%	20	8%	100	40%	120	48%
5.	Android phone	10	4%	10	4%	155	62%	75	30%
6.	Flash drive	2	0.8%	18	7.2%	116	46.4%	114	45.6%
7.	I-pad / I-touch	7	2.8%	10	4%	205	82%	28	11.2%
8.	Modem	5	2%	15	6%	180	72%	50	20%
9.	Power bank	10	4%	15	6%	111	44.%	114	45.6%
10.	Comfortable table & chair	20	8%	50	20%	55	22%	125	50%
11.	Study room	0	0%	80	32%	5	2%	165	66%

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Research Question 4: What is the best means of teaching and learning that is available and affordable during the turbulent times considering your location?

S/n	I am digitally skilled in the following technology	A	%	SA	%	D	%	SD	%
1.	WhatsApp	40	16%	100	40%	50	20%	60	24%
2.	Facebook	35	14%	110	20%	55	22%	50	20%
3.	Twitter	25	10%	50	11.2%	103	41.2%	72	28.8%
4.	Instagram	20	8%	50	8%	69	27.6.2%	111	44.4%
5.	Zoom	35	14%	30	12%	130	52%	55	22%
6	Google classroom	10	4%	25	25%	100	40%	115	46%
7.	Video conferencing	15	6%	15	6%	120	48%	100	40%

Research Question 5: Does the students from both residences have the digital skills require for twenty first century?

S/n	What is the best means of teaching and learning during turbulent times that is more available to you?	A	%	SA	%	D	%	SD	%
1.	Audio Teaching (Radio)	50	20%	175	70%	20	8%	5	2%
2.	Audio / Visual (Television)	80	32%	100	40%	20	8%	50	20%
3.	Visual/YouTube/Laptops/Desktops/Android phone through Zoom & other means.	16	6.4%	30	12%	100	40%	104	41.6%
4.	WhatsApp through (Android phone)	5	2%	60	24%	98	39.2%	87	34.8%
5.	Science practical was well attended to during turbulent times	5	2%	10	4%	130	52%	105	42%
6.	It was only the theoretical aspect of science that was attended to	90	36%	115	46%	25	10%	20	8%

Urban Residents

Research Question 1: Does Students living in urban centre have access to digital Technology facilities than students living in rural centre during the turbulent times?

S/n	During the turbulent times I have access to	A	%	SA	%	D	%	SD	%
1.	Electricity	25	10%	170	68%	25	10%	30	12%
2.	Network	60	24%	140	56%	15	6%	35	14%
3.	Computer	35	14%	195	78%	20	8%	0	0%
4.	Android phone	80	32%	155	62%	15	6%	0	0%
5.	ICT Technology personnel	65	26%	100	40%	45	18%	40	16%
6.	Learning software	60	24%	125	50%	25	10%	40	16%
7.	Alternative light (solar)	50	20%	165	66%	25	10%	10	4%
8.	Alternative light (Generator)	76	30.4%	129	51.6%	45	18%	0	0%
9	Data	90	36%	150	60%	20	8%	10	4%

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Research Question 2: Can most parents from rural areas afford the requirement of digital technology?

S/n	My parent were able to afford buying	A	%	SA	%	D	%	SD	%
1.	Data on my phone	30	12%	182	73%	38	15.2%	0	0%
2.	Computer for me	36	14.4%	196	78.%	10	4%	8	3.2%
3.	Android phone for me	20	8%	200	80%	25	10%	5	2%
4.	Simple phone for me	31	12.4%	209	84%	10	4%	0	0%
5.	all the ICT Technology tools for me	40	16%	200	80%	8	3.2%	2	0.8%

Research Question 3: Do most parents in rural areas have available technology that can be used at home during the turbulent times?

S/n	The following were available in my house during the turbulent times	A	%	SA	%	D	%	SD	%
1.	Desktop Computer	80	32%	105	42%	35	14%	30	12%
2.	Television	28	11.2%	202	81%	20	8%	0	0%
3.	Radio	40	16%	200	80%	10	4%	0	0%
4.	Personal computer (laptop)	50	20%	190	76%	8	3.2%	2	0.8%
5.	Android phone	41	16.4%	179	72%	22	8.8%	8	3.2%
6.	Flash drive	68	27.2%	100	40%	20	8%	62	24.8%
7.	I-pad / I-touch	49	19.6%	125	50%	46	18.4%	30	12%
8.	Modem	40	16%	180	72%	25	10%	5	2%
9.	Power bank	50	20%	170	68%	22	8.8%	8	3.2%
10.	Comfortable table & chair	40	16%	200	80%	5	2%	5	2%
11.	Study room	70	28%	170	68%	10	4%	0	0%

Research Question 4: What is the best means of teaching and learning that is available and affordable during the turbulent times considering your location?

S/n	I am digitally skilled in the following technology	A	%	SA	%	D	%	SD	%
1.	WhatsApp	30	12%	170	68%	20	8%	30	24%
2.	Facebook	30	12%	185	74%	15	6%	20	8%
3.	Twitter	35	14%	120	48%	45	18%	50	28.8%
4.	Instagram	66	26.4%	130	52%	20	8%	34	13.6%
5.	Zoom	70	28%	105	42%	40	16%	35	14%
6	Google classroom	75	30%	130	52%	25	10%	20	8%
7.	Video conferencing	30	12%	128	51.2%	50	28.8%	42	16.8%

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Research Question 5: Does the students from both residences have the digital skills require for twenty first century?

S/n	What is the best means of teaching and learning during turbulent times that is more available to you?	A	%	SA	%	D	%	SD	%
1.	Audio Teaching (Radio)	20	8%	70	28%	125	50%	35	14%
2.	Audio / Visual (Television)	60	24%	149	60%	21	8.4%	20	8%
3.	Visual/YouTube/Laptops/Desktops/Android phone through Zoom & other means.	75	30%	150	60%	20	8%	5	2%
4.	WhatsApp through (Android phone)	39	15.6%	160	64%	41	16.4%	10	4%
5.	Science practical was well attended to during turbulent times	30	12%	50	20%	130	52%	40	16%
6.	It was only the theoretical aspect of science that was attended to	100	40%	115	46%	20	8%	15	6%

DISCUSSION

The findings from this study revealed that students living in urban centres have access to digital Technology facilities than students living in rural centre as we can see that 68%, 56%, 78%, 62%, 40%, 50%, 66%, 52%, of students from urban claimed this, compare to those students (their counterpart) in the rural centres 12%, 6%, 4%, 16%, 5%, etc. as agreed by the students. This is in line with Bahram Imani (2012) who made research on Alleni village and found out that there was high cost of internet access, lack of specialized trainers, students of educated parents background receive more significant support and have access to more resources than that of parents with low education. They feel better equipped to support their children. Use of smart phones (72%) disagree and computers (64%) disagree turned into the major setback for the rural students whereas the urban students had access to all of this as seen in this research, 80% have access to smart phones,79% have access to computer,73% have access to data usage and 68% had access to uninterrupted electricity and so on like that. It was also observed that 60% of the rural student could not afford frequent buying of data. After the maximum data limit the students fell helpless to continue online classes. In the rural area 72% 0f the students claimed that they have interrupted electricity connection, intermittent signal issues, etc. The rural students must have lacked interest and attention during the online classes as they were not accustomed to learning with smartphones and computers since majority of them don't have it.

Most parents of students from rural residents cannot afford the requirements of digital technology, like purchase of data 54% of rural dwellers claimed this compare to their counterpart that claimed that 73% of them could afford it. 60% and 45% of the students from the rural residents do not even have computer and android phone because they could not afford it, whereas with the urban students, 78% and80% of the students have computer and android phone. This is in line with Kujur & Bareth (2021) that some of the challenges of rural areas is that most people are living under poverty, and rural residents lack human resources, computer and internet services are poor. There is also the problem of low socio economic conditions of the family, perhaps, during the lockdown period when they needed the laptop for online learning, they could not do so as majority of the rural students did not have desktop or laptop

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at home and the mobile phones were not found enough effective to participate in online classes secondly students were struggling with financial problems.

Students from urban centres have some of these digital technologies in their homes like computer(76%), Television (81%) ,Radio(80%) ,Comfortable table and chairs(8o%) Study Room (68%) whereas the rural students,50% of them have television ,68% have Radio, out of which 50% from the rural area claim they do not have comfortable table and chairs,66% of rural students do not have a study room at home, whereas the urban students,80% have comfortable tables and chairs and 68% has study room. Some of them have modem to charge, solar power, generator compare to their counterpart in the rural area that lack most of this things in their homes, Most of the rural residents have no alternative to electricity like generator, having modem, solar, This research is consistent with the work of Tripathi, Singh, and Dagur (2012), who named energy, communication, transportation, and a lack of awareness about new technology as the difficulties facing rural areas. They reported that electricity is the main hindrance in development.

56% of most urban resident's students said that network is always available because some of them are having high connectivity phones they do not have network issues as such whereas 52% of the rural resident students have problems of network which could be as a result of various hills and valleys that could be obstructing the network thereby causing Network problems in our rural centres. This is supported with a study from Michigan State University that found that poor internet access from rural families can cause students to lag behind academically. When asked about the best means of teaching and learning during the turbulent times, from rural students 28% wanted radio, 60% wanted audio visual, 64% wanted WhatsApp using android phones while 60% wanted visual but urban residence students has 28% for radio, 60% for audiovisual, 64% for WhatsApp using android and 60% for visuals, This showed that the acceptable and affordable means of teaching during turbulence times is the gadgets that are mostly available to the two groups which are radio audiovisual(media technology).

The digital skill of the students were expressed as 68%, 74%, 48%, and 52% for WhatsApp, Facebook, twitter, and Instagram respectfully for urban students while rural had 40%, 20%, 11.2% and 8% respectively as shown on the table. It shows that urban resident's students have more skills in digital technology than the rural students. This might be as a result of their background. Practical were not well attended to as indicated by urban students having 20% and rural students with 4%. This could be due to the fact that the teachers have no idea of how such experiments could be carried out and broadcast. They do not have the necessary technical skills and that teachers frequently used a limited number of tools provided by the e-learning platform.

Other factors observed in this research while interpreting the section A of this questionnaire is that most (65%) of the people in the rural set up are living under poverty, mainly farmers while 30% are primary and secondary school teachers with small salaries, majority, 70% small scale business Man / Woman, petty traders and most of the women are housewives. 32% of Parents of rural residents don't really have a high level of education, whereas some parents of urban residents do. Some of these parents in the rural areas 68% don't really socialize with the outside world (urban centers), some of them don't even know how a computer or an Android phone

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works, The parents of students of urban residents are economically more stable than those in the villages. Children from advantaged background received more significant support and have access to more resources Parents with higher education feel better equipped to support their children. However, few students in the rural areas that could afford this tools lacked necessary skills, proficiency, this could be that most of those who knows this thing and can teach them how to use it are not readily available in most of the rural centres. Also emphasis should be given and considered for practical experiments during turbulent times because it is part of the curriculum of each of the school subjects or courses. Furthermore students technical problems remain poor internet connections, signal loss, lack of adequate digital devices, financial constrain like purchase of data, especially for students living in rural areas or students from families with low income

CONCLUSION

This research can be concluded that use of computer and android phone will not give equality education during turbulent times. Combination of video and Television educational broadcast can give a better equality during turbulent times because it is available and affordable in homes of the students both urban and rural and the challenge of electricity can be resolved using battery for radio as a substitute and where generators are available, it can be used to powered the Television once a while during broadcasting, this can reduce the problem of inequality between the two groups during turbulent times. This will surely solve the problem of Network issues, purchase of data often, charging of phones all the time and even purchase of Android phone that is not affordable by the rural counterpart or better still, Radio, Television and Android phones can be combined for the Teaching and Learning. The government can look into the area of getting Android phones or computer at an affordable prices to everyone. This will help the citizenry (both rural and urban residential students). Hence the best way to given solution to this through these research is to use something affordable and available to all. It is therefore recommended that government and parents have a lot to do

1. By providing energy, a good network, and other amenities, the government should develop rural communities just like it does metropolitan ones.
2. Parents from rural settlement should be enlighten about the use of ICT resources so that they can assist their ward to have necessary facilities even as priority in their various homes things like generator or solar power, modem etc.
3. Teachers should constantly train their students in schools on how to develop their digital skills.
4. In case of future turbulence, Radio and Television media can be used to get good coverage for the students. This can be made available in addition to any other ICT technologies.
5. Government can help to develop the rural centres by putting up projects and infrastructures for example, a University and other educational institutions can be cited in the rural centres, banks, industries, event centres etc. That can always bring people together.

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6. Policies that could encourage the effective use of computers for educational purpose should be put in place by regulatory agencies.
7. Teacher should provide orientation to the students on the use of Android phones and computer assignments could be given through it and other means.
8. Government should provide and supply computers to the schools and to the students at a subsidiary rate that can easily be affordable by all.
9. Government should train people and send them to our rural areas as trainers, to train some other people in our various rural centres.
10. Rural people should also socialize with the urban people, this can be through travelling so as to blend with time and the season therefore socialization is also very important.
11. Schools should begin to think of how effective science practical/experiment can be carried out during future occurrence because science without practical is useless and inadequate knowledge.

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