



Mathematics Education And Coronavirus (COVID-19) Pandemic In Nigeria: Issues And Challenges

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ABSTRACT

This paper examines the challenges of teaching and learning of mathematics on e-learning implementation during the Coronavirus pandemic and beyond, thus the challenges include; isolation to teaching and learning, lack of motivation for online learners, technical difficulties with online teaching tools, setting and forgetting online learning activities and need to help with distance teaching. Digital learning has reshaped education systems in many ways. And this responses to the issues and challenges of the gateway for digital learning, performances of SS3 students' in external examinations and the views of teachers on the challenges on e-learning in mathematics education. During the COVID-19 pandemic teachers grappled with important decisions about that contents to teaching the limited time allocated for mathematics class through their understanding of mathematics curriculum contents, they see the curriculum as a set of connected instructional units and understand the way, concepts are been developed and make connections to the way students' learn mathematics through digital learning which is a poor substitute for the experience of studying. The paper recommended that, free access to computer devices and internet, students, parents, teachers and other members of society should maintain communication through e-mails, maintain learning materials through google apps, moodle, cloud, edmodo, austria or social media tools and parents to provide laptops, phones and tablets for the wards.

Keywords: Education Mathematics, Coronavirus Pandemic, Educational System, Digital Learning, Teaching and Learning, Mathematics Curriculum, Curriculum Contents.

INTRODUCTION

The World Health Organisation (WHO) declared COVID-19 a global emergency on January 30th ,2020 and a global pandemic on March 11th,2020, the pandemic has affected more than two hundred and thirteen (213) countries and territories (WHO,2020) .In response to this pandemic, several countries and Nigeria have applied strict social distancing measures and a lock down policy. Obviously, this pandemic has a tremendous impact on schools, students' and teachers'. In Nigeria the government has restricted community mobilization in an attempt to prevent the spread of the disease and keeps promoting the

agenda of: work from home, study at home and worship at home. In fact, this raised some issues and challenges among the workers, ministry officials, teachers and students which are: isolation in teaching and learning, lack of motivation in online learners, technical difficulties with online teaching tools, setting and forgetting outlines, learning activities and help with distance teaching, (Mailizar, Abdulsalam, Suci and Sandra, 2020). These raised some issues in respect of student's performance especially in mathematics (Edgar, 2020). Views of secondary school mathematics teachers and e-learning (Mailizar et al, 2020) and COVID-19, the gate way for digital learning in mathematics education (Mulenga and Marban, 2020).

Mathematics education is the teaching and learning of mathematics, using the principles, theories, philosophy and sociology of education. In order to make mathematics effective, especially during COVID-19 pandemic, teachers' should adopt innovative methodology in teaching mathematics, computer assisted/ aided instruction (CAI) or computer assisted learning (CAL) auto instructional teaching, (Rabiee and Gharibshacyan, 2015; Crosswell, 2017). The rate at which mathematics education is expanding call for innovations and transformations of teaching and learning of mathematics, coupled with re-energizing and restructuring our education system, it is essential for solution of life problems; it is needed for all factions of developments for social, cultural and scientific values. In fact the application of mathematics education is endless to life activities. In Nigeria education system, mathematics education is an essential commodity, because it is a planning process which involve deciding today, what will be done in future, hence the place of mathematics education in shaping Nigeria economy development and education system should not be handle with levity, (Perienen 2020).

To deal with school closure in Nigeria, the teaching and learning process has been maintained remotely using information and communication technologies (ICT). Electronic learning (e- learning) has been considered the best possible approach to continue the teaching and learning process during the pandemic, (Hew and Brush 2007). However, the implementation of e-learning is not always smooth and effective. During the COVID-19 outbreak, schools and tertiary institutions have rapidly implemented e-learning which have been there before the crises but emphases have been laid upon immediately the crisis began. Therefore, schools that have limited or no experience with e-learning and schools that have not prepared e-learning resources, experience difficulties, especially when teachers do not understand how to use online applications (Zahran and Kirilova 2020). There are three prevailing challenges for mathematics teachers in Nigeria: Nigerian students consistently under performed in digital activities/assessments, Nigerians mathematics teachers contents and pedagogical knowledge need improvement, Even though the country employs a decentralised education system, the central government still plays a major role in administering most educational policies such as curriculum planning, design, implementations, developments, innovation and national examination.(Crosswell, 2017)

The Issues And Challenges of Mathematics Education Before Coronavirus Pandemic: Before coronavirus pandemic, the most basic aims and objectives of mathematics education was the issues of an instructional materials, how it enhance teaching and learning of mathematics and improve learners performance in continuous assessment and examination (external), the issue of examination malpractices: the origin, what to do to eradicate it. Educational technology and instructional technology; how can it improve and enhance teaching and learning of mathematics with the solutions to their challenges, (Zahran and Kirilova 2020).

Moreover, education technology as the effective use of electrical and mechanical gadgets such as radio, television teaching machine, programmed learning materials, tape-recorded, opaque, overhead projector and so on, to facilitate teaching and learning mathematics, (Assareh and Bidokht, 2011). On the other hand, instructional technology is the art of employing appropriate education technology gadgets (instructional materials) in the course of instruction only, in the mathematics class. The challenge is that, of all this instructional materials, how the teachers effectively used them to enhance their activities in the class, to improve the performance and eradicated examination malpractices (Hadijah and Shalawati, 2017). Most mathematics teachers are not effective when it comes to ICT teaching and mathematics, but unexpectedly, the pandemic came in, the teaching and learning paralysed, every teachers confused, they don't to know what to do, learning how to use ICT gadgets effectively was problems to teachers, (Burke,

2020). The view of mathematics and science teachers' encountered challenge of lack of time to prepared lesson, most teachers do not use teaching aids during the class, they are lack of improvising instructional materials, limited resource and inadequate of resources (Hadijah and Shalawati, 2017). The opined that, the mathematics teachers need to find adequate time from no time to prepared for the lessons and use appropriate methodology in teaching their students' for more understanding because of their performance in examination. Teachers must use teaching aid that range from modelling to cardboard presentation what can aid students' in understanding the lesson, they should be enable to improvise where necessary in order to make class interesting. Mathematics curriculum and its components those not have problems before coronavirus pandemic, only the appropriate presentation of mathematics lesson that was the challenge for the teachers, (Crosswell 2017).

The Issues And Challenges of Mathematics Education During Coronavirus Pandemic

During coronavirus, mathematics education encounter challenge of lack of time to prepared lesson using technologies, due to lack of computer competency, lack of adequate professional development, inadequate and limited of resources, limited access to computer gadgets and tools and lack of technical support, Sintena (2020); Malenga and Marhan (2020), classified the challenge into curriculum, teachers, students and schools. The challenges of teachers include; lack of professional development concerning technology, lack of understanding, competence and confidences, lack of exposition to e-learning, thus they are unwillingness to change their attitudes and beliefs towards ICT Zahran and Kirilova (2020)

The challenges at school levels relate predominantly to hardware and software availability, access to internet connection and school policy. Teachers considered time to prepare lessons, textbooks and lack of technical support as major challenges, Bingimlas, (2009). Moreover curriculum barriers include mismatch, between students' assessments and e-learning (Hew and Brush, 2007). Another issue is that curriculum does not support technology based application. Regarding student level challenge this included student inadequate e-learning skills (Assareh and Bidokht, 2011) students lack access to technology infrastructure and internet connection and lack of motivation to use e-learning. Promptly accessible computers, phones, laptops and tablets either at home or in school at affordable costs have come within the reach of the great majority and policy makers and significant partners are anticipating hopes to see learning go in a different direction in Nigeria during the COVID-19 crisis. Perienen (2020) argued that with the coming of technology impacting almost all areas of life the education sector, particularly, education mathematics too is witnessing a paradigm shift. At the university, learning proceeds through e-learning platforms like Moodle and Astria. Subsequently, academic staff was requested to expeditiously secure learning support material for them to facilitate teaching and learning using the e-learning. Similarly, students were also guided to make sure that they register and get connected to the e-learning platforms to avoid missing out on learning. Hadijah and Shalawati,(2017) argued that maintaining learning and communication during a school closure by any means possible is important.

Coronavirus Pandemic: Features, Characteristics and Educational Systems

A disease which appeared in the Chinese region of Wuhan surprisingly spread so far across China and other parts of the world in November 2019 and was first reported by WHO in the month of December 2019. The coronavirus Pandemic has become humanity's largest war of the century against the virus. The damages of human health, wealth, and welfare due to world war II and other Pandemic in the world are already very high case fertility rate (CFR) that define the measure of severity due to disease are fatal within their concern time period, Covid 19 also caused massive damage to the global economy, it has racked the world spreading to more than one hundred and ninety (190) counties, in Nigeria more than one hundred and eighty two thousand seven hundred and forty (182,740) died due to infection within a year, (Mailizar et al, 2020).

So the biggest concern in front of the world is to save the lives of people. Lockdown and social distancing, use of face mask, sanitizer, washing of hand and face frequently are the only solutions strictly followed by Nigerians, (Zahran and Kirilova 2020). Education is not directly affected by the effect of

covid 19 pandemic but rather because studies in education rarely incorporate effect of disease on the issue of provision of education to the learners across Nigeria (Malenga and Marhan, 2020) Education is nor exception, this crisis has exposed many inadequacies and inequities in our education systems, that is, from access to the broadband and computers needed for online mathematics education and the supportive environment needed to focus on learning, to the misalignment between resources and needs, (Perienen, 2020).

While the educational community have made concerted efforts to maintain learning continuity during this period, learning remotely through the internet, platform, computer, television and radio. Teachers had to adapt to new pedagogical concepts and modes of delivery of teaching mathematics which they may not have been trained, learners the most marginalised group, who don't have access to digital learning resources or lack the resilience and engagement to learn on their own, are at risk of falling behind.(Burke, 2020)

The Challenges of Online Teaching and Learning

Millions of children have already had their education disrupted by the spread of COVID-19, with nationwide social distancing and restriction of movement, digital learning is an increasing response to these closures and is being used as a response to the COVID-19 crisis. Tertiary institutions country- wide is looking at the developing situation which is also exploring digital learning as one response, some for the first time. With education being thrown into disarray by coronavirus, more and more educators were being forced to teach their students from home. We might not have signed up for distance learning, but in true teacher style it is time to learn how prepare lesson plan and make the best of it in COVID-19 situation. To get prepared, there are run-down on the four main challenges of distance and the strategies needed to navigate them with confidence for effectiveness, these include;

- i. Isolation in teaching and learning –coronavirus virus pandemic separated both teachers and students from the classroom. In fact this is a challenge for both teachers and students in the sense that s learning from home can be lonely without the buzz of the classroom setting and the company of their peers, it is no surprise that some students can begin to feel a strong sense of isolation that slowly erodes their desire to learn (Crosswell 2017). Despite what they say, many students will find that they miss school when the alternative is to be desk-bound. At home, isolation can also undermine many of the instructional strategies that is taking for granted in our classrooms. Group work, class discussion and collaborative activity can disappear from the program entirely if we are not careful and with the associated levels of understanding in learning and teaching (education) especially in mathematics (Quadri et al., 2017).
- ii. Lack of motivation in online learners – another challenge for the students is that, there is no encouragement form any where like from the government, School Management Board (SMB), Parent Teachers Association (PAT) and from others, that are closer to the students encouragement or motivation inters of getting reduction money for data, browsing, et-cetra, as hard as distance teaching might be for us it is likely even harder for our students. And more challenge due to lack of motivation, (Mailizar et-al, 2020). Another way motivation is that measurable goals are the best source of motivation , set them regularly so that students have something to focus on instead of setting an open ended task and leaving them to-it as can be the temptation when you are not in the same room.
- iii. Technical Difficulties With Online Teaching Tools – this is another threat for the students, although there is no probability that every students with have assets to computer may not have opportunity of a standby repairer to repair the computer when faulty. The teaching tools that available may not be adequate, this is a great challenge to students, Moreover not every home will always have a reliable internet connection or readily available device for students to use (Hew and Brush, 2007).it is also challenges for most of our students being “digital natives” many of them are not that proficiency when it comes to tackling unfamiliar software.(Zahran and Kirilova, 2020) Moreover, recording your lesson on instructions is another issue that is essential and posting it online (as with a flipped classroom) is one way of avoiding hassle, although beware

that the technical dimensions of this takes time as well. If you want to avoid having problem on a ten-page instruction manual and interactive video for a single lessons worth of material, you might look further into educational technology solutions where possible. With inbuilt resources and instructional material, they pay for themselves quickly in terms of time saved.

- iv. Setting And Forgetting Online Learning Activities – it is challenge for struggling teachers stripped of the face time and environments that inform so much to teaching and learning, it also challenge to revert to set and forget mode, assigning some work online and just hoping for the best. But the dedication here is for quality learning which cannot go on the backburner in the face of such massive disruption. It is a time when our students need us more than ever before, and it's the perfect opportunity to innovate and try something new (Rabiee et al, 2018).
- v. Need Help With Distance Teaching – this is another challenges for the students, that need assistance (Quadri et al, 2017). Therefore, school management should establish comprehensive strategies that will prepare students to use e-learning which may include providing students vouchers for internet connection as well as incremental training the use of e-learning prior to crisis such as pandemic as a way of gambling with student education (Perienen, 2020). Given the reality of the internet world, students will likely have to learn one thing or another strengthen e-learning at some point in their adult life and giving them the skills now will help them as working adults in the future.

CONCLUSION

Above all, challenges faced by Nigerian mathematics teachers and their students cannot be overemphasized, and includes lack of knowledge and skill in the using e-learning, lack of access to devices and internet connections, lack of adequate professional development concerning technology, lack of time to prepared lesson using technologies, limited and inadequate resources, lack of technical support, competence and confidence. There are issues on mathematics curriculum and its components like objective, evaluation, contents and learning experiences. Since curriculum does not support technology based application, then the curriculum barriers include mismatch, between students' assessments and e-learning.

In addition, there are issues of isolation of teachers and students, lack of motivation in online teaching of mathematics, technical difficulties with online teaching tools, setting and forgetting online learning and need for help with distance teaching which reflected why curriculum does not support technology based application that is objective cannot be achieved, likewise learning experience and the contents and evaluation. There is a lot that can be learned during the COVID-19 closure period which will be a guide, experience and directives for us after the crisis. The crisis will continue to spread and cause disruption, but the tension may reduce, therefore it is hoped that CBU would make digital learning a paramount feature of their portfolio even if coronavirus resolves.

RECOMMENDATIONS

In the wake of the Coronavirus pandemic school closure, digital learning in mathematics education appears to be the immediate positive responses, the following have been recommended:

- (i) CBU management should create an official positive response platform (class) for mathematics as for students to freely access all the information they need beforehand.
- (ii) The policy makers and the government of Nigeria should re-evaluate digital learning and its place in education system across all levels of learning during and after COVID-19 resolves.
- (iii) Students' parents', teachers' and other staff members maintain communication through emails and maintain assess to learning materials like Google applications
- (iv) Parents must also provide computers, phones, laptops and tablets for their children.
- (v) Governments, industries and manufacturers must make computers, cell phones, laptops and other technology gadgets affordable, so that it will be within the reach of majority.
- (vi) The government on the other hand should use some measures to motivate students and teachers' to improve on their knowledge and computer skills.

(vii) Due to under performance of both mathematics teachers and students in digital activities /assessment, Nigeria mathematics teachers need to improve on mathematics contents and pedagogical knowledge.

REFERENCES

- Assareh, K., & Bidokht, M.H. (2011). Barriers to Teaching and E-learning *Procedia Computer Science*, 3 Pp. 791-795. <https://doi.org/10.1016/j.procs.2010.12.129>.
- Bingimlas, K.A. (2009) Barriers to the Successful Integration of ICT in Teaching and Learning Environment: A Review of the Literature. *Eurasia Journal of Mathematics Science and Technology Education*, 5(3)Pp. 235-245. <https://doi.org/10.12973/ejmste/75275>.
- Burke, J. (2020), COVID-19 Practice in Primary Schools in Ireland. Report April. <https://doi.org/10.13140/RG.2.2.14091.03369>.
- Crosswell, J.W. (2017), *Educational Research: Planning, Conducting and Evaluating Quantitative and Qualitative Research*. Macmillan Lagos-Nigeria. 4th edition
- Hadijah, S., & Shalawati, S. (2017) Investigating Teacher Barrier to ICT Integration in Teaching English at Senior High School in Pekanbaru: Proceedings of ISELT FBS University Negere Padang 5, 302-310.
- Hew, K.F. & Brush, T. (2007) Integrating Technology into K-12 Teaching and Learning: Current Knowledge Gaps and Recommendations for Future Research *Educational Technology Research and Development* (55), 223-252.
- Mailizar, A., Abulsalam, A. Suci, M. & Sandra, B. (2020) Secondary School Mathematics Teacher's Views on E-learning Implementation Barriers During the COVID-19 Pandemic. *Eurasia Journal of Mathematics Science and Technology Education*, 16(7).
- Malenga, E.M. & Marhan, J.M. (2020) COVID-19 Pandemic: The Gateway for Digital Learning in Education *Mathematics*. *Contemporary Educational Technology* 12(2) P.269
- Perienen, A. (2020), Framework for ICT Integration in Mathematics Education. A Teacher's Perspective. *Eurasia Journal of Mathematics Science and Technology* 16(6) eml 1845. <https://doi.org/10.2933/ejmste/7803>.
- Quadri, N.N. Muhammad, A., Sanober, S. Quareshi, M.R.N. & Shah, A. (2017) Barriers Affecting Successful Implementation of E-learning in Saudi Arabian Universities. *International Journal of Emerging Technologies in Learning (IJET)* 12 (06).
- Rabiee, A. Nazarisan, Z. & Gharibshacyan, R. (2015) An Explanation for Internet use Obstacles Concerning E-learning in Iran. *The International Review of Research in Open and Distributed Learning* 14(3), 361-376.
- Sintena, E.J. (2020), Effect of COVID-19 on the Performance of Grade 12 Students: Implication for STEM Education. *Eurasia Journal of Mathematics Science and Technology Education* 16(7) eml 1851 <https://doi.org/10.29333/ejmste/7893>.
- WHO, (2020), Coronavirus Disease (COVID-19) Pandemic. 2020 from <https://www.who.int/>
- Zahran, Z., & Kirilova, G.I. (2020) Impact of Corona Virus Outbreak Towards Teaching and Learning Activities in Indonesia. *SALAM: Journal Social dan Budaya Syra-i* 7(3) <https://doi.org/10.15408/sjsbs.v7i3.15104>.