

Managing Classroom Environment in a Post Covid-19 Pandemic Atmosphere: Class Size, Classroom Interactions, and Infrastructure For Effective Learning

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Abstract— This paper focuses on the current trends in Education in a Covid-19 Pandemic Atmosphere with regards to Classroom Management, touch lighting Class Size, Classroom Interactions, and Infrastructures for effective Learning. The level of sincere attention accorded to the Education Sector by any government would dictate to what extent scientific discovery and technological breakthrough would be available for socio-economic emancipation, poverty alleviation and overall growth. Nigeria occupies a very prominent position in the comity of nations. Unfortunately, most sectors seem not to be working well, with the Education sector not being an exception.

Index Terms— Class Size, Classroom Interactions, and Infrastructure.

I. INTRODUCTION

Covid-19 Pandemic

The whole world seems to have paused for a moment, a result of the evolving coronavirus pandemic. Knowing the facts is key to protection. A novel strain of coronavirus – SARS COV 2 was first detected in December 2019 in Wuhan, a city in China’s Hubei Province with a population of 11 million, after an outbreak of pneumonia without an obvious cause. The virus has now spread to over 200 countries and territories across the globe and was characterized as a pandemic by the World Health Organization (WHO) on 11th, March 2020. There are over 100 million confirmed cases with over 2 million deaths globally. Covid-19 is real. It is in Nigeria! Many people have died as a result of the virus, and many are still battling with complications related to covid-19. How to manage this pandemic in our educational institutions vis-à-vis class size, and infrastructural provisions becomes worrisome. As the Presidential Task Force (PTF) on covid-19 works round the clock to curtail the ravages of the virus, let us encourage our students, teachers and everybody to wash hands regularly with soap and water, cover mouth and nose while sneezing or coughing, avoid close contact and maintain social distance, and seek medical care early if one has a fever, cough, difficulty in breathing, or any other symptoms that are

related to covid-19.

II. CLASSROOM ENVIRONMENT (CE)

A classroom is based on many different things. It is a second teacher for any student, a large time of the student is spent sitting in the classroom. This is where various skills are learnt to achieve success in the global society. It is important to know the ways to manipulate the environment in order to receive effectiveness in instruction. Students come from different socio-economic backgrounds to converge in the classroom with a view to learning and acquire what would make them fulfilled in life. The classroom is the bestowal of knowledge. The classroom environment is both physical, psychological, emotional and aesthetical. CEs vary as school administrators, students, teachers and parents fashion and pattern them: interesting, comfortable, accessible, conducive boring, crowded, hot, noisy etc. Classroom design should enable the achievement of maximum efficiency. CE should not be static but dynamic.

“The old, more fixed, more static, more traditional classroom layoutis becoming obsolete. It just can’t support those new behaviors and activities and, in fact, gets in the way of them”

III. SEAN CORCORRAN, MANAGER, STEELCASE EDUCATION.

Classrooms or Learning Spaces should be flexible, multimodal, and collaborative. The learning environment should help students thrive; learning centres are like rooms inside the classroom, with sturdy bookshelves, area rug, age-appropriate activities like puzzles, tools, collection of different manipulative, tables, chairs, desks and benches. Specific areas for specific activities keep the child-focused. The child explores and uses imagination to engage with learning.

Teaching is more than just passing on facts to students. It is equipping, motivating, influencing and shaping children to be lifelong learners and successful adults; showing them how to be productive citizens. On social-emotional learning, when students trust the environment, they are more able and willing to learn. Show interest in the students by knowing them; listen to the students during meetings or through dialogue journals. The teacher has more power in setting the tone of the

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classroom environment. Use a positive reward system rather than emphasize the negative and punishment, focus on rewarding positive behaviour. Speak calmly, clearly, slowly, and gently to encourage confidence and kindness. Develop strategies to deal with stress and frustration as you endeavour to have one-on-one discussions with students who seem to be having challenges.

Class Size

The Glossary of Education Reform sees Class Size (CS) as the number of students in a given course or classroom. Specifically, either as the number of students being taught by individual teachers in a course or classroom, or the average number of students being taught in a school, district or education system. It may also refer to the number of students participating in learning experiences that may not take place in a traditional classroom setting. Leadner and Liora (2021) see CS as regular enrolment divided by the number of classes. Average Class Size (ACS) is commonly expressed as a ratio of students to teachers. Student-Teacher Ratio (STR) is different, as it expresses the relationship between the number of students enrolled in a school, district, or educational system and the number of full-time equivalent teachers employed. STRs are general ways to measure teacher workloads, resource allocations in public schools, amount of individual attention a child is likely to receive. It is often used as a broad indicator of the overall quality of a school, district, or education system. STR affects per-pupil spending or the average amount of money spent to educate students in a school, district or education system.

Most public schools in Nigeria have overpopulated and crowded classrooms, with the very poor environment and infrastructural decay. The ravaging covid-19 pandemic calls for social distancing, and the maintenance of other protocols. How may this be accomplished, given that even before the coming of the covid-19 pandemic, government policies and implementations have not favoured small class sizes? If teachers have fewer students, they can devote more time and attention to each student, including more time, diagnosing specific learning needs, critiquing work products and giving students one-on-one instruction and academic support, and observing the covid-19 pandemic protocols. If a teacher has, for example, six classes with 30 students each, he is responsible for 180 students. If each class is increased to 45 students, he is responsible for 270 students. This is a 50% increase in workload.

What is the average class size in public schools in Nigeria?

What are the effects of class size on students' academic achievement?

How may the issue of large class size be resolved in the face of inadequate budgetary allocation to the Education sector?

What roles are expected of stakeholders in Education?

No Child Left Behind (Public Law 107-120) sees student achievement as attendance rate, grade point average, discipline referrals, drop-out rate, co-curricular participation, standardized test scores by subgroup and by subject or other measures as indicators. With the rise in high stakes testing and a shift toward Common Core Standards, student achievement has been subjected to increased measurement and

accountability.

How are public schools dealing with the problem of underfunding?

While average class sizes may be reduced in a variety of ways, two main approaches are Educational Policy, and Funding Mechanism, reconfiguring the organizational and instructional systems in a school.

Confrey and Maloney (2014) identified class size to be related to non-cognitive skills, student ability, socioeconomic status, and different grades. Non-cognitive skills are personality traits that are weakly correlated with measures of intelligence, such as the intelligence quotient index. Non-cognitive skills are improved by small class sizes in promoting behavioural engagement by allowing teachers to limit disruptive behaviour as well as to encourage attentiveness and asking questions. Small class sizes may help teachers promote emotional engagement in the form of student interest and personal academic identification. Small classes may promote cognitive engagement by allowing teachers to assist students in flexible problem-solving in the face of challenges.

On student ability, low, medium and high achievers all benefit from being in small classes at near grades, across all achievement tests. **Student-Teacher Achievement Ratio (STAR)** was a study of 325 K-3 classrooms across 75 schools in Tennessee.

Small (13 to 17 students per teacher)

Regular (22 to 25 students per teacher)

Regular- with- aid class (22 to 25 students per teacher)

Low achievers are easily identified by teachers in small classes, have more chances to interact with the teachers. Class size reductions appear to both raise average attainment and help close achievement gaps between students with different ability levels. Class size expansion may reduce gains for low achievement students. To incentivize disengaged students is more effectively done in small classes; students can connect to the school setting in small classes.

Socioeconomic status (SES) schools could be classified into the inner city, suburban, rural, and urban. Small class sizes tend to increase academic achievement, particularly for low SES students.

Folger and Breda (1989) in their study of project STAR, found that K-3 grade students who attended small classes scored significantly higher than students in regular-size classes in reading and math as well as in other subtests of the Stanford Achievement Test each year of the project. The researchers further reported that academic gains in first grade were about 15% larger in small classes than in regular classes that it was more difficult to manage a large group of students who are not well socialized into classroom routines. Fewer (19.8%) small class students were retained, as compared with 27.4% of students in regular classes. Small class size seems to be more beneficial to students in elementary grades. Larger class sizes seem to have more discipline problems than smaller classes.

Some respondents to certain survey items on class size opined that:

“The smaller the class, the better the focus, less the distractions and more of time spent understanding things before moving on”

“more students, more problems”

“small class sizes seem to result in higher academic achievement”

Larger classes change the way a teacher can give feedback and the style of learning demonstrations that they can reasonably have students complete – multiple-choice, fill-in-the-blank, short answer, essay responses.

Suggested class size ranges:

Less than 15

15 to 19

20 to 24

25 to 29

30 to 35

Over 35

@ Ideal class size is less than 30

Whitehurst and Chingos (2011) giving their report on a study - Class Size: What Research Says and what it means for State Policy, opined that class size was one of the small numbers of variables in American K-12 education that are both thought to influence student learning and are subject to legislative action.

On Class Size Reduction (CSR), state resources for education should be carefully allocated concerning class size, human resource policies, funding levels, curriculum issue, days/ hours of instruction, testing and accountability. A report from the STAR project indicated that increasing the pupil/teacher ratio in the U.S. by one student would save at least \$12 billion per year in teacher salary costs alone. More classrooms are needed for smaller class sizes. Schools with different class sizes likely differ in many other, difficult-to-observe ways, e.g. more affluent schools are more likely to have the resources needed to provide smaller classes, which would create the illusion that smaller classes are better when in fact, family characteristics were the real reason. Major education initiatives do not operate in a vacuum. Policies designed to affect one dimension of a student’s educational experience are likely to affect others as well.

The class size limit in Israel is 40 students. Whenever there are more students in a grade than 40 per teacher, a teacher and classroom must be added. For example, 80 students would mean 40 students each in two classes, 81 students would mean 27 students each in three classes.

The trade-off between class size and teacher salaries needs to be very carefully considered. Effects on student achievement related to differences in teacher quality are very large; resources for education should always be judiciously allocated, but they need to carefully weigh costs and benefits is particularly salient in times of austere budgets.

What is the situation in Nigerian public schools?

Class size is almost an administrative decision over which teachers have little or no control.

What then should be done?

INFRASTRUCTURE AND RESOURCES

The National Policy on Education (NPE, 2013), section 8 identifies the goals of Educational Support Services to include:

(c) provide a conducive environment for learning;

(h) develop and promote the effective use of innovative materials in schools.

To achieve these goals, some services and facilities are to be provided. They include:

1. School library
2. School meals and incentives
3. School gardens
4. Health and other nutritional services e.g. sickbay, toilet facilities, potable water, first aid box
5. Sports and recreational facilities
6. Education Resource Centers (for teachers)
7. Laboratories and workshops
8. IT hardware and software development.

In addition to the above, No. 128 of the Policy stresses that there shall be a National Book Policy which shall devise strategies for book development in the country to enable the government to promote the development, production and distribution of books for all levels of education and encourage indigenous authorship.

Section 1 of NPE (2013) identifies:

- a) Education as an instrument for national development and social change
- b) Education to maximize the creative potentials and skills of the individual for self-fulfilment and general development of the society.

What tools are teachers using and how do they access the tools?

How do we interpret Infrastructure and Resources?

Ikoya and Onoyase (2008) defines Infrastructure as the operational inputs of every instructional programme and constitutes elements that are necessary for teaching and learning. They must be functional, and include buildings, laboratories, machinery, furniture and electrical fixtures. Education Infrastructure is to include suitable spaces to learn, which is one of the most basic elements necessary to ensure access to education. Examples are tents, temporary shelters, plastic sheeting, the shade of trees, places of worship, people’s homes etc.

Attributes of adequate infrastructure comprise:

- Sufficient space per child
- Sufficient space for 30 – 40 children per class
- Construction methods should ensure the safety of children
- Adequate separate sanitary facilities for boys and girls
- Increasingly, electricity and internet connectivity

Whenever the attributes above are identifiable, more classrooms will alleviate overcrowding; class size would be reduced; long travel distances by children would be discouraged

Qualitative and quantitative school infrastructure would fundamentally be:

- Potable water and sanitation
- Electricity (full and regular)
- Security
- School buildings and facilities
- Functioning library
- School transport
- Interactive smart and whiteboard
- Video conferencing facilities
- LCD projector

- IT hardware and software
- Virtual library
- Mathematics/science laboratories
- Regular access to internet connectivity
- Educational resource materials like kits and games
- NERDC approved educational materials
- Equipment (light and heavy-duty)
- CCTV and other security gadgets
- Fire extinguishers
- Conducive staff rooms and offices
- Adequate official school record materials
- Comfortable furniture for students and teachers

The education sector drives the manpower needed to catalyze national development, productivity, entrepreneurship, and global competitiveness. However, to what extent education would achieve these roles in a nation is contingent on proper policy implementation, funding and accountability. Inadequate infrastructural facilities and resources have grave repercussions, best imagined than experienced. Lack of teaching materials is a de-motivating factor to teachers, alongside poor conditions of service. Unattractive school buildings and overcrowded classrooms contribute to poor academic performance. Overcrowded classrooms have been linked with increased levels of aggression in students, which leads to a decreased levels of student engagement and learning.

Effective learning is enhanced by the provision of adequate educational facilities and school buildings in quantity and quality. Adeyemi and Farayola (2014) in a study to examine the impact of ICT in the teaching and learning of mathematics, found a significant difference in students' achievement on those exposed to ICT and those not exposed to it. It was suggested that the integration of ICT would improve educational achievement. Sunday and Adebowale (2013) enumerating ways of promoting effective teaching suggested the use of mathematics laboratory lesson approach. Andrew (2003) said that the accuracy of news today is measured differently; and that the internet should be used as a tool for communicating, optimizing workload, navigating the jungle of information, to be able to face the information challenges ahead.

Okechukwu and Al-janabi (2020) in the experimentation and the development of the psychomotor domain, opine that the pervasiveness of electronic equipment and accessibility of modern tools to teachers and students is germane to enhancing global information since technology rules the world. Udenka (2021) opine that the state of school infrastructure has been shown to have a major impact on perceived and actual educational quality and on sustained pupil access in Nigeria, as well as on teacher motivation. Community Participation for Action in the Social Sector (COMPASS) project noted that the self-help grants awarded to PTAs and generally used on infrastructural development hold not significantly improved the learning environment.

Ezeaku (2021) on the analysis of the provision of school building facilities in secondary schools indicated that school facilities require planning in its provision, utilization and maintenance to meet the increasing demand for education and enhance the maximum realization of the target set in the NPE.

They relied on the Resource Dependency Theory (RDT) propounded by Pfeffer and Salancik in 1978. RDT deals with how the external resources of the organization affect the behaviour of the organization. **Basic features of RDT are:**

- **Organizations depend on resources**
- **Those resources originate from an organization's environment**
- **The environment to some extent contains other organizations**
- **Resources are a basis of power.**

Organizations depend on multidimensional resources like labour, capital, raw materials etc. Critical resources not within the environment must be sourced. School facilities include the school buildings, classrooms, accommodation, libraries, furniture, recreational equipment, apparatus and other instructional materials; then availability, adequacy and relevance to academic achievement. Kivenule (2015) suggested that the provision of school facilities and buildings should be considered first before mounting an educational programme. Jacob (2020) investigating the perceived quality of infrastructure in selected Nigerian universities discovered that some departments in the universities borrow facilities and equipment to meet up with the standard of the Nigerian Universities Commission (NUC) accreditation exercise. They suggested the need to improve the level of infrastructural provisions in the universities to enhance effective teaching, learning and research.

The National Mathematical Centre (NMC), an Inter-University Centre of Excellence in the Mathematical Sciences has done some research, development and production of relevant educational resources in mathematics. They include:

- Mathematics textbooks Primary 1 -6, JSS 1- 3. SSS 1 – 3
- Mathematics teaching modules Primary 1 -6, JSS 1 – 3, SSS 1 – 3
- Mathematics workbooks Primary 1 – 6, JSS 1 – 3, SSS 1 – 3
- Mathematics Games and Accessories
- Perceived Difficult Concepts in secondary school mathematics
- Foundation postgraduate modules in mathematical sciences
- Mathematics kits for Basic education
- Mathematics kits for Senior secondary schools
- The Whiz Teacher – an Animated Classroom Electronic software
- Digital Mathematics Network Project (DIMANET)
- State of the art mathematics laboratory
- Computer laboratory
- Mathematical Sciences e-library.

What tools are teachers using?

- Predominantly, most teachers still use the conventional analogue tools
- The majority of teachers who own laptop computers only use them for very basic operations
- Accessing internet facilities is hampered by the power supply, data, and network issue
- Teachers are generally exposed to poor provision, inadequate and obsolete infrastructure and resources

How are teachers accessing the tools?

- Some of the teachers wait for the government/ schools to provide the basic tools
- If provisions are not made, your guess is as good as mine
- Few committed teachers go the extra mile to buy basic tools from their meagre income
- Many teachers are not conversant with the preponderance of information available on the web.

It should be noted that the provision of basic infrastructure and resources are *sine qua non* in the delivery of goals and objectives of education. Before setting up an educational programme, the issue of infrastructure and resources to drive the programme must first be settled.

- The government at all levels (federal/state/local) should be sincere in the provision of educational infrastructure and resources
- Government should have the political will to implement relevant policies and pronouncements as documented, especially in the NPE
- There should be entrenched in the system, credible and transparent monitoring and evaluation of resources allocated to the education sector
- School-Based Management Boards along PTAs should assist in ensuring conducive school environments for effective learning
- Teachers should invest more in self-professional development
- Critical educational matters should be legislated on, and implemented as obtainable in countries with the sound educational system,

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