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# **Comparative Assessment of Academic Performance in Mathematics in Urban and Rural Junior Secondary Schools in Apa Local Government Area of Benue State, Nigeria**

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### **Abstract**

This study was carried out a comparative assessment of academic performance in Mathematics in urban and rural Junior Secondary Schools in Apa Local Government Area of Benue State, Nigeria. The study uses a quasi-experimental design and the population of the study comprised 943 JSS 3 students in Apa L.G.A. of Benue State, Nigeria. Five (5) specific objectives, five (5) research questions and five null hypotheses were stated to guide the study. Mean and standard deviation were used to answer the research question while t-test statistics was used to test the hypotheses at 0.05 level of significant. The sample size of the study was two hundred (200) students drawn using simple random sampling and a

Mathematics Performance Test (MPT) was used as the instrument for data collection. The instrument was validated by two Mathematic Education experts, one expert test and measurement and two mathematics teachers and Kuder-Richardson 20 (KR-20) method was used to ensure the reliability of the instrument, yielding 0.85 for the entire test item, indicating a high level of internal consistency of the instrument. Based on the data collected and analyzed, the results obtained revealed that students in urban schools perform better in mathematics than students in rural schools. Also, the study revealed that female students in both urban and rural schools perform better than their male counterparts in mathematics. The poor performance of rural students could be attributed to unavailability of school facilities, poor funding, poor quality of teachers, low access to reading materials in schools, poor medical care, inadequate teaching materials, parents low socio-economic status, poor infrastructure and lacking quality instructional material and if some of the factors can be put to check it will help improve the performance of students in rural schools. The study recommends that the government and other educational agencies should put all these factors leading to the poor performance of student in rural schools into due consideration so as to help improve rural students' academic performance in mathematics and also supervise teachers in rural schools regularly to ensure they are carrying out their duties properly.

**Keywords:** Mathematics, Mathematics Education, Comparative Assessment, Urban Schools, Rural Schools, Apa, Basic Education

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## Introduction

The Nigerian National Policy on Education as stated in the policy guidelines (Federal Republic of Nigeria, 2004) aims at producing literate and numerate citizens who can think logically and scientifically for themselves. In order to give the students a sound scientific background, Mathematics is made a compulsory subject in our schools due to its foundational role in the study of basic sciences. Science subjects like physics, chemistry and biology are the building blocks for most scientific and technologically based courses including engineering, medicine, computer science etc. A careful look at these science subjects reveal that their basic principles hinge heavily on mathematics. In view of this, students' proficiency in mathematics is believed to enhance their performance in these subject areas. In spite of the importance attached to mathematics and the relevance of mathematics in the admission of students into tertiary institutions, a reasonable percentage of students in Nigerian secondary schools still underachieve in mathematics.

Mathematics according to Maliki, Ngban, and Ibu (2009) is described as a subject that "affects all aspects of human life at different degree". Dharmendra (2017) defines mathematics as the study of assumption, its properties and application. It is much more than algebra that is the language of symbols, size, shapes and space. It is also more than arithmetic that is the science of numbers and computation. Furthermore, it's more than numeric and trigonometry, which measure distance to the interpretation of data and graphs. Again, it's more than calculus that is the study of change, infinity and limits. It is an organized systematic and exact branch of science. That is to say the knowledge of Mathematics is essential in every phase of human endeavors. Mathematics as a father of all science and as well as an integral part of everyday life, play a vital role in every human.

Despite the fact, students themselves saw the need for the knowledge of Mathematics in almost all the subject learned in school.

Mathematics is a subject that is very important in every day to day activity. It forms the bedrock for other subjects be it pure science, social science, applied science or arts. Due to its importance, it was made a compulsory subject in schools such that failure in the subject may hinder a student from being promoted to the next class from gaining admission into a higher institution of learning. Mathematics also is a compulsory subject in all secondary school in Nigeria irrespective of the class of the student (junior or secondary) or the location of the school (urban or rural). Therefore, developing strong mathematical skills early in life is necessary for all students. Mathematics helps student develop general problem-solving skills. Furthermore, without the knowledge a strong knowledge foundation in early mathematics, students are not prepared to enroll in more advanced mathematics courses at high school and college level.

The performance of students in any academic task has always been of special interest to educators, parents and society at large. The primary concern of any educator who is entrusted with the responsibility of selecting students for any advance training program in a given field is the ability to estimate as accurately and as early as possible, the probability that such candidates will succeed or fail. Okereke (2006) attributes students' poor performance to factors such as the society's view that Mathematics is difficult, shortage of qualified Mathematics teachers, lack of Mathematics laboratory among others. The ability of the students to think critically and tackle Mathematical problems is also lacking and not well developed. These two core subjects, English Language and Mathematics, are very important for the present technological challenges (Olagunju, 2012) and even government, parents and guardians are complaining about this situation. This deplorable condition, when compared with huge sums of money spent on education annually, demands an urgent attention when aimed at addressing the abnormal (Adeniji, 2003). This situation informs many research efforts like those of Akinwumiju and Orimoloye (1997); Obilade (2006) and Oladebo (2006) which are pre-occupied with factors that are responsible for the dismal state of education in the country.

Scholars have defined academic performance in many ways. According to Maruff (2012), academic performance is the combined outcome of attitude and interest, though the two variables are positively correlated, a high value of one necessarily means a high value of the other. Academic performance of students is a vital indicator which policy makers, educational planners and other stakeholders in education are interested in. According to Aremu (2012), researchers who focus on the academic performance of students have continued to examine diverse phenomena that have been found to predict performance. He also contends that there have been a number of reviewers or researchers that have critically examined the relationship between certain explanatory constructs and academic performance with diverse findings. Yet, the battery of variables used to predict students' academic performance in formal face-to-face educational situations, may not adequately serve as predictors of academic performance (Kumar, 2012). Tata (2013) made his study in Nigeria and came out with findings that, students' negative attitude toward mathematics, fear of mathematics, inadequate qualified teachers and inadequate teaching

materials were some of the causes of poor performance in mathematics. Developing positive attitude, motivation and proper guidance toward mathematics and provision of relevant teaching materials could make students perform better in mathematics.

Nowadays, education is the most important aspect in society development. School has to play a major role in ensuring the successful of the development. As for students, they need to have good skills and have to be proactive with an appropriate futuristic set of mind. Besides that, students are also need to be active in co curriculum activity along with high academic achievement. The learning environments also have major roles to play in learning and the area where the students' lives can determine their performance in their studies. Reasons for the variations in achievement are geographic location, resources, availability of technology and also the quality of teachers. This study want to investigate the differences between students' performance in rural and urban areas. The purpose is to determine whether learning environment or living area is one of the factors that contribute to their low performance. Students' performance is their achievements in their studies whether they have low or high performance. Urban area relates to the area that are surrounding by cities and it is well populated areas compared to rural area which is sparsely populated areas and it usually farmland or country areas.

Urban area refers to the region which is densely populated and possesses the characteristics of the man-made surroundings (Surbhis, 2017). The people residing in such area are engaged in trade, commerce or services. In this settlement, there is high scale industrialization that results in better employment opportunities. The Urban settlement is not confined to the cities only, but towns and suburbs (suburban areas) are also included in it (Surbhis, 2017). There are many advantages of life in urban areas like easy access to various amenities, better transportation facilities, entertainment and education options, health facilities. Although it suffers certain drawbacks like pollution, caused due to large scale industrialization and means of transportation like buses, trains, cars and so on, leading to increasing in health problems in the people living in that area.

Rural areas are region located on the outskirts. It refers to a small settlement, which is outside the boundaries of a city, commercial or industrial area. It may include, countryside areas, villages or hamlets, where there are natural vegetation and open spaces. There is a low density of population in such area. The primary source of income of the residents is agriculture and animal husbandry. Cottage Industries also form a chief source of income here. Further, there is no municipal board, in the villages and maximum percentage of the male population are engaged in agriculture and related activities.

There are fundamental differences between urban and rural areas. A settlement where the population is very high and has the features of a built environment (an environment that provides basic facilities for human activity), is known as urban. Rural is the geographical region located in the outer parts of the cities or towns. Urban settlement includes cities and towns. On the other hand, the rural settlement includes villages and hamlets. There is greater isolation from nature in urban areas, due to the existence of the built environment. Conversely, rural areas are in direct contact with nature, as natural elements influence them. Urban people are engaged in non-agricultural work, i.e. trade,

commerce or service industry. In contrast, the primary occupation of rural people is agriculture and animal husbandry. Population wise, urban areas are densely populated, which is based on the urbanization, i.e. the higher the urbanization, the higher is the population. On the contrary, the rural population is sparse, which has an inverse relationship with agriculture. Urban areas are developed in a planned and systematic way, according to the process of urbanization and industrialization. Development in rural areas is seldom, based on the availability of natural vegetation and fauna in the region. When it comes to social mobilization, urban people are highly intensive as they change their occupation or residence frequently in search of better opportunities.

However, in rural areas occupational or territorial mobility of the people is relatively less intensive. Recent educational research has examined rural and urban differences in their achievement. Many educators, researchers, legislators and the general public believe that students from rural schools mostly receive an education that is inferior compared to the students that live in urban areas. Students background also impact on their performance where we can see that many of the students that lives in rural areas has low academic achievement when we compared it with the students that lives in urban areas. There are many factors that cause to the gap performance between students in rural and urban areas. Students in urban schools get many excess compared to students in rural schools. The National Education Association said that the low performing youth are in public rural schools (Brown & Swanson, 2001). The excellent performance of urban students is because of their better quality in their education, availability of the information that they get from various sources like mass media and electronic media, their educated families and peers groups which help them for better performance. They have many advantages and facilities in their education compared to rural students. Students in rural areas less exposed to the outside world and also lack of knowledge about the currents issues that happen.

Nowadays, students make use of computer- assisted problem-solving systems to better learn and understand mathematics. Some of these basic requirements needed for easy understand of mathematics may not be available or available at a minimal quantity rural schools and such may affect the performance of students in those areas. According to Oguntuas, Awe and Ajayi (2013), availability and adequacy of teaching/learning resources promote the effectiveness of schools as these are basic things that can trigger good academic performance in students. Also, the type of school attended by an individual is likely to have some educational implications on him or her either positively or negatively. Indeed, Ogunlade in Olagunju (2012) stated that a genius who attends an institution devoid of basic facilities for teaching and learning may find it difficult to display his or her ingenuity maximally whereas an average intelligent child who attends an institution where facilities for teaching and learning are available in quantity and quality may perform brilliantly.

In civilized and developed communities, schooling resources which cost money, including class size reduction, higher teacher salaries, modern school buildings and equipment, are positively associated with student outcomes. Although money alone may not be the only solution, the more equitable and adequate allocation of financial inputs to

schooling does provide opportunities for improving the equity and adequacy of outcomes. This notion was confirmed by Wenglinsky (1997), when he stated among other reasons, that economic resources that are spent judiciously are always associated with academic achievement. He further added that per-pupil expenditures on both instruction and administration of the school are positively related to class size, which in turn relates to student achievement.

The school population, according to Korau (2006), today, is in the thousands compared to mere hundreds many years ago. Consequently, schools are now overcrowded with some classrooms having too large a size that may seriously compromise mathematics teaching and learning. A student-teacher ratio of 40:1 may be considered adequate, but according to Unameh (2011) some schools in Nigeria are noted to have a 100:1 ratio, a situation that will never lead to any meaningful learning of mathematics no matter how capable the mathematics teacher may be. According to Asikhai (2010), the government recommendation for student-teacher ratio was 50:1, but it is obvious that this ratio can never be met with the astronomical increase in population experiencing currently.

In the Nigerian educational policy, one of the paramount goals is to provide equal educational opportunity for all citizens. However, in practice, this is rarely accomplished because of inequality in supply of facilities to schools and differences in quality and quantity of education given to students by their teachers. Even when the equal opportunity is given, they rarely result in equal academic achievement which leads to the belief that it is impossible to ensure both equality and quality education in real situation.

In Nigeria, there is a common believe that the standard of education is falling and the education provided in rural area is very poor when compared to the quality of education received in urban area due to the environment in the rural area that is not conducive for learning. Our rural areas are laden with poverty, inadequate water supply, poor electricity supply and poor learning environment. It is known that most schools in the rural areas are poorly staffed; it was also asserted by Solarin (2001) “that most schools in the rural areas feather their nest including under-privileged schools in the rural areas with not teachers”. These factors have direct influence on the teaching and learning of mathematics. The better performances of urban students when compared to rural students could be as a result of better quality of education given to urban schools and availability of infrastructural facilities like mass media and electronic media.

Olanipekun and Okunrotifa (2008) also noted that apart from the inadequate academic background of the students and limited resource for teaching, the quality of teaching offered in rural schools is also a major concern due to lack of practical approach in the teaching of mathematics. In rural schools it is observed that talk-chalk method is majorly used in the teaching of mathematics. Educational facilities like: necessary instructional materials, well trained teachers, uncrowned class setting, access to online study, provision of needed text books, and standard school library are mostly available to students in urban areas and are mostly not available to students in rural areas.

Rural settlement might have an inherent danger if the necessary facilities are not in place to stimulate learning as well as boost academic performance. One can thus assess the

effective utilization of various facilities available and their shortages both in the rural and urban settlements respectively. Rural schools however do not always have access to the same level of funding as urban schools, which can limit the opportunity students have for learning mathematics. Despite these challenges many rural schools offer unique factors that are associated with Mathematics achievement, such as smaller class size and community cohesiveness.

This study therefore will consider whether attending a school in a rural or urban community is related to student's performance in Mathematics in junior secondary school in Apa Local Government Area of Benue State, Nigeria.

## Statement of the Problem

Performance is the translation of potentials while learning is the change in behavior potentials. Student's performance in urban schools could be higher than rural schools probably due to a good parental social-economic status; as it may give them an ample opportunity for the child's upbringing, such as good educational opportunities, reading materials, better medical facilities, exposure to information, greater recreational and computer entertainment facilities, electricity, access to modern communication facilities, access to self-determination opportunities. It has been observed that educational achievement of students in Mathematics varied according to location along with the urban and rural environment where student live.

Therefore, it became imperative to access and compare the academic performance of students in Mathematics in junior secondary schools. This pertinent discrepancy in academic performance due to location form the problem of this study.

## Literature Review

### Theoretical Frame Work

#### Skinnerian environmental theory (Skinner, 1948)

This theory is based on the fact that environment is vital for the achievement of educational goal. The origin of environmental theories can be traced to a known psychologist named John Locke (1917). He is the father of the learning tradition. He postulated that experience and learning are basic and very essential to understanding of human behavior. The environmental approaches conceive human behavior as something that is acquired through the process of interaction with the environment, rather than inherited. According to this model, behavioral development is controlled by and is a function of the physical and psycho-social environment (Labara in Ngwoke, 1997). Children's development is believed to be shaped by the pattern of reinforcement it receives from the environment.

Skinner (1948) contributed in shaping the views expressed by environmental approach. It includes the work of such people as Thorndike Toleman, Guthrie and Hull. These writers have these basic assumptions about the process of learning. These are: Learning is manifested by a change in behavior, and the environment shapes behavior.

Therefore, learning is the acquisition of new behavior through conditioning. The current study is therefore, being anchored on Skinnerian environmental theory.

The Skinnerian environmental theory has direct implication for the comparison of the academic performance of students in Mathematics in urban and rural junior secondary schools because a major argument of the theory is that environment is vital for the achievement of educational goal. This implies that, a student in a more conducive learning environment can perform better in Mathematics than his/her in a non-conducive environment which is the case in most rural secondary schools in Nigeria. The theory also asserts that Children's development is believed to be shaped by the pattern of reinforcement it receives from the environment. This gives a basis for the present study to compare the academic performance of students in Mathematics in urban and rural junior secondary schools since the environments in urban and rural schools are different and may affect the performance of students in Mathematics.

## **Conceptual Framework**

### **Academic Performance**

Kanshew (2003) views performance as the output result and its outcomes obtained from processes, products and services that permit evaluation and comparison relative to goals, standards, past results and other organization. According to Maruff (2012), academic performance is the combined outcome of attitude and interest, though the two variables are positively correlated, a high value of one necessarily means a high value of the other. Academic performance of students is a vital indicator which policy makers, educational planners and other stakeholders in education are interested in. According to (Otoo, 2007), academic performance refers to the capacity to achieve when one is tested on what one has been taught, which relates to curriculum content, the learner's intellect, and hence depends on the learner's competence. Olamie (2005) opines that academic performance refers to how pupils deal with their studies, how they cope with or accomplish different tasks given to them by their teachers. It is, also, the ability to study and remember facts and being able to communicate knowledge verbally or down on paper.

It therefore infers that a student's academic progress is usually inferred from the score assigned to his/her performance in achievement test when evaluated; such scores are directly related to the student's level of performance. In comparing a student's actual performance score to his aptitude test score; a student's actual performance in an achievement test score may be poor, when compared well with intelligence and such students are said to be low achievers, such student's poor performance are as a result of the low limit of their learning capacity beyond which they are unable to perform. The probability of an effort leading to a particular performance is often affected by the effectiveness of tools with which one makes the effort. The learning condition of many schools may be poor; they lack effective and sufficient equipment, tools and apparatus to work with. Akagwu in Omotayo (2009) share the same view maintaining that the level of academic performance which student does achieve is dependent on their individual activities amongst other factors.

### **The Junior Secondary School**

A National policy on Education for Nigeria in 1982 began to show a sign of anticipation for a six year course that would be completed in two 3 (three) year stages called the junior secondary and senior secondary schools. This is referred to as the 3-3 tier system.

Nigeria is currently using the 6-3-3-4 schemes and it implies the following:

- i. 6 years in primary school
- ii. 3 years in junior secondary school
- iii. 3 years in senior secondary school
- iv. 4 years (average) in tertiary institution

Junior secondary school (JSS) was established with the intention of giving pre-vocational and academic training in basic knowledge and skills and it last for duration of three years. It is a compulsory program for all pupils who have completed their primary school education to pass through junior secondary schools before they will be admitted into senior secondary school in Nigeria.

### **Urban Schools**

These are schools that are located in cities and towns with high population densities. These schools are well equipped with modern educational facilities which enhance smooth learning of the pupils. Pupils in this area are usually more intelligent compared to those in the rural areas which can be influenced by their environment (Piaget, 1950) and background. Ezewu (2006) reveal that people of high socio-economic status provide their wards/children with books and the necessary school materials. He also points out that some families have a standard formula for spending a proportion of their income in these aspects of their children's schooling. Teachers in the urban areas are well motivated in terms of teaching environment, salary, modern teaching aids which facilitates higher inputs in service rendering (teaching).

### **Rural Schools**

These are schools located in areas of low population densities situated in the villages. These schools lack modern educational facilities which enhance proper learning of the child. Omotayo (2009) maintain that high socio-economic goals are well balanced to educational materials while low socio-economic homes are not. Omotayo (2009) further stressed that children in rural places have over-crowded rooms. Such rooms may lack chairs or tables for children to use in reading and educational materials for the children to read. Children from such areas can hardly perform well like their counterparts in urban areas. It has been observed from empirical studies that children from poor socio-economic homes are handicapped directly by higher rates of sickness, poor rate of attendance at school, which in turn affects the performance of such child (Haruna & Onyebu, 2011).

### **Challenges Facing Educating Nigeria Child in the Rural Area**

To Omotayo (2009), the following factors affect the performance of students especially in the rural area: Parent children relationship, domestic works such as hawking which is most perennial among rural children's, parents' level of education, environmental and so on. Haruna & Onyebu (2011) observed that in Nigerian rural areas some children are kept at home on market days and after school hours to hawk around. Those children have the

little or no time to go through their school works. In a report, Ikwuba (2010) confirmed that, it is not rare in rural Nigeria to see cases of 100 students under a teacher or students sitting under trees outside the school building because of lack of classrooms. Majority of secondary schools lack water, electricity, and toilet facilities. The report also highlighted that not only poverty of income exists in the rural areas but that of ideas as majority of the rural dwellers are illiterate. Illiterate parents are blunt tools in the academic life of a learning child. They cannot assist the child in assignments, insist upon successful behavior, understand the value of investing in education of their child, encourage and motivate the child (Ekong, 2003). Parental role in children's upbringing is a crucial one, the economic pressures on the average Nigerian family today is a serious factor to be considered when talking about parental responsibility to children's education and upbringing (Salawu, 2004). In the Nigeria's National Policy on Education (FRN 1998), it is stated that the Federal Government has adopted education as an instrument for effecting National Development in all areas of the nation. However, this does not reflect the situation in rural Nigeria where there is overwhelming widespread of illiteracy.

Education in rural Nigeria is characterized with very poor infrastructure, insufficient academic staff, insecurity, and non-payment of academic staff among others. It is common knowledge that majority of the population in developing countries like Nigeria live in rural areas. Nigeria is predominantly a rural society as the vast majority of her population lives in rural area. Generally, rural areas in Nigeria are incessantly neglected by the government when it comes to development of any form, educational development inclusive.

Despite the fact that rural dwellers in Nigeria are usually not recognized on government development activities, the nation's wealth is derived from rural areas across the country. Crude oil, limestone, coal among other resources possessed by the country are hugely deposited in rural areas. The under-development in Nigeria as a country has been linked to lack of development in the rural areas. A view states that no serious, active, conscious, sensitive, and organized government would want to neglect rural communities. Lack of development has a positive correlation with the neglect of rural areas. Rural neglects brings negative consequences such as exodus of rural dwellers to urban areas, with resulting problems of unemployment, crimes, prostitution, child labor, insecurity, money laundering, bribery, poverty, proliferation of shanty living areas, spread of diseases, and overstretching of the facilities and infrastructures in the urban areas.

Education is to a nation what the mind is to the body, just as a diseased mind is handicapped in the coordination and direction of the bodily activities. Therefore, the single most significant complex of social – control tools for national development is found in the educational system. Since majority of the population still live in rural areas, education which is believed to be the bedrock of any serious nation's development should be experience serious development in rural areas, hence it is expected of Nigeria's government and relevant stakeholders to take the issues of education in rural areas seriously. Challenges confronting rural education in Nigeria include:

- i. *Lack of Infrastructure:* There is a huge infrastructural deficit in rural education development in Nigeria. Majority of the rural schools are poorly built and very

- old with damaged roofs and walls. Other educational facilities such as chairs and tables are usually not sufficient; libraries and mathematics laboratories do not exist in many rural schools.
- ii. *Poor Legislative Oversight Duty*: Legislative oversight duty is a serious way the legislature can check the executive by supervising projects awarded and asking important questions on budget and expenses on such project. However, the legislators have performed poorly in their oversight function. Thus, some of the approved rural schools are not well constructed or not constructed at all.
  - iii. *Insufficient Academic Staff*: There has been an incessant shortage of academic staff in rural schools for many years in Nigeria. This explains why a teacher can be saddled to teach two or more subjects/courses, sometimes outside his/her discipline.
  - iv. *Poor Learning Facilities*: Learning facilities in rural Nigeria are in very poor conditions, if at all they exist. Computer laboratories, internet and other things that will expose the children to global standard in their studies are absent.
  - v. *Poverty*: This is an underlining factor in Nigeria as a whole. People in rural areas live below a dollar daily. The poverty level is so high for them to afford schooling opportunities for their children.
  - vi. *Corruption*: This problem has affected Nigeria negatively in all sectors. Embezzlement of educational funds, scholarship and grants has marred the effort to develop education in rural Nigeria.

### **Effect of Rural Areas Characteristic on Educational Development in Nigeria**

There is no doubt that child's education is a function of the heredity and environmental factors as stated by many writers in the field of education. The nature and characteristics of the environment under which child is brought up often makes significant impact on his/her social, economic and educational development, it affects his interest and attitude towards schooling (Haruna & Onyebu, 2011). It is therefore; very imperative to conclude that nature of Nigerian rural areas affect child's educational opportunities, interest and attitude which may in turn affect the educational development of the nation.

It has been stated that the majority of the rural populace of Nigeria are poor and live in abject poverty. The implications of this to child's education and national development are that parents cannot meaningfully support the educational pursuit of their children, this led to reason why such children engaged into petty trading and hawking before going to or instead of going to school. This also affects child's punctuality and regular attendance of school which results in poor performance of pupils or sometimes withdrawal from school.

Also, poor physical developmental condition of the rural areas of Nigeria is also not favorable to the development of child education well as national development. This is so because many writers observed, rural areas in Nigeria are characterized by such under developmental conditions such as in adequacy or lack of basic social amenities as portable drinking water, electricity supply, good road network, health care services and social networks. This grossly affects the quality of education to be received by rural child in

Nigeria as most teachers' resist being posted to serve in such places which may result into acute shortage of teachers in the village school.

Ignorance and high level of illiteracy among rural populace also affects their attitude towards education of their wards; hence it results into low enrolment rate in schools. Haruna (2011) stated that level, and quality of education given to the citizen of a nation has significant effect on the National development. Because education help to provide people with the necessary skills, knowledge, and attitudes that will enable them to effectively participate and contribute towards the development of their nation. Therefore, there is need for adequate funding of education so as to cater for the UNESCO standard of budgetary allocation to education of any nation, consequently infrastructural facilities such as: teaching and learning materials, libraries, laboratories, sport and practical materials, gardens and equipment need to be adequately procured especially in rural schools.

### **Teaching and Learning of Mathematics**

The Cockcraft Committee (1982), reports about the teaching style and methodology that, Mathematics teaching at all levels should include opportunities for: exposition by the teacher discussion between teacher and students and between the students themselves, appropriate practical activities, consolidation and practice of fundamental skills and routines, problem solving including the application of mathematics to everyday situations and investigational work. However, the report says that the list of opportunities does not guarantee good methodology. It is the context in which these activities take place, the importance attached to it and the relationship between them that are the real determine factors. Activity based methods of teaching depend significantly on the incorporation of suitable learning resources. The use of resources is critical in ensuring that learners develop an appreciation and enjoyment of Mathematics through a variety of appropriate practical activities. The use of resources and the resulting activities enhance students' understanding of Mathematical concepts. It is important for the teacher to identify well in advance the resources needed for a particular lesson and develop a clear understanding of the role the teaching/learning resources will play in the lesson. Textbooks, teacher's guidebooks and the syllabus are crucial in the teaching of Mathematics.

Mathematics teachers had on several accounts been judged as the main determinant in the success or failure of students in the subject. This is true for many reasons; according to Idowu (2015), "they are the main custodians of students, the way and manner they perform this role is important". Because of this, mathematics teachers are expected to have the required knowledge necessary for teaching as well as the ability to disseminate such knowledge appropriately that will result in learning. Mathematics teachers, according to Soer (2009), should be able to communicate the required knowledge in a clear, informative and precise manner to their students. This, unfortunately, according to Okafor and Anaduaka (2013), is not being done by the mathematics teachers. According to both researchers, most teachers are not ready to go the extra length in their teaching.

Use of necessary facilities like media is essential in the teaching of Mathematics because: It increases learners' motivation by creating a conducive atmosphere which is

stimulating, interesting and intellectually rewarding. Motivation increases because of the learning resources' concreteness and appeal. The level of motivation will depend on how the teacher organizes the class for the utilization of the resource; it leads to sharing of ideas, thought, feelings and knowledge. This sharing leads to persuasion to change his / her attitudes or to adopt desirable responses or actions, It can be tailored to the abilities and needs learners each of which has a preferable way of learning e.g. through sight experience, learning etc for example, media can be used to structure learning experiences for the under achievers, It enhances learning, increases perception, understanding and reinforcement and hence retention of what has been taught. Okereke (2006) attributes students' poor performance to factors such as the society's view that Mathematics is difficult, shortage of qualified Mathematics teachers, lack of Mathematics laboratory among others.

Tata (2013) made his study in Nigeria and came out with findings that, students' negative attitude toward mathematics, fear of mathematics, inadequate qualified teachers and inadequate teaching materials were some of the causes of poor performance in mathematics. Developing positive attitude, motivation and proper guidance toward mathematics and provision of relevant teaching materials could make students perform better in mathematics.

In a study conducted by Avong (2013), shortage of qualified mathematics was judged to be the most contributing factor to poor performance by her participants in a study conducted in a remote in Kaduna state. Teachers' attitudes had also been linked to students' poor performance in a study conducted by Osunde and Izevbogie (2006). In this study, 400 Nigerian post primary school teachers' attitudes toward the teaching profession were sorted. They discovered that issues like delay in payment of salaries and poor financial remuneration contributed to a low attitude of teachers in the teaching profession.

A limited number of researchers have cited reasons for poor mathematics achievement among disadvantaged learners in the classroom situation. The following paragraphs will outline some of these reasons. According to Gourgey (1992) the following reasons were stated as poor achievement by many learners, let alone among disadvantaged learners:

- i. Feeling of being powerless when mistakes are made and not knowing how to correct them.
- ii. Distrust of own intuition.
- iii. Mathematics is emotionally charged, evoking strong feelings of aversion and fear of failure.
- iv. Mathematics is seen as a subject to be performed by applying algorithms dictated by higher authority, rather than understanding underlying logical principles.

## **Purpose of the Study**

The purpose of the study is to compare the academic performance of students in Mathematics in urban and rural junior secondary schools in Apa Local Government Area of Benue State. Specifically, the study seeks to:

- i. To compare the academic performance of students in Mathematics in urban and rural Junior Secondary Schools in Apa Local Government Area of Benue State, Nigeria.
- ii. To compare the academic performance of male and female students in Mathematics in urban Junior Secondary Schools in Apa Local Government Area of Benue State, Nigeria.
- iii. To compare the academic performance of male and female students in Mathematics in rural Junior Secondary Schools in Apa Local Government Area of Benue State, Nigeria.
- iv. To compare the academic performance of male students in Mathematics in urban schools and male students in rural Junior Secondary Schools in Apa Local Government Area of Benue State, Nigeria.
- v. To compare the academic performance of female students in Mathematics in urban schools and female students in rural Junior Secondary Schools in Apa Local Government Area of Benue State, Nigeria.

## **Research Questions**

The following research questions guided the study:

- i. What is the mean difference between the academic performance of students in Mathematics in urban and rural Junior Secondary Schools in Apa Local Government Area of Benue State, Nigeria?
- ii. What is the mean difference between the academic performance of male and female students in Mathematics in urban Junior Secondary Schools in Apa Local Government Area of Benue State, Nigeria?
- iii. What is the mean difference between the academic performance of male and female students in Mathematics in rural Junior Secondary Schools in Apa Local Government Area of Benue State, Nigeria?
- iv. What is the mean difference between the performance of male students in Mathematics in urban schools and male students in rural Junior Secondary Schools in Apa Local Government Area of Benue State, Nigeria?
- v. What is the mean difference between the academic performance of female students in Mathematics in urban schools and female students in rural Junior Secondary Schools schools in Apa Local Government Area of Benue State, Nigeria?

## **Hypotheses**

The following hypotheses are stated and tested at 0.05 significance level in the study:

- i. There is no significant difference in the academic performance of students in Mathematics in urban and rural Junior Secondary Schools in Apa Local Government Area of Benue State, Nigeria.
- ii. There is no significant difference in academic performance of male and female students in Mathematics in urban Junior Secondary Schools in Apa Local Government Area of Benue State, Nigeria.

- iii. There is no significant difference in the academic performance of male and female students in mathematics in rural Junior Secondary Schools in Apa Local Government Area of Benue State, Nigeria.
- iv. There is no significant difference in the academic performance of male students in Mathematics in urban schools and male students in rural Junior Secondary Schools in Apa Local Government Area of Benue State, Nigeria.
- v. There is no significant difference in the academic performance of female students in Mathematics in urban schools and female students in rural Junior Secondary Schools in Apa Local Government Area of Benue State, Nigeria.

## Methodology

### Design of the Study

This study uses a quasi- experimental design. Abah (2020) states that a quasi- experimental design is used in comparing a group that gets a particular intervention with another group that is similar in characteristics and also for comparing results that are both statistically significant and meaningful. Therefore, a Quasi experimental design was considered appropriate for this study to compare the academic performance of junior secondary school students in secondary schools in urban and rural areas of Apa Local Government Area in Benue State, Nigeria.

### Area of the Study

The area of this study is Apa Local Government Area of Benue State, Nigeria. Apa local government area with headquarters in Ugbokpo is one of the councils created in August 1991. The local government area shares boundary with Agatu, Otukpo and Gwer West local government areas of Benue State to her north, south and east respectively while to her west, she is bordered by Ankpa and Omala local government areas of Kogi State. Other towns and villages in the local government area aside from Ugbokpo include Iga-Okpaya, Ikobi, Odugbo, Oiji, Ofoke, Oba Alifeti, Idada, Ojantela, Edikwu-Icho and Ogbobi. The people of the Apa Local Government Area predominantly speak a dialect of Idoma language.

The choice of Apa LGA of Benue State, Nigeria, as an area of study is because literature reviewed that not much have been carried out on the topic under study in the area.

### Population of the Study

The population considered in this study is junior secondary school students in both urban and rural settlements in Apa Local Government Area of Benue State. The target population is 943 SS1 (recently promoted from JSS 3 after taking BECE) students in Apa L.G.A OF Benue State, Nigeria (Area Education office-Apa L.G.A (2019/2020)).

### Sample and Sampling Technique

The sample comprises 200 secondary school students in SS1 (recently promoted from JSS 3 after taking BECE). In sampling, eight secondary schools will be randomly selected from within Apa Local Government Area; Four (4) secondary schools in urban settlements and four (4) from rural settlements will be randomly selected. Consequently, twenty five (25)

students will be selected randomly from each of the eight (8) schools making a total of two hundred (200) SS1 students (recently promoted from JSS 3 after taking BECE).

In order to obtain a feasible and accurate data, the researcher will visit selected secondary schools in the research area and seek the permission of school management to allow some of their teachers to assist in administering the test on the students. The results from this test questions will be used as raw data for analysis in the study.

#### **Instruments for Data Collection**

The instrument for data collection for the study was Mathematics Performance Test (MPT) and all questions were adopted from Basic Education Certificate Examination (BECE) past questions, standardized by the Benue State Examination Board (BSEB). This test was administered on the students in the rural/urban settlements in Apa L.G.A Benue State.

The Mathematics performance Test (MPT) consists twenty (20) test questions adopted from Basic Education Certificate Examination (BECE) past questions and time allowed for the test was twenty (20) minutes. The MPT test tends to ascertain the academic achievement of the students in Mathematics.

#### **Validation of the Instrument**

To validate the instrument, one expert in Measurement and Evaluation and two experts in Mathematics Education from the College of Agriculture and Science Education of Joseph Sarwuan Tarka University, Makurdi, and two mathematics teachers from different secondary schools examined the instrument and made all necessary corrections, amendments and suggestions. Content and face validity of the instrument was conducted in which experts validate the instrument to determine the accuracy, relevance, clarity and total coverage of the content and the appropriateness of the instructions. The validations yielded a total of 20 after an initial effort of 30 items were subjected to thorough scrutiny. For instance question that were not within the Benue State Education Board syllabus were removed and question option in the answer like 'none of the above' were also detected and removed.

#### **Reliability of the Instrument**

To ensure that the instrument for the study was reliable, a trial-test was conducted using the final extract from validated instrument and was administered to 25 students outside the scope of the study location. And the result from the reliability was analyzed using Kuder-Richardson 20 (KR-20) yielding 0.85 for the entire test item, indicating a high level of internal consistency of the instrument. Kuder-Richardson 20 was used because the test item follows a dichotomous response pattern.

#### **Method of Data Collection**

The instrument will be administered by the researcher with the aid of some of the mathematics teachers in the selected schools. The researcher and the teachers will administer and supervise the students during the test and the test will last for 20 minutes. The test questions will be answered on the spot and returned to the researcher/teacher.

### Method of Data Analysis

In analyzing the data, descriptive statistics (means and standard deviation) is used to answer the research questions while the inferential statistics (t-test) will be used to test the hypotheses of the study. The t-test was used because it provides an appropriate measure of statistically significant differences between two independent random samples from normal population who variances are not necessarily equal.

## Results

The presentation of data analysis and interpretation for this study was done according to the research questions and followed by related hypotheses.

### Research Question One

What is the mean difference between the academic performance of students in Mathematics in urban and rural junior secondary schools in Apa Local Government Area of Benue State, Nigeria?

**Table 1: Analysis of Data on the Academic Performance of Students in Urban and Rural Junior Secondary Schools in Mathematics**

Variables (X)	N	Mean	Std. Deviation
Urban	100	70.85	16.393
Rural	100	33.30	13.031
Mean Difference		37.55	

Table 1 shows that the mean score of students from urban schools is 70.85 while that of students from rural schools is 33.30. The mean difference between the two groups is 37.55 in favour of urban schools. This result indicates that students in urban schools performed better than their counterparts in rural schools in Mathematics.

### Research Question Two

What is the mean difference between the academic performance of male and female students in Mathematics in urban junior secondary schools in Apa Local Government Area of Benue State, Nigeria?

**Table 2: Analysis of Data on the Academic Performance of Male and Female Students in Urban Junior Secondary Schools in Mathematics**

Variables (X)	N	Mean	Std. Deviation
Urban (Male)	50	68.40	16.612
Urban (Female)	50	73.30	15.959
Mean Difference		4.90	

Table 2 shows that the mean score of male students is 68.40 whereas that of female students is 73.30. The mean difference between the two groups is 4.90 in favour of female students in urban schools. This finding implies that female students performed better than male students.

**Research Question Three**

What is the mean difference between the academic performance of male and female students in rural junior secondary schools in Apa Local Government Area of Benue State, Nigeria?

**Table 3: Analysis of Data on the Academic Performance of Male and Female Students in Rural Junior Secondary Schools in Mathematics**

<b>Variables (X)</b>	<b>N</b>	<b>Mean</b>	<b>Std. Deviation</b>
Rural (Male)	50	30.90	12.924
Rural (Female)	50	35.70	12.818
Mean Difference		4.80	

Table 3 shows that the mean score of male students is 30.90 whereas that of female students is 35.70. The mean difference between the two groups is 4.80 in favour of females in rural schools. This finding implies that female students performed better than male students in mathematics in rural schools.

**Research Question Four**

What is the mean difference between the performance of male students in Mathematics in urban schools and male students in rural junior secondary schools in Apa Local Government Area of Benue State, Nigeria?

**Table 4: Analysis of Data on the Academic Performance of Male Students in Urban Junior Secondary Schools and Male Students in Rural Junior Secondary Schools in Mathematics**

<b>Variables (X)</b>	<b>N</b>	<b>Mean</b>	<b>Std. Deviation</b>
Urban (Male)	50	68.40	16.612
Rural (Male)	50	30.90	12.924
Mean Difference		37.50	

Table 4 shows that the mean score of male students in urban schools is 68.40 while that of their male counterparts in rural schools is 30.90. The mean difference between the two groups is 37.50 in favour of male students in urban schools. This result implies that male students in urban schools performed better than their counterparts in rural schools.

**Research Question Five**

What is the mean difference between the academic performance of female students in Mathematics in urban schools and female students in rural junior secondary schools in Apa Local Government Area of Benue State, Nigeria?

**Table 5: Analysis of Data on the Academic Performance of Female Students in Urban Junior Secondary Schools and Female Students in Rural Junior Secondary Schools in Mathematics**

Variables (X)	N	Mean	Std. Deviation
Urban (Female)	50	73.30	15.959
Rural (Female)	50	35.70	12.818
Mean Difference		37.60	

Table 5 shows that the mean score of female students in urban schools is 73.30 while that of their female counterparts in rural schools is 35.70. The mean difference between the two groups is 37.60 in favor of female students in urban schools. This result implies that female students in urban schools performed better than their counterparts in rural schools

**Hypothesis One**

There is no significant difference in the academic performance of students in Mathematics in urban and rural junior secondary schools in Apa Local Government Area of Benue State, Nigeria.

**Table 6: t-test Analysis of the Academic Performance of Students in Urban and Rural Junior Secondary Schools in Mathematics**

Variable	N	Mean	S.E	df	t-cal	t-crit	Decision
Urban	100	70.85	1.639	198	17.931	1.972	Reject $H_0$
Rural	100	33.30	1.303				

$\alpha = 0.05$

Table 6 shows the t-cal as 17.931 while the critical value is 1.1972 at 198 degrees of freedom (df) and a significant level of 0.05. Since the value of t-cal is greater than the critical value, the null hypothesis is rejected. This implies that there is a significant difference in the academic performance of students in urban and rural schools in favor of the urban schools in Mathematics.

**Hypothesis Two**

There is no significant difference in academic performance of male and female students in Mathematics in urban junior secondary schools in Apa Local Government Area of Benue State, Nigeria.

**Table 7: t-test Analysis of the Academic Performance of Male and Female Students in Urban Junior Secondary Schools in Mathematics**

Variable	N	Mean	S.E	df	t-cal	t-crit	Decision
Urban (Male)	50	68.40	2.349	98	-1.504	1.984	Accept $H_0$
Urban (Female)	50	73.30	2.257				

$\alpha = 0.05$

Table 7 shows the t-calculated as -1.504 while the critical value is 1.984 at 98 degrees of freedom (df) and at a significant level of 0.05. Since the value of t-calculated is less than the critical value, the null hypothesis is accepted. This implies that there is no significant difference in the academic performance of male and female students in urban schools.

**Hypothesis Three**

There is no significant difference in the academic performance of male and female students in mathematics in rural junior secondary schools in Apa Local Government Area of Benue State, Nigeria.

**Table 8: t-test Analysis of the Academic Performance of Male and Female Students in Rural Junior Secondary Schools in Mathematics**

Variable	N	Mean	S.E	df	t-cal	t-crit	Decision
Rural (Male)	50	30.90	1.828	98	-1.865	1.984	Accept $H_0$
Rural (Female)	50	35.70	1.813				

$\alpha = 0.05$

Table 8 shows the t-cal as -1.865 while the critical value is 1.984 at 98 degrees of freedom (df) and a significant level of 0.05. Since the value of t-cal is less than the critical value, the null hypothesis is accepted. This implies that there is no significant difference in the academic performance of male and female students in rural schools.

**Hypothesis Four**

There is no significant difference in the academic performance of male students in Mathematics in urban schools and male students in rural junior secondary schools in Apa Local Government Area of Benue State, Nigeria.

**Table 9: t-test Analysis of the Academic Performance of Male Students in Urban and Male Students in Rural Junior Secondary Schools in Mathematics**

Variable	N	Mean	S.E	D.F	T-cal	T-crit	Decision
Urban (Male)	50	68.40	2.349	98	12.599	1.986	Reject $H_0$
Rural (Female)	50	30.90	1.828				

$\alpha = 0.05$

Table 9 shows the t-cal as 12.599 while the critical value is 1.986 at 98 degrees of freedom (df) and at a significant level of 0.05. Since the value of t-cal is greater than the critical value, the null hypothesis is rejected. This implies that there is a significant difference in the academic performance of male students in urban schools and male students in rural schools in favor of the male students in urban schools.

**Hypothesis Five**

There is no significant difference in the academic performance of female students in Mathematics in urban schools and female students in rural junior secondary schools in Apa Local Government Area of Benue State, Nigeria.

**Table 10: t-test Analysis of the Academic Performance of Female Students in Urban and Female Students in Rural Junior Secondary Schools in Mathematics**

Variable	N	Mean	S.E	df	t-cal	t-crit	Decision
Urban (Female)	50	73.30	2.257	98	12.989	1.986	Reject $H_0$
Rural (Female)	50	35.70	1.813				

$\alpha = 0.05$

Table 10 shows the t-cal as 12.989 while the critical value is 1.986 at 98 degree of freedom (df) and at a significant level of 0.05. Since the value of t-cal is greater than the critical value, the null hypothesis is rejected. This implies that there is a significant difference in

the academic performance of female students in urban schools and female students in rural schools in favor of the female students in urban schools.

### Summary of the findings

- i. Urban students perform better in mathematics than their counterparts in rural schools.
- ii. Female students in urban schools perform in mathematics better than male students in urban schools.
- iii. Female students in rural schools perform better in mathematics than male students in rural schools.
- iv. Male students in urban schools perform better in mathematics than their male counterparts in rural schools.
- v. Female students in rural schools perform better in mathematics than their female counterparts in rural schools.
- vi. There is a significant difference in the academic performance of students in urban and rural schools in mathematics in favor of students in urban schools.
- vii. There is no significant difference in the academic performance of male and female students in mathematics in urban schools.
- viii. There is no significant difference in the academic performance of male and female students in mathematics in rural schools.
- ix. There is a significant difference in the academic performance of male students in urban schools and male students in rural schools in mathematics in favor of male student's urban schools.
- x. There is a significant difference in academic performance of female students in urban schools and female students in rural schools in mathematics in favor of female students in urban schools.

### Discussion of Findings

This study focuses on comparative assessment of academic performance in Mathematics in urban and rural junior secondary schools in Apa Local Government Area of Benue State. The findings of the study clearly revealed that students who school in urban areas performed better than their counterparts that school in rural areas as it can be seen on Table 1. This finding supports Eze (2010) who reported that the performance of students in academics would differ considerably based on school location. This, however, favors students in urban schools. Kator (2007) posits that most teachers in rural schools are not committed to their work largely as a result of poor supervisory machinery in rural schools. The study attributes the poor performance of rural students to unavailability of school facilitates, poor funding, poor quality of teachers, low access to reading materials in schools, poor medical care, inadequate teaching materials, parents low socio-economic status, poor infrastructure and lacking quality instructional material. The excellent performance of urban students is because of their better quality in their education, availability of the information that they get from various sources like mass media and electronic media, their educated families and peers groups which help them for better performance. The implication of this statement is that teachers in rural schools should

wakeup to their responsibilities to enable students in rural schools to also compete favorably with their mates in urban schools.

The study also revealed within urban schools that female students perform better than their male counterparts as shown in Table 2. This is also substantiated by Chinelo (2019) who stated that it is a strong misconception to identify Mathematics as a male subject in schools in Nigeria; even female students can perform very well in the subject as seen in the current study. This study also argues that of Onekutu and Onekutu (2012) who reported that boys performed better than their female counterparts especially in arithmetic and general reasoning. The present study notices a good improvement in the academic performance on female students in mathematics. The implication of this finding is that female students are also very capable of performing very well in mathematics and can also study mathematical related courses in the higher institutions.

Also, the study revealed within rural schools that female students in rural schools perform better than their male counterparts in rural schools in mathematics as shown in Table 3. But the performance of the two groups was poor which could be as a result of lack of facilities, poor funding, poor quality of teachers as well as their working conditions and the socio-economic status of the parents. The study is not in agreement with that of Braun *et al.* (2006) who reported that male students are better than their female counterparts in academics most especially in general reasoning and mathematics related tasks. This agrees with Braun, Jenkins and Gigg (2006) view that that poor learning environment in school produces an un-conducive atmosphere for students to perform better in their academic work. But it was also noticed that in spite of the poor academic standard in the rural schools female students tends to be taking up the challenge to perform excellently in mathematics to an extent even better than their male counterparts.

In Table 4, the outcome shows that male students in urban schools perform better than male students in rural schools in mathematics. This finding agrees with that of Kator (2007), who reported that the performance of male students in academics differs significantly based on location and in favor of male students in urban schools. Also Olanipekun and Okunrotifa (2008) noted that apart from the inadequate academic background of the students and limited resource for teaching, the quality of teaching offered in rural schools is also a major concern due to lack of practical approach in the teaching of mathematics. Furthermore, the finding supports Adeyemi (2014) view that students in urban areas where there is better medical care, access roads, better communication and information gadgets performed better academically. This implies that teaching quality in rural schools should be improved so as to help improve the academic performance of their students.

Furthermore, the study revealed that female students in urban schools perform better than their female counterparts in rural schools in mathematics as shown in Table 5. This finding supports that of Akegh (2012) who reported that the academic performance of female students in urban schools is better than that of female students in rural schools. This according to the Akegh (2012) is because urban schools are richer than rural schools in literary materials. The implication of this finding is that government and private school

owners should make conscious efforts to enrich their school environment, and make it more conducive for studies (Naakaa, Abah & Atondo, 2019).

## Conclusion

This study focuses on comparative assessment of academic performance in Mathematics in urban and rural junior secondary schools in Apa Local Government Area of Benue State in order to proffer solutions to the unequal academic performance seemingly observed among students in urban and rural schools in Mathematics.

The findings of this study showed that students in urban junior secondary schools performed better than their counterparts in rural junior secondary schools. The study also enabled the researcher to conclude that the performance of students in urban and rural junior secondary schools differ according to gender differences but this time around in favour of the female students.

## Recommendations

Based on the findings of this study, the following recommendations have been made:

- i. Education should not be left to government alone. Communities and private organizations too should aid government in the provision of facilities such as chairs, chalk, tables, books, computers, classroom blocks, both in rural and urban schools and they should provide security to such facilities.
- ii. It should be noted that female students can perform very well in mathematics as well as their male counterparts, unlike in previous times that mathematics was describe as a subject for the male gender. This calls for a re-orientation of all form of gender stereotyping in Mathematics Education.
- iii. Only teachers, who are trained, qualified and dedicated to teach the subject in schools should be employed most especially in the rural school. They should also encourage their teachers to update their knowledge by attending seminars, workshops, and conferences regularly.
- iv. Government should provide all necessary learning facilitates and good infrastructure in both urban and rural school to enhance mathematics teaching and learning.
- v. Educational agencies should regularly supervise teachers within rural settlements to ensure they are carrying out their duty according to the educational set standards and also check their commitment to the teaching profession.

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