

IMPACT OF STUDENTS' POPULATION GROWTH ON EDUCATIONAL INFRASTRUCTURE PROVIDED BY THE PLATEAU STATE UNIVERSITY, BOKKOS, NIGERIA

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ABSTRACT

The swift rise in students' population, propelled by population expansion and the escalating demand for higher education, presents considerable challenges of Plateau State university's infrastructure, encompassing classrooms, dormitories, laboratories, libraries, and other vital facilities. This study examines the impact of this increase in population on infrastructural facilities provided by the Plateau State University (PLASU). Data were gathered through questionnaires. Systematic and simple random sampling techniques were employed to select departments and 92 students for the study. Descriptive statistics were applied in the analysis of data collected. Results indicated that the university's infrastructure is severely strained due to insufficient planning and constrained financial resources to support the increasing student population. Inadequate hostel accommodations, computer laboratories and overutilized library resources were seen as significant adverse impacts of the population affecting the university's reputation and capacity to compete favourably with other tertiary institutions. Recommendations encompass augmented governmental financing for infrastructure development, the adoption of public-private partnerships (PPPs) to leverage resources, and the execution of strategic enrollment management policies to synchronise population growth with existing facilities.

Keywords: *Accommodation, Facilities, Population Growth, Infrastructure, student, PLASU*

1. INTRODUCTION

The world population has undergone extraordinary expansion in the last two centuries. In 1800, the global population was around 1 billion; by 2022, it exceeded 8 billion (Roser et al., 2022). Roser et al. (2022) argued that swift escalation is ascribed to progress in medicine, agriculture, and general living conditions, resulting in elevated birth rates and decreased mortality rates. The global growth rate reached a zenith of 2.1% in 1962 and has subsequently diminished, dropping below 1% in 2019 (Roser et al., 2022). The United Nations forecasts that the global population would attain around 10.3 billion in the mid-2080s, thereafter declining to 10.2 billion by 2100 (United Nations, 2024). The same report stressed that this expected peak is mainly attributed to decreasing global fertility rates, since several nations are already reporting rates below the replacement threshold of 2.1 children per woman.

The African continent has the highest population growth rates, propelled by elevated fertility rates and a mostly young demographic composition. Sub-Saharan Africa is projected to represent a substantial share of global population increase in the forthcoming decades. The United Nations forecasts that Africa's population will quadruple by 2050, reaching almost 2.5

billion individuals (United Nations, 2024). This swift expansion offers both possibilities and problems, encompassing the possibility of economic advancement via a demographic dividend and issues pertaining to resource distribution, infrastructure enhancement, and social services. Africa is also seeing alterations in population size and age distribution. Over the past thirty years, Africa has had an average yearly population growth rate of 2.6%, compared to the world average of 1.5% (ECA, 2016). The fast population increase in Africa is anticipated to persist despite the reduction in fertility rates from 4.7 births per woman to 3.1 births per woman between 2010 and 2015 and between 2045 and 2050, respectively (United Nations, 2017). In 2017, the African population under 15 years constituted 41%, 15 to 24 represented 19%, the prime working-age group (25-59 years) and the elderly population (60 years and older) constituted 35% and 5% of the population, respectively (World Bank, 2023). Nigeria, being Africa's most populated nation, significantly influences the continent's demographic patterns. The National Population Commission of Nigeria anticipated the population at over 216 million in 2023, with predictions suggesting a further rise in subsequent decades (National Population Commission, 2023). The nation's elevated fertility rate, projected at 5.3 children per woman, facilitates its fast population growth (World Bank, 2023). The United Nations' World Population Review (as cited in Obokoh, 2024) posits that Nigeria ranked sixth in global population, with 235 million people, and is projected to cross 237 million by 2025. The report says just between 2023 and 2024, there was an increase of 4,796,533 people in Nigeria, thereby marking a steady rise in the country's population.

Nigeria's expanded population needs collection of internal structure, particularly, potable water, healthcare, electricity, road networks and educational facilities to enhance their quality of life. But, shortfall in the supply of these infrastructure poses concerns to urban population and tertiary institutions in Nigeria. The infrastructural development needs of every society is supposed to keep pace with the population growth in order to achieve an appreciable quality of life. The provision of adequate infrastructure can certainly improve the quality of education and enhance the acquisition of requisite skills, ability, competence and knowledge (SACK) which are *sine qua non* for transforming the society. The term "infrastructure" encompasses the quality and quantity of such facilities including buildings, machinery, and equipment, as well as their utilization and upkeep.

The pressure on universities due to high demand and the restricted growth of physical facilities and academic personnel to meet this need has significantly compromised the quality of programs inside these institutions. The caliber of graduates is contingent upon the infrastructure that shapes the students' learning environment and willingness to learn. Infrastructure is as essential as a skilled instructor and teaching pedagogy in influencing students' academic lives. It fosters an environment conducive to students' holistic growth. They want to ensure that the schools have adequate infrastructural facilities to make learning enjoyable. As a result, the study of infrastructural facilities has become crucial in educational institutions with trends at population growth rate (Krishnaiah et al., 2024).

The lack of sufficient information concerning the effects of population growth on educational infrastructure provided by the Plateau State University (PLASU) Boko necessitated this study with the objectives to characterize the socio-demographic compositions of the students; to determine how students' increasing population affect the utilization of educational facilities provided by PLASU; and to ascertain educational facilities mostly overrun by increasing students' population in PLASU. It is expected that the outcomes of this study will guide management to make informed decisions in the provision of adequate infrastructure to enhance pedagogical process in the institution.

1.1 CONCEPTUAL CLARIFICATION

Population Growth

Population growth refers to continuous increase in human number, which has the tendency to overrun the existing resources. The world population is projected to grow from 7.7 billion in 2019 to 10.9 billion in 2100. Most of the projected growth is in impoverished, low-income countries with nature-dependent livelihood. Sub-Saharan Africa (SSA) and Southeast Asia are regions that experience an average annual population growth rate of over 2.5% (United Nations, 2019). Population increases rapidly in these regions as they are in the “demographic transition” (Bongaarts and Casterline, 2013). The UN projection indicates that more than half of the global population change between now and 2050 will be accounted for by the changes in these regions. The SSA experiences a high fertility rate (over 4.6 live births per woman), which is higher than the rate observed in Central and Southern Asia and Western Asia (DESA, 2019). Similarly, about 25% of global population growth will be concentrated in Central and Southern Asia, and these areas are expected to add over half a billion people in the coming three decades despite declining birth rates. This rapid population growth, urbanization, and economic development have caused an overwhelming increase in food, energy and water demand, which imposes substantial pressure on the environment (Jiang & Hardee, 2011; Molotoks et al., 2018).

Infrastructure

Infrastructure refers to structures installed to facilitate and enhance ease of performance. Infrastructure is vital to economic growth, enhancing productivity and increasing future output potential. It encompasses essential facilities and systems that support a community and civilization, including roads, water supply systems, sewage systems, electrical grids, telecommunications, and renewable energy (Fagbohunka, 2017). The quality of a school's learning environment significantly influences students' academic achievement and efficacy. Essential facilities for successful learning include sufficient electricity and water supply, a robust communication system, enhanced transit network, appropriate classrooms, libraries, labs, furniture, and athletic equipment (Sanele and David, 2021). The quality of infrastructure significantly impacts academic standards, serving as an indicator of quality assurance within the institution. Adequate infrastructural facilities are essential for universities to operate effectively and for students to commence their academic pursuits effectively. The pursuit of sufficient infrastructure in Nigeria's tertiary education sector is crucial for achieving effective, standardized, and quality education (Fagbohunka, 2017).

University Education

University education refers to the formal educational system after secondary school level. It consists of inputs and outcomes, with physical infrastructure being the essential facilities and equipment required for university operations. In Nigeria, 90% of higher institutions are classified as elevated secondary schools due to deteriorating infrastructure, graduate unemployment, political meddling, disciplinary issues, and market dynamics (Adejomo, 2017). Physical facilities are crucial for instruction, education, and research, including classrooms, labs, workshops, administrative offices, libraries, hostels, staff accommodations, recreational amenities, and sports and gaming facilities (Subair et al., 2012). The quality of infrastructure significantly impacts academic standards and serves as an indicator of quality assurance within the institution. Infrastructure is essential for unifying regional economies and facilitating the movement of production elements within and between nations, enhancing regional productivity and growth. Inadequate infrastructural facilities at Nigerian public universities significantly hinder the attainment of educational objectives. This deficiency includes insufficient finance, inadequate infrastructural planning, rising enrollment, corruption, unfinished or abandoned projects, and a deficient maintenance culture. The demand for access significantly exceeds the system's physical ability to serve pupils, leading to inadequate infrastructural facilities and other resources. Insufficient and declining funding allocations to tertiary institutions contribute to the deteriorating quality of physical facilities.

Funds gathered are often intended for ongoing expenditures, and some institutions must supplement government money with internally generated income (IGR), inhibiting the relevant entities from initiating capital projects (Mahmud, 2015).

Classroom dimensions and capacity Classrooms with sufficient space for expansion enable teachers to reorganise seating arrangements and use diverse teaching approaches. They also establish quiet study places and smaller learning centres that minimise visual and auditory distractions (TASB, 2014). Overcrowding has consistently been associated with heightened student hostility, diminished engagement, and worse learning outcomes. Classrooms that provide flexibility and reconfiguration correlate with heightened student engagement and learning (TASB, 2014). As pedagogical approaches evolve, so too does the configuration of classrooms. A versatile environment facilitates student collaboration, communication, and overall performance (TASB, 2014). Clemmons (2014) asserted that our strategies for enhancing school infrastructure also transform as education evolves.

2 MATERIALS AND METHODS

2.1 History of Plateau State University

Plateau State University Bokokos was established by Law No. 4 of March 7, 2005 and was approved by the National Universities Commission (NUC) on April 29, 2005, as the 66th University in Nigeria and the 24th state-owned University in the nation figure 1. The referenced Law is found in Plateau State of Nigeria Gazette No. 3, Vol. 11, May 24, 2006. PLASU is about 70 kilometres away from Jos, the State Capital. It lies in Diram Village along the Butura-Tarangol axis in Bokokos Local Government Area. Though there were 480 students involved in academic activities beginning in May 2007, these events were cancelled on September 10th of the same year and the students were sent to the University of Jos (Wikipedia, 2018). The university reopened in October 2010 for the 2010/2011 Academic Session, with lectures starting in January 2011.

According to Wikipedia (2018) as at June 2018, the University has 424 Teaching personnel (154 Permanent/Contract, 154 Visiting, 173 Senior non-teaching staff, 103 Junior staff, and 40 Casual/Adhoc workers for a total of 540 staff). The University was, however, re-opened in October 2010 during the 2010/2011 Academic Session, with lectures commencing in January 2011. As of May 2018, the University had four (4) Faculties and seventeen (17) Departments/programmes. But recently, more Faculties, including Education and Health Sciences have been established, with many Programs. The University has enjoyed TETFUND infrastructural development right from inception and continues to make huge progress in meeting population growth experience with the period of its existence.

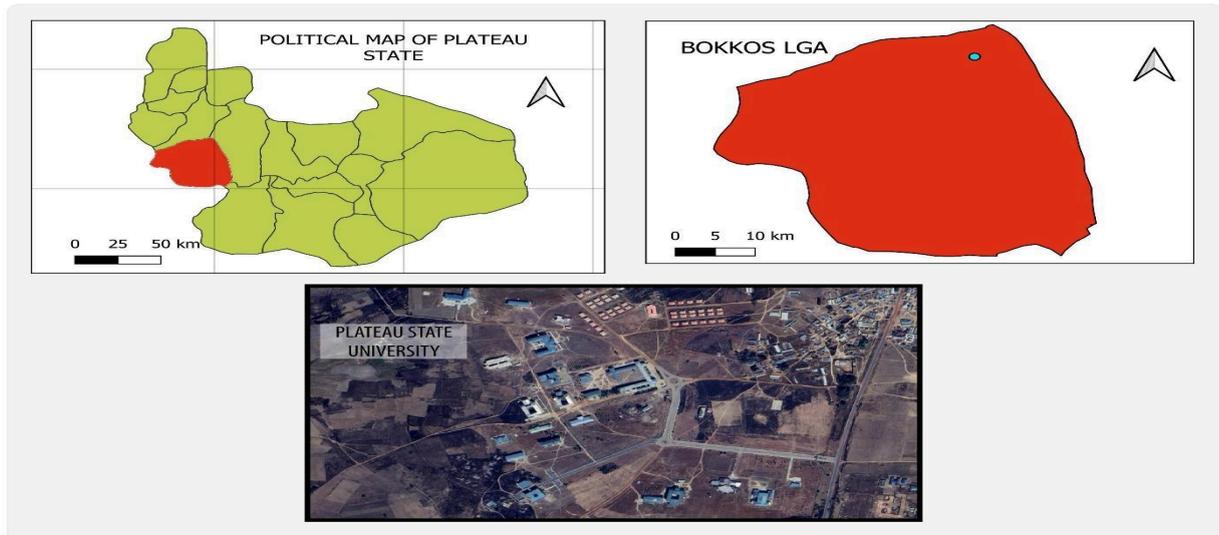


Figure 1: Imagery of Plateau State University Bokkos, with Maps of Plateau and Bokkos (Inset).

The study adopted a quantitative research design. Plateau State University which was established in 2005 is situated along Butura-Tarangol axis in Bokkos LGA of Plateau State. Its student population has been increasing over the years, from 480 students in 2007 to the current population of 6,014 students. With the students' population of 6,014, a sample size was determined using Taro Yemane's formula which gave a figure of 100 participants. The University currently has nine Faculties, comprising many Departments, with 540 non-teaching and 224 academic staff. However, the study's purpose focused only on student's vis-a-vis educational infrastructural facilities provided by the PLASU authorities. In order to have fair representation, systematic sampling technique was applied to select five Departments out of the 17, while simple random sampling was used to select 100 participants. Data were collected by administering copies of structured questionnaires to the participants. A total of 92 copies of filled questionnaires were returned, but eight were not used due to incomplete information. Descriptive statistics of frequency counts, percentages and means were applied in data analysis, while Factor Analysis, an inferential statistic, was also useful for the analysis. Results were summarized and presented by means of Tables.

2. RESULTS AND DISCUSSION

This section focuses on the presentation and discussion of the outcomes of the study. The analyzed data have been collated and presented in Tables. Highlights of each result presented followed thereafter.

Table 1: Participants' Socio-Demographic Compositions

Description	Frequency	Percentage %	Mean
Gender			
Male	59	64.1	1.36
Female	33	35.9	
Age (Years)			
15-20	35	38.0	2.05
21-24	28	30.4	
25-30	18	19.6	
> 31	11	12.0	
Student's Educational Level			
100 level	25	27.2	2.37
200 level	26	28.3	
300 level	23	25.0	
400 level	18	19.6	
Department			
Accounting	7	7.6	2.87

Sociology	32	34.8
Mathematics	31	33.7
Geography	10	10.9
History & International Relation	12	13.0

Table 1 shows the socio-demographic distribution of participants at the study. Results have revealed that nearly two-thirds (64.1%) of the participants were males. This seems to suggest that more male students enrolled into the five Programmes of PLASU than their female counterparts. Majority (68.4%) of the participants were within 15- 24 age brackets, and largely drawn from 100 and 200 levels (55.5%). Although five Departments, namely Accounting, Sociology, Mathematics, Geography, and History and International Relations participated in the study, 68.5% came from the Departments of Sociology and Mathematics alone. This implies that students that enrolled into these two Programmes are more in population, compared to those admitted for Accounting, Geography, and History and International Relations.

Table 2: Students' Population Effects on Utilization of Infrastructural Facilities

S N	Assertion	SA	A	D	SD	\bar{X}	δ
1	Students' population is outgrowing facilities every year	65 (70.7)	20 (21.7)	7 (7.6)	00 (00)	1.37	0.624
2	Students' population has increased above library capacity	32 (34.8)	16 (17.4)	44 (47.8)	00 (00)	2.13	0.904
3	Lecture halls do not sufficiently accommodate students' population	12 (13.0)	64 (69.6)	16 (17.4)	00 (00)	2.04	0.553
4	Students' population growth negate access to hostel accommodation	27 (29.3)	61 (66.3)	4 (4.4)	00 (00)	1.75	0.527
5	Laboratories accommodate students in sets to cope with the large size	45 (48.9)	14 (15.2)	23 (25.0)	10 (10.9)	1.98	1.089
6	Students' population size often overrun recreational facilities	17 (18.5)	73 (79.3)	2 (2.2)	00 (00)	1.84	0.427
7	Large students' size pushes many of them to stay off-campus	16 (17.4)	74 (80.4)	2 (2.2)	00 (00)	1.85	0.418
8	Limited accommodations made PLASU to give only to female students	83 (90.2)	9 (9.8)	00 (00)	00 (00)	1.10	0.299
9	Students' high population is the bane of overcrowded halls	5 (5.4)	35 (38.1)	52 (56.5)	00 (00)	2.51	0.602
10	Students' high population increases infrastructural maintenance costs	30 (32.6)	27 (29.3)	25 (27.2)	10 (10.9)	2.16	1.0069
	Mean	36.1		18.8	2.2		
			43.3				

Table 2 depicts the distribution of students' high population effects on infrastructural facilities in PLASU. A 5-point Likert Scale was used to gauge respondents' views regarding the adverse effects of high students' population on useful infrastructural facilities of the University. Their responses as ranked in order of decreasing magnitude were that high students' population: increases infrastructural maintenance costs (mean = 2.16); leads to overcrowded lecture halls (mean = 2.51); surpasses the capacity of library facilities (mean = 2.13); leads to lecture halls not able to sufficiently accommodate students (mean = 2.04); admittance of students into laboratories to be in sets (mean = 1.98); pushes male students to stay off-campus (mean = 1.85); overruns recreational facilities (mean = 1.84); negate access to University's hostel accommodation for male students (mean = 1.75); outgrows facilities provided (mean = 1.37); and limit the provision of hostel accommodation to female students only (mean = 1.10).

The finding on the annual increase in number of students outgrowing available facilities in the study area agrees with earlier reports by Roser et al. (2022), United Nation (2017) and ECA (2016) that population growth and fertility rates are very high in Africa. Finding on students' population putting undue pressure on universities library facilities concurred with Yangambi (2023) and Krishnaiah et al. (2024) who earlier reported that infrastructural facilities, including libraries, laboratories, and lecture theatres have become crucial in educational institutions which require regular expansion to meet the increasing students' population. This means there is an urgent need to expand library, lecture halls, laboratories and hostel accommodations in order to meet the demand of an increased number of students into Programmes of the University (PLASU).

Table 2: Infrastructural Facilities Mostly Over-used due to Students' Population

SN	Facility	Tally	Frequency	Percentage %
1	Accommodation (Hostel)	√√√√√√√√√√√√√√√√	34	36.9
2	Library		00	00
3	Classroom		00	00
4	Lecture Hall		00	00
5	Laboratory	√√√√√√√√	20	21.7
6	Total facilities		00	00
7	Transportation		00	00
8	Electricity and Water	√√√√√	12	13.0
9	Sporting Facilities		00	00
10	Clinic		00	00
11	Computer Facilities	√√√√√√√√√√√√√√√	30	32.6
	Total		92	100

Table 3 reveals the infrastructural facilities affected by the population growth of students in PLASU. Accommodation constitutes the highest percentage (36.9%) of infrastructural facilities affected by increase in students' population. Inadequate hostel accommodation often leaves students with no choice but to secure accommodation outside the campus. This explains in part why Awara and Anyadighibe (2014) advocated that hostel accommodation should be on the front burner of administrations of tertiary institutions of learning in Nigeria. Unfortunately, inadequate hostel accommodation clearly manifests by overcrowding in rooms, which make learning uncondusive. Overcrowded rooms have a high tendency of rapid depreciation, unless such facilities are regularly maintained.

The second issue of concern shown on Table 3 is computer facilities where one-thirds (32.6%) of participants at the study complained of not having access to it because of the high population. Many of them said they sometimes have to patronize business centres within the University premises to get their assigned work done. Result has also shown that 21.7% of participants at the study cited laboratories as other infrastructure frequently affected by students' rising population. Consequently, the population has to be split into several groups during practicals which takes longer time to cover the curriculum. Electricity and water accounted for 13.0% of infrastructural facilities often affected by the rising population of students in PLASU. This claim corroborated Ajayi's (2020) submission that there is a need to effectively use services like electricity and water in university systems across Africa because of their great influence on students' endeavours during pedagogical process.

In a related study, Ganiyu et al. (2020) reported that adequate use of service infrastructure in universities in Nigeria is a solution for any curriculum implementation obstruction. Additionally, Thongplew and Kotlakome (2019) reported that promoting the drinking of clean water and upholding better access to drinking water are important for students and staff in universities. Clearly planning for population growth should be totally inclusive and cater for services required by the population.

3. CONCLUSION

The study highlights the urgent issues arising from the rapid increase in student population growth at Plateau State University Boko, which is putting pressure on the university's infrastructure. The university needs sufficient resources to support the growing population, leading to accommodation problems, laboratory issues, electricity and water supply can bring a decline in the quality of education. These issues could hinder the university's ability to deliver quality education and promote academic achievement. The pressure on infrastructure also affects students' educational experiences, affecting the University's reputation and regional development objectives.

4. RECOMMENDATIONS

To address these issues, immediate and strategic measures are needed. These include tactical enhancement of infrastructure, augmented government financing, public-private partnerships, e-learning platforms, a holistic master plan, efficient maintenance of current facilities, collaboration with development partners, and enhanced resource utilization. By adopting these strategies, the university can mitigate the negative impacts of population expansion on its infrastructure and provide a conducive learning environment. Proactive planning and efficient resource management are crucial to ensure the university maintains its provision of excellent education and its status as a bastion of academic achievement in Plateau State and beyond.

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