Analysis of Parking Space Requirement in Cross River University of Technology, Calabar Campus

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ABSTRACT
This paper focused on analyzing parking space requirement in Cross River University of Technology (CRUTECH), Calabar campus. The objectives include to examine the existing parking facilities in the university, to determine the parking demand in the study area, to examine the parking problems in the study area. Data were sourced from both primary and secondary sources. A total of 400 copies of questionnaires were administered while 393 copies were retrieved and used for analysis. Data were also obtained using interviews and observations. The study showed that parking facilities are largely inadequate. Due to the absence of sufficient spaces for parking, most vehicle owners park indiscriminately, hindering traffic flow. Based on the observations of the study, it was recommended that the physical planning unit of the institution should be active by checkmating every new development that is taking place to ensure there are spaces earmarked and well organized for parking facilities. The study also suggested that substantial financial allocations be given to the institution by the state government for development, vis-à-vis the provision of parking facilities especially whenever there are new projects.
Key Words: Parking, parking demand, CRUTECH, transportation system, motorization, population increase.

I. INTRODUCTION

Generally, parking provisions are auxiliary facilities that need to be properly integrated into the development process for effective use and management of space, devoid of the consequences of parking inadequacies (Boamah, 2013). Whether in towns, cities, neighbourhoods, school campuses etc. parking spaces are needed for various reasons. For instance, at some point, vehicle owners will have to park and access services or probably render services. In Universities and colleges there is high demand for parking spaces. This is since there is growth in campus population and loss of surface parking lots especially around new buildings. These campuses are locations of high concentration of students and staff involved in academic and support service activities. As such, the parking demand often constitutes a problem in meeting with the existing parking supply with ineffective parking management strategy (Neves, Barata and Silva 2010). Like the larger urban centres, University campuses also experience dynamic increase in parking space requirement which translates to high parking demand without adequate supply.

The rapid rate of urbanization has its effect on the development of university campuses vis-à-vis population increase, expansion in physical development and increase in demand for auxiliary facilities. Parking facilities particularly, have received little attention in subsequent physical developments and expansion. The consequences are highlighted with growing reliance on the use of motor vehicles, which apparently is brought about by improvement in the state of socio-economic development in the country. This has not left out staff and students at the university communities who are now empowered as to make affordability and ownership of vehicles/cars possible (Shaw, 2016).

From the early period of motorization, planning and provision for parking spaces were less considered than the motorways as the need for them were less critical. The problems associated with the high demand for parking spaces evolved

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gradually with the increasing reliance on the use of private/single ownership motor vehicles (Marshall, 2015). In Nigeria, tertiary institutions located especially within most of our cities are characterized by high influx of staff and students' population. Consequently, the institutions' campus environment is faced with shortage of developmental support facilities such as those for vehicular parking. These spaces are either not provided for or are grossly inadequate.

Parking is an important element of transportation system having several impacts on the environment, yet it is often neglected and rarely given considerable attention in transportation studies. The integration of all the factors of motorization and the need for parking all culminate into the demand for parking. The phenomena of parking are common occurrences on the urban and city road systems. Shoup (2009) likened these city roads and parking characteristics to that of big university campuses as they exhibit similar developmental or land use features such as offices, libraries, theatres (though for lectures or multipurpose), housing, clinics, restaurants, sporting facilities and a few other functional and support facilities/services. Higher education is an expanding sector, in terms of both students and staff population and therefore increasing demand for physical facilities like parking (Shoup, 2009).

Cross River University of Technology (CRUTECH) Calabar campus has existed since 2002. The Cross River State Government passed a bill for the establishment of Cross River University of Technology (CRUTECH) Calabar for Sciences and Technology education. However, the change of status of the defunct polytechnic Calabar to CRUTECH Calabar campus was done without consideration of the carrying capacity of other auxiliary facilities such as vehicular parking spaces for staff and students as well as visitors to the institution. Today, with the growing rate of staff and students' population as well as vehicle ownership among staff and students, the high demand for parking facilities both on a temporary or permanent basis have become obvious in the institution's environment. This study is therefore conceived to analyze the parking requirement in the Calabar campus of the university, with a view to recommend measures for improvement.

II. STATEMENT OF PROBLEM

Vehicular parking space has become a major problem in both Nigerian urban centres and its university campuses. This problem is brought about by the increasing rate of urbanization in the country and increase in the yearly students' enrollment. In CRUTECH Calabar campus, vehicular parking spaces have become obviously inadequate for staff and students of the institution. Consequently, most vehicles are parked indiscriminately along the roads and at green areas that are meant for beautification of the campus environment. Even in some new buildings like the new Administrative Complex, new Science Block, etc. where attempt have been made to provide vehicular parking spaces, they are not adequate, not functionally designed and not properly demarcated such that each vehicle occupies a parking lot.

Furthermore, in 2002 when CRUTECH came into existence, the change in institutional status was not accompanied with the provision of additional facilities particularly, for vehicular parking. This has resulted to acute shortage of parking facilities within the campus environment and in turn encouraging indiscriminate and on-street parking in the institution. The institution's physical planning unit that is saddled with the responsibility of monitoring development and checking indiscriminate parking within the campus has performed below expectation over the years as the unit appears to be of no influence on land use regulation in the entire campus. This study is therefore meant to examine the existing parking facilities vis-a-vis the parking demand in the study area. The result would be to provide planning options to curb the challenges of inadequate parking facilities in the institution.

III. LITERATURE REVIEW
Parking Facilities

Parking facilities play important role as pathways for drivers to move from the car into buildings and/or the urban fabric. Alternatively, it can be viewed as the starting and/or ending point of travel for the automobile and its driver. In attempting to solve the complex urban and environmental issues surrounding the use of the automobile, the parking facility can be seen as part of the solution for the integration of different systems of transportation, or as a transfer point between systems, bus, train or air terminals. These solutions are not historically new but are seen to re-emerge, as traffic in many urban areas become overwhelming and extremely time consuming. Parking lots are areas designated and fixed by authority of a city's management or its agents to ease inter or intra-transport systems for long or short journey of passengers. Parking lot is an essential part of the road transport system; it plays crucial role in the management of traffic and congestion. But where these lots are not authorized, they become illegal parking (Ahmed, 2013).

Parking is one of the comprehensive components in land use appearing in residential, shopping and industrial areas, and is related to all kinds of trips (Mniach, 2010). Rodrigue (2011) observed that in a motorized city, on the average, 30% of the surface is devoted to roads while another 20% is required for off-street parking. In North American cities, roads and parking lots account for about 30% to 60% of the total land surface.

According to Msigwa and Bwana (2013), parking supply is the provision of facilities for the temporary storage of vehicles. The type and level of availability and location of the parking facilities should be on a p1anned basis so that it is adequately related to factors such as the demand, land use policy and economics of land in any urban centre. They are covered garages, paved or unpaved spaces, marked lots, shade trees and so on. The more often vehicle owners use their vehicles, the higher will be the demand for parking facilities. Each time a trip is made; vehicle owners must park at any intervening and terminal destinations. They further stressed that the type of vehicles that are most dominant in a city affects parking demand in terms of the space requirement which is smaller for cycles and larger for trucks. Where there is poor mass transit system, as in most Nigerian cities, the use of private vehicles will be higher leading to higher demand for parking facilities.

Parking Demand
According to Haruna (2014), the demand for parking is the expressed need by motorists for facilities to store vehicles on a temporary basis when not in motion. The demand is derived demand because it arises from the need for journeys for various purposes. Parking demand is therefore directly affected by land use. First, parking may either be short term when vehicles are parked for only a few minutes like 10-15 minutes, or long term when they are parked for many hours in the day. Second, for any area, the demand for parking may vary at different times of the day in terms of the collective need expressed by motorists.Haruna further said that parking demand has spatial dimensions as it varies from one part of the town to another, being generally higher at the CBD and other commercial areas compared to residential areas. The major activity areas of the town which attract high volumes of traffic have higher parking demand. Additionally, the demand for parking is effective if it is backed by the ability to pay in money terms where it is charged. It may also be in terms of motorists' willingness to take the risk of parking vehicles at a parking area.

There are different factors that affect parking. They have direct and indirect effects on parking demand. Direct effect determinant is land use. Different land uses attract different levels of vehicular traffic movement. This exerts different demand situations for different land uses in the city. Commercial land uses like hotels, banks, plazas, department stores, etc., attract more visitors than others especially during peak hours. Therefore, the demand for parking is expected to be higher in the Central Business District (CBD), with concentration of commercial, public and semi-public activities. Second, change in time is an aspect of urban activity pattern. The time of day is a determinant of the level of parking demand. For example, demand is higher during working hours on weekdays in areas with concentration of public uses while in the night, negligible level of parking demand is recorded. The third one is that vehicle usage affects the level of parking demand in the city. It is commonplace that the higher the rate of vehicle usage, the higher the demand. The increase in vehicular ownership has been associated with high demand for parking facilities especially in the larger towns with higher income base (Allison, 2012). However, demand for parking is most prominently determined by factors such as: weather, price and location (Adams, 2011).

Space Standards for Parking Requirements
Car parking provision is usuallyexpressed in terms of 'spaces' andinclude carports and undercroft parking as well as parking courtsbut does not include garages under a certain internal dimension. Further explanation on this canbe found under the "ResidentialParking Design" section (Rochford District Council, 2010).

Parking ratio
Parking ratio is a numerical figure used to compare the size of a building to the amount of parking spaces that it should have. For the building, units of square metres is used, while the number of useable spaces is used as units for the parking area.

Calculation of Parking Space Requirements
For trip destinations, parking requirement is calculated on Gross FloorArea (GFA), or the number of visits (where the final employee/visitornumber can be estimated). As a rule, business and commercial usevehicle parking requirements are calculated by GFA, whilst leisureuses are based on the estimated number of vehicle visits. For triporigins, the size of the dwelling is considered (by way of thenumber of bedrooms) and spaces are allocated per dwelling

unit basis. In determining parking space requirement for a building, calculate the building number spaces or the area of a building by its total square footage in thousands. For instance, in a 3716.1216 sq. metres building with a 200-space parking lot, 3716.1216 (square metres) is divided by 200 space parking lot to find a parking ratio of 5 spaces per 92.903square metres of space (Rochford District Council, 2010).

Table 1: Space Allocation Standards for Parking Requirements

Faculties/units	Area of building in sq. m	Area for parking space in sq. m	Total space of building by (92.903sq. m)	Space for parking lots	Division of parking space by building sq. m to get ratio
Education	1500	3600	16	60	4
Environmental sciences	325	250	3	13	4
Engineering	660	1680	7	30	4
Sciences	900	1800	10	30	3
Physical sciences	440	120	5	8	2
Biological Sciences	900	450	10	15	2
Communication Technology	500	1800	5	30	6
Architecture	275	50	3	5	2
Bursary	275	675	3	23	8
General Admin	2700	960	29	60	2
Library	605	55	7	6	1
Clinic	300	55	3	6	2

Source: Rochford District Council, 2010.

IV.   MATERIALS AND METHODS
Study Area

Cross River University of Technology (CRUTECH) Calabar campus is a state-owned institution. There are three other campuses spread across three local government areas (LGAs) of the state; Obubra, Ogoja and Yala LGAs respectively. Calabar campus of the institution (the study area) is the main campus, and it is located within Calabar South Local Government Area of Cross River State (figure 1).   The institution lies within latitude 40°54'N and 40°58'N of the Equator and longitude 80°15'E and 80°25'E of the Greenwich meridian as shown in figures 2 and 3. Calabar campus has eight (8) faculties which are Faculty of Engineering, Faculty of Environmental Sciences, Faculty of Education, Faculty of Sciences, Faculty of Biological Sciences, Faculty of Architecture, Faculty of Physical Sciences and Faculty of Communication Technology. In each faculty are departments/units (Eteng, Etim, Eyo and Eze, 2022).

Figure 1: Map of Cross River State showing Calabar South LGA
Source: Cross River Geographical Information Agency (CRGIA) 2021
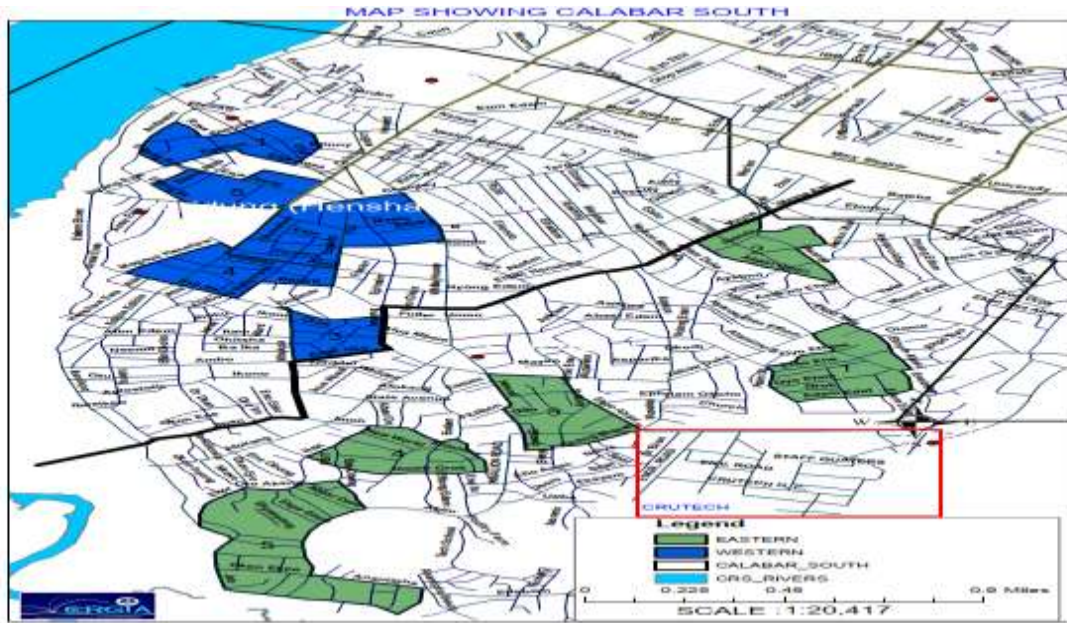
Figure 2: Map of Calabar South showing CRUTECH (Inscribed with red rectangular block)
Source: Cross River Geographical Information Agency (CRGIA) 2021

Figure 3: Map of CRUTECH, Calabar Campus
Source: Cross River Geographical Information Agency (CRGIA) 2021

Parking Situation

Cross River University of Technology, Calabar campus comprises of General Administrative Block, Post-Graduate Block, Faculty/Departmental Blocks, Banks, lecture halls, Library block, male and female hostels and other support services buildings. Each of these buildings, outside the administrative block that has few defined and parking lots, others do not have. Within the lecture halls such as the Education Trust Fund (ETF) building, prefabricated (PREFAB) building and New Cafeteria block as well as faculties and departments/units' blocks, there are limited or non-existence of defined or predesigned open spaces for vehicular parking. Vehicle owners usually park their cars indiscriminately on the roads and any available green area in appendix. This is as a result of inadequate defined spaces for off-street parking facilities in the campus environment. However, the rate of on-street parking in the institution has assumed an alarming proportion. This is a clear indication of the dimension of parking problems in the campus.

Methods

This study adopted the survey research design in order to facilitate the systematic, objective and accurate data collection and analysis. The study employed both primary and secondary sources and types of data. The primary sources of data are oral interviews, questionnaires and personal observation, while the secondary sources are published and unpublished materials like journals, textbooks, project reports, CRUTECH academic planning database. The primary data include the socio-economic characteristics of respondents, number of exiting parking spaces and their locations, number of vehicles that comes in and out of the institution periodically etc. Secondary data include staff and students' population, maps and number of faculties/departments/units in the institution.

The sample frame for this study was the total population of CRUTECH staff and students which amounted to 6000. The sample size based on the sample frame was determined using the sample size determination formula adopted from Taro Yamane. The formula is stated below:

$N = NI + N(e)2$ Where n = Sample size, e = Tolerance error (5%) N = Population of the study area, I = Constant.

From the formula, the sample size was 400. However, the 400 copies of questionnaire were distributed and 393 were retrieved and used for analysis. Two sampling techniques were adopted: stratified and systematic sampling techniques. In stratified sampling technique, each faculty/unit in the institution formed the stratum for this study. Furthermore, respondents from each faculty or unit were selected systematically during questionnaire administration. In each of the faculties and units, the first name on the list of staff and students and the next seventh name on the list were selected. The process continued until respondents were selected from all the faculties and units in the sample frame. However, the table below shows the sampled faculties/units, and the number of questionnaires distributed in the study area:

Table 2: Distribution of Questionnaires

S/N	Faculties/Units	Population	Percentage (%)	Number of questionnaires	Number of Questionnaire Returned
1	Education	1105	23	92	89
2	Environmental sciences	700	9	36	36
3	Biological Sciences	600	7	28	27
4	Engineering	1050	20	80	79
5	Sciences	800	10.5	42	42
6	Architecture	250	5	20	19
7	Physical Sciences	350	5.5	22	22
8	Communication Technology	850	12	48	48
9	General Admin. Block	95	3.5	14	14
10	Bursary	44	1.5	6	6
11	Post graduate school	35	1	4	4
12	Students Affair	56	2	8	7
	Total	**6,000**	**100**	**400**	**393**

Source: CRUTECH, 2021

V. DATA PRESENTATION AND ANALYSIS

Educational Qualification of Respondents
Table 3 presents the educational qualification of respondents in the study area. As displayed in the table, 1 percent of the population had first school leaving certificate, 7 percent had secondary school education, 41 percent had first degree, while 51 percent are holders of master's degree and above. The data presented in the table is a clear indication that the study area is dominated by academicians with high level of education.

Table 3: Educational Qualification of Respondents

Educational Qualification	Frequency	Percentage
Non-Formal Education	-	-
Primary Education	5	1
Secondary Education	28	7
OND, NCE and First Degree	160	41
Others (M. Phil, Ph.D)	200	51
Total	**393**	**100**

Source: Field survey 2021.

Employment/ Occupation of Respondents
Table 4 shows that the study area is dominated by public servants. From the table, 71 percent of the respondents are public servants, 20 percent are students, 4 percent are artisans and 5 percent were businessmen/women.

Table 4: Employment/ Occupation of Respondents

Employment/occupation	Frequency	Percentage
Civil/public Servant	280	71
Students	79	20
Artisans	15	4
Others (businessmen/women)	19	5
Total	**393**	**100**

Source: Field survey 2021.

Number of Vehicle Ownership (both staff and students) per Faculty/Unit
Table 5 presents the level of vehicle ownership across faculties/units in the study area. The Table indicates that Faculty of Education had the highest record of vehicle ownership with 22 percent. This was followed by staff in the administrative block with 15 percent, Faculty of Engineering had 12 percent, while Faculty of Environmental Sciences had 9 percent. Faculty of Sciences had 21 percent, Faculty of Physical Sciences had 10 percent, Faculty of Biological Sciences had 22 percent, Communication Technology had 12, Faculty of Architecture had 15 vehicles, Students Affairs Unit had 7, Bursary Department had 9, General Administrative Block had 40 vehicles while Library had 6, and Medical Centre had 13 vehicles respectively. The study apparently shows that the Faculty of Education and General Administrative Block of the institution have the highest number of vehicles.

Table 5: Number of Vehicle Ownership (both staff and students) per Faculty/Unit

Faculty/unit	Number of cars	Percentage
Education	60	22
Environmental Sciences	23	9
Engineering	31	12
Sciences	21	8
Physical Science	10	4
Biological Science	22	8
Communication Technology	12	4
Architecture	15	6
Students Affairs	7	3
Bursary	9	3

General Admin Block	40	15
Library	6	2
Clinic	13	4
Total	**269**	**100**

Source: Field survey 2021

Number of Defined (Organized) Parking Spaces per Faculty/Unit

Table 6 indicates that parking in the study area are not well defined or designated. Table 6 shows that the only organized parking space is found in the General Administrative Block which is demarcated into 13 parking lots. In all other units/faculties, organized parking spaces do not exist. Vehicle owners park their cars on the road, green areas and any available space close to their offices/classrooms.

Table 6 Number of Organized Parking Spaces per Faculty/Unit

Faculty/unit	Vehicle ownership per faculty/unit	No. of organized parking Spaces
Education	60	None
Environmental Sciences	23	None
Engineering	31	None
Sciences	21	None
Physical Sciences	10	None
Biological Sciences	22	None
Communication Technology	12	None
Architecture	15	None
Students Affairs	7	None
Bursary	9	None
General Admin Block	40	13
Library	6	None
Clinic	13	None
Total	**269**	**100**

Source: Field Survey, 2021.

Average Parking Accumulation in Faculties/Units

Table 7 shows the result of the parking survey conducted in the study are. The survey (traffic count) was to determine the number of vehicles parked at a certain time period in the institution (parking accumulation). The data however shows that between the hours of 7-8am, there were about 9 vehicles parked in the Faculty of Education. Environmental Sciences had parking accumulation of 3 vehicles, Engineering had 8 vehicles, and Sciences had 3 Vehicles. Physical Sciences, Biological Sciences, Communication Technology, Architecture, Bursary, General Admin, Library, Clinic and Student Affairs Units had 2, 6, 2, 3, 4, 8, 1, 4 and 3 vehicles parked respectively.

On the other hand, within the time frame of 8am-9am, Faculty of Education had 15 vehicles, Environmental Sciences had 8 vehicles, Engineering 11 vehicles, Sciences 10 vehicles, Physical Sciences, Biological Sciences, Communication Technology, Architecture, Bursary, General Admin., Library, Clinic and Student Affairs had, 5, 10, 5, 6, 6, 12, 3, 3, and 3 vehicles parked respectively.

By 9am to 10am the following were the number of parked vehicles in each of the faculties/units. Faculty Education had 28 vehicles parked, Environmental Sciences 15 vehicles parked, Engineering 18 vehicles parked, Sciences 13 vehicles parked while Physical Sciences, Biological Science, Communication Technology, Architecture, Bursary, General Admin., Library, Clinic Student Affairs had 5, 8, 8, 8, 6, 15, 4, 6, and 4 vehicles parked respectively. It follows that way (see the table 7).

Table 7: Average Parking Accumulation in Faculties/Units

Faculties/units	Time Duration								
	7am-8am	8am-9am	9am-10am	10am-11am	11am-12pm	1pm-2pm	2pm-3pm	3pm-4pm	4pm-5pm
Education	9	15	28	20	55	43	32	20	6
Environmental Sciences	3	8	15	10	18	14	16	10	4
Engineering	8	11	18	14	25	22	26	15	3
Sciences	3	10	13	15	20	18	19	12	3
Physical Sciences	2	5	5	4	6	6	3	2	2
Biological Sciences	6	10	8	12	16	12	13	8	7
Communication Technology	2	5	8	6	9	6	9	7	3
Architecture	3	6	8	8	14	9	10	6	4
Bursary	4	6	6	7	9	8	9	5	2
General Admin Block	8	12	15	32	40	38	33	25	10
Library	1	3	4	3	5	5	4	3	1
Clinic	4	3	6	8	11	7	6	5	3
Student Affairs	3	3	4	3	6	6	4	2	2

Source: Field survey, 2021

Parking Demand in Faculties/Units

Table 8 shows the present and the future parking demand in the study area. The table indicates that in ten (10) years' time, Faculty of Education will require 13 parking spaces to accommodate the number of vehicles, Environmental Sciences will required 5 parking spaces, Engineering will require 7 parking spaces, Sciences, Physical Sciences, Biological Sciences, Communication Technology, Architecture, Bursary, General Administrative Block, Clinic, Library, and Students Affairs units will require a total of 5, 3, 5, 3, 4, 3, 9, 3 1, and 1 parking spaces respectively in the next ten years.

Table 8: Parking Demand in Faculties/Units

S/N	Faculties/units	Number of vehicles per faculty/unit	Ratio of parking demand in each faculty/unit R = 1:5	Parking requirement in 2031 $N\left(\frac{1+r}{100}\right)^n$
1	Education	60	10	13
2	Environmental Science	23	4	5
3	Engineering	31	5	7
	Science	21	4	5
5	Physical Sciences	10	2	3
6	Biological Sciences	22	4	5
7	Communication Technology	12	2	3
8	Architecture	15	3	4
9	General Admin Block	49	9	12
10	Clinic	13	2	3
11	Library	6	1	1
12	Student Affairs	7	1	1

Source: Field survey, 2021

Traffic Survey

Table 9 shows the result obtained from the traffic survey conducted in the study area on Monday being the first day of the week. The survey was to determine the number of incoming as well as outgoing vehicles at certain time intervals in the institution. The table however shows that between the hours of 7am to 8am the number of vehicles that came in were 50, while 15 vehicles went out. Also, between the hours of 8am to 9am, 75 vehicles came in while 33 vehicles went out respectively. It follows that way as seen in the table.

Table 9: Traffic Survey

Time Period	No. of Incoming Vehicles	No. of Outgoing Vehicles	Available Vehicles
7am-8am	50	15	35
8am-9am	75	33	42
9am-10am	96	54	42
10am-11am	81	48	33
11am-12pm	75	56	19
12pm-1pm	58	60	2
1pm-2pm	40	58	18
2pm-3pm	30	58	28
3pm-4pm	25	64	39
4pm-5pm	15	20	5
Total	**545**	**466**	**763**

Source: Field Survey, 2021.

Trip Purpose to the Institution

Table 10 shows trip purpose of motorists to the institution. According to the table, 40.97 percent of the motorists were mainly for work, 2.04 percent indicates they were mainly for business within the school premises, 51.91 percent were for academic purpose. While 5.08 percent were for visiting.

Table 10: Trip Purpose to the Institution

Trip Purposes	Frequency	Percentage
Work	161	40.97
Business	8	2.04
Schooling	204	51.91
Visiting	20	5.08
Total	**393**	**100**

Source: Field survey, 2021

Parking Problems

An interview was held with some selected members of the institution to discuss the extent of parking problems in the study area. Selection was made from the Department of Urban and Regional Planning, Civil Engineering and Architectural Technology. Principal Officers of the institution and some proportions of students. The outcome of the interview generally revealed that there are inadequate organized parking spaces across faculties/units in the institution, while increase in vehicle ownership have resulted to indiscriminate parking habit and increase in on-street parking across the study area. They also stated that newly constructed faculties/departments blocks have also replicated the culture of not providing organized parking areas for the end users of the buildings.

They stressed that this attitude has catapulted the problems of parking in the study area.

VI. DISCUSSION OF FINDINGS

The study noted that organized and designated parking facilities in the study area are grossly inadequate as vehicles are parked indiscriminately. For instance, it was noted that only the general administrative building has organized vehicular parking lots. On the level of vehicles ownership, the study showed that vehicles' ownership is a function of the population of the faculties or units. Notably, Faculty of Education, Faculty of Engineering and the General Administrative Block in the institution had the highest number of vehicles accumulation during the peak parking periods. The increase in the number of cars that are parked is as of the increase

in population of staff and students of the faculties/ units and the number of departments that constitutes these faculties and units.Findings from the parking survey conducted in this study showed that the number of vehicles parked at each faculty or unit is tied to time of the day. The table shows there is a proportional increased in the number of vehicles parked in each faculty/unit at a given hour. The number of vehicles in the parking spaces increases on an hourly basis with the faculty of engineering, education and administrative block topping the list.

With regards to the trip purpose to the institution, the findings showed that most trip to the institution were basically for schooling and work with few being for businesses, pleasure and visit. This however shows that trips to the institution is basically triggered by the need for school and work. The survey also showed that on the average, 370 vehicles entered institution between the time period of 8am - 12 Noon on working days and about 260 between the time period of 2pm to 5pm on working days. However, the number of vehicles that leaves the study area according to the traffic survey was about 206 during the hours of 8am - 12 noon and 260 between the hours of 2pm to 5pm daily.

With regards to the parking problems in the study area, it was revealed through an in-depth interview conducted among selected members of the university community and personal observation that parking problems in the institution stems from the unorganized nature of parking spaces in the institution to the increased on-street parking, lack of considerations for vehicular parking spaces in development plans, increased parking on green areas among others.

VII. RECOMMENDATIONS
The following measures are recommended:
i   The Physical Planning Unit should be more proactive in the development and redevelopment activitiesin the campus especially in the area of organized for parking facilities
ii.   Adequate space allocation should be made for parking facilities whenever there a new project within the study area.
iii. Instead of vehicle owners parking on green areas and on the road, the school authority should collaborate with the physical planning unit to identify vacant lands within each faculty/unit and design them for parking.
iv   On-street parking should thereafter be discouraged in order to improve on the aesthetic value of the campus environment and for free flow of traffic (both vehicular and pedestrians.

VIII.   CONCLUSION
One may conclude that parking space as an important element of the transportation system having several impacts on the environment. It is necessary to estimate the parking generation rate for all developments at the preliminary stage. This study which was aimed at analyzing parking space requirement in CRUTECH Calabar campus, suggested appropriate measures to address the problem. However, the study revealed that the high level of indiscriminate parking in the study area was due to the unavailability of well-organized parking facilities for each of the various faculties/units as well as the inactiveness of the physical planning unit in their responsibilities.

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