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# ORGANISED PARKING FACILITIES' UTILIZATION INVESTIGATION: THE CASE OF FEDERAL POLYTECHNIC ILARO, OGUN STATE, NIGERIA

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**ABSTRACT**

*Previous studies on parking facilities in tertiary institutions have overlooked the environmental impact of parking capacity utilization. This research aims to bridge this gap by examining the organized parking lots at Federal Polytechnic Ilaro, with a focus on proposing optimal and sustainable parking solutions. The study's objectives are to identify organized parking spaces on campus; determine parking volume, index, and turnover in these spaces; and propose optimal parking space utilization strategies. Using a week-long observational study and secondary data from the institution's Master Plan and Strategic Plan, the findings reveal that the parking index is less than 1 for all surveyed facilities, indicating underutilization of parking spaces. The study recommends the need to promote walking by constructing walkways linking parking facilities to activity points and encourage sustainable parking practices to reduce environmental impact*

**KEYWORDS:** *Analysis, Capacity, Parking, Facilities, Utilization.*

## 1.0 INTRODUCTION

Optimal parking management and capacity optimization of parking spaces becomes imperative in the face of increasing volume of vehicular traffic essentially occasioned by the increasing possession and utilization of private vehicles in Nigeria (Aderamo &Salau, 2013; Nkem et al., 2015). Nigerian tertiary education campuses, on account increasing premium being placed on higher education, keeps experiencing expansion, which manifests in the form of population growth, facilities and utilities expansion. Albeit most Nigerian tertiary institutions, ab initio, had master plans, their provisions have become overstretched in the face of plunging resources required to implement the plans and also conduct periodic reviews. Consequently, as campuses experience expansion in facilities like offices and classrooms and cars' ownership by students and staffers increase, facilities like parking spaces are also expected to be proliferated (Nadimi et al., 2021; Rotaris and Danielis, 2014). However, unlike other facilities, the effectiveness of parking spaces, including during peak periods when ceremonies and examinations that drive the highest traffic are held within tertiary institutions, is not a function of the extent to which they are proliferated. It is essentially about the optimality of the capacity utilization of parking spaces. This is owing to the environmental implications of having too many hard surfaces within the sites of tertiary institutions. Hard surfaces that are the requirements for parking surfaces prevent the percolation of water into the soil and essentially represent one of the causative factors of environmental problems like erosion and flooding (Berland *et al*., 2017). Suffices to conclude that incidences of roads setbacks' parking, parking in incidental open spaces, and undeveloped spaces meant for other land uses within campuses are not necessarily informed by the paucity of parking spaces. According to Janak et al. (2020), parking behavior in tertiary institutions is explained by the need for vehicles' owners to gain the closest access to their destinations and activity areas within campuses. Rather than parking in some distant parking spaces that would involve trekking to their activity points, they would rather park on the street, incidental open spaces, or undeveloped spaces meant for other land uses. Sometimes, cars' owners park under trees, taking advantage of the natural canopy offered by the trees, as a form of maintenance measure. This is a common feature in campuses where parking facilities are not adequately provided with sheds, parking policies are either weak or unavailable, punitive measures in the form of fines for indiscriminate parking unavailable, and guidance systems like road signs and institutional wardens that are meant to enforce parking policies unavailable.

Few researches had investigated the demand for parking, parking adequacy, challenges of parking, parking characteristics and parking behavior in Nigerian institutions (Nkem et al., 2015; Olugbenga&Oluwole, 2015; Adeniran, 2016). However, none has endeavored to explore the parking lots' challenges from the environmentalist dimension of existential capacity utilization via assessments of parking volumes, parking index, and parking turnover before arriving at conclusions suggesting the need for quantitative increase in the provisioning of parking spaces. Therefore, the aim of this research is to examine the capacity of organized parking lots within the campus of The Federal

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Polytechnic Ilaro with the view of making proposal for optimal and sustainable parking for the institution. The objectives are to identify the organized parking spaces in the study area; determine the parking volume, parking index and parking turnover in the organized parking spaces; and make proposal for optimal parking spaces utilization within the institution.

## 2.0 METHODOLOGY

The Federal Polytechnic Ilaro is based in Ogun State, Southwestern Nigeria. It was established by law on July 25, 1979 and fully commenced operations, November 15, 1979. The Federal Polytechnic Ilaro is geographically situated in Ilaro, Yewa South Local Government Area of Ogun State. It is located between latitude 6° 53' 0" North and longitude 3° 1' 0" East of the meridian. The institution has since expanded infrastructurally by leaps and bounds, providing educational services to over 19,000 students in its five schools.

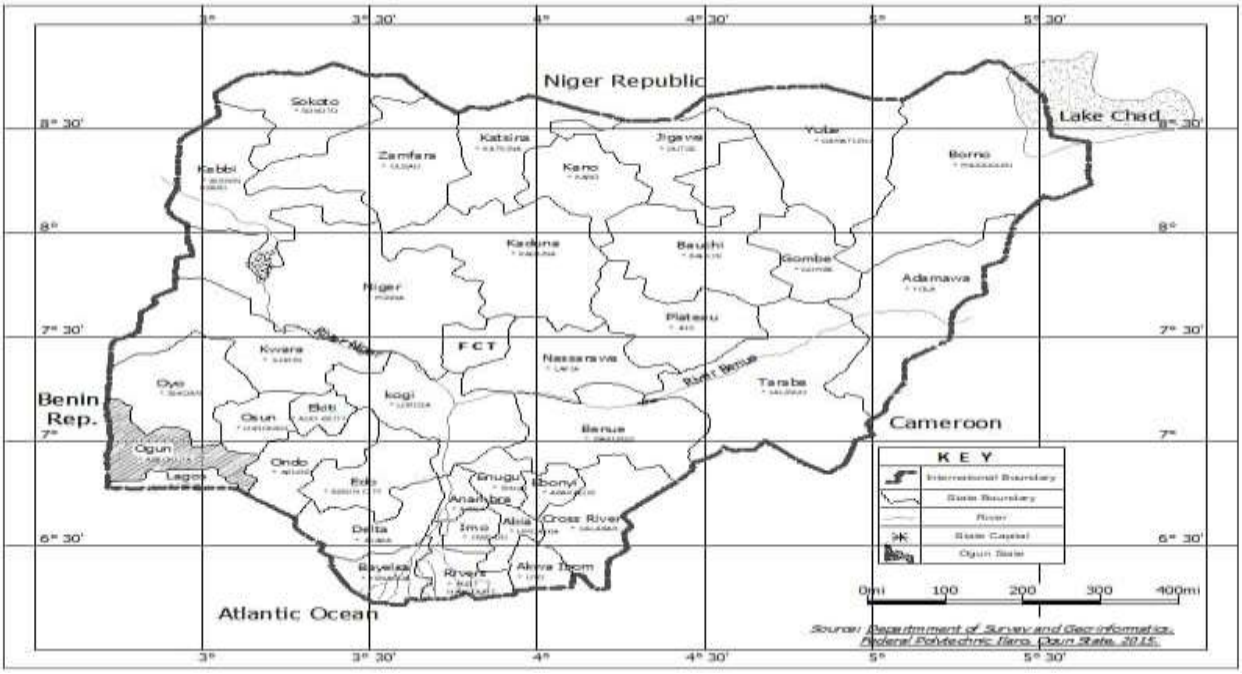



**Figure 1: Map of Nigeria.** ***Source: Department of survey and Geo Informatics, Federal Polytechnic Ilaro, 2025.***

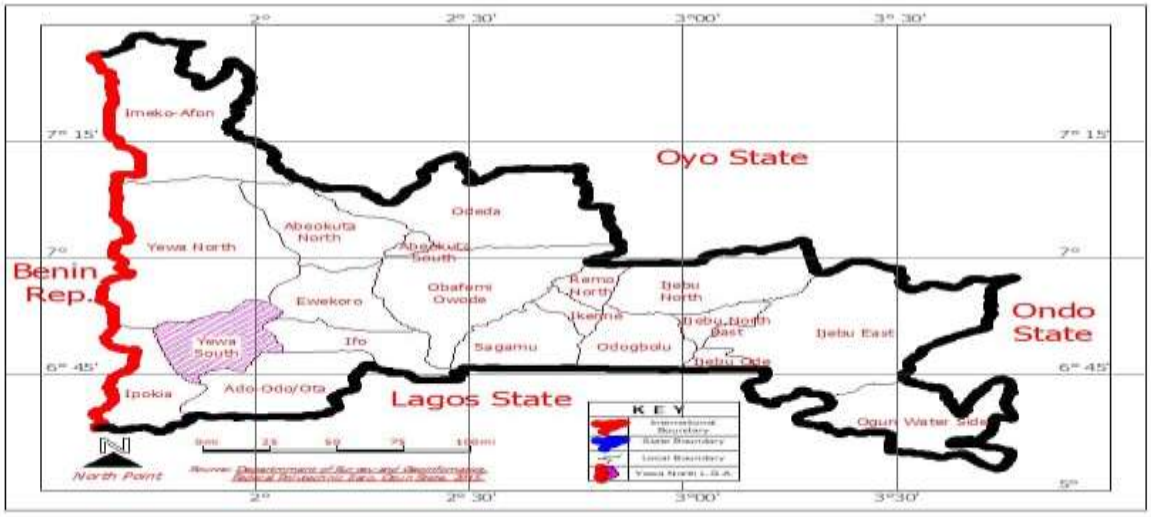



**Figure 2: Map of Ogun State.** ***Source: Department of survey and Geo Informatics, Federal Polytechnic Ilaro, 2025.***

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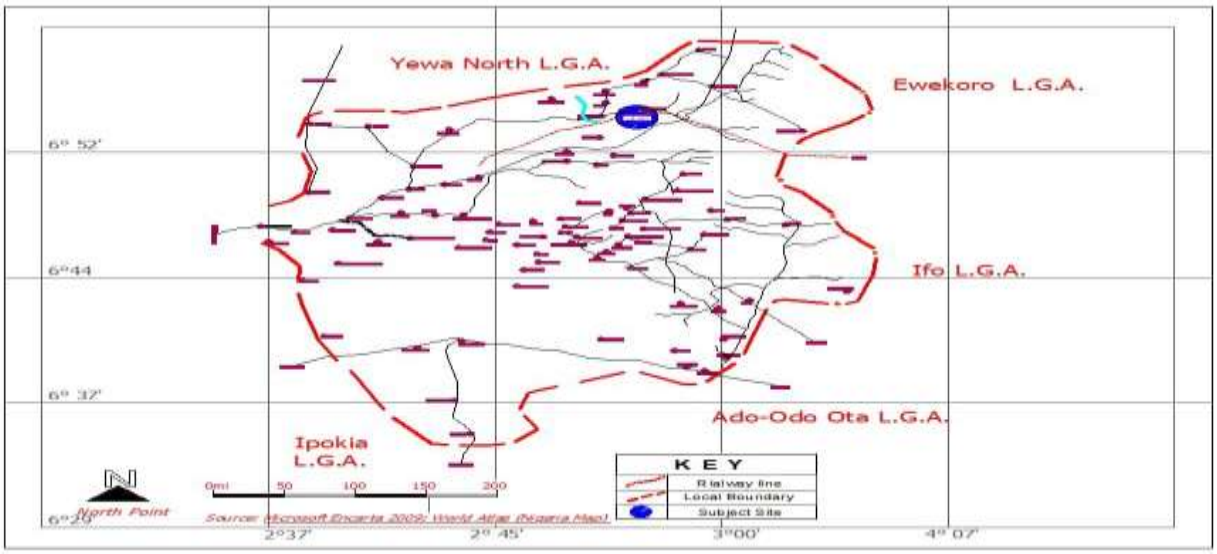



**Figure 3: Map of Yewa South Local Government Area.** ***Source: Federal Polytechnic Ilaro, 2025.***

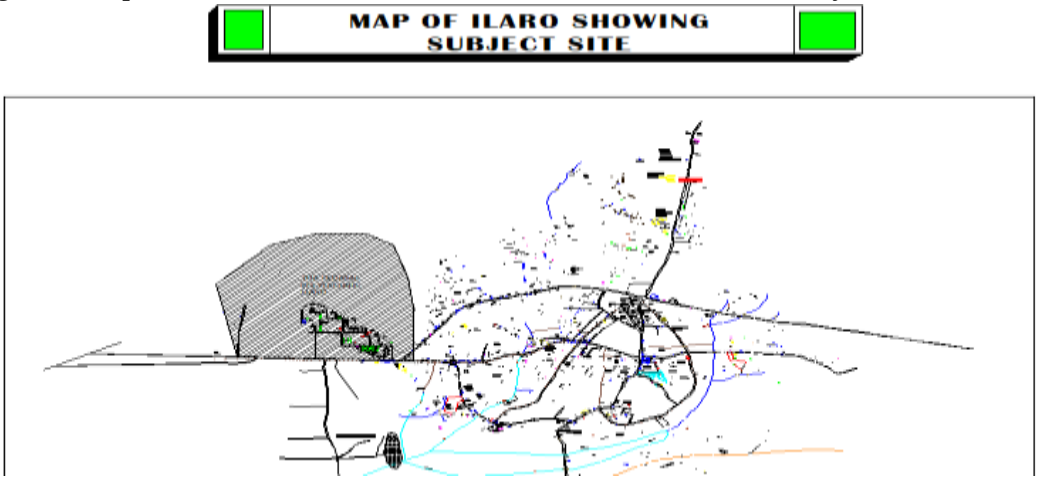



**Figure 4: Map of Ilaro Town Showing the Study Area.** ***Source: Ilaro Zonal Planning Authority,2025.***

The study adopted an observatory approach in the form of field surveys. Secondary data were sourced from the Polytechnic's Master Plan and Strategic Plan. A week-long parking survey spanning 10 hours (between 7.00am to 5.00pm) per day parking surveys were conducted. Organized parking spaces were those confirmed to be delineated in the Polytechnic's Master Plan. They were effectively parking spaces that had been tarred and, in some cases, laid out into parking units. The different surveys conducted were related to parking volume, parking capacity, parking load, parking index and parking turnover. Parking volume is the total number of vehicles parked within a given period of observation. This really doesn't involve repetition of count for same vehicle still parked in the subsequent hourly interval during which another observation will be taken. Parking capacity refers to the total number of parking units/spaces laid out or available for parking within the lot being assessed. Parking load is obtained by getting the average of the vehicle counts parked per hour obtained within the surveyed parking space. The obtained average volume is multiplied by 0.25 (15 minutes) presumed to be the average duration within which a random vehicle is parked (University of Idaho, 2023). Moreover, parking index is the percentage of parking bays actually occupied by parked vehicles as compared to the number of bays available in the theoretical sense. Parking turnover is a ratio gotten by the division of the total number of vehicles parked for the whole duration of survey by the total number of parking lots available (Kadiyali., 2007).

Average Parking Volume=∑N0. 0f Parking Volume/No. of day

Parking Load= Average Vehicle Count Per Hour *0.25
Parking Capacity = No. of bays.

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Parking Index =Parking Load/Parking Capacity
Parking Turnover = Parking Volume/No. of available bay

## 3.0 RESULTS/DISCUSSION

### 3.1 Parking Spaces in the Study Area.

Findings gotten through survey of the entire stretch of the institution's developed space and complemented with spatial information in the Polytechnic's Master Plan and Strategic Plan show that there are 15 organized parking spaces within the campus. Of course, there are 27 unorganized parking spaces, which is the classification for either the incidental open spaces, on-street parking, and undeveloped spaces meant for other uses, where vehicle owners were parking illegally parking on account of proximity to activity areas.

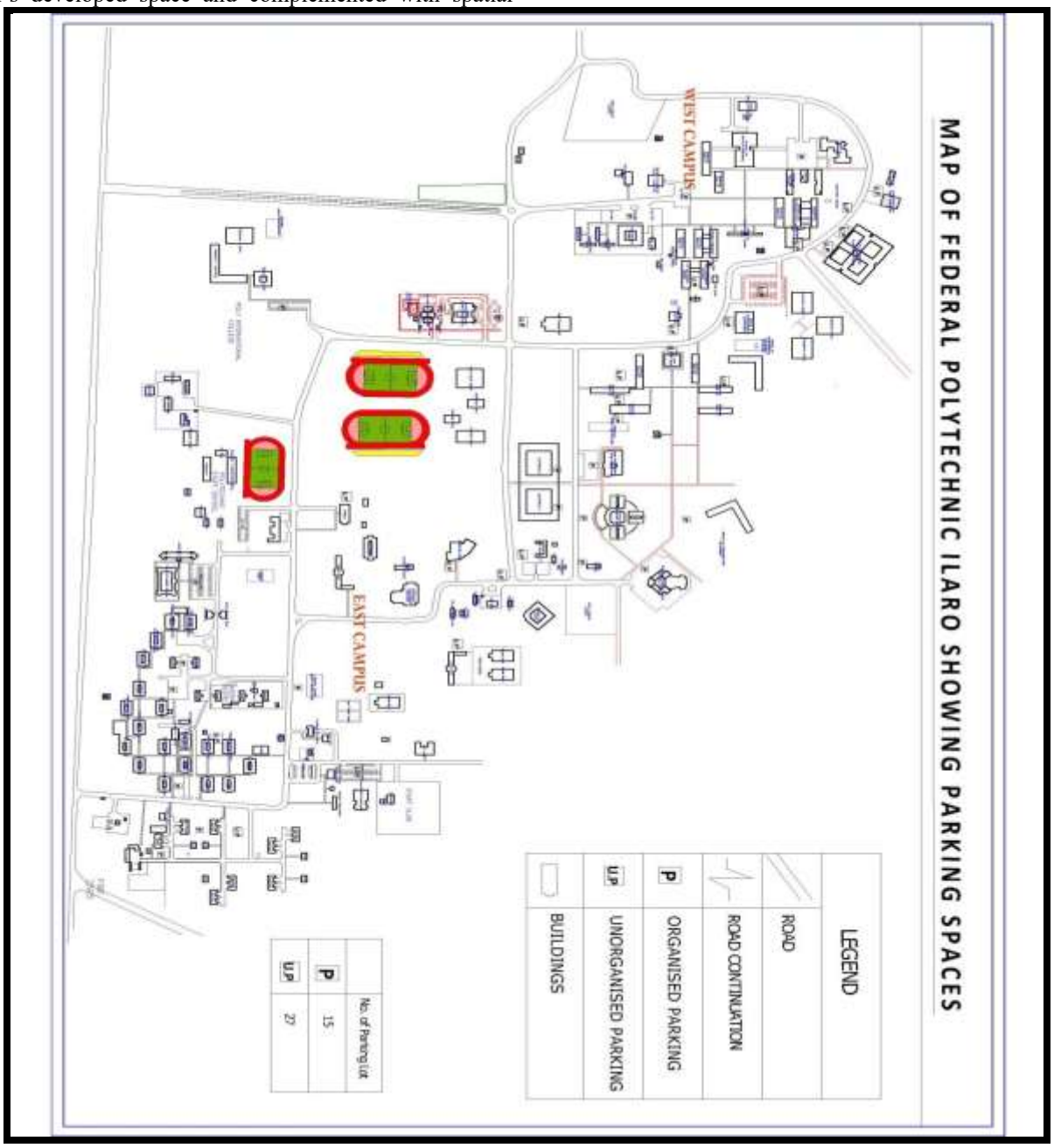



**Figure 5: Spatial Distribution of Organized and Unorganized Parking Spaces Within the Campus of Federal Polytechnic Ilaro.Source: Field survey, 2022**

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### 3.2 Parking Metrics

From the data presented in Table 1, the organized parking capacity for the Federal Polytechnic Ilaro is about 380. Considering the average parking time of about 15 minutes per random vehicle, barring special occasions like convocations or examination periods when parking periods can exceed that average limit, the parking capacity can accommodate about 1520 in one hour. This is about 15,200 parking spaces available within the entire 10 hours period considered as the activity period for the institution. All the metrics assessed- parking volume, parking capacity, parking load, parking index and parking turnover, show that the parking spaces are not optimally utilized. From the 1.25 observed average parking volume per hour in Guest House to the 70.2 in admin block, it is evident that the parking spaces are underutilized. For instance, the average per hour capacity for admin block with 75 parking units should be 300, considering the duration of about 15 minutes that should be the average parking time for any random vehicle as espoused by University of Idaho (2023). Of course, this excludes special occasions like convocations or examination periods when parking periods definitely exceed that average limit. The most important evidence of underutilization of the parking spaces is the parking index estimations, as all the outcomes are less than 1. This effectively implies that, in all the parking spaces, the number of bays occupied within specific hours is lower than the theoretical number of bays available.

**Table 1: Organized Parking Spaces Within Federal Polytechnic Ilaro's Campus**

| S/N | Location | Parking Capacity | AverageParking Volume | Parking Load | Parking Index | Parking Turnover | Remark |
|---|---|---|---|---|---|---|---|
| 1 | Entrepreneurship Development Center | 10 | 6.8 | 3.5 | 35.7% | 0.6 | Adequate |
| 2 | Masscom Studio | 24 | 7.5 | 3.08 | 13% | 0.28 | Adequate |
| 3 | School Of Management Studies | 42 | 6.2 | 2.04 | 2.4% | 0.15 | Adequate |
| 4 | School Of Communications | 30 | 6 | 2.13 | 7.08% | 0.20 | Adequate |
| 5 | School Of Engineering | 35 | 18.4 | 10.7 | 30.57% | 0.53 | Adequate |
| 6 | Robotics Building | 16 | 3.4 | 1.54 | 9.63% | 0.21 | Adequate |
| 7 | Raheem Oloyo Conference Hall | 18 | 13.6 | 5.83 | 32.4% | 0.76 | Adequate |
| 8 | Guest House | 8 | 1.25 | 1.25 | 15.63% | 0.5 | Adequate |
| 9 | General Studies Department | 20 | 10.6 | 5.62 | 28.35% | 0.53 | Adequate |
| 10 | East Campus ICT Center | 22 | 21.8 | 16.9 | 76.8% | 0.99 | Adequate |
| 11 | UBA | 8 | 8.8 | 3.8 | 38.0% | 0.88 | Adequate |
| 12 | Yayi Productivity Library | 10 | 1.8 | 3.5 | 35% | 0.18 | Adequate |
| 13 | Admin Block | 75 | 70.2 | 49.67 | 66.23% | 0.94 | Adequate |
| 14 | Car Park (West Campus) | 40 | 20.2 | 11.88 | 29.5% | 0.51 | Adequate |
| 15 | Clinic | 22 | 12.6 | 7.83 | 35.6% | 0.57 | Adequate |

## 4.0 CONCLUSION/ RECOMMENDATIONS

From the findings, it is evident that there are about 15 organized parking facilities within the institution. It is also evident that all the parking spaces are currently underutilized. This implies that the ubiquitous parking in incidental open spaces, roads setbacks' parking, and undeveloped spaces within the campus is not explained by quantitative limitation of parking facilities. It is also not explained by the capacity of the institution's parking facilities. It is rather most logically explained by the behavioral tendency to opportunistic parking in the most proximate locations to accessibility areas, as canvassed by Mohammed (2016) and Janak et al. (2020). This is usually the case when parking policies are non-existent, weak, and hardly enforced with punitive measures in form of fines. In order to optimize utilization of the current parking facilities and prevent illegal parking, it is imperative that the Management of the Polytechnic improves existing parking facilities, most especially in terms of ensuring sheds are provided to obviate the tendency of indiscriminate parking under trees under the guise of looking out for canopies that is the common wont of vehicle owners. There is the need to not just promote the health advantages of walking, walkways should be adequately provided to link parking facilities with activity points that have been planned to be serviced by the parking facilities. Given the need to restore order, the Management of the school should design guidance systems like road signs and employ institutional wardens that would be saddled with the onus of enforcing parking

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policies of the institution. Fines can be imposed on erring vehicle owners. To further modify the micro-climatic conditions of parking facilities, trees can be aggressively planted around existing parking lots that are canopy free. This would represent a big leap in the attempt to implement the Federal Polytechnic Ilaro's campus green initiative program. Through the institution's community radio and social media, the Management should create necessary awareness and education regarding its parking policies towards a sustainable campus. Lastly, abandoned cars, machineries and supplies kept in parking lots, especially those in desirable areas, should be completely removed to optimize capacity utilization of the parking facilities.

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**Statements and Declarations**
**Competing Interests**: The authors have no relevant financial or non-financial interests to disclose.
**Ethical Approval**: Not applicable.
**Consent to Participate**: Informed consent was obtained from all subjects involved in the study.
**Data Availability Statement:** the field data that formed the basis of the study's results can be made available upon reasonable request.

**Author Contributions**: All authors were involved in the production and writing of the manuscript. Conceptualization was done by Olasunkanmi Olapeju. Data collection was coordinated by Olasunkanmi Olapeju and Adewara Babalola. Formal analysis was performed by Olasunkanmi Olapeju and Adewara Babalola. Olasunkanmi Olapeju and Adewara Babalola were involved in investigation. Methodology was ideated by Olasunkanmi Olapeju. The writing of the original draft was done by Olasunkanmi Olapeju. Review and editing were performed by Olasunkanmi Olapeju and Adewara Babalola.

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