

Sustainable Campus Planning and Architecture: A Comparative Study of American and Nigerian Universities

By

Prof. Olu Ola Ogunsote and Dr. (Mrs.) Bogda Prucnal-Ogunsote
Department of Architecture, Federal University of Technology, Akure
Email: bogunsote@yahoo.com. Web site: sdng.net

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Abstract

Campus planning and architecture present unique opportunities for demonstrating and popularizing contemporary tendencies in architecture and urban planning. A visit to several American universities during the summer of the year 2005 presented an opportunity to observe and experience current trends in campus planning and architecture. The seven American universities used as case studies are the Cleveland State University, Harvard University, Illinois Institute of Technology (IIT), Massachusetts Institute of Technology (MIT), Rockhurst University, University of Chicago and University of Missouri, Kansas City (UMKC).

The location and campus plans of these universities were analysed while their architectural character is illustrated. Campus specific architecture such as student hostels, religious buildings and libraries were used to characterize the universities. Landmark buildings were used to illustrate architectural tendencies and these include the Harvard Carpenter Centre for the Visual Arts, the Harvard Graduate School of Design, Architecture and Planning, the IIT University Centre, the MIT Stata Centre and the Stowers Medical Research Centre. An analysis of landscaping, traditional architecture and conservation as well as parking and transportation was also carried out.

These American universities were compared with African universities including the Ahmadu Bello University, Benue State University, Covenant University, Delta State University, Federal Universities of Technology in Akure and Yola, Obafemi Awolowo University, University of Benin, University of Ibadan, University of Lagos and University of Science and Technology, Kumasi. It was concluded that architecture and urban design contribute immensely to the success and popularity of universities. It was recommended that universities should invest in dynamic master plans to enhance architectural character and encourage landmark buildings that popularize significant tendencies in architecture.



Plate 1. Stata Centre, Massachusetts Institute of Technology.

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1. Introduction

The design of University campuses offers unique opportunities for demonstrating and popularizing contemporary tendencies in architecture and urban planning. The concept of the University as an ivory tower is universal. The freedoms of thought, speech and association found on university campuses combine with the abundance of impressionable minds to provide fertile soil for sowing architectural ideas. Few people have visited the Obafemi Awolowo University, Ile Ife campus without being impressed by its beauty and serenity. This “most beautiful Campus in Africa” represents the zenith of campus planning and architecture in Nigeria (Olaniyan 1985).

The same university campus however shows the current degradation in campus facilities and architectural originality. Many of the new buildings are little better than temporary buildings, with little or no architectural significance. Meanwhile the older buildings are falling apart from disrepair, while facilities are stretched beyond limit. Certainly, this radical decline cannot be permanent, and the dawn of renewed originality in campus architecture is hopefully imminent. The proliferation of private universities with their individualistic architectural styles, promises to wake us up from this intellectual coma and artistic nightmare.

A recent visit to several universities in the United States of America offered an opportunity to compare campus planning and architecture across the two continents. The universities were visited in June and July 2005. Seven of the universities were chosen as case studies and these are Cleveland State University, Harvard University, Illinois Institute of Technology (IIT), Massachusetts Institute of Technology (MIT), Rockhurst University, University of Chicago and University of Missouri, Kansas City [Table 1].

These visits were planned to study new directions in campus architecture, and specifically to predict how these developments may influence the Nigerian situation positively. Thus the emphasis was not only on form and function, but also on sustainability, social responsibility and atmosphere.

The visits took place at the beginning of the summer vacation, thus only the departments offering summer courses were active, but even these had only skeletal staff on ground. The absence of staff and students reduced the opportunities for interaction, but the few people present had more time to show us around.

1.1 Comparisons

The authors attempted to find examples from African universities to relate their experiences to the Nigerian situation. One Ghanaian and five Nigerian universities were used as major case studies [Table 2]. Nine Nigerian Universities were additionally used as minor case studies [Table 3]. The visit to Ghana was in the year 1999 while photographs from the Nigerian universities were taken over the last five years.

Table 1: American Universities used as major case studies.

| University | City | State |
|---------------------------------------|-------------|---------------|
| Cleveland State University | Cleveland | Ohio |
| Harvard University | Boston | Massachusetts |
| Illinois Institute of Technology | Chicago | Illinois |
| Massachusetts Institute of Technology | Boston | Massachusetts |
| Rockhurst University | Kansas City | Missouri |
| University of Chicago | Chicago | Illinois |
| University of Missouri, Kansas City | Kansas City | Missouri |

Table 2: African Universities used as major case studies.

| University | Location |
|--|--------------|
| Ahmadu Bello University, Zaria | Kaduna State |
| Federal University of Technology, Akure | Ondo State |
| Obafemi Awolowo University, Ile-Ife | Osun State |
| University of Ibadan, Ibadan | Oyo State |
| University of Lagos, Lagos | Lagos State |
| University of Science and Technology, Kumasi | Ghana |

1.2 Style and Presentation

This paper is necessarily very graphic, since it attempts to illustrate the experiences of the authors during these visits. The use of pictures has taken precedence over descriptions, while the rigid academic writing style has been relaxed to convey meanings found not just in the words, but in their sequence.

All but a few of the photographs used were taken by the authors. These photographs were scanned and edited using photo-editing software including Adobe

Photoshop, Corel Photo Paint, Hewlett Packard Image Zone and Microsoft Office Picture Manager. The page layout was done using CorelDRAW. The renderings were produced using Autodesk Architectural Desktop and 3D Studio Max.

2.0 University Campuses

The architecture of the campuses is often unique and is generally interesting. The campuses are located in large cities, and they are integrated into the city transportation network. There are usually well serviced bus and train routes leading to these campuses. The buildings are integrated into the city fabric, and there is usually no fence separating the university from the neighbourhood.

2.1 Cleveland State University

The Cleveland State University (CSU) has a very beautiful and serene campus with extensive glass walls reflecting the blue sky, brick facing, horizontal lines and beautiful landscaping. Though strategically located in downtown Cleveland, it covers 85 acres and consists of 40 buildings. This elegant architecture is characteristic of Cleveland with its modern skyscrapers stylishly and gracefully adorning the downtown skyline.

The University is located at the centre of the city and is made up of a series of interconnected buildings, some of which are linked by an overhead bridge. A pleasant system of walkways, lawns, trees and flowerbeds give the campus its characteristic park atmosphere. The surrealistic blue sky works well with the glass to create palpable euphoria. [Plate 2].



Plate 2. Cleveland State University.

2.2 Harvard University

The Visitor Centre provides information on the architecture and planning of Harvard University. A detailed map of the campus is given to each visitor. Most of the buildings are historic such as the Widener Library, the Barker Centre and the Wigglesworth Hall. There are some modern additions including the Carpenter Centre for the Visual Arts, the Graduate School of Design, Architecture and Planning, Knapel Building by famous architect Pei Cobb Freed and the Sackler Museum. The Sackler Museum was designed by British Architect James

Table 3: Nigerian Universities used as minor case studies.

| University | Location |
|--|---------------|
| Ambrose Alli University, Ekpoma | Edo State |
| Babcock University, Ilisan-Remo | Ogun State |
| Benue State University, Makurdi | Benue State |
| Covenant University, Sango Otta | Ogun State |
| Delta State University, Abraka | Delta State |
| Federal University of Technology, Yola | Adamawa State |
| Kogi State University, Ayangba | Kogi State |
| Olabisi Onabanjo University, Ago Iwoye | Ogun State |
| University of Benin, Benin | Edo State |

Stirling, winner of the 1981 Pritzker prize. [Plate 3].

2.3 Illinois Institute of Technology

The Illinois Institute of Technology is renowned for many inventions, including the first portable cell phone and magnetic recording. The master plan of the campus was designed by famous architect Ludwig Mies van der Rohe in 1941 and it is one of the top architectural achievements in the United States. Mies also designed 20 of the buildings, including the famous Crown Hall (1956) which has been declared a national monument and is currently being renovated. It is his first large-scale, clear-span, universal-space building and it has exposed, well expressed steel frame with the roof suspended from spanning I-beams.

Through this building and the Perlstein Hall (1946) Mies modified and refined the basic details of his architecture which later became the standard for many later campus buildings.

The Grover Herman Hall (1962) by Walter Netsch of Skidmore, Owings and Merrill and many others followed the Miesian's style [Plate 4]. There are two splendid, newly added buildings; the McCormick Tribune Campus Center (2003) designed by Rem Koolhaas and the State Street Village (2003) a residence hall designed by Helmut Jahn, voted one of the "Ten Most Influential Living American Architects" by the American Institute of Architects.

2.4 Massachusetts Institute of Technology

The Massachusetts Institute of Technology campus is a modern conglomerate of buildings, most famous of which is the Stata Centre by Frank Gehry [Plate 5]. This quiet yet busy campus is home to several world class schools, laboratories and research institutes, including the School of Architecture. The campus is intersected by major urban roads, but there is no definite boundary separating the campus from the other buildings. There is free bus transport within the campus and a large shopping mall complete with specialty shops, grocery stores, restaurants and services.



Plate 3. Sackler Museum. Harvard University.



Plate 4. Grover Herman Hall, Illinois Institute of Technology,



Plate 5. Stata Centre. Massachusetts Institute of Technology, Boston.

2.5 Rockhurst University

Rockhurst University is a private Christian University located on Troost Avenue in Kansas City, Missouri. The objectives of the University emphasize the shaping of character and the serene environment of the university campus is ideal for contemplation. The modern buildings have a unique character with stone cladding, glass walls and pyramid motifs in pillar details. The central square is beautifully landscaped with a tower, fountains and a colonnade [Plate 6]. The pedestrian gate which leads to the University square reflects the architectural character of the university.

2.6 University of Chicago

This spacious university campus is home to the School of Social Service Administration by Mies van der Rohe. It is an academic building with a low-rise structure, steel skeletal frame clearly expressed in the elevation and a characteristic curtain wall [Plate 7]. Also seated along a quiet road is the Robie House, one of the best designs by one of the greatest architects of the last century: Frank Lloyd Wright. Opposite the Robie house is a modern building celebrating the ideals of this great architect.

The Henry Hinds Laboratory for the Geophysical Sciences is a well articulated building with a well defined entrance and some sophisticated postmodern details. The Students' Hostel has good proportions, beautiful color scheme and postmodern toy-like appearance enhanced by carefully designed landscaping elements. The high-technology sports hall uses white pylons with suspension and tension cables.

2.7 University of Missouri, Kansas City

The Main Campus of the University of Missouri, Kansas City is located in the southern part of the city. Many of the buildings, such as Epperson Hall are historical buildings. Some, such as Flarsheim Hall, have been completely renovated and have modern interiors. Most of the core buildings are however modern buildings, including Katz Hall, the Pierson Auditorium [Plate 8] and the Bookshop Complex. The Stowers Institute for Medical Research is the most interesting building on the campus. The Swinney Recreation Centre houses a swimming pool complete



Plate 6. Rockhurst University, Kansas City, Missouri.



Plate 7. School of Social Service Administration, University of Chicago, Chicago.

with a glass roof that can be retracted in segments. Most of the University buildings are concentrated in a clearly defined quadrant, often separated from the rest of the city by roads. The campus is bisected by major city roads, including Volker Boulevard and the infamous Troost Avenue. Popularly called the Troost or the Hood, this avenue is a manifestation of the racial divide in the US.

2.8 Other Universities

The researchers also visited some other universities, including Columbia University and Fordham University [Plate 9] both in New York, the University of Illinois at Chicago and Wayne State University in Detroit. Columbia University and Fordham University are located at the very heart of New York and right on the main street. The opinions expressed in this paper are also influenced by the planning and architecture of these universities.

3.0 Libraries

University libraries have distinct character. The Widener Library at Harvard University is a monumental historical building. The Rational Style that prevailed at IIT is also behind the design of the Paul Galvin Library (1962) by Walter Netsch of Skidmore Owings and Merrill [Plate 10]. The future of the library as an institution is unknown with the advent of the virtual library and wide internet access. The researchers paid several visits to the Chicago Public Library where visitors have free access to two hours of internet connection daily and to 15 pages of free computer printouts daily. Registered library users have even more access. They also spent a week at the elegant Miller Nichols Library at the University of Missouri, Kansas City and made the following observations:

- The students and general public use books very rarely.
- They come to the library mainly to use the computers with internet access.
- Students and university staff are encouraged to use the internet and they



Plate 8. Pierson Auditorium, University of Missouri, Kansas City.



Plate 9. Fordham University, New York.



Plate 10. Paul Galvin Library, Illinois Institute of Technology, Chicago.

have unlimited access. Students pay a small fee per session for computer usage and a limited number of computer printouts. Staff have unlimited access.

- A new concept of gaining and sharing knowledge is encouraged through interactive spaces in cafeterias, students centers and also in the libraries where students can plug their laptops to access the internet.
- Public libraries provide unlimited free internet access to users who come with their own laptops. The laptop should have a wireless network card installed.

4.0 Religious Buildings

There is an expectation that a church should be monumental to host its religious function due to the long tradition of historical churches. This is fulfilled in some cases by the modern architects. In some other instances they used box-like anonymous forms which in the opinion of the researchers are not the best for the purpose. They are good however in demonstrating the changing fashion in architecture like for example the Robert F. Carr Memorial Chapel of St. Savior (1952) at IIT. It is the only ecclesiastical building ever completed by Mies van der Rohe. It is 11m wide, 18m long, and 6m high. Its walls are constructed of buff brick with interior partitions of natural finished oak. This building does not reflect the religious function on the exterior in anyway. It looks like any other building on the campus. Even the interior is just an open hall like other Miesian's open space interiors. St Francis Xavier Catholic Church (1951) at UMKC has a sculpture-like, monumental shape with the cross on the tall bell tower in front [Plate 11]. It can be compared to the shape of a boat or to "praying hands". The interior is very pleasant especially because of the sapphire blue color of the stained glass. The light that comes in through the narrow, tall, vertical windows makes it appear mystical. Its form goes well with the Revival of Radical Individualism as represented by the pilgrim church at Ronchamp by Le Corbusier.



Plate 11. St Francis Xavier Catholic Church, University of Missouri, Kansas City.

5.0 Student hostels

The new tendency is that the university should be an integral part of downtown rather than an enclosed and separate community. In that regard private sector and joint development is encouraged within the university. The university is also concerned with the surrounding neighbourhoods. Increasing the number of students and staff who live on or near campus is a priority in the master plan.

In all universities visited the students who secured accommodation on the campus lived in a serene environment. Their residences are as well treated as any other university buildings and thus at IIT Mies van der Rohe used the Alumni Memorial Hall (1945-46) to improve on his earlier works. He used dark anodized metal for the glazed curtain walls and raw brick walls to

supplement the metal frames.

Also at IIT main campus there is the spacious McCormick Student Village - a residence hall complex for the students. The hostels are accommodated in the traditional buildings like at Harvard University or very fashionable Post Modern buildings like at the University of Chicago [Plate 12].



Plate 12. Student Hostels at University of Chicago.

6.0 Landmark Buildings

The most famous buildings are designed by world-renowned architects. Although many of these architects are Pritzker prize winners, they usually strive to produce unique and interesting designs for these university campuses. They know that a successful project on campus will enhance their fame and popularity. The landmark buildings used as case studies are the Harvard Carpenter Centre for the Visual Arts, the Harvard Graduate School of Design, Architecture and Planning, the IIT University Centre, the MIT Stata Centre and the Stowers Medical Research Centre.



Plate 13. Carpenter Centre for the Visual Arts, Harvard University.

6.1 Carpenter Centre for the Visual Arts

The Carpenter Centre for the Visual Arts (1961) at Harvard University is the only building designed by Swiss architect Le Corbusier in North America, and one of the last to be completed during his lifetime [Plate 13]. He was the spokesman for Modernism with its Rationalism through the publication *L'Esprit Nouveau*. The open plan was a characteristic feature of the buildings of Rationalism. Closed square and rectangular rooms were replaced by open spaces which led from one to the other, giving a flowing series of rooms. These could be subdivided as required, because the skeleton structures only needed supports and did not require load-bearing walls. As a result of these principles the Carpenter Centre is a unique, open structure with a curved ramp and a promenade, a particularly strong accent, passing through the building from one side to the other with glass on either side making the interiors visible from the outside. The layers and levels swing out and back from the grid of concrete pilotis within, making the most of cantilevering to create interpretations of exterior, as well as a sequence of special events linked by the promenade of the ramp. It is a wonderful collection of the design principles and devices from Le Corbusier's earlier works, the "ondulatoires" from *Le Tourette*; the *brise soleils* originally from the *Marseille Unite' d'habitation* but angled later in Chandigarh and the original *Five Points* from the 1920s accentuated in a new way. It is as if the *Villa Savoye* had been exploded inside out, with ramp and curved partitions extending into the environment.

6.2 Harvard Graduate School of Design, Architecture and Planning (Gund Hall)

Gund Hall which houses the Harvard Graduate School of Design, Architecture and Planning (GSD) was designed by rationalist Australian architect and GSD graduate John Andrews [Plate 14]. It has a skeleton structure which allows for flexible floor planning. The glazed wall and the sloping clear-span roof (sky light) reveal the shape of the studio for five hundred students. All

the students work in the same stepped studio space. The entire studio is evenly and very well lit by the sky lights. There are long space rafters that span across the width of the studio and support the weight of the sky lights. The ground floor with the reception and a conference hall has a lot of exhibition space for students' works. There is free access around the building allowing easy pedestrian circulation. The cantilevered front area with horizontal window bands has offices for 100 faculty and staff. The pillars visible on the front elevation span three floors while on the side elevation their height changes according to the studio level. The studio wall is projected in a way that the side elevation perfectly exposes the levels used for the studio.



Plate 14. Harvard Graduate School of Design, Architecture and Planning, Harvard University.

The studio space is organized on five levels. All the levels have visual contact with the ground floor and other facilities including the snack bar. The working spaces for individual students are separated by portable partitions which are also used as display boards. Each student has a large drawing table with provision for networked computing and a big modeling table. Students bring their own computers which they use for design work. One of the levels is however dedicated to providing computer resources. Computer laboratories, large format plotters, printers, huge touchscreens, consumables and personalized networking are managed by computer experts.

6.3 McCormick Tribune Campus Centre

The McCormick Tribune Campus Centre is strategically located at the centre of the Illinois Institute of Technology campus. This appealing design is the work of Pritzker Prize winning architect Rem Koolhaas based in Rotterdam [Plate 15]. The design concept arranges various areas around diagonal pathways, with a concrete and stainless steel tube that encloses an elevated section of the city mass transit railroad. This tube dampens the noise of the trains overhead. The building houses services that had hitherto been scattered all over the campus: food courts, retail shops, student organization offices, a recreational facility and space for campus events. This is the first building completed by Koolhaas in the United States.



Plate 15. McCormick Tribune Campus Centre, Illinois Institute of Technology, Chicago.

6.4 Massachusetts Institute of Technology Stata Centre

The Ray and Maria Stata Centre by Pritzker Prize winning architect Frank O. Gehry is arguably the most interesting building at MIT. The architect's challenge was to design an open environment for researchers that encourages intellectual and social interaction, thus facilitating cooperation and exchange of information.

The interior concept zones private and quiet areas from common and public areas while working spaces, lounges and kitchens are arranged around public areas. The exterior is a complex array of deconstructivist volumes clad in metal and brick, with extensive glass walls [Plate 16].

The Stata Centre houses the Computer Science and Artificial Intelligence Laboratory, the Laboratory for Information and Decision Systems, and the Department of Linguistics and Philosophy. The Student Street is the heart of the building. It is an example of MIT's effort to improve the student experience beyond the classroom. There is casual seating for socializing and chalk boards for informal academic interaction. A 350-seat amphitheatre used mainly for casual gatherings also hosts lectures and performances.

The fitness centre has facilities for aerobics, weight training and a dance studio. There is a direct link from the Fitness Centre to the Alumni Swimming Pool. The building also has a Childcare Centre with a playground and a designated drop-off area. The building is designed to maximize the use of natural lighting. This is enhanced by a series of glass walls and roof lights. The building uses raised floors with a modular electrical system, phone and data networks and a displaced air system. The Stata Centre is environmentally friendly, with a storm water management system and pumps powered by solar panels. Water from the roofs is collected in underground cells and used for flushing toilets. A series of interconnected plazas and gardens provide extensive outdoor space. Completely hidden underneath the building is a 700-car underground garage.



Plate 16. Stata Centre, Massachusetts Institute of Technology, Boston.

6.5 Stowers Medical Research Centre

The Stowers Medical Research Center (2000) by Peckham Guyton Albers & Viets Inc. and MBT Architecture is dedicated to research on cancer patients [Plate 17]. It has the beauty and character that directly responds to its mission statement: "Hope for Life". The complex can easily capture passers-by attention by its beautiful form, rich landscape and quality of details. In a way it is reminiscent of Prairie house buildings by Frank Lloyd Wright especially in the design of the roof and the last floor, the linear treatment of finishes of the ground floor and the elongated wall with falling water and the general attention paid to details. The elevation uses warm light brown colour and is finished to resemble natural granite stone. Most windows on the elongated elevations are in horizontal bands while on the short elevations there are big windows occupying nearly half the wall surface. The overall result is very pleasant and enchanting. The design is further enhanced by the landscaping features including a small garden setting with a gazebo, water bodies with fountains and sculptures. The contrasting dark green plants also have a



Plate 17. Stowers Medical Research Centre, University of Missouri, Kansas City.

beautifying effect. The interior consists of interactive spaces throughout the facility that invite researchers to pause and exchange ideas. Conference rooms, break rooms, shared lab support spaces, and other public spaces are situated along central corridors, and windows are placed in lab doors all allowing scientists to view what others are doing. The gallery includes quiet interior niches, indoor gardens, and a pool fountain for gathering or solitary reflection.

7.0 Landscaping

The landscape design plays an indispensable role in campus planning. It relates to circulation and recreation. It supplements the architecture and creates a visual pleasure [Plate 18]. It consists of the ground finish with pavements; concrete tiles, brick, stone or gravel finish with terrain steps, grass lawns, and pools of water. Others are vertical elements, seating arrangements, elevated flower beds, retaining walls, fencing materials, fountains, sculptures, small scale free standing structures like gazebos and plants including trees, shrubs, herbs and climbing plants. Along with buildings, landscaping is responsible for the skyline, the views, vistas and the way the sky vault appears.



Plate 18. Garden at the Stowers Institute for Medical Research, University of Missouri, Kansas City.

The character of the landscaping elements is carefully chosen. The shape of the flower beds and the water pools correspond to the character of the Miller Nichols Library. At the Stowers Medical Research Centre, the roof of the small garden structure used for outdoor seating (gazebo) is in analogy to the roof of the main building. In another case it is a contrast concept of a soft line motif that is used to complement the box like architecture. Generally the character is carefully chosen to follow a well defined concept. There is an atmosphere of a dream garden created in the park-like setting of the Research Centre. At the Illinois Institute of Technology the seating arrangements are an invitation to have a lunch break.

The landscape brings life to the built environment and there is a constant change associated with the growth of and the seasonal change of plants. The water pools with the fountains introduce the element of motion to the otherwise static environment. Sculptures can act as accents in courtyards. Sometimes the seats look like sculptures and sometimes the sculpture poses like a human. The materials used include stone, reinforced concrete, timber, alloys and steel.

8.0 Traditional Architecture and Conservation

The universities have a policy of retaining and rehabilitating buildings of historic significance [Plate 19]. Historic buildings add architectural diversity to the campus and provide a tangible link to the past. The reuse of buildings also reduces the environmental impact of demolition and new construction. The historic buildings are preserved for university use. For example, Epperson Hall at UMKC is



Plate 19. Robie House, University of Chicago, Chicago.

occupied by the Department of Architecture. The MIT School of Architecture is in a monumental classical building much like Widener Library at Harvard.

The Crown Hall at IIT which was declared a national monument is now being restored by several teams of specialists. It represents Mies van der Rohe's concept of a building devoted to architectural education. Mies-style buildings are endlessly adaptable due to the simple skeleton structure and open plans. Several architectural practices specialized in imitating this style.

Some buildings, like the Robie House at the University of Chicago, are now used for tourism. Originally owned by Frederic C. Robie, a businessman and inventor, Robie House has a long, low profile with linear white stones, nicely arranged red bricks and wide, nearly flat roof and overhanging eaves. It is perhaps Frank Lloyd Wright's most famous prairie house.

9.0 Parking and Transportation

The network of the roads in the universities is freely connected to the city network. It is in fact integrated into the city and linked by primary roads and thus easily accessible. The physical separation between the town and the university is thus minimized. The design of the inner network maintains a serene atmosphere while meeting the demands of transportation. The planning of circulation roads is professional with good views and beautiful vistas. The pedestrian walkways are clearly defined.

The universities provide ample parking spaces for the large commuter population.

Apart from surface parking, multi-storey

garages are strategically located allowing parking closer to the classrooms and other campus destinations [Plate 20]. This also enhances the beauty of the environment. One such structure is accessible right from the primary road while the second is situated at the very center of the university. In the first case the parking is designed as a continuation of the very sophisticated Stowers Institute for Medical Research. In the second case it closes up a large beautifully landscaped courtyard. The entrance to the complex is below the pedestrian link which acts visually as a beautiful gate. Sometimes there is underground parking like in case of the MIT Stata Centre which accommodates 700 cars. Parking is strictly ticketed with permits for the staff. There are many signs instructing on the parking usage. The visitors parking is charged through self-service metering. There is a strict punitive system against parking in the undesignated areas and thus order is maintained. The tendency is to reduce the number of cars coming to the campus and there is often free intra-campus transportation.



Plate 20. Multi-storey car park with bridge at the University of Missouri, Kansas City.

10.0 Comparison with African Universities

The distinct and elegant look of first generation Nigerian universities is associated with the flamboyant economy of the country of the seventies [Plate 21] and in the case of the younger universities with the rational thinking of



Plate 21. Sculpture at Department of Fine Arts, Ahmadu Bello University, Zaria.

indigenous architects. The universities landmark buildings act as the image makers of the institutions. University of Lagos and Ahmadu Bello University are easily identified by their Senate Buildings. Obafemi Awolowo University is identified by Oduduwa Hall and the Department of Architecture while University of Ibadan is identified by the University Bookshop and the administrative complex. Newer universities strive to create a good image by using fashionable modern structures.

10.1 Ahmadu Bello University, Zaria

The hexagonal twin lecture theatre (FASS Theatre) by Niger Consultants is one of the most attractive structures on the campus. The building is surrounded by green areas and stands like a monument. The architects utilized shadow effects on elevation well. This characteristic building is very popular despite some obvious functional problems. The Senate Building by Egbor and Associates is the tallest building within the campus [Plate 22]. Looking at the building from the outside one can hardly expect that there is a Senate Chamber hanging just on top of the entrance hall. On top of the Senate Chamber is a nice atrium.



Plate 22. Senate Building, Ahmadu Bello University, Zaria.

10.2 Federal University of Technology, Akure

The Senate Building by Ahime Associates has a pleasant exterior and is in harmony with the landscaped environment. The CBN-FUTA Computer Resource Centre (2004) by the Authors is a unique building designed on a honeycomb grid with a characteristic outline of the parapet walls [Plate 23]. The building is climate sensitive and is well protected from rain and sun glare. It has an oblique courtyard which also acts as a passage hence there are two well linked entrances. The Chancellor's, Pro Chancellor's and Vice Chancellor's Lodges were designed by the Authors on the same principle of a square plan with a concentric square courtyard. The diagonally positioned entrance porches give the buildings a unique appearance. The School of Mines and Earth Sciences is a building very sensitive to the local conditions. It is designed on a sloping site and it smartly incorporates the change of levels. The National Fellowship of Catholic Students (NFCS) Lodge looks like a cross in plan.



Plate 23. CBN-FUTA Computer Resource Centre, Federal University of Technology, Akure.

10.3 Obafemi Awolowo University, Ile-Ife

Oduduwa Hall by AMY is a very interesting building that stands out as a unique icon. It has many public ambiguous spaces while the air penetrates freely through the pierced walls with the zoning and the visual aspect carefully considered. The building is well detailed and the choice of colours makes it even more intriguing and dynamic. The open amphitheatre (now covered) and the well composed landscape enhance its beauty even further. The Department of Architecture previously Central Cafeteria (1976) was designed by Design Group of Nigeria.

There are four separate structures joined with a passage and void areas. The form arose from the need for having natural ventilation. The air reaches from the side and escapes out from the roof. The timber finishing of the roof structure adds to the pleasant environment within the building. The landmark Civil Engineering Complex by Niger Consultants has a form reminiscent of Egyptian architecture with the slanting prism-like expression, magnified even further by the repeated roof module [Plate 24]. The Faculty of Social Sciences with the aggressively projected roof slab and the repeated slanting columns gives the expression of an inverted pyramid. The overhanging slab acts as a sunshading device providing a lot of shadow for the elevation, thus demonstrating how pure modern architecture of simple basic forms can be adapted to the Nigerian climate.



Plate 24. Civil Engineering Complex (Spider Building), Obafemi Awolowo University, Ile Ife.

10.4 University of Ibadan, Ibadan

The Conference Centre has a nice atmosphere created right from the entrance area. The big complex houses many facilities including a conference hall, restaurant, and a hotel with a beautiful rock garden. The entrance courtyard of the conference hall takes care of many activities. It links the smaller seminar rooms and leads to the main hall. The garden atmosphere created here is very suitable for the pre- and post-conference activities. The arrangement of the conference hall is based on concentric squares.



Plate 25. University Bookshop, University of Ibadan, Ibadan.

The University Bookshop (1960's) was designed by Design Group Nigeria. This building is the most characteristic building of the International Style in Nigeria. It consists of a simple geometric form and exposed parapet wall with typical curtain walls and perfect precision of detail [Plate 25]. The Department of Nursing (1967) by Design Group Nigeria creates a very peaceful atmosphere. The most pleasurable is the small courtyard with a stone wall on one side and representative stairs. Traditional building materials such as wood and stones used for wall finishes and balustrades classify the building to the regional trend. The design is well adapted to the weather. The wind penetrates through the building across the open staircase and through the balcony which extends to form a kind of window to the surrounding environment.

10.5 University of Lagos (UNILAG)

The Senate Building by James Cubitt and Partners consists of simple forms [Plate 26]. The architects diversified the form by using different heights and by projecting a semi-cylindrical form from the approach elevation. The structural pillars are projected to the front of the elevation giving an illusion that they don't carry the weight of the building. The beauty of the building is further enhanced by the colour combination used on the elevation. The site of the Science Complex (1978) imposed a lot of challenges on the architects Godwin Hopwood

Kuye. They used the sloping site in a way that allows the penetration of the wind into every building achieving perfect cross ventilation so much desired in this highly humid area. The Berger Conference Centre is a simple and elegant building that demonstrates the use of appropriate technology. Although fully air-conditioned, it is also adequately well ventilated and naturally lit.

10.6 Kwame Nkrumah University of Science and Technology, Kumasi, Ghana

The majority of buildings in the University were designed in the international style of Modern Architecture. The concrete entrance gate, though sculptural is devoid of decoration. The whole university is beautifully land-scaped, with breathtaking views. The student's hostels are well detailed, with expansive courtyards and covered walkways [Plate 27].

10.7 Other Nigerian Universities

The Faculty of Environmental Studies (2004) at Covenant University is a Late Modern building. It still uses a parapet wall but the presence of the roof is obvious. The building is adorned by vertical strips of windows with reflective glass and a well celebrated entrance with a semi-transparent vault. John Hall (2002) is a student hostel in the same style [Plate 28]. The late modern style is also evident at the Benue State University, with new buildings more compatible with the climate [Plate 29]. The University Library at the Delta State University, Abraka is in the international style but the use of landscaping including trees and the introduction of a sculpture garden containing works by students give the building character [Plate 30]. The same applies to the School of Environmental Studies at the Ambrose Alli University, Ekpoma [Plate 31]. The buildings at the main campus of the Delta State University are mainly late-modern and postmodern buildings, but with the influence of low-trop architecture still visible. A similar



Plate 26. Senate Building, University of Lagos, Lagos.



Plate 27. Students' Hostel, Kwame Nkrumah University of Science And Technology, Kumasi, Ghana.



Plate 28. John Hall, Covenant University, Sango Otta.



Plate 29. New Buildings at the Benue State University, Makurdi.

tendency can be found in new buildings at the Ambrose Alli University, Ekpoma. Babcock University is a famous private university [Plate 32].

The Senate Building of the Kogi State University, Akungba is an interesting building [Plate 33]. This white building with imposing vertical elements contrasts beautifully with the forest background. Other buildings in the university are in the international and low-trop styles, but many have been recently renovated with postmodern elements added. Most of the original buildings at the Federal University of Technology, Yola are in the international style of modern architecture, complete with flat roofs and parapet walls [Plate 34]. The new additions however exhibit some characteristics of postmodern architecture, and are more responsive to the climate. The numerous new buildings at the main campus of the Olabisi Onabanjo University, Ago Iwoye show attempts at introducing postmodern elements into low-trop buildings [Plate 35]. Similar example can be found in the shopping mall at the University of Benin [Plate 36]. The prevalence of low-trop architecture in many universities has been attributed to the high cost of erecting modern buildings.

11.0 Summary

The importance of icon (landmark) buildings in characterizing universities is obvious. These buildings are in various architectural styles including:

- The International Style characterized by cubic order, strict rules of measurement and proportion, and perfect precision of details.



Plate 30. University Library, Delta State University, Abraka.



Plate 31. School of Environmental Studies, Ambrose Alli University, Ekpoma.



Plate 32. Entrance gate, Babcock University, Ilesan Remo, Ogun State.

- The Late Modern trend obvious in many Nigerian Universities (Prucnal-Ogunsote, 2001).
- The Post-modern style including deconstructivism.

12.0 Conclusion

This paper has shown that university campuses have unique architectural character. This architectural character and urban design contribute immensely to the success and popularity of universities. University buildings feature a blend of old and new architectural styles, with historic landmarks sharing the stage with modern facilities. The landscape is highly valued and the visual structure of interconnected landscaped areas often form passages, thus reinforcing the universities' physical identity. Concentrating parking in strategically located structures frees up



Plate 33. Senate Building, Kogi State University, Akungba.



Plate 34. Multipurpose Hall, Federal University of Technology, Yola.



Plate 35. Postmodern elements in a low-trop building at the Olabisi Onabanjo University, Ago Iwoye.

land and provides convenient access to campus facilities. In the planning aspect the relationship with the town is very essential and in a way the town is brought to the campus. The universities try to be an integral part of downtown. In the Nigerian context the Universities still remain in isolated spaces maintaining the old model which needs to be reexamined.



Plate 36. Shopping mall, University of Benin, Benin City.

13.0 Recommendations

Nigerian universities should invest in dynamic master plans to enhance architectural character and encourage landmark buildings that popularize significant tendencies in architecture. They should strive to engage renowned architects for the design of their most significant buildings. The environment contributes significantly to the formation of character. University buildings should always reflect the culture and the climate while university campuses should be better integrated with their host communities.

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