



Figure 7 : University of Newcastle Upon Tyne, UK.
Source: Undergraduate Prospectus 2003/2004

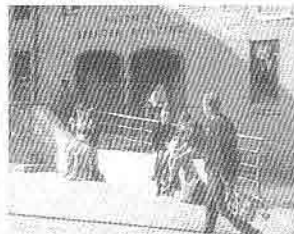


Figure 8 : University of Melbourne, Australia.
Source: Information Guide 2000/ 2001.



Figure 9 : University of Durham's Stockton campus, UK.
Source: University of Durham undergraduate prospectus, 2003.



Figure 10 : Bangladesh Agricultural University.
Wide pedestrian walkway is located in front of the campus central facilities.

03. The influence of landscape design elements on campus activities

Nowadays, landscape design has become synonymous with the unified design of the social landscape. The forms for landscape design include ground forms, buildings, trees, vehicular and pedestrian circulation, green open spaces, paved open spaces, water forms as well as the multiple detailed furnishing, equipping and enriching elements of the man-made world and the world of nature. Thus landscape design begins with the common or garden variety of local landscaper and ends with the merging of all the space-planning professions and all other fields of design concerned with improving our world. There are many social and physical forces converging on this field of landscape design to shape our environment. These are: architecture, nature, history, and society, with architecture as the most pertinent force of influence for our subject matter. Architecture is important to landscape design because it is the primary expression in the landscape of human creativity and control of nature.

Nature is important to landscape design because it is the world of forces and processes within which we live and work. It is the world of which man and all his works are an inseparable part. Climate, vegetation, soil, topography, and water movement are all fundamental to landscape design thinking. Very often, landscape design plays the role of a defender of nature against the destructive attacks of human beings. Its true constructive role is the establishment of connections, relations, and adjustments, both physical and visual, between buildings, sites, and their surrounding landscapes, that is, between people and total landscape around them (Eckbo, 1969, 62). In the case of the university campus these connections and relations between the students and the total landscape around them are essential because of its career fulfilment goal.

It is essential to understand how students live and how the landscape affects their daily lives. Student's activities in every hour, every day, every weekend, every vacation, and on other special occasions, shape the landscape around them. Architecture and the landscape for students must respond to their perception of the world, the nature of their consciousness, memory, attitudes, needs and desires. It is also essential to know how the students relate, in their activities, to the landscape. Do they relate to it by lying down, sitting, standing, walking, running, climbing, swimming, working, or simply recreating in the university campus landscape?

In the light of the above, it is understandable that the university campus is not only an institution of learning but also a place of social events, recreation, meditation, rest, sports, multicultural events, multi-traditional events, etc. These important activities mostly take place in the open spaces. As discussed previously (on the relationship between human beings and nature), there are definite influences of landscape design on campus activities. To elaborate on that, we briefly consider three major landscape design elements as they influence the activities of university communities.

These are: -

- Pedestrian walkways and footpaths
- Courtyard and open spaces
- Landscape forms (hard and soft)

03.1 Pedestrian walkways and Footpaths

The characteristics of pedestrian traffic can best be understood by comparing them with those of a stream or river (Simonds, 1961, 159). Footpaths, like flowing water, follow a course of least resistance. They tend to connect the shortest possible distance between two points. By its nature a footpath has momentum, force, and it erodes. Swift movement requires a straight smooth channel with

Influence Of Landscape Architecture On The Contemporary University Campus Design

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Abstract

The University campus is capable of providing the foundation for developmental activities for catchments human settlements. It is not only established as a higher learning centre but it also constitutes a cultural centre for the region in which it is situated. Different attributes of university campus design namely size, patterns of growth, circulation, and hierarchy of open spaces enhance open-air learning and cultural activities within the campus environment. Landscape design elements namely pedestrian walkways, courtyard and landscape forms influence directly open-air student activities and it is very interesting to observe the behaviour and nature of student outdoor activities in respect of these landscape design elements. The aim of this paper is to justify the above claims.

Key words: University campus, open-air space, landscape architecture, pedestrian walkway, courtyard spaces, landscape forms.

01. Introduction

The university campus is basically a place of academic, social, cultural, and recreational activities. The core objective of the university as a tertiary institution is students' academic learning, which is usually fulfilled through varied experiences. The success of the learning process is related to the articulation of the university campus spaces both in the interior and the exterior. However, the social, cultural, and recreational activities take place in the outdoor spaces of a university campus. Therefore, landscape design should play a major role in the organisation of these outdoor activities. The attributes of the university campus are therefore also related to the student's outdoor activities. The varied attributes of the university campus are discussed early in this paper followed by the influence of landscape design on campus outdoor activities. On the basis of the analysis of the two, the factors of effective design are derived.

02. The attributes of the university campus

A fully established university campus can be likened to a city on a small scale because apart from the academic facilities, it provides most of the socio-economic needs of the university community. Moscow University commonly referred to as a city in a city. It is a typical example, situated in the heart of the mega-city, Moscow, it provides for all the basic needs of members of the university community. Unlike a city, however, the university is not a profit making entity but primarily, a place of study – learning not only in the classroom or in the library building but also in the outdoor space. The campus, therefore, ought to be a closely-knit environment with clusters of buildings and intimate open spaces, a unique environment for learning and recreation. It should ideally be a quiet, comfortable "oasis" within the normally busy, noisy, congested communities around it. In this sense a campus may be likened more to a residential neighbourhood than a commercial entity of the city.

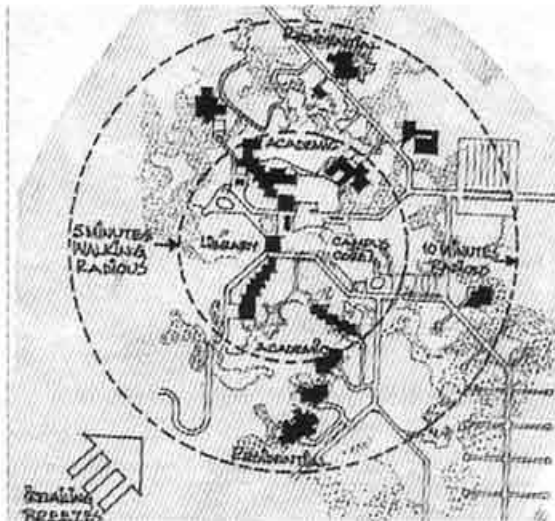


Figure 1 : A campus layout showing the walking radius from the centre of the campus to the periphery.
Source: Haider, S. (1994)

The university campus should not, be isolated from its surrounding communities. The university and the region in which it is situated will mutually benefit from proper interaction of the "town and gown" ideal. The university can serve as a cultural centre, if the surrounding communities are allowed to share in its facilities and activities. It can contribute to the generation of economic activities and provide progressive ideas and new knowledge if its research projects are tied to the particular problems of its region. The open spaces between university buildings, if properly harnessed, provide areas where students may

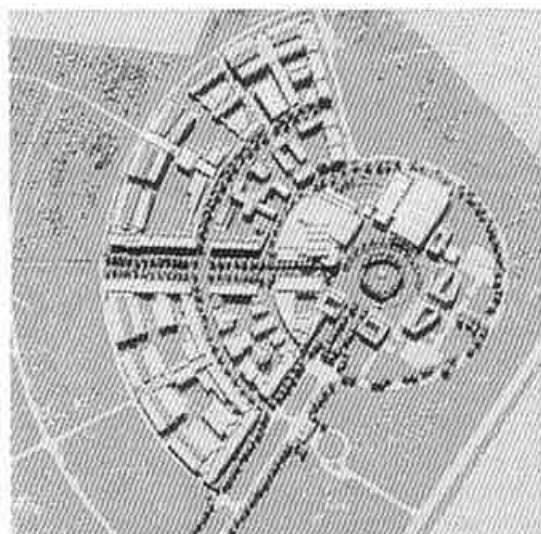


Figure 2 : Aerial view of model of the central core of NUST Site campus, Zimbabwe. A Homogeneous campus.
Source: Director of Works office, NUST, 2003.

congregate informally between classes for discussion and rest, or where they can gather in large numbers to watch or participate in sports and other recreational activities. A well landscaped campus encourages socialisation of all kinds in student activity hubs. It provides a place for literary, artistic, musical and dramatic occasions, which culturally enrich life in the university community as a whole.

One of the most important attributes of a university campus is dynamism or change in time and space. The university management normally seeks for a satisfactory degree of stability and continuity as the institution undergoes progressive changes required for maintaining its pace-setting tradition. Consequently, it is not possible to produce a final landscape design of a university campus because growth and change, in response to changing academic and social demands, are not permanent features. A direct consequence of the attribute of change is size. The ideal size for a university campus depends upon individual circumstances. The demands on the university, the location of the campus, the academic focus, all influence the size. Experience has shown that even when an ultimate size is predetermined, the university often continued to grow beyond what was originally considered best. Usually, a simple rule of thumb for size is the walking distance (Kanvinde & Miller, 1969). Ten minutes from hostel to classroom is considered a maximum allowable walking time. Three to five minutes is optimum (Fig-1).

A related attribute of a university campus is the pattern of growth. What manner of design will likely succeed in producing an ultimate campus form most appropriate for the needs of a university? It is easier to classify campuses by



Figure 3 : Site plan of a Heterogeneous campus allowing for growth. Roorkee University, India, 1947.
Source: Haider, S., 1994

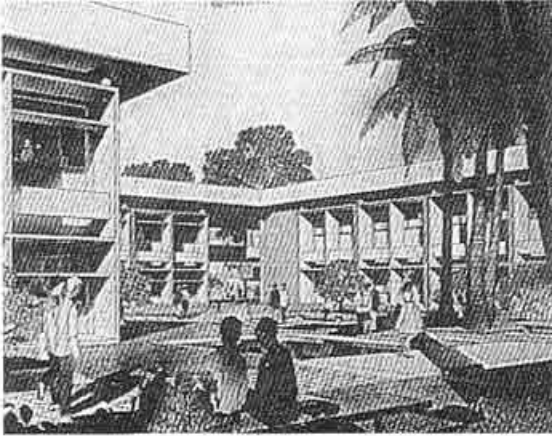


Figure 4 : Academic court, University of Baghdad, Iraq. Source: Fry and Drew, 1964, 184.



Figure 5 : Aerial view of the NUST Campus with a pre-designed circulation system. Source: NUST Information and Public Relation Office, 2002.

comparing their relative physical characteristics and their pre determined patterns of growth. In reality, campus forms are as individual in personality as members of the human race. Since time, place, conditions, attitudes and intentions of each case differ in combination, no two campuses are alike. Nevertheless, there are two broad categories: "Homogenous" and "Heterogeneous" (Dober, 1963). A campus of homogenous style is a mannerism conceived as an entity in a kind of geometric pattern utilising the same materials and forms consistently throughout (Figure 2). This style is based on a close-ended system. In other words, it is conceived and built as one whole with only minor additional growth expected and tolerated. However, that may not always be true because several new campuses are "homogeneous", yet anticipate considerable future expansion (Kanvinde & Miller, 1969).

Campuses that are "Heterogeneous" are made up of individually designed buildings that are distinct entities not in harmony with each other, nor providing open space- planning to unify them. This is characteristic of a majority of

older campuses that have suffered under the hands of changing administrations and usage through the years. Such a style is certainly "Open ended" and considerable growth occurs with very little consideration given for future identity (Figure 3).

Contemporary patterns of growth are many and varied, though Robert Mathew, Johnson – Marshal & Partners Architects, in their report; "The Proposed University of Bath" suggest four basic patterns that might encompass most of the types in use. They are as follows: the Concentric¹, the Zonal/ American plan², the Molecular³, and the Linear pattern of growth⁴.

No matter whether the patterns of growth of a university campus are concentric, zonal or linear type, the design should be meaningful as well as beautiful. Beauty is the evident harmonious relationship of all parts of a thing observed. In observing the natural landscape character there is a very real pleasure in sensing the unity and harmony of the total scene. In the university campus landscape design this factor or quality should be explored.

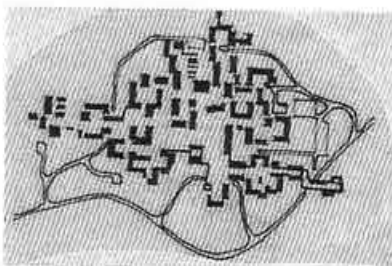


Figure 5A : The Structural skeleton. Source: Kanvinde & Miller, 1969.

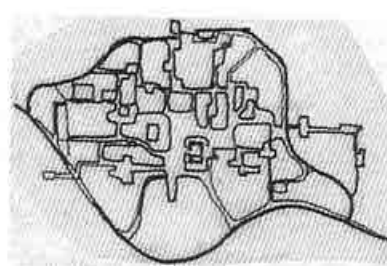


Figure 5B : The circulation strings. Source: Kanvinde & Miller, 1969.

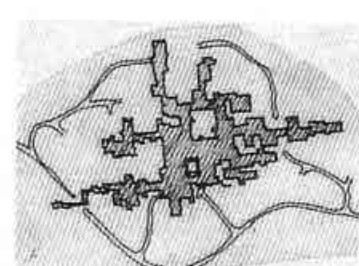


Figure 5C : The muscles. Source: BUET Arch. Library

Ugliness is found wherever man insensitively placed his structures in the landscape. It follows that a visual harmony of all parts of a landscape, including buildings and other man made elements, is a desirable objective in the design of a university campus landscape. Thus, in creating an ideal campus environment, the necessary classrooms, offices and living spaces ought to be as closely related to the existing natural setting as possible. The selection and use of materials should be restrained and indigenous. It is however incorrect to think of landscaping as a setting after the building structures are placed. The landscape existed in the beginning. The man-made elements must be carefully added so as to harmonise, complement, and be completely integrated with the existing natural environment. Thus, skilfully designed, building and landscape will be one in a beautiful, harmonious environment totally appropriate for human use.

Since buildings occupy a piece of land, the organisation of the adjoining earthscape is next in importance. Often the exterior spaces for movement and access are what are left after buildings have been placed. However, in any effective university campus design, the exterior spaces should be as carefully articulated as the interior spaces. The University of Baghdad, Iraq, where the designer concentrated on the exterior space to achieve a very effective campus space (Figure 4) is a good example. Some exterior spaces exist for educational purposes, such as play fields, but they are no more important to overall campus design than other exterior spaces, all of which are simply extensions of, and linkages with, interior spaces.

Circulation (pedestrian and vehicular) and service systems (sanitary, electrical, water, etc.) are primary considerations, which nevertheless should be properly designed as an integral part of the total fabric of the campus and not later superimposed on a framework that initially ignored them, as is often the case. The University of Melbourne, Australia, boast of one of the good examples of a well-designed pedestrian walkway. In some instances the pedestrian circulation system may be allowed to establish the basic framework of the campus, since movements of students is a primary functional requirement. The National University of Science and Technology campus, Zimbabwe, demonstrates one of the good examples of a pre-designed circulation system (Figure 5).

A campus is made up of visible, physical, measurable systems, which directly express and support invisible, psychological and immeasurable systems of human interactions. The visible on the landscape includes the open spaces, pedestrian walk-ways, vehicular access, the framework of buildings and the various utility service systems (Dober, 1963). The invisible are the interaction of

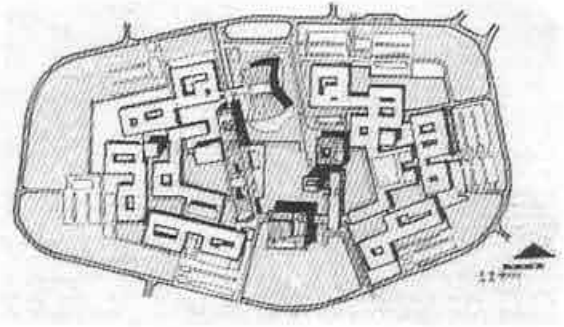


Figure 6 : Site plan of University of Baghdad,
Source: Fry and Drew, 1964, 183.

academic and living activities, the time, motion and communication required. How well the visible total landscape fabric, as an expression of the invisible, satisfies the philosophy and intentions of the university community, determines the ultimate quality and success of the campus design.

Like an organic entity, a campus landscape should consist of a kind of hierarchy of elements that give it a comprehensible form (Kanvinde & Miller, 1969). The integrated systems, as in any organism, are a part of that hierarchy. The "structural skeleton" is the framework of buildings (Figure 5 A). The services provide the networks of "nerves" and the "circulation system" consists of pedestrian walkways and vehicular roads (Figure 5B). The "muscles" are the ordered sequence of linked spaces, classed as static or dynamic, collector, focal, intimate or monumental (Figure 5C).

International practices show a trend toward breaking down the rigid zoning and intermixing of facilities. An excellent example is Gunnar Birkert's proposal for the new campus at Tougalou, Mississippi, U.S.A. It significantly contributes to the possibility of the integration of all campus activities into a unified community, placing living units directly above learning facilities (Schmertz, 1969). Another trend is towards a more compact and denser campus. The University of Baghdad (Figure 6), designed by Walter Gropius, became more widely accepted because of variety of comparatively small exterior spaces are more desirable than large spaces that create excessive distances between buildings. A sprawling campus lacks in unity and clarity.



Figure 11: Bangladesh Agricultural University, Open-air court inside student hostel Building. Source: Author's Photograph, 2002.



Figure 12 : Dhaka University, Bangladesh. Curzon Hall, front open space , stimulates a prescribed emotional response. Source: Author's Photograph, 2002.

increased width at the curves. If not provided, such a channel will be forced. In the case of the university campus, students generally walk around, sit, socialise, read, and eat in groups. They go to attend lessons from the hostels to the academic buildings first thing in the morning and come back from the academic buildings to the hostels at the end of the day. These are "rush hours" on campus. The curvatures of pedestrian walkways should be designed on campus considering that, students walk in groups (Figure 9). Intersections are points of maximum interest in a university campus landscape. These places are full of excitements and activities. They can resemble a market place, trade show, book fair, amusement park etc. Where two or more intersecting streams of traffic are to be merged into one fast, free-flowing stream, the area of juncture must be widened and shaped to provide a smoothly swelling transition and uninterrupted flow.

Pedestrian routes can find interest at the bottom of a ramp or a flight of stairs. The pedestrian environment is the connective web of open spaces threaded through the university fabric, in which people can move about on foot (Gage and Vandenberg, 1975). The following general observations are made with regard to the influence of pedestrian walkways and footpaths on the users: -

Students prefer to socialise standing on the pedestrian walkways, especially in front of the entrances of either academic buildings or any other buildings on the university campus (Figure 7).

Students prefer to sit beside the pedestrian walkways or footpaths. In many university campuses it is observed that students spend so much of their time socialising and reading seated beside these pedestrian walkways (Fig : 8).

The size (width) of the pedestrian walkways in the university campus can be a factor of the rate of interactions among the students (Figure 9). A well-designed pedestrian walkway or a footpath can serve and function as a central plaza of the university campus (Figure 10).

03.2 Courtyard and open spaces

The basic ingredient of architectural design consists of two elements, mass and space. The essence of design is the interrelationship between the two (Bacon, 1974). In theory a definite open-space can be created or articulated using forms (Ching, 1979). In an unobstructed base, if we set an upright plane, it becomes an element of high interest and a point of orientation for the visible field. We are drawn to it, and come to rest at its base. The vertical plane or wall gives us protection and suggests shelter. Two intersecting upright planes afford increased protection. They provide a corner into which anybody can get a feeling of shelter. Additional vertical planes define spaces that are further controlled by the introduction of overhead planes (Simonds, 1961, 87). Such spaces assume not only their size and shape, but their degree of enclosure from the defining planes. This space may be one of tension (Figure 11) or repose; it may be stimulating or it may be relaxing. It may be immense, suggesting certain uses (Figure 12), or it may be confined and suggest others.

The forecourt or area immediately in front of a structure or group of structures should be well planned as these open spaces are an integral part of the structure, at least in diagram. These open spaces are designed to attract and accommodate specific types of approaching traffic. They receive guests and direct services. They focus attention on the entrances, prepare one for entry, and establish the appropriate atmosphere. In most of the university campuses it is observed that these open spaces are always occupied by the students for social interaction or study purposes. The following general deductions with regard to campus courtyard spaces are made: -

- Courtyard space and open space in the university campus can be used as a study space or a lecture space. University campuses situated in the tropical countries prefer outdoor learning facilities because of their climatic conditions (Figure 13).

- Courtyard space and open space in the University campus is widely used for recreational, social and cultural activities (Figure 14). Students prefer to go to nature for recreation and for its purifying qualities.

- Courtyard space and open space can be used as a design tool to solve the climatic problems of the building (Fig : 15). It is efficient to solve cross-ventilation and natural day lighting problems by providing courtyards in the building.

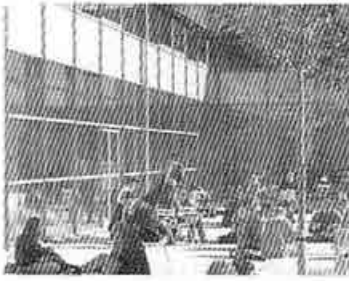


Figure 13 :Faculty of Arts University of Southampton. Inner courtyard is transformed by glazed aisles, which have replaced narrow institutional corridors. Source: The Architects Journal, No. 20, Vol. 204, 1996, 33.



Figure 14: Brunel University, UK. Students are relaxing in the campus open space. Source: BU Undergrad. Prospectus 2003/2004



Figure 15: Bangladesh Agricultural University, Faculty of fisheries. The open-air courtyard in between the lecture theatres – an effort by the architect to relate the courtyard, the study area and to solve climatic problem. Source: Author's photograph, 2002.

- Courtyard space is used on some of the university campuses as meditation space for the students, and they need concentration and to be focused on their studies while they spend their time on the university campus.

03.3 Landscape forms

Earlier in this paper it was discussed that a form can dominate a space and this form has influence on the student's open air activities. So, landscape forms can be man made or natural, hard or soft. They can be a structure, stone block, tree, column, mountain, sculpture or a fountain, which is located on the natural earth surface. The influence of these landscape forms are discussed below.

03.3.1 Hard landscape forms

Hard landscape forms include pavements, street furniture, mountains, rocks, sculptures, monuments. Concrete, brick and stone are the major construction materials for hard landscape forms. Pavement is one of the commonest hard landscape forms. Students' open-air activities often take place on the pavements depending on the form of the pavements. There are different types of pavements: - pavements for open-air pedestrian footpaths, covered pedestrian walkways/ corridors, boulevard, plaza, pedestal, pavements for leisure walk in the open-air courtyard, or any other open space including pavements for car parks and bicycle bays. It is observed that a significant number of students use all these paved spaces either for learning or social gathering purposes in the contemporary university campuses.

Street furniture is also treated as hard landscape forms and street furniture enhances student open-air activities.

There are different types of street furniture, which enhance these activities: light posts, seats, post boxes, signboards, plant containers, etc. A seat, if it is well located, attracts students to sit or gather around it (Figure 16). Beside pavements and street furniture, sculptures and monument play a major role in enhancing student open-air activities (Figure 17). Most of these monuments and sculptures are constructed either out of respect for any historical events of the particular nation, or as symbols of some important events. It is observed that these sculptures and monuments influence the psychology of the students.

03.3.2 Soft landscape forms

These are normally natural elements of the landscape. Trees, grass and hedges are the major components of the soft landscape forms; others include water in various shapes and forms. Trees give welcome shade in an otherwise open landscape. That is why students always prefer to sit and to gather under the shade of the tree (Figure 18). Green lawn with shrubs also attracts students for relaxation (Figure 19). Soft landscape form in the form of trees is necessary for protection against wind, noise, or fumes, to screen undesirable views into or out of the particular open space, to give privacy to the open space, and visual or ecological links with the surrounding landscape; to frame views, to give shade and form space divisions. Soft landscape forms can enhance open-air activities in several ways.

For effectiveness it is very important to specify the right plant and the role it is to play in the landscape. A detailed knowledge of the visual characteristics of plants is essen-

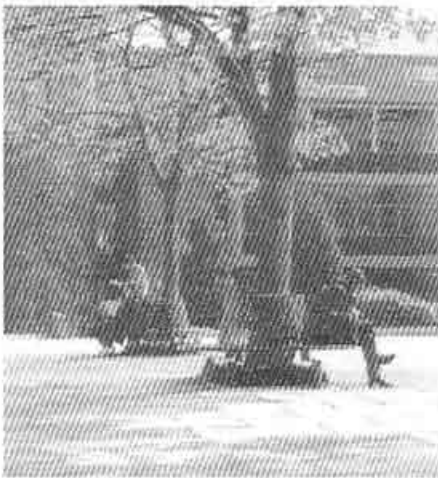


Figure 16 : Brunel University, UK.
Students sit, read around trees.
Source: Undergrad. Prospectus 2003/ 2004.

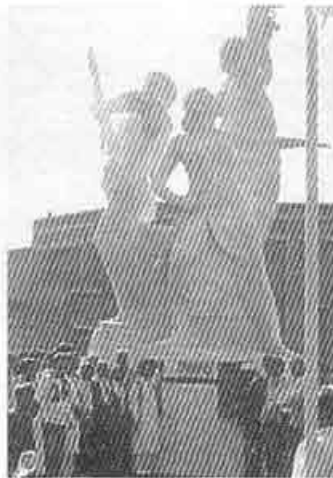


Figure 17 : Bangladesh Agricultural University. Statue Victory-71, where students and staffs always gather for various events.
Source: Author's photograph, 2002.



Figure 18 : Brunel University. Students are in the Academic courtyard block and the space is dominated by the soft landscape form (tree).
Source: Brunel University

tial in this regard. It has been observed that students' open-air gathering is greatly enhanced by different forms of trees, which is determined by the way the main stem or branches grow (Figure 20). Too many different forms can give a restless effect to users. So, it is effective to limit variety and use strong forms for specific reasons where student gathering is expected.

For instance the leaf colour can be employed to attract students to specific areas on the university campus. It is very important to consider the appropriate colour of the overall tree leaves when planting in the open spaces. The size, spacing, disposition, grouping, attitude of leaves and branches, and the detailed structure of the plant growth are related to the overall landscape texture. The texture depends on single trees and combination of trees. The textural pattern is determined by the play of light and shade on the tree mass (Weddle, 1967). Glossy and small leaves give a finer texture because light reflections are more broken up. Large leaves appear coarse in near view, and this is particularly noticeable when the leaves are widely spaced. Texture of the soft landscape form is very closely related to scale, and wrong texture can easily disturb the apparent size of an open area as well as the open air activities. Texture is especially important in choosing plants for backgrounds (Weddle, 1967). For example, close matt textures make the best foil for sculptures or monuments. All in all, Trees, lawn, and hedges contribute to the success of landscape design of open spaces on these campuses if the right forms of trees, textures of plants, and variety of grasses are specified.

04. Conclusions

The university campus is a place of life fulfilment for the future generation. This life fulfilment does not take place in isolation in the university academic building, classrooms, or in the library building alone; rather it involves the interactions of different ideologies, cultures, traditions, religions, ethnic background carried by people of international communities. Such interactions take place in various spaces of the university campus and these spaces include: interior space, courtyard open space, semi-covered open space, playfields, circulation spaces, etc. This study is focused only on open air spaces on the Greenfield university campus. The factors of effective design imply the landscape design tools, which help to create a favourable environment for the functions of a university campus. One of the ways to assess the effectiveness of those landscape design tools is to observe the users' responses towards the design or users' activities. The main focus of this paper is the outdoor space, which is subjected to landscape design based on the students' outdoor campus activities & needs. Landscape design plays a major role in students' outdoor activities and the different attributes of university campus of Size, shape, patterns of growth, circulation systems, are all significant. Pedestrian walkways, courtyard open spaces and landscape forms are the major landscape design elements which are discussed and identified in relation to student open air activities. Besides these three major landscape design elements of university campus open spaces, the achievement of environmental control through the effective landscape design is also discussed.



Figure 19 : University of New Castle Upon Tyne.
Students are relaxing on the grass lawn on a public park near the campus. Source: . Prospectus 2003/ 2004

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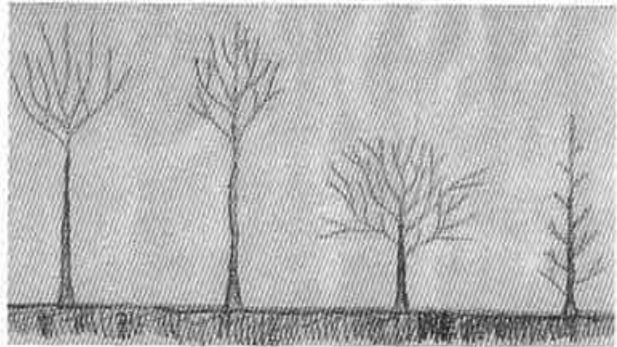


Figure 20 : Different forms of tree

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End Notes :

¹ The central area or "core" of the campus becomes tightly enclosed and successive rings of development shut in and prevent selective expansion.

² Typical American plan; zones allocated specifically to academic, residential or recreational; handicapping integration of campus activities.

³ Growth accomplished through addition of self contained units or "molecules," each a microcosm of the whole. The campus is complete at each stage of growth, but the system is perhaps limited to a 'many centred' campus rather than a 'centralised' type.

⁴ The pattern chosen for the University of Bath; the central core can expand at either end as the University grows; existing elements extend outwards and grow independently of one another; new ones are added to extensions of the core, which never becomes shut as in the concentric pattern.