LANDSCAPE FOR LEARNING:
An approach towards the campus design uniqueness and memorable character with special reference to the visual influence on design decisions.

Submitted by

Eman Ahmed Saleh Eldin Abdelhaleem.

A Thesis submitted to the faculty of Engineering at Cairo University,
In partial fulfillment of the requirements for the degree of
Master of Sciences in Architecture

Under the Supervision of

Prof.Dr.
Mohmamed M. Dorra
Head of Architecture Department
Faculty of Engineering
Cairo University.

Assoc.Prof.Dr
Ayman H. Ahmed
Associate Professor
Architecture department
Faculty of Engineering
Cairo University.

Assoc.Prof.Dr
Ahmed M. Amin
Associate Professor
Architecture department
Faculty of Engineering
Cairo University

Faculty of Engineering, Cairo University.
Giza, Egypt.
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Examiners 'Committee:
Prof.Dr. Mohmamed Medhat Hasan Dorra (Main advisor and Head of the department)

Prof.Dr. Khaled Mohammed Dewidar (Examiner)

Assoc. Prof.Dr. Naela Farid Toulan (Examiner)

Assoc. Prof.Dr. Ayman Hassan Ahmed (Advisor)

Assoc. Prof.Dr. Ahmed Mohammed Amin (Advisor)

Faculty of Engineering, Cairo University.
Giza, Egypt.
January 2010

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I would also like to show my gratitude to my parents and my husband who supported me in a number of ways.

Eman Saleh

Abstract

Campuses' open spaces in our society are not sufficiently appropriate to meet many of the users' moral needs. Such needs differ in terms of cultural, social and economical environments of users. The designer often disregards and does not recognize the importance of the consistency of such aspects with his design, whereby, certain negative behaviors of users towards design, such as outrage, change or destruction in many cases would take place.

In this research open spaces of campuses will be studied in different aspects. Open space should support a sense of community, by providing many types and sizes of outdoor meeting and recreation areas. In addition, open space should be designed and maintained to unify the campus by connecting diverse site and building elements together as an attractive whole. Further, each outdoor space, large or small, should be seen as a garden to cultivate the minds of students.

The research went through some hypotheses which based on the site not against it, and the relationship between urban design and landscaping process in order to create beautiful and unique urban scenery in the campus space.

The thesis aims at studying the guidelines of the design process of open areas and urban spaces in campuses, and the role of the landscaping process in the creation of a strong vivid image to the observer, and the creation of a comfort environment, and to support the sense of community by bringing together a diverse group of students.

Going on with the chapters which include a definition of campus planning and visual qualities, then studying the urban image of the campus and lining the guidelines of the image creationg of the urban setting of the camus, then confronting main problems gambling inner city campuses, then moving to

the landscape in campuses including softscapes and hardscapes, and using examples of landscape implementation in developed countries.

Furthermore the study includes the practical study, where a list of guidelines which was concluded before in the theoretical study is successfully. implemented in American University campus, showing advatages and drawbacks in such campus.Then finally the study ends with a group of conclusions and recommendations.

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CHAPTER ONE.
Thesis Confrontation.

1-1 Introduction

Campuses' open spaces in our society are not sufficiently appropriate to meet many of the users' moral needs. Such needs differ in terms of cultural, social and economical environments of users. The designer often disregards and does not recognise the importance of the consistency of such aspects with his design, whereby, certain negative behaviors of users towards design, such as outrage, change or destruction in many cases would take place[1].

In this research open spaces of campuses will be studied in different aspects. Open space should support a sense of community, by providing many types and sizes of outdoor meeting and recreation areas. In addition, open space should be designed and maintained to unify the campus by connecting diverse site and building elements together as an attractive whole. Further, each outdoor space, large or small, should be seen as a garden to cultivate the minds of students.

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This is done through a number of hypothesis, such as the considerations taken by the designer, so that his design becomes elaborated and comprehensive, then the practical applications are applied, which portrays the

[1] Hanson, Jennifer L. McComb and William E. *Problem Gambling on College Campuses . NASPA Journal, 46(1).* Berkely, April 23, 2009.

implementation of the design process, and its analysis, which proves whether these campuses are appropriate to meet the students' needs or not.

1-2 The research problems.

The main problem of the thesis comes from the significant incompatibility of the contemporary campuses to meet users needs, where a distinctive increase in population appeared in the recent years in the main cities, specially the city center, which caused certain problems to universities, as the population resulted into the extensive need for more extensions to the campus away from the urban settelements of the city campus, which results into the diversity of the campus elements, disorganization in ceratin zones, and the disappearance of the sense of community. Furthermore this problem can be a reason for a certain shortage of the intellectual development of students , due to the ceratin hesitation for the various interchange between farther districts in the main city.

Furthermore, landscaping is not appropriately integrated with the educational process, which has been already integrated in the developed countries, where open spaces and recreational areas has an efficient role in the educational process in the developed countries.

Thus these problems call for the presence of certain campuses in new cities , away from the noisy city center, forming a comfortable environment, and satisfying the needs of students by the presence of an appropriate relation between intellectual, adminstral, residential, and the entertainment zones, forming a vivid and a unique urban scenery to the campus.

1-3 The research objectives

The main objective of the thesis is performing certain guidelines to the campus planning, by using certain principles in design to reach an optimum solution to the urban setting directly compatible with the available site, and appropraitely integrated with landscape.

The thesis answers number of questions concerning the design decisions of the campus open spaces such as:

1. Principles of design and design elements.
2. Reviewing the theoretical approaches of design of campus spaces.
3. The role of the planting elements and water element in achieving Successful design.
4. The efficient role of landscaping in the developed countries, which is appropriately integrated with the design process of educational spaces.
5. Reviewing the practical study and analysing the design implementation, and noting the negative behaviours of students against the design.

1-4 The research hypotheses.

The main hypothesis of the thesis depends on whether certain guidelines can be performed to form an appropriate image to the campus, using elements of imageable cities supposing that the campus is a minor form of a city, “A city within a city.”

Moreover the possibility of designing certain criteria and guidelines to form an appropriate integration of landscaping with the educational process in order to promote the intellectual and the social interaction. This integration is referred to the strong relation between man and natural environment, and his care for using it’s elements in his built environment.

1-5 The research methodology.

The research methodology depends on a theoretical study and a practical study, where the the theoretical study begins with the thesis confrontation, which includes problems, hypotheses, problems, and methodology, then going on with the chapters which include a definition of campus planning and visual qualities, then studying the urban image of the campus and lining the guidelines of the image creationg of the urban setting of the camus, then confronting main problems gambling inner city campuses, then moving to the landscape in campuses including softscapes and hardscapes, and using examples of landscape implementation in developed countries.

Furthermore the study includes the practical study, where a list of guidelines which was concluded before in the theoretical study is successfully. implemented in American University campus, showing advatages and drawbacks in such campus.Then finally the study ends with a group of conclusions and recommendations. See table 1-1

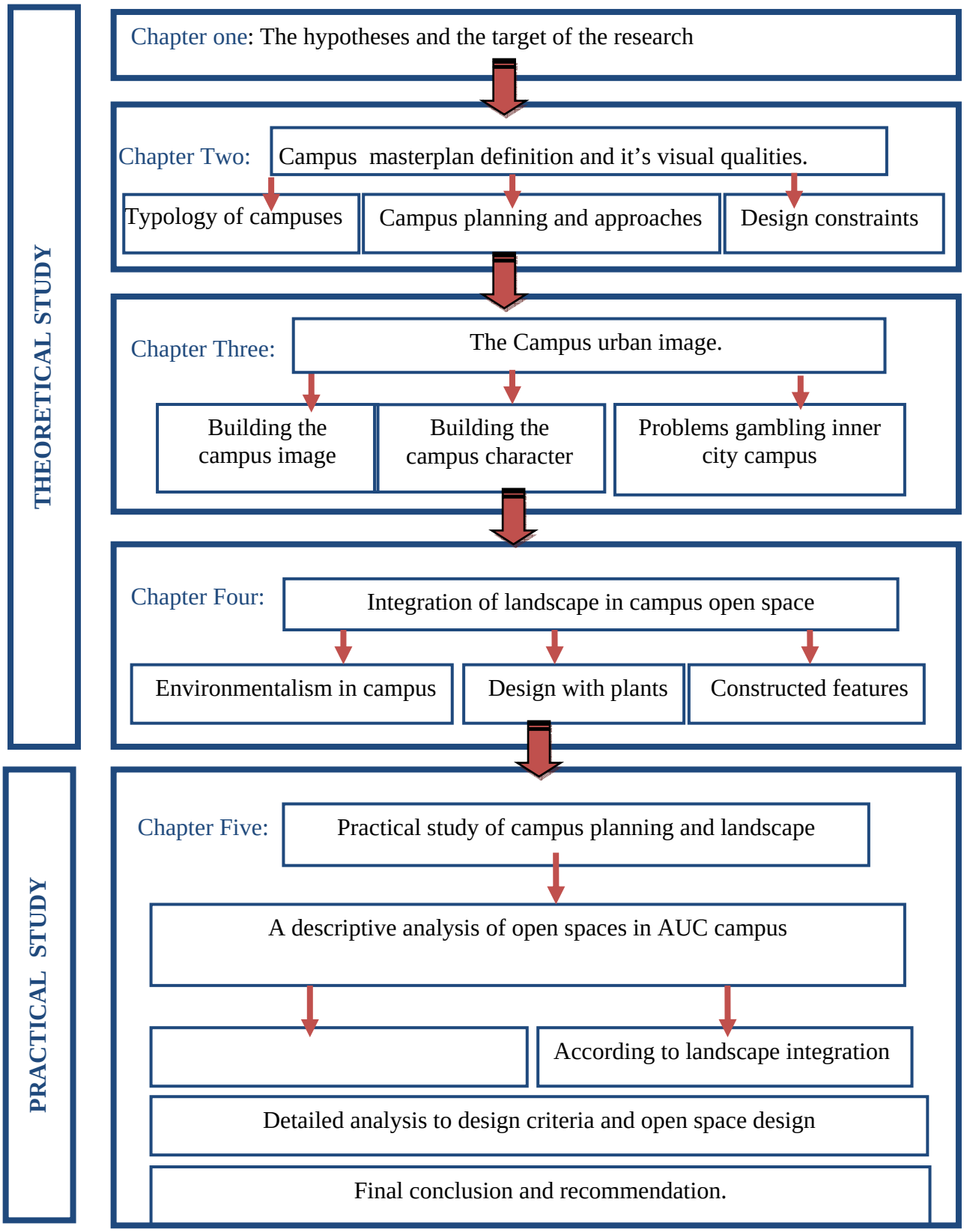


Table1-1 The research methodology. (Researcher)

1-5 The research components.

The research consists of Five chapters as follows:

CHAPTER ONE:

Here the problem of the thesis is confronted (problems, hypotheses,etc…).

CHAPTER TWO:

The chapter presents the definition of universities, and their concepts due to time changes , and then going through the campus and presenting the main nine types of master plans of campuses with their properties, advantages , drawbacks ,and how time change ,financial element, religious approaches, and technological developement were dominant factors in the rechaping of the master plans.

Furthermore the thesis presents certain constrains to form a general strategy for the campus planning by applying the physical and non physical guidelines to reach the optimum solution in the urban setting of the campus. The Design Constraints -- based on interaction, culture and history, and sustainability -- provide a working framework to guide any changes to the campus that might be considered. The Design Guidelines are more specific, and provide planning and design direction for all landscape and building projects.

CHAPTER THREE:

This chapter discusses the campus image and how to present a memorable character to the campus as a minor form of a city by applying elements of space perception for spaces as a whole in a city.

Thus, the chapter resents these applications in various campuses, shown by their analysis, showing how the image can be expressed clearly by using elements of space perception including, landmarks, edges, centers, paths and its positive or negative influence on space perception and on uniqueness of space in developed countries.

Furthermore the chapter presents landscape elements with it's components of hardscape and softscape and it's influence on the space as a whole, and then presenting the theory of the contemporary integration of landscape with the campus pavilions in developed countries, thus how landscape and environmental context influence physically and non physically on students behaviour and becoming a dominant element in designing the campus space, hence the influence of landscape in creation an essential place which pursuits intellectual enrichement and provides dominance and uniqueness to the urban image to the campus space.

CHAPTER FOUR:

This chapter presents landscape elements with it's components of hardscape and softscape and it's influence on the space as a whole, and then presenting the theory of the contemporary integration of landscape with the campus pavilions in developed countries, thus how landscape and environmental context influence physically and non physically on students behaviour and becoming a dominant element in designing the campus space, hence the influence of landscape in creation an essential place which pursuits intellectual enrichement and provides dominance and uniqueness to the urban image to the campus space.

CHAPTER FIVE:

This chapter presents the problems facing the urban area and it's influence on the campus as a whole, including increasing population problems, financial problems and the existence of many governmental campuses in the middle of the city which causes other problems. Then moving to open spaces and whether they were appropriate to the students needs or not, and whether the space perception was successfully applicated or not, and how landscape elements was applicated in an appropriate way or not

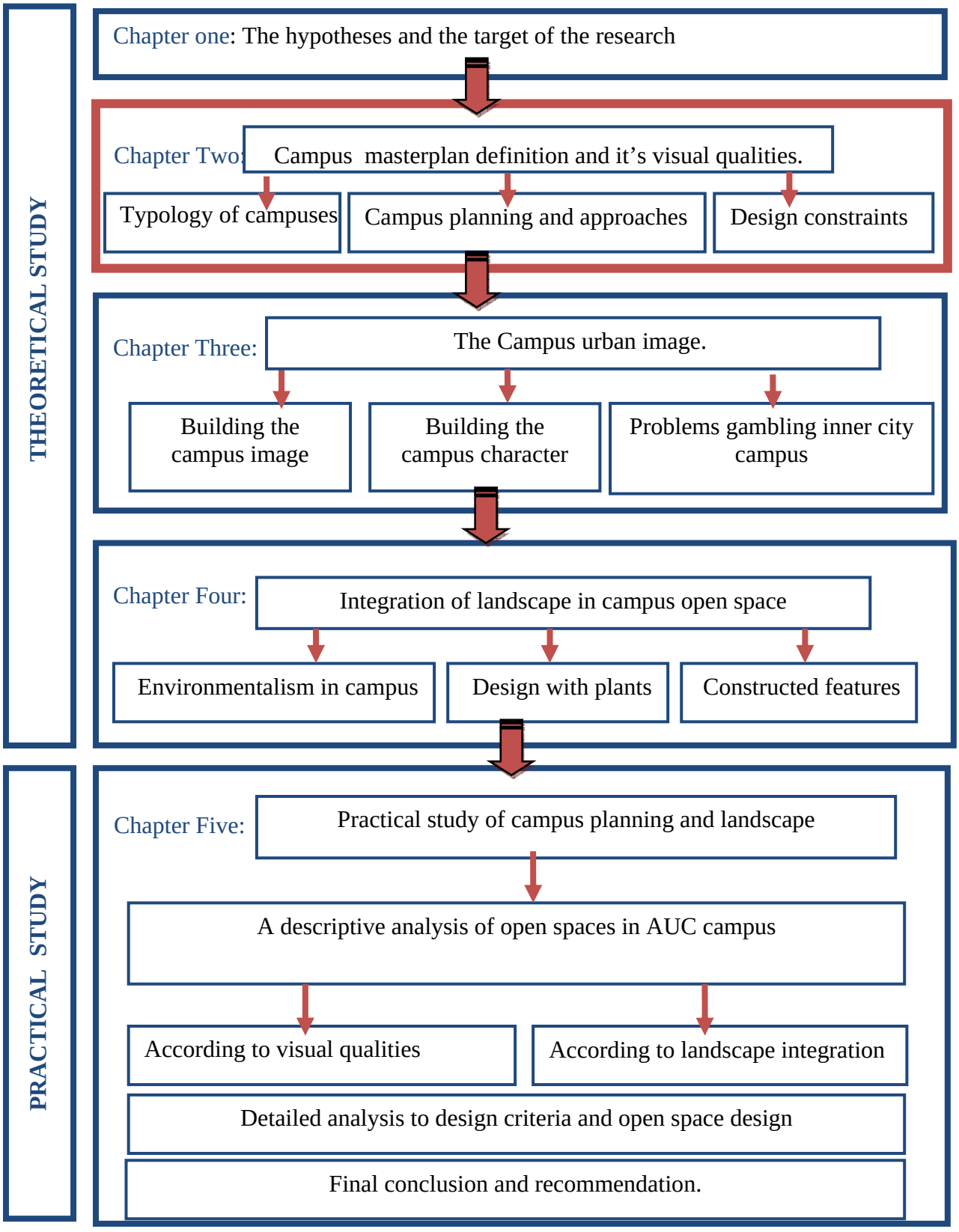
Moreover The chapter presents the practical applications of the various theories on certain campuses.

This occurs by applications in campuses in cairo, by choosing a campus and analysing it descriptively, by studying whether the design were applied appropriately or not, and smaller zones are identified, analyzed and criticized, thus certain positive and negative qualities are presented, and whether the designer was successful in creation an urban image appropriate to students needs as a dominant target, and whether landscape and open spaces were taken in consideration in design decisions. with certain reference to campuses which experience a successful integration of landscape with campus pavilions.

Finally the certain recommendation are added for certain developement in campus design.

Chapter Two

Chapter Two.
Campus masterplan definition and visual qualities.



Chapter Two.
Campus masterplan definition and visual qualities.

2-1 Introduction

The chapter introduces an introduction to the university definition, including a historical review, the campus definition, and finally the main design constrains for campus planning.

2-2 The beginning of universities in Europe and America.

The original Latin word "universitas", first used in a time of renewed interest in Classical Greek and Roman tradition, tried to reflect this feature of the Academy of Plato (established 385 BC). The original Latin word referred to places of learning in Europe, where the use of Latin was prevalent.

2-2-1 The earliest universities in Europe.

The earliest universities in Western Europe were developed under the aegis of the Church, the first higher education institution in medieval Europe was the University of Constantinople in turkey, followed by the University of Salerno (9th century)in Italy as it was a monastery.

Afterwards, the university of Paris sprang up, as Henry Malden said," the university of Paris was one of the oldest universities in Europe and indeed it has a fair claim to be the oldest." The University of Paris was founded by Charlemagne; and consequently its origin was referred to the year 800 A.D or thereabout. The most ancient part of the university was the faculty of arts or philosophy. This faculty originally constituted the whole university; and the faculties of Theology, Law, and medicine were not added until a later period[1.]

[1]Malden, Henry. *On the Origin of Universities and Academical Degrees.* Harvard: J.Taylor, 1835,p14.

2-2-2 The medieval universities in Europe.

Universities in europe sprung up in the twelfth century, and were formed by the zeal and enterprise of learned men, who undertook deliver public instruction to all who were desirous of hearing them. From these universities,"Oxford" and "Cambridge"university in london, and the " sorbonne" university in paris(1257). These universities were constructed between the twelfth and the fourteenth century.

2-2-3 The medieval universities in America.

The most ancient university in the united states was the university of "Harvard" (1636). The name "Harvard" came from its first benefactor "john Harvard" , As it is the most ancient university in the united states, however, most of the old blocks of the campus was demolished, but the school of the medicine took place in the "Holden chapel", then afterwards it concerned its own blocks, the "Holden chapel" returned to its origin as a religious building.

Furthermore the "Yale" university was founded in (1701 A.D), which was not as the same quality of education as "Harvard", and the quality of the building blocks as well. The most significant university at that time was the University of "Virginia" which was founded in 1822A.D by Thomas Jefferson. The plan was specialized by a grid iron crossed by a central linear square, which was established as a central landscaped axis through the university for social and academic discourse. [1]Figure 2-4

Figure2- 2 University of cambridge, U.K (Cambridge 2008)

Figure2- 2 The university of Harvard, United States. (Harvard 2007)

[1]Pearce, Martin. *University builders.* London: John Wiley and sons, 2001,p10.

Figure2- 4 The rotunda in the university of Virginia. (Dober 1992)

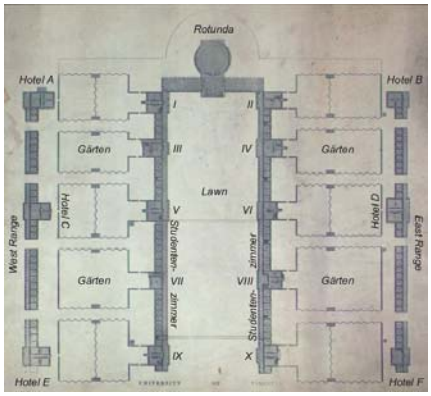


Figure2- 4 Plan of the university of Virginia,United States , by Thomas Jefferson (Edwards 2000)

2-3 The beginning of universities in Egypt.

Education in Egypt began with the beginning of “EL Azhar” which was considered a Masjid and at the same time the center of religious education, having the same role of the “madrasa” with more precise education in religion. However the “university education” with it’s recent name, began at the year 1906 A.D, as a concept of having a university in Egypt. Afterwards the university was funded by the jewels of princess Fatima Ismail, and contributed 600 feddans from ”al waqf” land, and also six feddans near her palace in “Bulaq El Dakrur”.

The Egyptian University finally came into being and was officially inaugurated on December 21, 1908. A great ceremony was held at the Legislative Council Hall, attended by Khedive Abbas II and foreign heads of state. Study began at the university in the evening of the inauguration day in the form of general lectures to be given in diverse places such as the Legislative Council Hall, High Schools Club and Dar AL-Garida.

In 1917 it was commanded the government thought to build a governmental university, so a committee was prformed to discuss the main rules of constructing a governmental university, subjected to the ministry of education.

In 1923, it was agreed to unify the two universities, the old and the governmental universities to form the “Egyptian University” subjected to the Egyptian governorate. Furthermore in 1925, it was commanded to construct the

“Egyptian university” consisting of four faculties, which were the faculties of literature, science, medicine, and law, for the courses would be educated using the Arabic language.

In 1935 the high schools of engineering, agriculture, and commerce were incorporated with the “Egyptian University”, and were converted to faculties, except for the high school of veterinary which, was not converted at that time. [1]

[1]"Cairo University Historical snapshots ." *Cairo University centnnial.* November 27, 2007. http://100.cu.edu.eg/index.aspx (accessed February 5, 2009).

2-4 The Campus definition and visual qualities.

Universities are places of teaching and learning. They generate a feeling of community in whole and in part. The role of colleges is to create small, self-regulating units of residential scholars who share dining and other social spaces.

The university master plan has somehow to create a feeling of community among students and lecturers yet provide the means to accommodate change without disruption, and there are models of successful campus master plans which create a sense of place and accommodate change.[1]

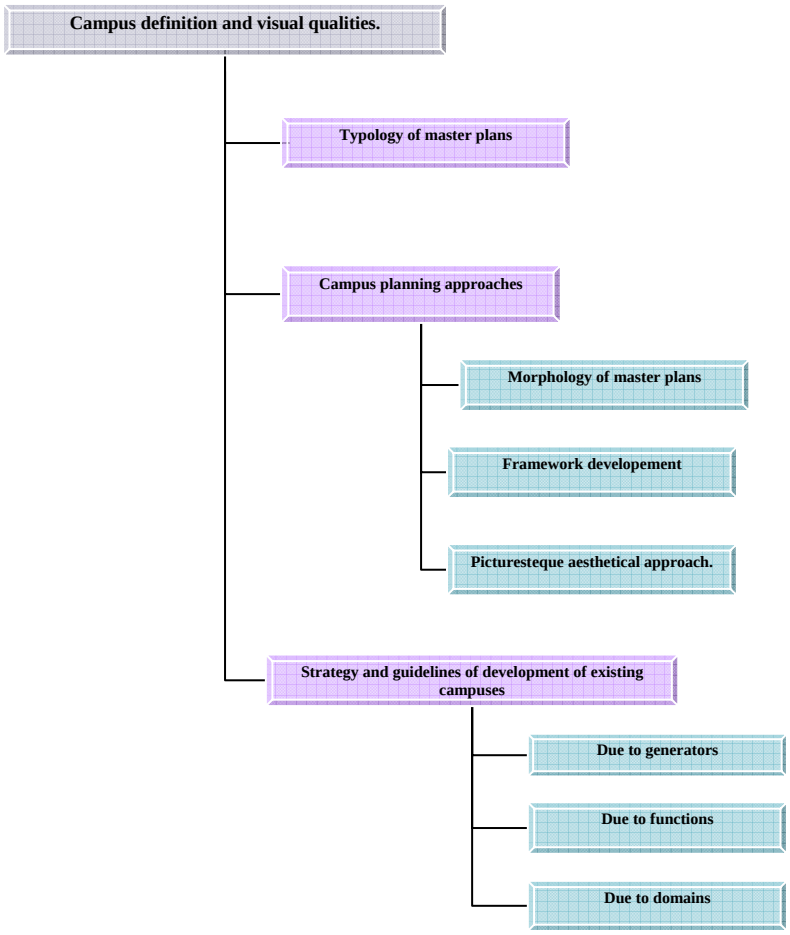


Table 2-1 structure of chapter three.(Researcher)

[1]Schmertz, Mildred F. *Campus Planning and Design.* New York: McGraw-Hill, 1972.

2-4-1 Part One: Typology of masterplans.

It is possible to distinguish nine types of campus plan among the countless university developments across the world. [1]

The nine types of masterplan can be identified as follows:

2-4-1-1 Place making: Building dominated plans.

Here there is a strong sense of campus identity forged mainly by the presence of usually large bold buildings. Such campuses are normally near city centers with university buildings grouped around streets or urban squares. Generally, the major university buildings make contributions to the skyline of the area and have strong presence on the street.

Figure2- 5 University of Michigan,Ann arbour,USA (Dober 1992)

This type of campus evolved mainly in the late nineteenth century but had matured into the typical campus of the industrial city by the mid-twentieth century.

For e.g. the university of Michigan, Ann arbor, USA figure2-5

Drawbacks of such campuses:

Such campuses today have three main drawbacks:

a. There is little room for expansion.

b. Car parking tends to destroy the sense of place.

c. The bustle of the city live is not conductive to academic reflection. However being centrally located, this category of university benefits from good public transport links and can take advantage of other facilities in urban areas for learning such as public libraries and art galleries.

[1] Edwards, Brian. *University Architecture.* London: Spon Press, 2000 p.7

2-4-1-2Place making: landscape-dominated plans.

This type of campus has a sense of place dominated by landscape design. The presence of a backcloth of well planted greenery and sometimes nature in unmanicured form provides sense of nature and challenge the relation between intellectual buildings and nature. These campuses offers three three advantages:

Figure2- 6 University of Stirling, Scotland, UK. (Stirling n.d.)

a. The tranquility feeds creative thoughts.
b. Nature is itself instructive and can be used in teaching.
c. The separation from urban life formed by the planted framework helps give a strong sense of community.

Figure 2-6. University of stirling, Scotland,UK.[1]

2-4-1-3 Collegiate plans.

Universities composed of autonomous colleges have an ancient foundation. Generally the colleges were privately funded. Most formed recognizable units within the loose agglomeration of a university.

Figure2- 7 University of Churchill, Cambridge ,1985. (Cambridge 2008)

The advantages of such plans:

a. The close relationship between teacher and student, the sense of containment in physical, social, and academic terms.

[1] Edwards, Brian. *University Architecture.* London: Spon Press, 2000. P41

b. The well developed typology for the college unit (gatehouse, quad, lodgings, refectory, clock tower etc.)

The main disadvantage is the lack of central control over the colleges, with a consequent loss of identity of the university as a whole.
For examples of such plans Churchill college, Cambridge, 1958 Figure 2-7.

2-4-1-4 Linear plans.

This type of campus, normally arranged around an internal street, takes advantage of linear compaction to create distinctive and relatively economic universities. The longitudinal configuration allows for growth at either end and cross axes are easily created to form sub-developments of student housing or teaching areas (eg. California state university chico). Normally three or four storeys high at the center, the linear plans can twist or turn to follow site contours, to respond to view or sun path, or to connect with the external infrastructure.[1]

Figure2- 8 University of California state, Chicago.(Google earth 2008).

From the advantages of these kinds of plans:

a. The internal streets of such development provides a useful point of contact for students and academic staff alike

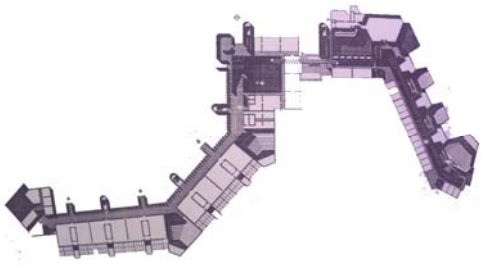


Figure2- 9 Scarborouh university, Tronto, Canada (Schmertz 1972)

[1]Pearce, Martin. *University builders.* London: John Wiley and sons, 2001.

b. The linear form leads to the megastructure approach to campus design. Here greater his exploited to add even more functions within the linear shell , sometimes involving students housing at upper levels. Figure 2-9.

From the disadvantages of these kinds of plans.

The lack of a sense of orientation within the central street

a. The difficulty of establishing an identity for faculties, departments or research units located in its form.

b. The separation of external landscape from university buildings.

Examples of these kinds: California state university, scarbrough university and simon fraser university.[1]Figures 2-8, 2-10

Figure2- 10 Simon Fraser university, UK. (Bell 2007)

2-4-1-5 Grid dominated plans.

This masterplan type is a natural development of the linear form. The grid whether or not biased in favour of one of its axes, provides a rational basis for university planning.

The orthogonal layout with streets, pedestrian paths or infrastructure corridors at right angles to each other exploits land well while providing a variety of routes across the campus. Figure 2-11.

From the advantages of these master plans are:

Figure2- 11King saud university, saudi arabia (Edwards 2000)

[1] Edwards, Brian. *University Architecture.* London: Spon Press, 2000. P42

a. The permaeable nature of gridded layouts suits the democratic ideals of many universities, while providing a high measure of flexibility in the use of the land.

b. Different blocks within the grid can be used for a variety of educational functions and there is usually space within the rectangular parcels of land for external growth.

c. Sub-division of grids provides flexibility and internal changeability but the anonymity of structures and spaces formed can undermine the sense of academic place.

Examples for gridded plans are, King saud university, Saudi Arabia.[1]

2-4-1-6 Modular-based plans.

This type of masterplan is composed of repeating units which, in different configurations and scales of use, provides a kit of parts for the university. Which is often based of prefabricated elements of construction and dimensional co-ordination, it allows for fast, relatively cheap construction. Modularity is suited to elements of the university which consist of repeatable units, such as student housing or research facilities, or to universities constructed to standardized plans.

Figure2- 12 University of York, Heslington,U.K.(Google earth 2009)

From its advantages.

a. The plan gives the university a great visual order.

b. these plans are considered economical as working in repeating units through mass production as modularity is favoured by the cost conscious,

[1] Ibid.P43

and, by working with building contractors at the design stage, can lead to high standards of construction per unit of cost.

From the disadvantages of these kinds of plans are.

a. The visual monotony and lack of differentiation of functional hierarchies are offset not only by cost and aesthetic consistency.

b. This type of master planning can lead to dull and poorly considered external spaces.[1] Figure 2-12

2-4-1-7 Molecular growth plan.

Master planning based on molecular principles consists of a grouping of buildings in logical relationship according to functional, non-linear hierarchies. Each building of varying form and function is connected by roads and paths to create a network of interacting units. The molecules are the buildings, the paths and the lines of force which hold the elements in place. Each building is composed of some identical parts and some different ones thereby allowing separate internal programs to be externally expressed.

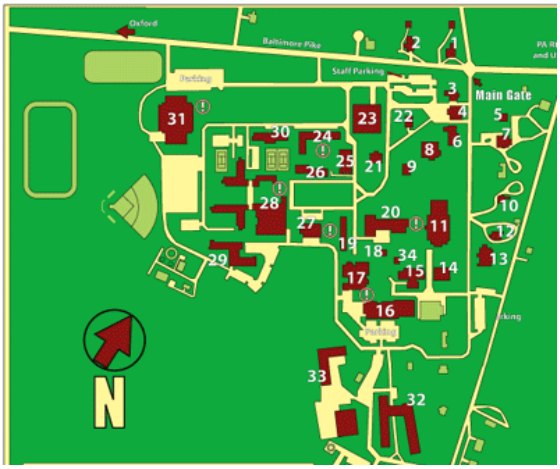


Figure2- 13 University of Lincoln, U.K. (Google earth 2008)

From its advantages are:

a. The existence of space for growth which is essential unlike the collegiate or linear as these kinds of campuses does not take in consideration with future extensions.

b. The retains a sense of vitality and a feeling of order.[2]

[1] Edwards, Brian. *University Architecture.* London: Spon Press, 2000. P44

[2] Pearce, Martin. *University builders.* London: John Wiley and sons, 2001. P67

2-4-1-8 Radial plans.

This master plan form adds the benefits of the gridded layout to that of place making. Normally the radial master plan consists of a central point about which lines or clusters of campus development radiate.

The pivot is often the senate house or library, but can be an arbitrary point on the campus.

From its advantages.[1]

a. Radial plans provide better orientation than those planned on gridded lines.

b. There is less feeling of abstraction, and the arms which radiate outwards can forge subtle relationships with the wider landscape.

Figure2- 15 Temasek Polytechnic, Singapore. (Google earth 2008).

c. The flow of lines in the radial plan helps create a sense in one direction of building focus and in the other of external contemplation.

d. Creation of strong distinctive plans due to the combination with strongly defined axial elements, and this is strongly required in modern universities.

Figure2- 14 University of Bath, U.K.(Google earth 2008)

e. The establishment of relationships between faculties and facilities (such as libraries) and more private areas (such as student housing).[2]

Figures 2-14,2-15.

[1]Pearce, Martin. *University builders.* London: John Wiley and sons, 2001.P68

[2]Nyuk Hien Wonga, and Steve Kardinal Jusuf. "GIS-based greenery evaluation on campus master plan ." *Science Direct.* February 6, 2008. www.sciencedirect.com (accessed April 23, 2009).

2-4-1-9 Ad hoc plans.

This form of master plan is barely a plan at all, though it is a common reality of how universities develop over time. The ad hoc master plan accepts little or no spatial pattern other than functional demands of access and daylight, neither is there a considered relationship between building types or functional hierarchies, nor are pedestrian routes well established or articulated. Each building in the plan follows a function of its own with little regard to the whole plan. Most frequently this kind of plan is found in inner cities or redevelopment of existing universities requiring functional use of space and disregarding the urban environment of the campus.

Figure 2-16 Massachusetts Institute (MIT), USA. (Google earth 2008)

The disadvantages of this kind are:

a. The lack of consistency and the damage of the campus identity.
b. The fracturing of internal routes.
c. Obscuring historic or cherished buildings.[1]

[1] Schmertz, Mildred F. *Campus Planning and Design.* New York: McGraw-Hill, 1972.p.80.

TYPE	PROPERTIES	EXAMPLES	NAMES	ADVANTAGES
1.Place making: Building dominated plans.	Here there is a strong sense of campus identity forged mainly by the .presence of usuallylarge bold buildings Such campuses are normally near city centers with university buildings grouped around streets . or urban squares		a.university of Virginia, by Thomas Jefferson. b.University of London. by Charles Holden. c.University of Michigan, Ann arbor	a.There is little room for expansion. b.Car parking tends to destroy the sense of place. c.The bustle of the city live is not conductive to academic reflection.
2.Place making: landscape-dominated plans	This type of campus has a sense of place dominated by landscape design The presenc of a backcloth of well planted greenery and sometimes nature in unmanicured form provides sense of nature.		a.California State university, Chicago. b.Stirling university.	a.The tranquility feeds creative thoughts. b.Nature is itself instructive and can be used in teaching. c.The separation from urban life formed by the planted framework helps give a strong sense of community. For eg. University of stirling, Scotland,UK.
3.Collegiate plans.	Universities composed of autonomous colleges have an ancient foundation. Generally the colleges were privately funded Most formed recognizable units within the loose agglomeration of a university.		a.Churchill university.	a.The close relationship between teacher and student, the sense of containment in physical, social, and academic terms. b.The well developed typology for the college unit (gatehouse, quad, lodgings, refectory, clock tower etc.)
4.Linear plans.	This type of campus, normally arranged around an internal street, takes advantage of linear compaction to create distinctive and relatively economic universities..		a.Simon Fraser university , UK b.Scarborough university, Singapore	a.The internal streets of such development provides a useful point of contact for students and academic staff alike . b.The linear form leads to the megastructure approach to campus design .
5.Grid-dominated plans.	This masterplan type is a natural development of the linear form. The grid whether or not biased in favour of one of its axes, provides a rational basis for university planning..		a. Northcarolina university , USA. b, King Faisal university, Saudi Arabia. c. Illinois institute, USA.	a.The permaeable nature of gridded layouts suits the democratic ideals of many universities, while providing a high measure of flexibility in the use of the land. b.Different blocks within the grid can be used for a variety of educational functions. c.Sub-division of grids provides flexibility and internal changeability.
6.Modular-based plans.	This type of masterplan is composed of repeating units which, in different configurations and scales of use, provides a kit of parts for the university.		a. University of York, Heslington, U.K.	a.The plan gives the university a great visual order. b.these plans are considered economical as working in repeating units through mass production as modularity is favoured by the cost conscious, and, by working with building contractors at the design stage, can lead to high standards of construction per unit of cost.
7.Molecular growth plan.	Master planning based on molecular principles consists of a grouping of buildings in logical relationship according to functional, non-linear hierarchies.		a. University of Sunderland, U.K. b. University of Lincoln, U.K	a.The existence of space for growth which is essential unlike the collegiate, or linear as these kinds of campuses do not take in consideration the future extiensions. b.The retains a sense of vitality and a feeling of order.
8.Radial plans.	This masterplan form adds the benefits of the gridded layout to that of place making. Normally the radial masterplan consists of a central point about which lines or clusters of campus development radiate.		a. Temasek Polytechnic Institute, Singapore. b. University of Bath, U.K.	a.Radial plans provide better orientation than those planned on gridded lines. b.There is less feeling of abstraction, and the arms which radiate outwards can forge subtle relationships with the wider landscape.
9.Ad hoc plans.	This form of masterplan is barely a plan at all, though it is a common reality of how universities develop over time.		a. Massachusetts Institute of Technology(MIT), USA. b. Starthclyde University, Glasgow, U.K.	The master plan concerns the functional demands of the space which is considered efficient and economical.

Table 2-2 Typology of campuses' master plans.

2-4-2 Part Two: The design approaches of campus planning.

2-4-2-1 Introduction

For the campus is considered a number of blocks and open areas surrounding them, having a certain role, as it enhances the intellectual facilities of students, thus the settings of the elements should have certain criteria, according to the site potentials and the construction time.

Consequently various approaches for the campus planning were established like, the master plan morphological approach, the framework development approach, and the picturesteque enclosures' approach which are all reliable on the site location, perimeter, and legislative funders.[1]

2-4-2-2 Master plan morphological approach.

The master plan morphological approach is majorly used in campuses constructed at the same time for the edges are clear and the land use is completed, whereas the campus image is appropriately designed and adequate to the user's needs. Potential developer, such as research partners and private institutions, can obtain through the master plan a picture of what they may be willing to support. Thus the approach deals with spaces, three dimensions, and certain visual qualities.

However, the formal and visual image may become an impediment to campus growth when the assumptions upon which the master plan was based change. Thus the approach may not help secure investment, where the possibility of future extensions may not be valid, or not compatible with the existing pavilions.[2]

As shown in figure2-16 a clear example of the morphological approach which is,

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[1] Schmertz, Mildred F. *Campus Planning and Design.* New York: McGraw-Hill, 1972.p.75.
[2] Ibid p.76.

Temasek Polytechnic, Singapore.

a. Architect: Michael Wilford and partners (1995).

b. Location and site: 30-hectare site site between Tampines New Town and Bedok Reservoir

Figure2- 16 Master plan of Temasek Polytechnic, Singapore. (Google earth 2008).

c. The concept: The concept is based upon the "city of learning" with a deliberate attempt to create a mega structure of physically linked parts.

d. Key words: Consistency, Legibility, Hierarchy, Unity.

e. Morphological approach: The designer chose the radial form for the master plan to establish the sense of legibility and hierarchy, as he chose a central focus in the form of a horse-shoe shaped administrative building with wings for separate faculties radiating from its core, forming a central plaza as sown in fig.(2-17)

Moreover each wing is dedicated to a particular faculty, with the form and layout of each reflecting specific functional demands. As such the faculty of business wing consists of mainly of lecture theatres and seminar rooms, where the design school has large studios. Thus the designer created a morphological language with various units but unified in a mega structural radial form, "Variety within Unity".[1]

Figure 2-17.

f. Extendable facilities: Since Temasek University has a certain pattern and a well known template which can be readily expanded, by expanding each wing

[1]Nyuk Hien Wonga, and Steve Kardinal Jusuf. "GIS-based greenery evaluation on campus master plan ." *Science Direct.* February 6, 2008. www.sciencedirect.com (accessed April 23, 2009).

by the pattern used in the existing wing. Therefore, a combination of consistency to faculty needs monumentality plus rational order.

2-4-2-3 The Framework development approach.

The framework devolvement approach is majorly used in campuses constructed in various stages for different purposes, either for financial problems or future extensions. The approach deals with standards and heights, but it is usually two dimensional abstracts. If this approach is compared with the morphological approach, it will be considered practical and functional solution to future growth, while the latter will be considered an aesthetical and higher visual qualities of master plans.

As shown in figure2-17 a clear example of the Framework development approach which is:

Cambridge University West campus , UK.

a. Architect: Macormac Jammison and Prichard (1997)

Figure2- 17 Cambridge university west campus. (Cambridge 2008)

b. Location and site: West Cambridge, United Kingdom

c. The concept: The concept is to create a largely self- contained new science campus which promotes interaction between researchers, and between academic and commercial research community, by designing a master plan strike balance between spatial order and future flexibility[1].

d. Key words: Future development, landscape integration.

e. Framework development approach: The framework development approach appears as the designer created a structure development over thirty-

[1] Department of Architecture, Cambridge University. *About planning and building.* 2004. http://www-building.arct.cam.ac.uk (accessed April 15, 2009).

year period forming a finely balanced plan. Within this horizon of time other architects will be involved in the design and other technological systems will be enhanced to the buildings

2-4-2-4 The Picturesteque place making approach.

This approach deals directly with the site, seeing the campus as a part of the place, for the sense of place is extremely considered. The approach is majorly used in campuses constructed in agriculture land, thus certain constrains would be established, related to the landscape features. [1]

As shown in figure2-17 a clear example of the Picturesteque place making approach which is:

University of East Anglia ,Norwich, U.K

a. Architect: Lasdun

b. Location and site: few miles from Norwich.

c. The concept: Lasdun wanted a group of university buildings which grow like an organism uniting by creation of sprouted wings of stepped halls of residence to form a great picturesteque skirt around residence.

Figure2- 18 University of East Anglia, Norwich, U.K. (Powell 2008)

d. Key words: consistency, landscape domination.

e.The Picturesteque place making approach.

The context of the building was the greenfield site a few miles from the centre of Norwich where Denys Lasdun's teaching wall and residential ziggurats formed the most memorable of the new campuses of the 1960s.

[1]Powell, Kenneth. "Pavilion in the Park." Edited by Kieran Long. *The Architects' journal*, August 2008: 15-20.

The sense of landscape penetrates into the heart of the campus and from many rooms, most particularly student residences, there are uninterrupted panoramas across rolling country side.[1]

2-5 Part Three: Design constraints and strategies to existing campuses.

2-5-1 Introduction.

Campus master plan are usually part of a larger complex to be constructed at the same time or in the immediate future. For this reason the architecture tends to display consistency in form, structural system, and use of materials. If the master plan is a development of an older campus with a strong architectural character of its own, the planners and architects may work within a vocabulary of form, structure and materials which is sensitive to what has gone before.

The Design Constraints -- based on interaction, culture and history, and sustainability -- provide a working framework to guide any changes to the campus that might be considered. The Design Guidelines are more specific, and provide planning and design direction for all landscape and building projects. The primary audiences are those involved in the planning and design of such projects that include university user groups and design consultants' universities.

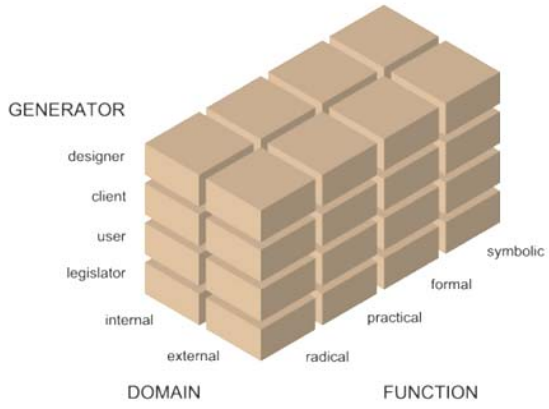

Figure2- 19 The design constraints diagram. (Pearce 2001)

[1]Powell, Kenneth. "Pavilion in the Park." Edited by Kieran Long. *The Architects' journal*, August 2008: 15-20.

2-5-1-2 The three main axes of design constraints .

The three main axes of design constraints depends on the following:

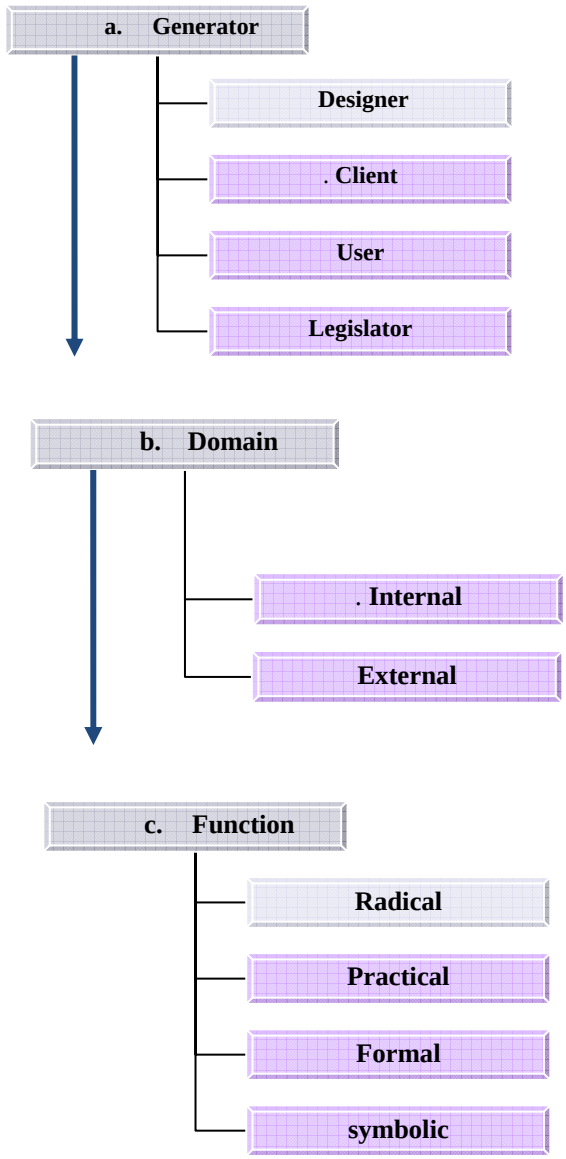

Figure2- 20 Structure of the design constrains of the development

2-5-2 Generator.

The generator is the creator of the whole design which is divided into four parts which originates the whole design.

2-5-2-1 Designer.

The designer has special criteria on which he creates his own design. These criteria depends on human factors, building masses and scale , access of natural lighting view, and other special details which signifies the whole design.

2-5-2-1-1 Human factors.

Buildings on campus should be designed with awareness and sensitivity for human interaction with the built environment. Design Professionals are to consider scale, way-finding, and adequate clearances. Walkway canopies, railings and similar work shall be designed to reflect their exposure to student use for consideration in restricting climbing, loading, etc.[1]

2-5-2-1-2 Building Massing and scale.

Generally, buildings on the main campus should be limited to four floors. The Campus Master Planner must approve exceptions to this rule.

New buildings should respond to the predominant massing and strategy of the surrounding buildings in their respective Architectural Character Zones.

In all cases, designs should contribute to the humane scale and proportions of a pedestrian-oriented campus.

As prominently discussed in the Physical Image / Sense of Place Plan, the creation and definition of open spaces .New buildings should be designed to enhance and frame public spaces, and courtyards.[2]

Buildings must be designed as part of the campus as a whole and as part of the local system of open spaces and linkages.

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[1]Clare Cooper Marcus, Carolyn Francis. *People places: Design guidelines for urban open space.* NewYork: John Wiley & sons., 1998.p.175.
[2] Ibid.p178.

2-5-2-1-3 Access to natural light and views.

Design the building to maximize interior day-lighting. Strategies to consider include building orientation, shallow floor plates, increased building perimeter, exterior and interior permanent shading devices, high performance glazing and photo-integrated light sensors.[1]

2-5-2-1-4 Special Details.

Architects are encouraged to include special elements of interest or delight in the exterior façades. Thefollowing are a few ideas:

a. Dedication plaques and cornerstones were common on older buildings around campus but are sometimes missing or overlooked in modern facilities.

b. Building identification, whether inscribed in stone lintels or lettering applied to the façade is crucial to orientation. Way finding is greatly enhanced when buildings (and entrances) are clearly identified in this manner. This also contributes to the sense of permanence mentioned elsewhere.

However, being able to change the name for a later donor or changed function should be considered as well.

c. With the expansion of evening courses and late building usage, concepts of "nocturnal architecture" bear consideration. This means functional as well as dramatic lighting, security considerations - often represented by Environmental Design, and appropriate landscaping.

d. Inclusion of art, whether freestanding sculpture or murals or integrated into building elements, etc., is encouraged and may be required by some building programs.

e. In the creation of outdoor spaces surrounding or formed by buildings, opportunities for use as alternative classrooms and "living rooms" should be considered.

[1]Dober, Richard P. *Campus design.* New York: J. Wiley, 1992.P54

2-5-2-2 Client.

For the campus planning the client role concerning the financial source, the goals of the future development and the site services and utilities is an essential generator in the campus planning and development.

3-3-2-2-A Financial Context.

In case of governmental universities, the University derives its capital funding from the provincial government, revenue generating departments and donations from the generosity of alumni and other contributors. As the government's priorities change, the University is affected. However that's completely various in private universities where the financial interest is much accommodating, where private institutions are capable of handling development projects.[1]

2-5-2-2-B Site development goals.

The planning goals set are to become part of these standards.

The pedestrian nature of the Main Campus will be reinforced. This will be accomplished by enhancing open green space and pathways, and by replacing parking on Core Campus roads with parking reservoirs on the campus periphery.

Outreach to the community will be reinforced. This will be realized by making the campus inviting and visitor access easy. Perimeter Road will be a zone to engage the public. This road will provide access to community facilities, which will be served by adequate parking facilities. Attractive landscaping and signage will further enhance this area.[2]

Sites for new buildings on the Main Campus must be carefully planned. When a new facility is designed, the building site must be selected to fit within the broad campus design parameters. Designating open space and other space

[1] University, Carleton. *Carleton University: "Campus master plan".* september 2009. http://www.carleton.ca (accessed March 2009).

[2] University, McMaster. *McMaster University: "Policies, Procedures & Guidelines".* March 2007. http://www.mcmaster.ca (accessed september 25, 2009).

that should not be built upon is essential to preserving the integrity of the main campus.

2-5-2-2-C Site lighting & electrical.

The primary goals for campus lighting area safety, security and aesthetics: Only light areas where exterior lighting is clearly required for safety and security. Lighting used solely for aesthetic effects shall be used only to achieve campus wide way-finding goals.

a. Safety involves minimizing conflicts with pedestrians, bicycles, and vehicles through channeling traffic to the safest paths and providing adequate sight lines and lighting levels.

b. Security minimizes personal harm or property loss by achieving good visibility and by removing shadows along paths.

c. Aesthetics in lighting refers to the appearance and place making qualities of the lighting design, both during the day and night.[1]

2-5-2-3 User needs.

The most important step is engaging the community and the users of the campus, a survey of specific points and a public hearing on the campus development

A questionnaire on the main points related to the development and the most important concerns and issues was being tagged to several users and students of different fields[2]

These points are related to the most suitable entrances, walking paths, running paths, bicycla paths and transit shops needed for students.

[1] University, Carleton. *Carleton University: "Campus master plan".* september 2009. http://www.carleton.ca (accessed March 2009).

[2] Dober, Richard P. *Campus design.* New York: J. Wiley, 1992.P58

2-5-2-3-A Needs of entrances.

Architects are encouraged to seek ways to provide visual clues to the entrances. Entrances should be prominently defined as part of the architectural statement of the façade.

Campus entrances should be designed to provide a clear and legible identification of place and arrival.

Repetition of landscape structures is useful in strengthening a sense of entry to the campus.

Scale of development at entrances should be appropriate to their function (i.e. vehicle and/or pedestrian entrances) and importance.

Campus entrances should express a strong landscape identity but need not be the same at each entrance.

2-5-2-3-B Needs of pedestrian Walkways.

The minimum width of campus walks shall be six feet (6'-0" or 2 m) for walkways in general. The vast majority of campus walks will be wider than six feet in order to handle pedestrian loads during class change.

2-5-2-3-C Needs of running Paths.

Running paths may be shared with either bicycle paths or pedestrian paths as long as paths are of adequate width to accommodate both.

The design criteria for running paths are the same as bicycle paths in terms of sight lines and intersections. The materials, however, should be more forgiving, using asphalt instead of concrete wherever possible, or even softer surfaces depending on conditions.

Dedicated running paths should have a minimum width of (4'-0" or 1.40m) in areas where wider paths are not possible. All other areas should have a minimum width of six feet (6'-0" or 2 m). See figure 2-22.[1]

[1] Dober, Richard P. *Campus design.* New York: J. Wiley, 1992.P60

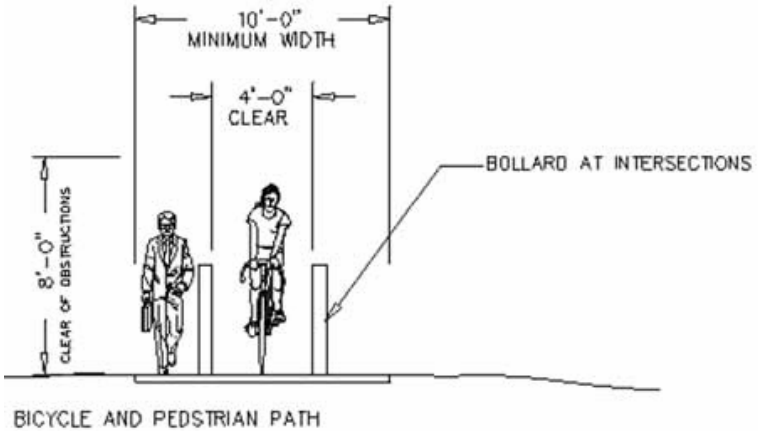

Figure2- 21The bicycle and pedestrian path. (Dober 1992)

2-5-2-3-D Needs of bicycle Paths.

Where dedicated bicycle paths are provided they should consider safety issues of design speed, sight lines, stopping distances, curve radii, intersection design, surfacing, and protection from hazards.

In general arterial roads should have a bike path that roughly parallels the road but does not share the right of way. All collector roads should have a dedicated bike lane within the right of way and bikes should share distributor roads with vehicular traffic.

Bicycle paths should have a minimum width of eight feet (8'-0" or 2.80m) or ten feet (10'-0"or 3.33m) where shared with pedestrians. There should be a minimum of eight feet (8'-0"or 2.80m) above the path, measured from the edge, that is clear of all side and overhead obstructions. Where possible, paths should be widened slightly in a curve and super-elevated at a maximum rate of six inches (6" or 2m) per foot. This is especially important for short-radius curves. See figure 2-23.[1]

[1]Dober, Richard P. *Campus design.* New York: J. Wiley, 1992.P61

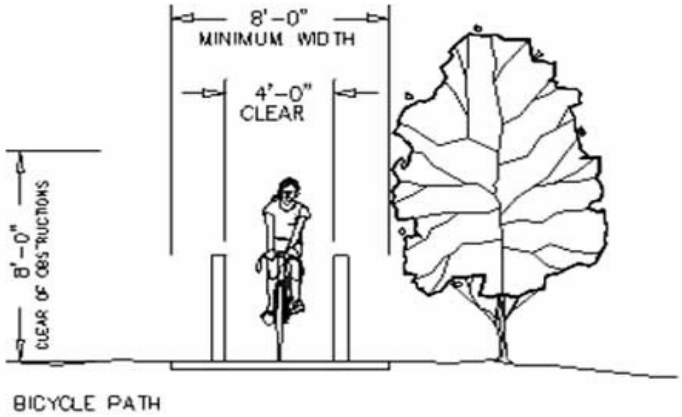

Figure2- 22 Dimensions of the bicycle path. (Dober 1992)

2-5-2-3-E Needs of transit Stops

Each transit stop shall be designed with:

Ample space for pedestrians to gather with seating, trash receptacles, lighting, and shelter from inclement weather

Directive signage indicating the location of the stop and its relationship with the transit system on campus safe routing for bicycles through the bus stop.

2-5-2-4 Legislator.

2-5-2-4-A Height

Building height should typically be three to five stories, or 40-60 feet. Only special architectural elements in key landmark locations as indicated on Master Plan should exceed this limit.

This limit coincides with the five story height that represents the upper end of the so-called human-scale for buildings. Only exceptional, monumental buildings should be allowed to exceed this height limitation. The overall size of modern academic facilities should fit into this height limit, assuming a footprint adequate to accommodate a large enough floor plate. If the floor plate is so small that the overall building height must exceed this recommended limit, then the site selection and programmatic concept should be challenged.[1]

[1] Dober, Richard P. *Campus design.* New York: J. Wiley, 1992.P61

2-5-2-4-B Façade Proportion

Directional aspects of campus building include building alignment and façade proportion and expression. All new buildings should be essentially horizontal in proportion, and the façade expression should be horizontal as well. Most campus buildings currently subscribe to this rule.

2-5-2-4-C Floor Area Ratios

The impervious area of a building "site" shall not exceed 60%. Impervious areas include the building footprint, paving, courtyards, service areas, and sidewalks. For the purpose of this document, the "site" shall be measured as:

Half of the distance to the next building or 1.5 times the overall, above grade height of the subject building on the facing side, whichever is less;

Back of curb for adjacent drives or parking areas;

Half of the average distance from the building to prominent landscape features; or the edge of property lines, rights-of-way, vegetative buffers or other setbacks.

2-5-2-4-D Campus streets

Establish structure and clarity for vehicular circulation routes by utilizing landscape treatment on the internal circulation routes

Campus streets shall have a single row of regularly spaced canopy trees along both sides of the street and continuing for the entire length of the street. Use of a singular species for each street with a spacing of 30’- 40’ on center is recommended. They may be different species for different streets, but mixing species within any particular street is discouraged. The trees shall be regularly spaced in a consistent alignment to distinguish them from adjacent landscape treatment and to reinforce the vehicular corridors. The ground plane shall be predominantly sod, with low maintenance groundcovers or native shrub areas at special points or entrances, if appropriate.[1]

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[1] Dober, Richard P. *Campus design.* New York: J. Wiley, 1992.P70

2-5-2-4-E Parking Areas.

Vehicular parking areas shall be both functionally and aesthetically pleasing. The overall goals of implementing these requirements are to enhance, beautify, provide aesthetic unity with the rest of the campus environment, improve the environmental and climatic impact of surface parking lots and to minimize the vast, barren character of existing and future parking areas while providing efficient parking, vehicular circulation and safe pedestrian access. Large canopy trees shall dominate the parking areas for shade and shrubs along the perimeter shall be provided for screening.

The University should implement a sequence for phasing in renovation of existing parking lots that contain little or no landscaping to meet the requirements of this section. This sequence is not a timetable and implementation will occur as funding becomes available. First priority will be given to Campus Core lots and/or other high profile lots, with the renovations moving out to the large, outlying lots on the edge of Campus.[1]See figure 2-24.

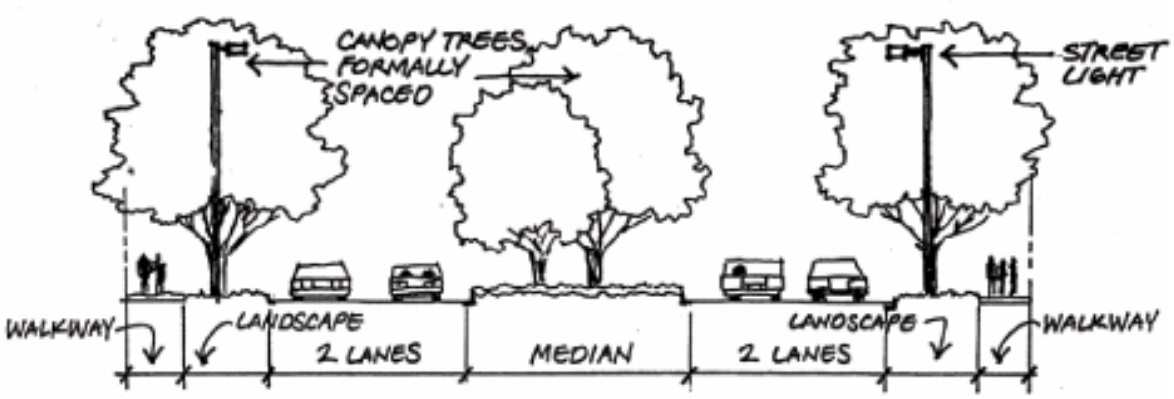

Figure2- 23 Parking areas and place of canopy trees (Arnold 1972)

[1]Arnold, Henry F. *Trees in urban design.* New York: Van Nestron Reinhold, 1972.

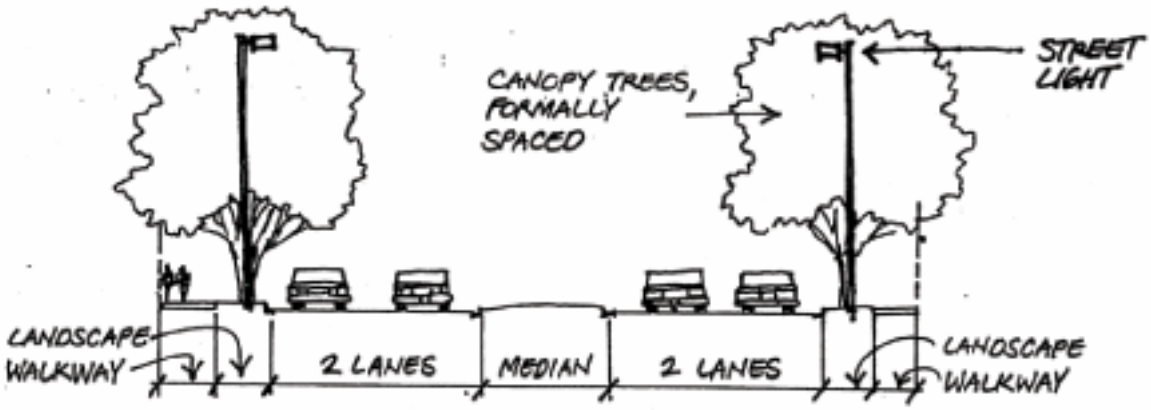

Figure2- 24 Parking areas and place of canopy trees and medians. (Arnold 1972)

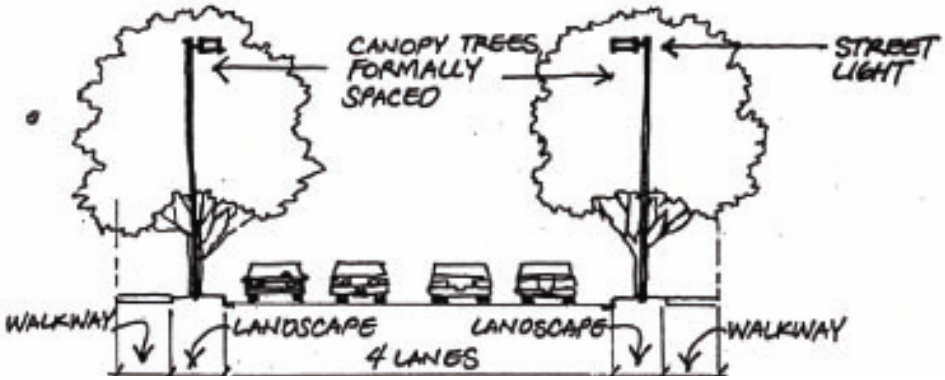

Figure2- 25 Parking areas and place of canopy trees. (Arnold 1972)

2-5-2-4-F Open spaces.

Establishing landscape treatments for various open space typologies, based upon the following categories of campus structure:

- Campus Quadrangles
- Pedestrian paths
- Courtyards
- Campus Greens
- Athletic Fields
- Planting Areas around Buildings
- Campus Entrances
- Streetscapes. Figures 2-27, 2-28.

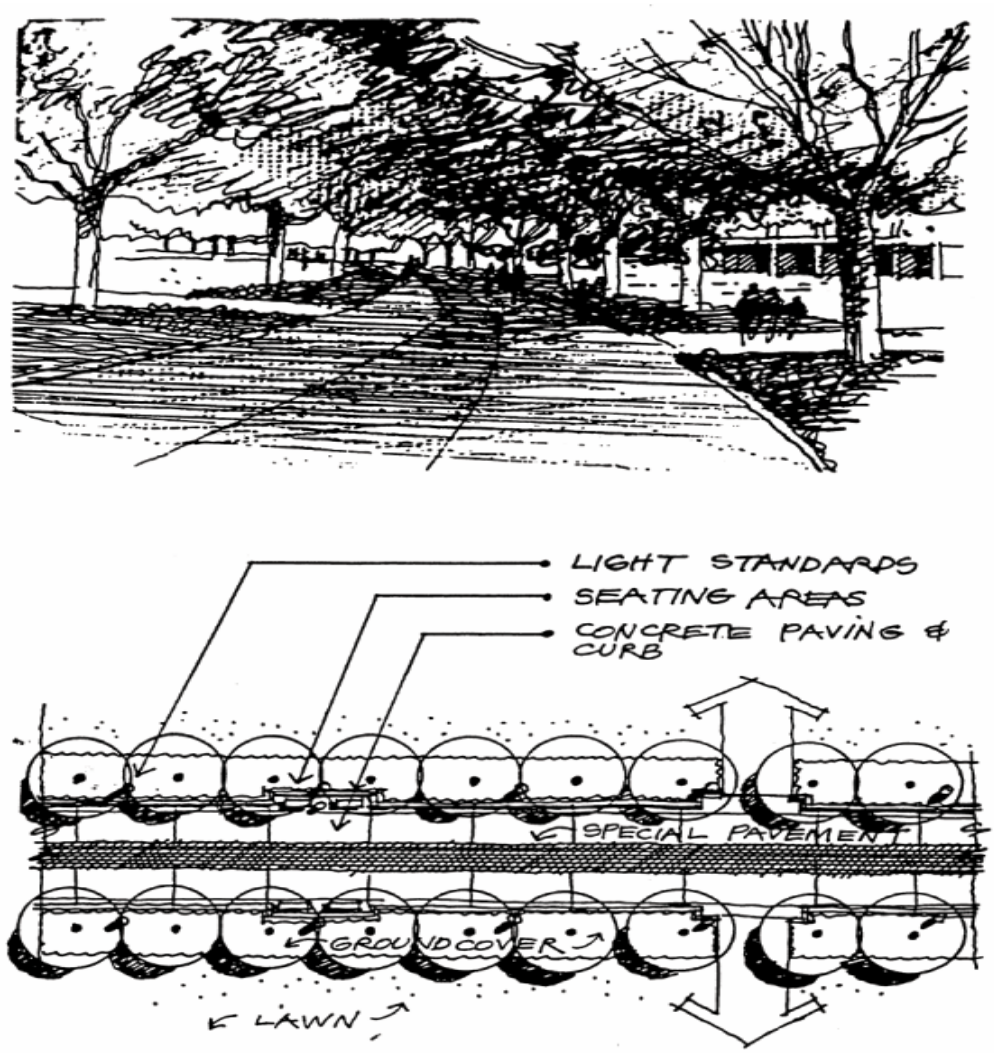

Figure2- 26 The pathwcay with trees and seating areas. (Dober 1992)

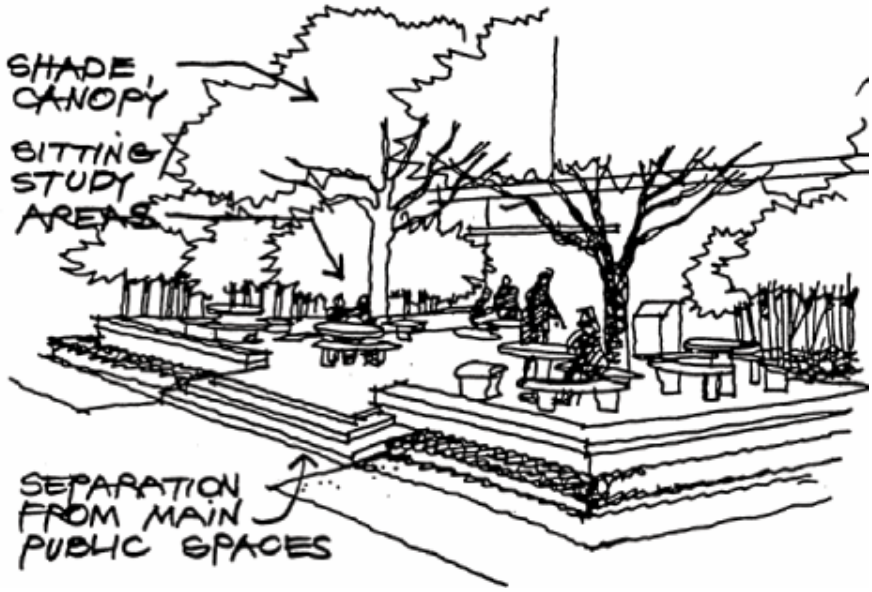

Figure2- 27 Leveled spaces as shown to be partially separated from public areas. (Dober 1992)

2-5-3 Domain

2-5-3-1 Internal.

There is a mutual relationship between Campus development, academic priorities and university principles. Campus design character has a great influence on the users including the students, staff and administration, which also reflects on the academic aspect.

2-5-3-1-1 Courtyards and Plazas

Courtyards and plazas are recognized as key gathering areas, complete with a wide range of amenities, including any or all of the following:

• seating (formal and/or casual)

• a complex planting program, hard and soft ground surfaces and visual diversity

• sculptural elements

• water features/fountains (which can serve as sculptural elements in winter);

Given their locations, their form and their situations relative to adjacent buildings, courtyards and plazas can be developed to extend the season of outdoor enjoyment, shelter from cold winds, act as sun traps, or serve as quiet places of retreat.[1]

2-5-3-2 External.

2-5-3-2-A Social Context

The social context differs from a university to another, depending on the character of the university and it's historical reflection upon the users, and whether it's capable of attraction of a diversity of students with different social aspects affects the campus character. Thus if the university has a unique character and the district is a mixed-use one , this affects directly the circulation network , approaches and entrances.[2]

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[1]University, Carleton. *Carleton University: "Campus master plan"*. september 2009. http://www.carleton.ca (accessed March 2007).

[2] Ibid.

2-5-3-2-B Respect Cultural and Historic Resources.

If the existing spaces and structures on campus have local, regional or national historic significance. Historic resources should be maintained and preserved and by acknowledging and respecting this past through a considered approach to the planned environment.

2-5-4 Function.

2-5-4-1 Radical.

2-5-4-1-A Vehicle/Bicycle/Pedestrian Circulation

1. Two lane roads are to be 24 ft. wide minimum, with minimum 30 ft. radius at curves.
2. Provide asphalt or concrete site paths of a width appropriate to its intended use. If asphalt is used, provide pressure treated pathway headers. Verify with the University's Representative.
3. Provide bicycle parking (to serve a minimum of 5% of the regular building occupancy) convenient to building entries and on the project site. Verify amount of bicycle parking with DPP.
4. Provide for bicycle circulation from bike paths to bike parking to pedestrian path to building entry. Bicycle and pedestrian paths shall be separate when possible.

2-5-4-1-B Service/Utility Areas.

• Open space design and development should provide for the functional requirements of service/utility areas.

• Strong landscape buffers should be developed and maintained at the edges of large "temporary" surface parking lots that will remain until they are re-developed. Appropriate combinations of trees, shrubs, fencing and/or land forming can be used to provide this kind of buffer treatment. The screening must be effective at eye level as well as in a general sense.

• Landscape buffers should also be employed to screen out other types of unsightly service areas (e.g. loading docks).

• Permanent surface parking should be developed with landscaped medians/bulbs to provide for efficient use and circulation and to break up the mass of non-green space in the parking areas, complete with appropriate lighting to provide personal safety and the perception of safety to users, visually softened/screened at the edges with land forming, planting and/or fencing, designed with the assumption that snow will be removed from, not stored on site, and surfaced with a permeable material to reduce storm-water run-off.[1]

2-5-4-2 Practical.

The campus should serve the external community and it would act as a focal point for the cultural activities.

The campus could be used for non-academic activities round the hour.[2]

2-5-4-3 Formal.

2-5-4-3-1 Strategic Buildings.

- **Gateway buildings** anchor strategic street intersections which mark entrances to the campus from public arterial streets. A gateway building functions as a highly visible facility, which structures the aesthetic experience of motorists in the vicinity of the gateway. In addition, the building is a key to creating an identifiable campus area for the portion of campus with which it is associated. Particular care should be given to the setting of a gateway building in relation to its intersection, as well as to building design, landscaping, and lighting.[3]

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[1]Pearce, Martin. *University builders.* London: John Wiley and sons, 2001.

[2]University, Carleton. *Carleton University: "Campus master plan".* september 2009. http://www.carleton.ca (accessed March 2007).

[3] University, McMaster. *McMaster University: "Policies, Procedures & Guidelines".* March 2007. http://www.mcmaster.ca (accessed september 25, 2009).

- **Landmark buildings** anchor activity nodes or major open space areas. A landmark building is designed to be easily identifiable or visually significant, especially to pedestrians, because of its clear or unique form or massing; high figure - background contrast due to setting , scale, color, or architectural style; and/or its prominent spatial location. Special attention should be given to building design and massing, landscaping, and lighting. New landmark buildings should be designed to actively structure and enhance the usable open space they anchor.[1]

2-5-4-4 Symbolic.

The campus should be a symbol for the cultural, academic and social place.

2-5-4-4-A Symbolic Spaces.

The relative scarcity of symbolic spaces on campus, however, serves only to emphasize the importance of their protection and enhancement. While it is not anticipated that there will ever be a large number of such spaces on campus, the passage of time, events, people and their achievements may well lead to the creation or evolution of others. Aside from recognizing the possibility of same, however, it is impossible to set out design guidelines for these spaces without understanding the nature of their significance.

2-5-4-4-B Named Places.

All primary walkways, primary and secondary streets, and any route or landscape with buildings fronting onto it should be identified with meaningful names that are tied to the University's heritage, culture, and setting. By identifying all named places with signage, the names will be recognizable and memorable.[2]

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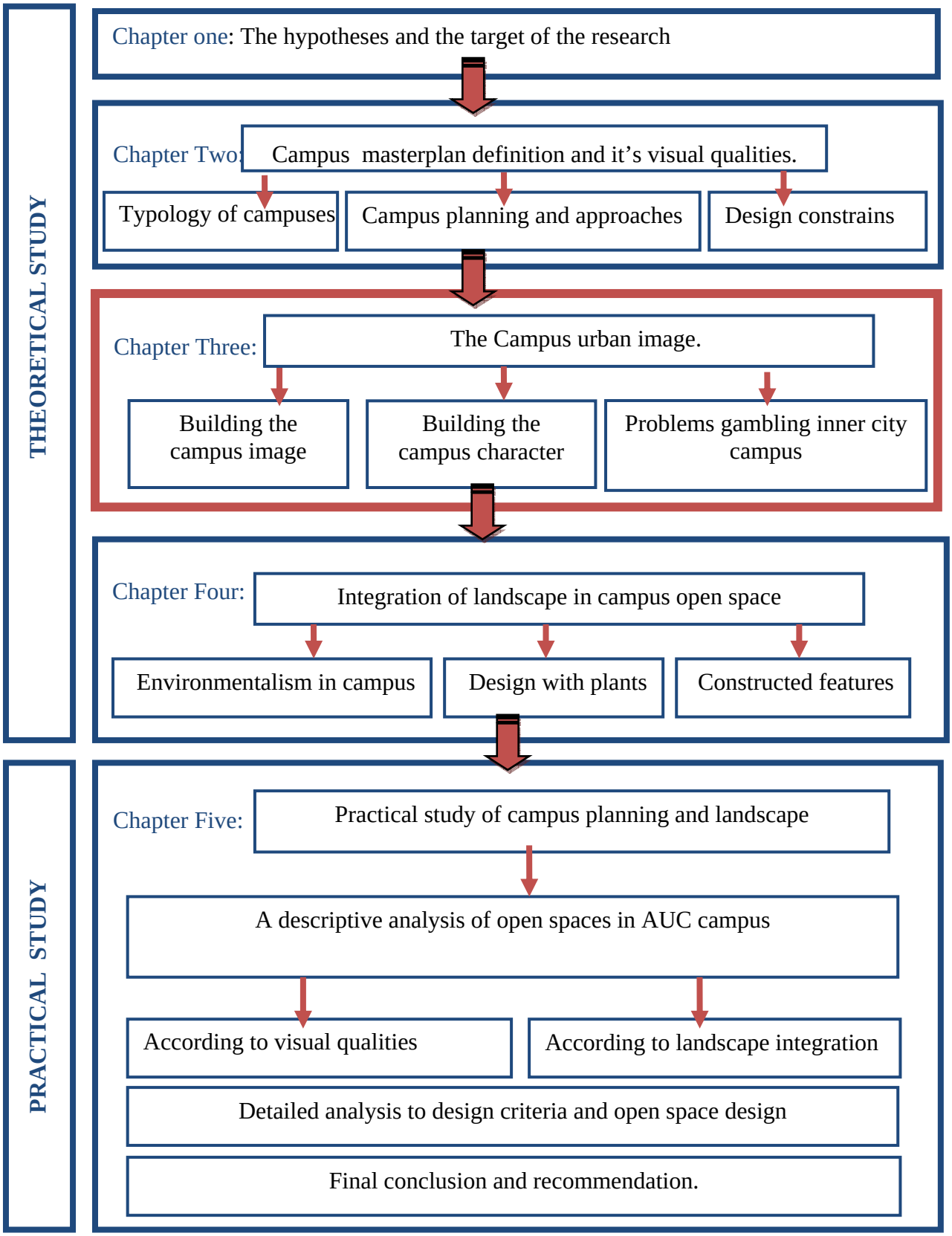
[1]Pearce, Martin. *University builders.* London: John Wiley and sons, 2001.p29-32.

[2]University, Carleton. *Carleton University: "Campus master plan".* september 2009. http://www.carleton.ca (accessed March 2009).

Chapter Three

Chapter Three.
The Campus urban image



Chapter Three.

The Campus urban image

3-1 Introduction.

The campus image in the campus planning is a significant aspect, which the designer should consider, thus the campus became a place where the students spend most of their time; therefore the image should be enhanced by certain qualities concerning the urban design guidelines and integrated by landscape elements where the image can be more comprehensive and entirely vivid.

Furthermore the image can be a basis of advocating intellectual performance of students, for the context can fortunate the social activities of students, and can be entirely abide for their needs, by performing and building a certain image by using significant guidelines, and aggravated by landscape elements to accomplish the image of the campus.

The campus is a distinct urban unit; a district devoted to higher education. As with all districts there needs to be a definition of centre, of edge, and an expression through buildings of functional uniqueness. The university district or campus requires its own land marks, own spaces, and its own well marked perimeter.[1]

3-2 Part One: Building the campus image

City planners are primarily interested in the external agent in the interaction which produces the environmental image. Different environments resist or facilitate the process of image-making, and each individual creates and bears his own image, but there seems to be substantial agreement among members of the same group, it is these group images, exhibiting consensus among significant members, as a result the built environment can be modeled by using many people. [2]

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[1] Caudill, Rowlett and Scott. *Campus design study*. Houston: U.S departement of education, 1999.

[2] lynch, kevin. *Image of the city*. chicago: james, 1959.

Three components can be analyzed in the built environment which are.

3-2-1 Identity.

A workable image should be well identified, which implies its distinction from other things, its recognition as a separable entity.

3-2-2 Structure.

The image must include the spatial or pattern relation of the object to the observer and to other objects.

3-2-3 Meaning.

Which is somehow different as it is the meaning or the conclusion of the visual recognition as a whole.[1]

An example:

The door, it is considered the image for making an exit which requires the door recognition as a distinct entity, of its spatial to the observer, and its meaning as a hole for getting out, and they are not truly separable.

3-2-4 Image conclusion.

If an image is to have value for orientation in the living space, it must have several qualities,

a. It must be sufficient, true in pragmatic sense, allowing the individual to operate within his environment to the extent desired.

b. The map, whether exact or not must be good enough to get one home.

c. It must be sufficiently clear and well integrated to be economical of mental effort.

3-3 Elements defining the campus image.

As Lynch has proved that there are certain elements to define the city's image to be entirely perceptive to a certain sum of people like, the inhabitants,

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[1]lynch, kevin. *image of the city*. chicago: james, 1959.

the visitors and the designer, then concerning the campus as an urban settlement with certain criteria manipulating the pavilions' arrangements, and with diverse usage of its elements, for instance, the campus center should be determined as a certain zone where students can union and also to connect the diverse setting of the various intellectual elements in the campus.

Therefore the campus should have certain criteria to build its image, to be a result of memorable, vivid or coherent buildings grouped around lively, ordered or serene external spaces.

3-3-1 Defining the campus center.

The University centre is where the main buildings of the campus are grouped. Normally the student union, library, refectory and graduation hall are located here. These activities should be allowed to enliven the edges of the space around which they are assembled, and to spill into it on certain occasions, like, graduation day and other special events.

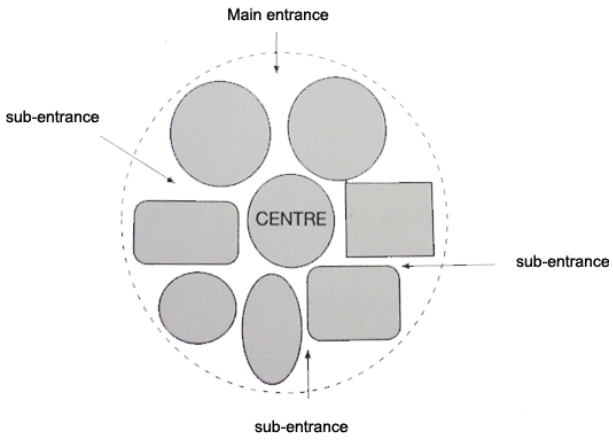

Figure3 -1The campus centre. (Edwards 2000)

The campus setting is considered as a small town with its own center where its identity is accomplished and it brings into particular focus the difference between 'space' and 'place'. see figure 3-1

The latter requires people and memorable design, the former is abstract and lifeless . Thus the campus center is particularly a 'place' by all means because of the role of building and landscape design which express its uniqueness and character.[1]

[1]Edwards, Brian. *University Architecture.* London: Spon Press, 2000.p.46

3-3-1-1Configuration of campus center

The campus center needs to be identified by special and distinctive buildings to be elevated as keys to the center. Furthermore landmark buildings like the main library and large lecture halls can take place in the main center and can compete for a memorable urban scene.

There are many configurations for the formation of the campus center (linear, quadrangle, megastructure). The key buildings which edge the space are each different in form and function yet together they create the ensemble of volumes or activities which transform the space into a real place. [1]

The center needs to be defined by building volume, using profile, façade and set-back, to distinguish the academic center from other parts of the campus. Furthermore dominance should be afforded to the central library which is often located in the campus center, where also learning resources and bookshops can be located there. However the campus center is supposed to be a rhythm of activities, like graduates can be photographed and certain ceremonies which needs a dignified space.

3-3-1-2 The linear nature of the campus center.

As we have discussed before concerning the center's enclosure and activities which occur in it, it was clear that the activities need a processional and a dignified space to be cheerfully sufficient to the ceremonies.

The linear nature of procession leads frequently to a longitudinal bias in the setting of the main campus buildings. The corridor of space created facilitates good communication along its length, provides an avenue of debate for scholars walking to their next lecture and if, free of cars and well planted, and provides a memorable setting for the university.

[1] Edwards, Brian. *University Architecture.* London: Spon Press, 2000.p.47

As shown in figure3-2 an example of the campus center which is:

Ohio state University, Columbia, USA.

a. Location: Columbia district, Ohio state, USA.

b. The Centre:

Figure3- 2Ohio state university Centre-The Oval- (Ohio state Campus 2009)

The open grassy area stretching from the Main Library almost to High Street symbolizes Ohio State to many people. The linear nature and the longitudinal nature of the centre appears clearly, for the enclosure is appropriate enough to meet processional activities and various ceremonies.

The main library is located in a dominant space which is the main visual axe to be a key building and a visual landmark to define the centre. See figure 3-2

c. The grouped buildings:

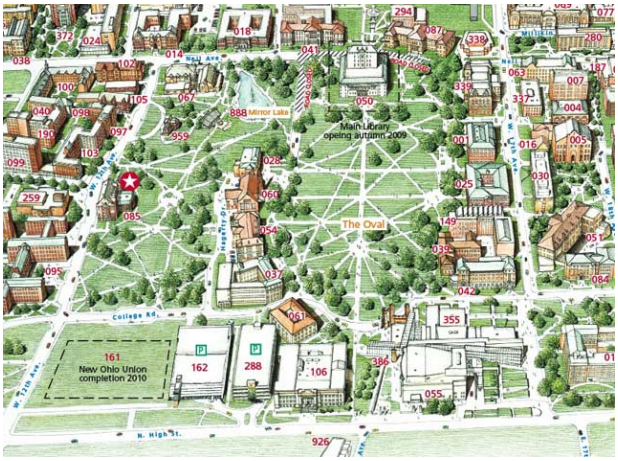

Figure3- 3The Oval related to context. (communication 2008)

Buildings surrounding the centre, or forming the centre are considered distinctive in its use, function and volume,

Like faculty club, Derby hall, Hopkins Hall, Orton Hall, and the main library centring the buildings' axe, where blocks are significant and appropriate to students' groupings and activities.[1]See figure 3-3.

[1] Univerity communication. *The Ohio state University-Campus map.* september 2008. http://www.osu.edu (accessed May 20, 2009).

3-3-2 Defining the campus Paths.

Lynch defined the paths as, “Paths are the channels along which the observer customarily, occasionally, or potentially moves. They may be streets, walkways, canals, railroads. For many people these are the predominant elements in their image”.[1]

Thus for the campus image the main circulation which connects various pavilions are considered the paths of the campus, moreover the main path is entirely the perceptive axe where various and daily activities are encountered , like the path which connects faculties to the campus center and with other important nodes in the campus.

Pedestrians routes provide the necessary connection to lecture theatres, refectories and faculty buildings . the interconnections on the campus should be thought of as a wed of foot-based circulation with nodes and sub-nodes at points of functional focus.[2]

3-3-2-1 Design criteria of campus paths.

Criteria of establishing the campus circulation and the main path, should undergo to certain guidelines to create a well perceived, and enjoyable space, and to prevent getting lost in the urban setting of the campus.

These criteria can be satisfied in:

a. The rhythm.

The rhythm of movement on campus reflects both the layout of key buildings and the timing of lectures or tutorials.

With modern designs the distance between various educational spaces should not exceed 500 meters, where ten minutes time between lectures is sufficient to students to attend lectures on time. However other uses like commercials, and residential are not limited to a certain time.

[1] lynch, kevin. *Image of the city.* chicago: james, 1959.
[2] Edwards, Brian. *University Architecture.* London: Spon Press, 2000.

b. Contact with nature.

Routes should be direct, safe, clearly perceived, enjoyable to use, and reflective in spirit, thus that occurs by contact with nature which is the opportunity to engage in discussion away from the bustle of inter-lecture movement. Face to face contact, whether planned or accidental, is an important aspect of academic life.

c. Key routes.

Key campus routes should not be placed only internally within faculties, but it should be shared in the external promenades edged by cafes, bookshops and student faculties. Moreover a main road should be place edging the whole campus with secondary walkways to act as connectors.

d. Vehicles accessibility.

The design of circulation on the campus needs to provide permeability for students and access of vehicles.[1]

Students need to be able to filter through the gaps between the often large departmental buildings, and within the buildings themselves, as they need variety of routes and a variety of types of spaces.

Mostly vehicles accessibility would be within the campus promenade, where parking space are located covering the outer gaps of the blocks. Thus areas of potential conflict between pedestrians and vehicles should be minimized for the campus safety.

As shown in figure3-4 an example of the campus path which is:

[1]Edwards, Brian. *University Architecture.* London: Spon Press, 2000.

The American University in Cairo (AUC), Cairo, Egypt.

a. **Location:** The AUC is found in the Fifth Avenue in New Cairo City of 240 Acres.[1]

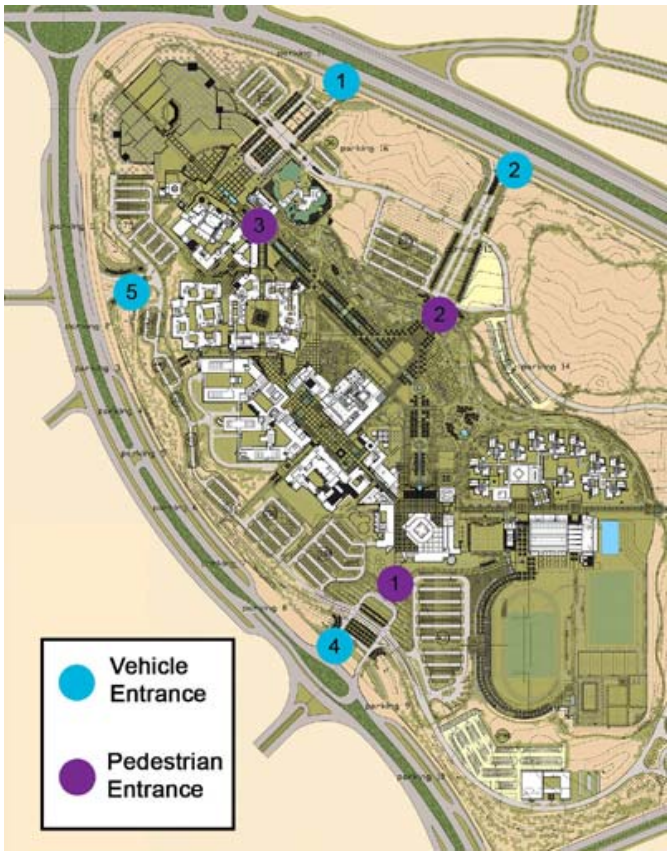

Figure3- 4The AUC Campus in New Cairo, Egypt. (Technologies 2008)

b. **The Path.**

As shown in figure 3-4, a main path is manipulated to connect diverse plazas and open spaces within the campus. However other walkways and connectors are branched from the main path way, which is capable of connecting the diverse setting of the campus.[2]

c. **Vehicles accessibility.**

As shown in figure 3-4, the parking areas are located at the campus edge, between the pavilions of faculties then connected to the walkways preventing the conflict between pedestrians and vehicles.

[1]Technologies, University Academic Computing. *About AUC's New Cairo Campus.* 2008. http://aucegypt.edu.html (accessed July 1, 2009).

[2] Technologies, University Academic Computing. About AUC's New Cairo Campus. 2008. http://aucegypt.edu.html (accessed July 1, 2009).

3-3-3 Defining the campus landmark.

For a campus, it’s usually marked by a distinctive landmark, to form a distinctive skyline, reserving the most shaped or profiled building to symbolize the center.

Such towers are usually useful in huge campuses where the tower can punctuate the urban space, and in a bigger scale can be a point reference to cityscape.

Many such towers litter the history of university architecture where their justification resides in the need for a conspicuous clock to ensure students attend lectures on time, a bell tower to signal prayer or meal times, or as a legacy of monastic origin. And that was a very conspicuous symbol in the early 20th centuries’ university.

3-3-3-1 Design criteria of campus landmark.

a. Skyline.

Buildings surrounding the land mark should be slightly lower than the land mark element so that the tower or the high rise building rises without visual competition.

b. The base.

To be effective the landmark building requires a zone of unencumbered external space to be conspicuous and to punctuate the spaces surrounding it. Ideally the landmark should be seen in a relation to the ground, perhaps with a square at its base.

c. Singularity.

The best campus landmarks enjoys singularity; there is no skyline competition and the form itself is slightly different contrasting the other pavilions, like using simple form with complex pavilions, and vice versa where the landmark is signaling an important element or place on the University estate.

3-3-3-2 Landmarks in local campuses.

1. **Cairo University, Egypt.**

The bell tower of the Cairo University is considered the universities' landmark; however the conference hall is considered a stronger landmark, for its dome which signals the conference hall and making the bell tower weaker as a space punctuator.

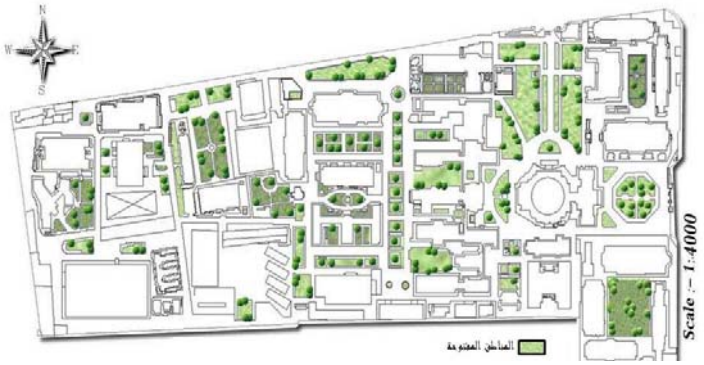

Figure3- 5 The master plan of Cairo University, Egypt, showing the location of the bell tower. (Cairo University Historical snapshots 2007)

Figure3- 6 The relation between the bell tower and the main conference hall. (Cairo University Historical snapshots 2007)

2. **The American University (AUC), New Cairo, Egypt.**

a. The main landmark:

The AUC library is considered a strong landmark signaling the main avenue and it's considered slightly Higher than the other colleges surrounding the main avenue. Moreover the architecture concerning the elevation is different from other pavilions, as timber work is used as sun breakers, while the library's elevation, a type of gridded concrete sun breakers acting as an isolating wall covering the main elevation facing the avenue. Thus the library

has successfully acted as a contrasting pavilion, and creating a conspicuous landmark. See fig.3-7.

b. Secondary landmarks:

Secondary landmarks are located in the AUC campus, where a tower in the residential zone found attached to various restaurants serving the residential zone. Thus the landmark came to punctuate the plaza of these restaurants.

Figure3- 7 The AUC library, New Cairo, Egypt. (The researcher)

c. The tower:

The tower came contrasting the pavilions, where the residential buildings took a modern style with an orange color nourishing the blocks, while the 9 meters tower came with an Islamic stile with timber work at the top and stone paving at the bottom and it took a chimney shape with conspicuous proportions.

Figure3- 8 The tower located in the residential zone in AUC (The researcher).

3-3-4 Defining the campus edge.

As the campus is considered an educational district, thus a well-marked perimeter should be established which is considered an edge to the educational district. The edge can be established in a variety of ways –through planting design, the physical marking of edge by buildings, the use of security gates onto the campus, or by the use of encircling roads.

3-3-4-1 Types of campus edge.

a. Tree belt edge.

With rural or sub-urban universities the edge is usually defined by tree belts sometimes with secondary boundary of hedges. The trees may blend into wooded copses or stitch the university into the external landscape of fields, woods, and gardens.

b. The physical enclosure edge.

With the urban university another type of edge should be used, as security and safety often require strong physical enclosure (with walls or buildings) and the use of security gates onto the campus. From the drawbacks of such edge, psychologically it gives the users the feeling of living in a citadel away from the citizens, thus the feeling of a town will be damaged.

As shown in figure3-9 an example of a campu edge which is:

Carleton University, Canada's Capital University, Ottawa, Canada.

Figure3- 9 An Overview of Carleton University, Canada, showing the natural edge and the integration with the town context. (carleton university n.d.)

As shown in figure3-9 the University is edged naturally with the Rideau River, and a tree belt is edging the whole campus integrating the campus with the whole town, although the campus a city by itself, as it consists a residence area for students and several services, but for urban design the campus has successfully integrated with the whole town[1]

[1] *carleton university.* http://www.carleton university\index.html (accessed 7 20, 2009).

3-4 Part Two: The campus character.

The campus character is considered a significant element in the campus image, which influence psychologically on students, and give them a chance to involve with the built environment, thus rage and actions of violence will actually be diminished.

In brief, future buildings must result from a problem solving approach which pays deference to certain characteristics which build certain character to the campus.

These characteristics can be classified as.[1]

1. Verticality.
2. Human scale.
3. Richness.
4. Variety.
5. Unity.

3-4-1 Verticality.

If architectural design could be divided into two categories it would be found that most buildings have either a horizontal or vertical expression, whether accomplished by size, scale, or fenestration. The vertical suggests the noble, the dramatic, and the aspiring, while the horizontal suggests serenity, repose and earthiness. Thus the vertical feeling should be expressed wherever possible and emphasized where feasible. Consider action should be given to the foreshortened view one will see while walking past the buildings.

Therefore all entities such as windows, doors and wall panels should be given a vertical proportion where possible. Where the overall width of a group of windows or doors exceeds their height, they should be detailed to read visually as a group of vertically proportioned entities rather than as one horizontal element.[2]

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[1] Caudill, Rowlett and Scott. *Campus design study.* Houston: U.S departement of education, 1999.

As shown in figure 3-10 an example of the pavilions' verticality which is:

Ohio state University, Columbia, USA.

Figure3- 10 A lecture hall in Ohio state University, Columbia, USA. (communication 2008)

A lecture hall in Ohio state University, showing the verticality in architectural elements like the double height columns, giving a vertical feeling to the building façade , as well as the side windows which have a vertical proportion, although the whole building doesn't exceed four storeys height to be compatible with the normal human scale.

3-4-2 Human scale.

In all views the buildings must readily relate to human being. This relation to human scale can be most readily achieved at the level of the smaller symmetrical entities such as windows and doors. It is this level that people relate more quickly and personally. When these components must occur in large numbers they should be grouped and detailed to read as human sized and usable elements.

Placement as determined by function rather than for symmetry will usually reinforce the human scale. Large, uninterrupted planes should be broken up into more human size elements through emphasis of joints, shadows, and the size and texture of the units or aggregate used. A steadfast expression of the structure will also help prevent massive and inhuman scale.[1]

As shown in figure 3-11 an example of the pavilions' verticality which is:

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[2]Caudill, Rowlett and Scott. *Campus design study*. Houston: U.S departement of education, 1999.

[1] Caudill, Rowlett and Scott. *Campus design study*. Houston: U.S departement of education, 1999.

Simon Fraser University, Vancouver, Canada

As shown in figure3-11 the height used in simon fraser university doesn't exceed three stories to compromise with the human scale.

Moreover, a part of the first floor was subtracted to create the sense of continuity nature. Also the stairs took the sense of continuity to allow the creation of a sitting area to enhance the compatibility of the building with the nature.

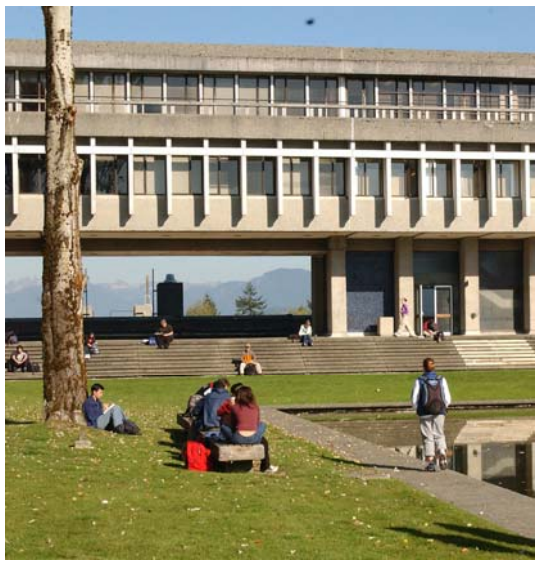


Figure3- 11 Simon Fraser University, Vancouver Canada .Showing the human scale compatibility. (Bell 2007)

3-4-3 The richness

Contemporary architecture often fails to solve this problem of the desire for decorative quality within the bounds of budget limitations. Ornament is a means of giving definition and human scale to a component of the architecture. Without it, buildings become scaleless, and lifeless. Present day standards do not demand the same abundance of ornament that some preceding styles had, but a sense of human scale and proportion is still a requisite.

3-4-3-1 International and local examples of richness

1. **Duke University, Durham, UK.**

In duke University ornament and decoration were essential features of the original gothic style . ornaments are used successfully in each element like the entrances, windows and the endings of the buildings to signify the main vocabularies of the gothic style as shown in figure 3-12

Figure3- 12 Duke University, Durham , Uk. (Caudill 1999)

2. **The American University in Cairo, New Cairo, Egypt.**

Figure3- 13The American University in Cairo, Egypt.(researcher)

For modern campuses in the new American University campus in Cairo, richness takes another picture, where differentiation to match with the Islamic style, moreover entrances to buildings are signified by double height arches with special colors as shown in figure which gives richness to the buildings.

3-4-4 Variety and unity.

With modern technology there will tend to be less variety in window and door types, and more uniformity in construction. The rugged informality of most future building sites will tend to offset this. In apparent contrast to variety a strong tradition of visual unity must be continued. Perhaps the fact that the variety is a consistent feature actually reinforces unity. Other unifying features will be in the use of materials, the vertical expression, consistent human scale and structural expression, and in the careful design of outdoor spaces and vistas which weave a thread of continuity throughout the campus. [1]

As shown in figure 3-11 an example of the pavilions' variety and unity which is:

Temasek Polytechnic institute, Singapore.

Temasek is considered a modern institute, however, thr designer used the contemporary construction and the geometrical pattern as well to contribute to variety and unity. Moreover the vistas and plazas used in landscape are arranged in a geometrical pattern matching with the pattern used in the whole campus.

[1] Caudill, Rowlett and Scott. *Campus design study.* Houston: U.S departement of education, 1999.

Figure3- 15The main horse shoe plaza in Temasek Polytechnic, Singapore. (departement 2007)

Figure3- 15Plazas and landscape in Temasek Polytechnic, Singapore. (departement 2007)

3-5 Part Three: Problems gambling main campuses in Egypt.

3-5-1 Case study: Cairo University, Giza, Egypt.

The overpopulation in cairo city is a major problem gambling the campuses planning, for the main campuses like Cairo University where the problem appears obviously, thus various elements apparently. That is clear where the student's residence is completely far from the campus, moreover the faculty of engineering is nearly a part of the Guiza Zoo, which is found on the other side of the main campus, creating an obvious separation to the students of engineering, as if that they are from a different town than those in the main campus. Thus the Cairo University campus loses the sense of the town.

Figure3- 16 Parameters of Cairo University.(Google earth)

3-5-1-1 Nodes in Cairo University.

As shown in figure the major and minor nodes in Cairo university, where major nodes are considered the main green areas of the campus where students are gathered. Thus the nodes have the following drawbacks,

1. They are not visually connected.

2. Students are majorly gathered by the node parameter because the nodes are green areas with spaces surrounding these areas, which are not appropriately sufficient for the students. See figure 3-17.

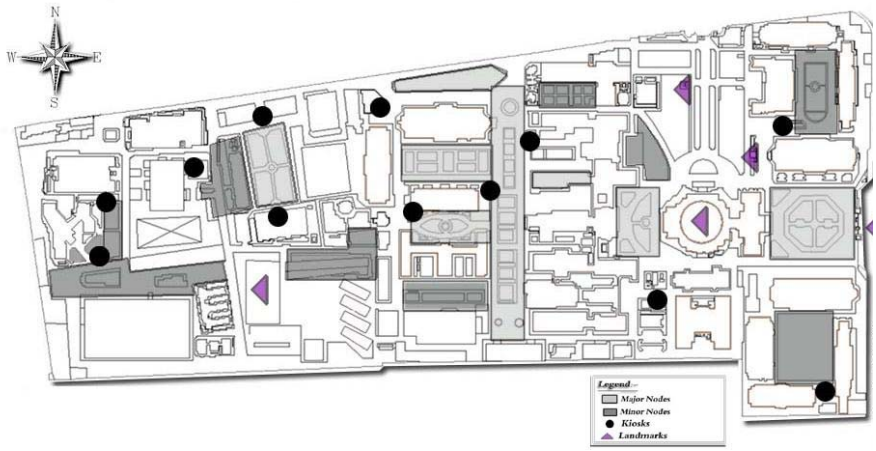


Figure3- 17 Major and minor nodes in the Cairo University campus (researcher).

3-5-1-2 Landmarks in Cairo University.

Figure3- 18 Landmarks in cairo university.

Landmarks in Cairo university are found at the beginning of the campus to be a key plan to the outsiders to signify the University as a historical and cultural resource, however the urban setting is obviously missing landmarks to the various plazas. As a result the campus becomes confusing to the new comers or visitors. The landmarks are the bell tower, the dome of the main conference hall and the main meeting hall. See figure3-18

3-5-1-3 Path ways and vehicles circulation in Cairo University.

The pathways in the campus is considered a network surrounding the open areas, except for the most commonly used, which is considered the main pathway. However it is not obviously clear; for the path is not perceptively clear and not signified by any elements.

For vehicles, the problem appears clearly as parking areas are not sufficient to all users, and parking areas are spreading along the parameters of the campus.

However that was not an appropriate solution to solve the population problem around the campus, and the numerous numbers of cars which need to park. See Figure3-19

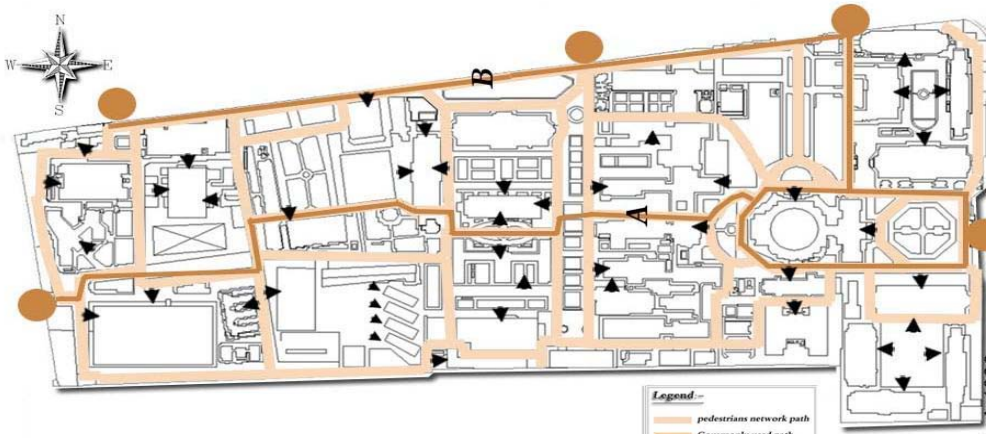


Figure3- 19 Pathways and gateways in Cairo University campus.

3-5-1-4 Open spaces in Cairo university campus.

The planning of the campus is considered a Collegiate planning which was common in the classical era when this campus was built. Thus the open spaces came compatible with the urban setting of the campus, however sitting and gathering areas for the students are not available enough, as the plaza is presented by a green area and students are supposed to be gathered around its parameters. See figure 3-20

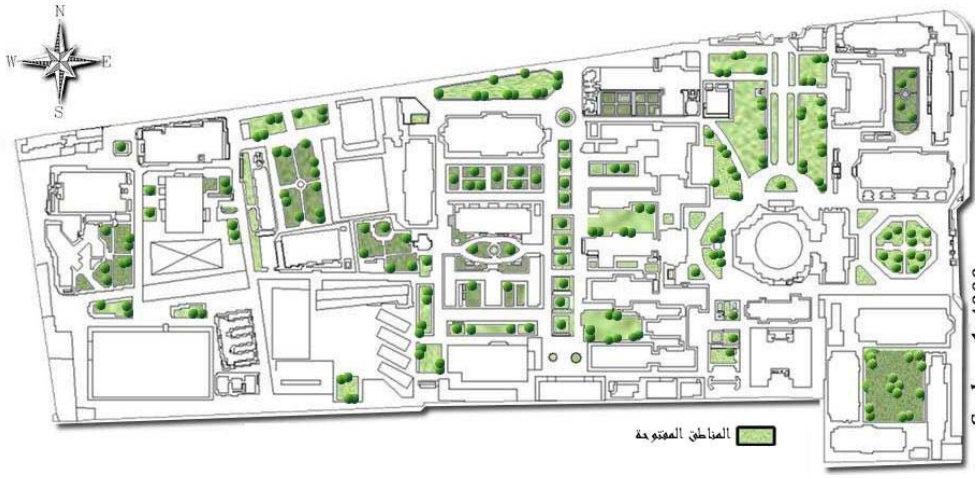


Figure3- 20 Open spaces and green areas in Cairo university campus.

3-5-1-5 Landscape in Cairo university campus.

Landscape as shown in figure is between hardscapes and softscapes which are used mainly in shading like "Ficus Nitida" in softscapes and Gazebos in hardscapes.

Figure3- 21 The Art's college plaza.

The figure shows the interaction between pedestrians and vehicles, and the existence of streets in a significant plaza in the campus, which is incompatible with the campus language.

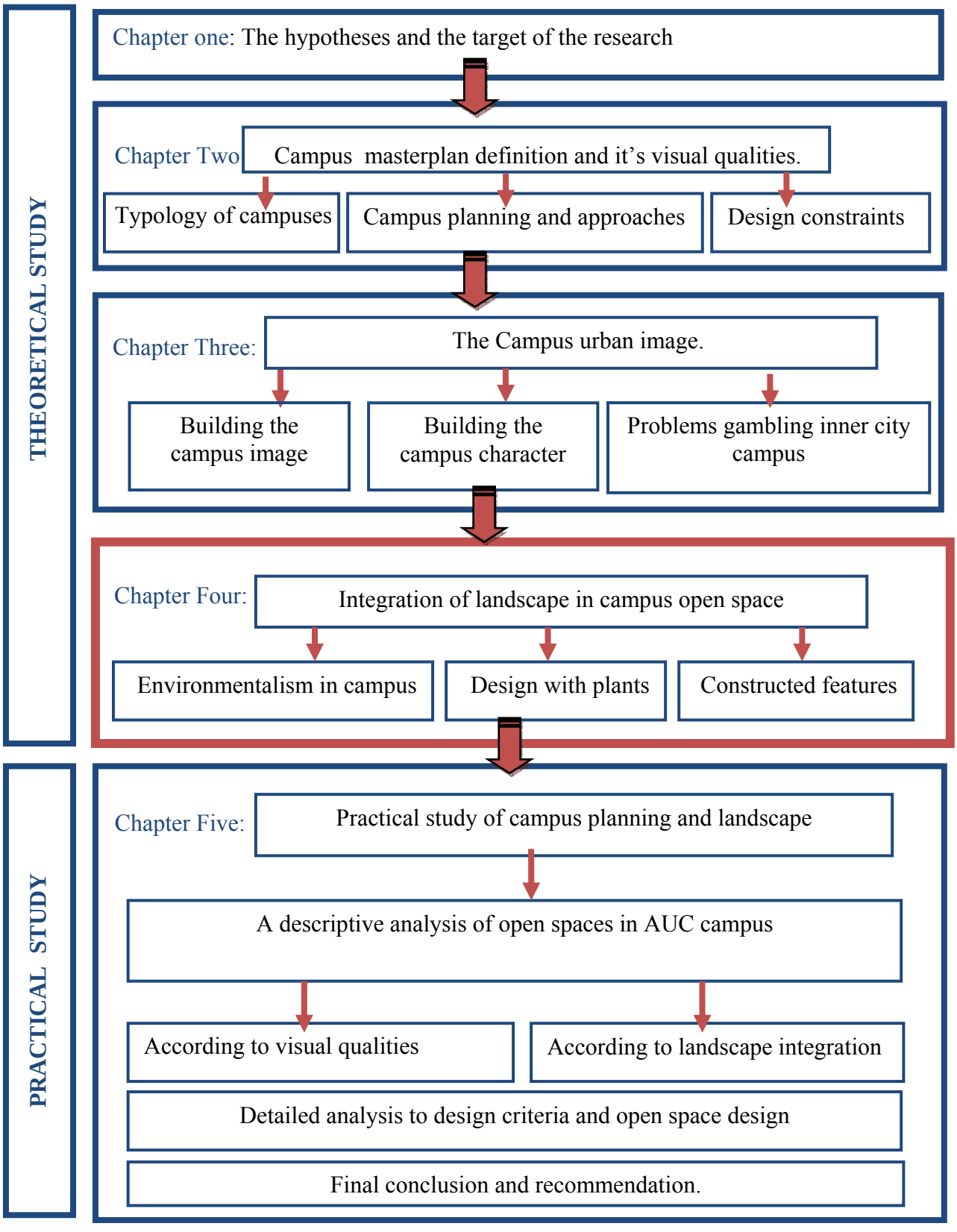
3-5-2 Conclusions of problem definition analysis.

There are obvious problems in planning of major campuses which appears in the practical study in Cairo university like,

1. The diversity of the main components of urban setting of the campus, which results in the students' separation. Thus the campus loses the sense of community.
2. The planning of Cairo university is a collegiate planning, but courtyards and nodes created are not visually connected and gathering areas are found in the nodes' parameters which are not appropriately sufficient for students.
3. Landmarks do not punctuate significant plazas. Thus the campus becomes confusing to new visitors.
4. Parking areas are not appropriately sufficient to the campus users.

Chapter Four

Chapter Four.
Integration of landscape in campus planning.



Chapter Four.
Integration of landscape in campus planning.

Part One: Integration of Softscape in Campuses.

4-1 Introduction

The campus landscape has significance at least as great as architectural design. The planted framework of many universities and the design of intimate spaces between is the means by which the disparate buildings of the typical university are united.[1]

4-2 The Architectural uses of plant material in space definition.

a. Creation of space.

A sense of space depends upon actual and implied enclosure created modifying the ground plane, vertical plane, and overhead plane both individually and collectively. Plant materials may be used in the landscape to influence each of these planes of enclosure. On the ground plane, groundcover or low shrubs may subtly imply spatial definition through variations in height and material. As illustrated in figure, the edge between a lawn area and a groundcover bed suggests the limits of a space without any physical barrier or alteration of views into and from the implied spaces.

b. Open space.

Using only low shrubs and groundcover as the spatial definers, one can create a space by implication that is open in all directions. Such a space is airy, outward oriented, lacks privacy, and is exposed to the sun and sky.[2]

c. Semiopen space.

Similar to a completely open space, a semiopen space is partially enclosed on one or more sides with taller plant materials acting as

[1]Booth, Norman K. *Basic Elements of Landscape Architectural Design.* London: Waveland Press, 1989.P71.
[2] Ibid.p.74

vertical walls blocking views into and out from the space. This spatial type possesses qualities similar to the completely open space but is less transparent while strongly oriented to the open sides. Such a space is often appropriate for a residential terrace where privacy is required in one direction but views are desired in another.

d. Canopied space.

Using a mass of shade trees with a dense canopy, one can create a space that is enclosed overhead and open to the sides. Overall, this space has a feeling of breadth sandwiched between the overhead plane of the tree canopy and the ground plane for a person moving and among tree trunks. a canopied space also establishes a strong sense of vertical space by capping the spatial height. Architecturally this type of space is often experienced when standing in an open ground floor of a building or in a parking garage that has open sides. [1]

e. Enclosed canopied space.

This space has the same characteristics as the canopied space just explained, but a major difference is that it is enclosed on the side with space, typical of that found in wooded forest conditions, is quite dark and oriented in upon itself, providing feelings of privacy and isolation.

f. Vertical space.

Using tall, narrow plant materials, one can create an outdoor space that is vertical in orientation and open to the sky as depicted. Depending upon how much emphasis is desired on this upward movement, the space can be either open or enclosed to the sides.

This vertical space is much like the gothic cathedral pushing one's attention towards the sky.[2]

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[1] Booth, Norman K. *Basic Elements of Landscape Architectural Design.* London: Waveland Press, 1989.P.75

[2] IbidP76

4-3 The Architectural uses of plant material in space design.

4-3-1Closure

this term describes the completion of a special enclosure that has been almost, but not quite articulated by a building on enclosing wall.

A space surrounded by a building or wall on two or three sides can use vegetation for "closure" or completion of the space on its other open size.[1] See figure4-1.

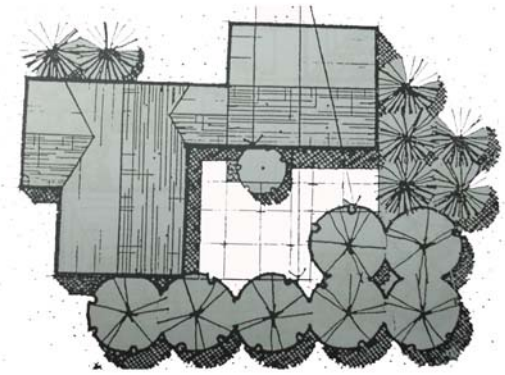

Figure4- 1 Closure. (Booth 1989)

4-3-2 Linkage.

this term lies to plant materials that finish the delineation of an outdoor space by visually connecting otherwise separate elements in the landscape like closure; linkage with plant materials fulfills the special definition partially suggested by the other elements by providing more enclosure than that given only by the separate elements. Linkage can occur by massing plant materials in linear manner between the initially isolated elements, thereby visually tying them together and finishing the special enclosure. Masses of trees and shrubs can be used to create a special enclosure. [2]See figure4-2.

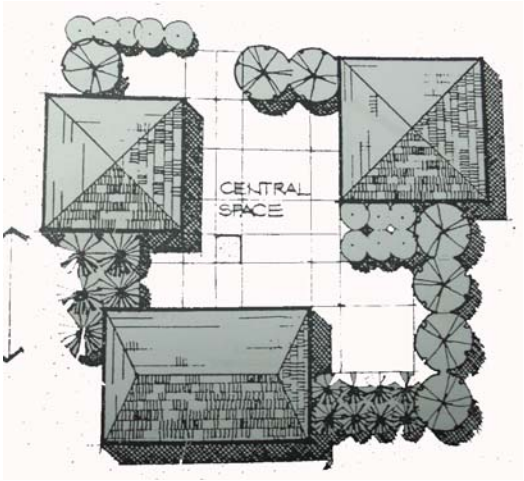

Figure4- 2 Linkage. (Booth 1989)

[1]Booth, Norman K. *Basic Elements of Landscape Architectural Design.* London: Waveland Press, 1989.p.77.
[2] Ibid p.83

4-3-3 Screening

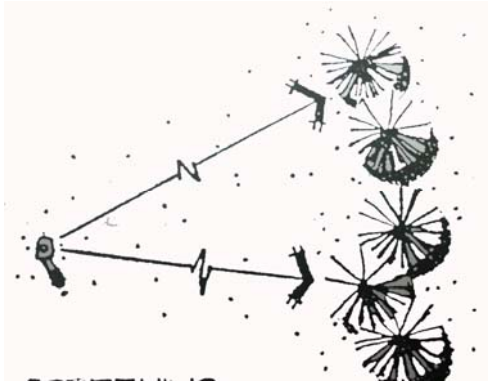

Figure4- 3 Screening. (Booth 1989)

Screening in the creation of outdoor space is one architectural use of plant materials another is to conceal unattractive objects or scenes in the environment. Plant materials as vertical barriers can control views so that desirable points in the landscape are observed while ugly points are blocked there are degrees of screening may be objects are completely opaque when totally screening the view, or it may be with varies degrees of transparency to provide partially screening . To establish an effective vegetative screening, one needs to analyze the points, from which the viewer will be looking, the height of the unattractive element the distance between the viewers and the slightly unattractive element and the land form configuration.[1] See figure4-3.

4-3-4 Privacy control.

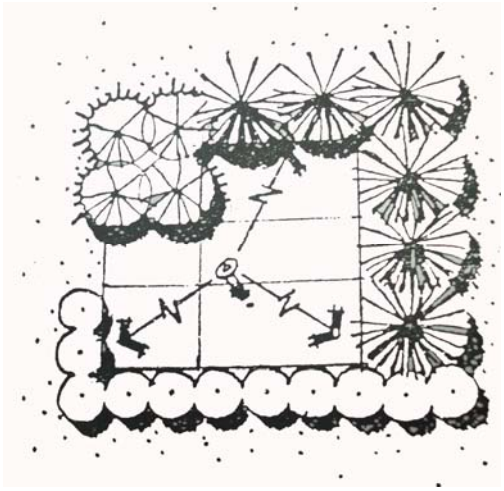

Figure4- 4 Privacy control (Booth 1989)

Somewhat similar to screening is the use of plant materials for privacy control . Privacy control is the technique of encircling a well defined area with plants of such a height that views into and from the space is prevented. The purpose of privacy control is to isolate the space from its surroundings thus the subtle difference between privacy control and screening is that the former in compasses and segregates a space, thereby blocking all views while screening is the judicious placement of parries stopping only selected views.

[1]Booth, Norman K. Basic Elements of Landscape Architectural Design. London: Waveland Press, 1989.

4-4 Visual plant characteristics

Plant size, form, color and texture together with compositional arrangement and relationship to the surroundings are all factors affecting the aesthetic quality of a design.

4-4-1 Plant size

Plant size affects directly the scale of a space, compositional interest, and the overall framework of a design plant materials can be categorized according to the following sizes.

4-4-1-1 Large and intermediate trees.

The most significant plants are large trees which act as spatial points to the space. Large trees grow 12m tall or more at maturity, while intermediate trees have a maximum height of 9-12m .

This category of plant material is dominant visual elements because of their height and mass.[1]

4-4-1-1-A How to Select a Tree

To select a tree, consider the following factors.

a. **Available space.** The location you choose for each tree should have enough space to allow for growth without severe pruning. Check for obstructions of buildings, overhead utility lines and tall fences. If lateral space is limited, select a tree that has a narrow, upright growth habit. Refer to height, branch spread and shape in the tree list shown in Table 4-1.
b. **Soil conditions.** Most trees perform best in well-drained soil. If you have compacted soil that is hard to work, loosen the soil and mix in organic material to a depth of at least 12 inches before planting your tree.[2]

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[1]Anderson, Rick. *rhythm-in-landscape-design.* june 8, 2006. http://whisperingcraneinstitute.blogspot.com/2006/06/rhythm-in-landscape-design.html (accessed september 7, 2009).

[2] Wilson, by J.E. Klett and C. *Garden.* January 4, 2009. http://www.ext.colostate.edu.html (accessed December 12, 2009).

c. **Irrigation lines.** If there are an underground irrigation system, plant trees to allow for the tree trunk and basal root flare to expand without encroaching on an irrigation pipe. Otherwise, tree roots may eventually compress the pipe and shut off the irrigation line.

d. **Growth rates vs. brittleness.** As a general rule, fast-growing trees tend to be brittle and can be damaged by limb breakage in storms. Plant these trees away from buildings, sidewalks, driveways and utility lines.

e. **Water requirements.** Trees vary in water requirements. Trees should not be planted that have low water needs in heavily irrigated lawn areas or at the bottom of slopes. Plant trees with high water requirements in locations where supplemental watering is possible and desired. In dry years, fall and winter watering is critical to the health of trees. Trees under drought stress are more susceptible to insect and diseases.

f. **Large Trees for Shade**

Table 4-1 includes trees that will exceed 30 feet in height when fully grown. These trees should not be placed under or near power lines or other overhead structures. Use one-half of branch spread (diameter) indicated below to determine distance from structures.[1]

4-4-1-1-B Description of Tree Shapes

The following tree shapes describe the general outline of the trees in the accompanying tree list. Use this chart in combination with height and branch spread to determine proper location of trees and ensure adequate clearance from obstacles.[2]

[1] Anderson, Rick. *rhythm-in-landscape-design.* june 8, 2006. http://whisperingcraneinstitute.blogspot.com/2006/06/rhythm-in-landscape-design.html (accessed september 7, 2009).

[2] Wilson, by J.E. Klett and C. *Garden.* January 4, 2009. http://www.ext.colostate.edu.html (accessed December 12, 2009).

Tree shape	Description
	**Columnar.** Sides more or less parallel, much more tall than broad.
	**Conical.** Cone-shaped. Broad at base, tapering to a narrow top.
	**Elliptical.** More than broad, widest branching at or near the middle.
	**Round or globe.** About as broad as tall.
	**Broad spreading.** A wide vase shape.
	**Upright spreading.** A narrow vase shape.
	**Weeping.** Branches tend to weep downward.

Table4- 1 Typology and description of trees. (Anderson 2006)

4-4-2 Geometry of trees.

4-4-2-1 Relation to sidewalks.

An urban sidewalk without trees is like a building without a roof. Even if the tree had no functional value, such as providing shade, they would be useful to give a sense of scale. The street side near the curb is the best location for trees along sidewalks. This is one of the few purely aesthetic judgments that should become a rule in most urban situations.

It is commonly recommended that were buildings are set back far enough from the street, shade trees should be planted only on the side of the walk away from the street . This does serious harm to the street aesthetics whether or not there are above ground utility lines. [1]

As the tree spacing that gives more emphasis on space. Using collectively, trees produce a more open, translucent canopy that greatly improves visual continuity.

The most obvious benefit of planting trees close to the curb is their effect on the overall street scale. by extending the branch canopy over the street the immensity of the right - of - way is reduced . where streets are over 40 feet wide additional rows of trees are needed to satisfy the urban scale requirement before the trees are near full size . The principle of planting trees close to curb is applicable to all types of streets . when the trees reach maturity, the effect is more spectacular .[2]

4-4-2-2 Criteria of locating urban trees

There are four criteria that should be applied when locating urban trees.

They are as follows in order of importance :

1. Direct sunlight for tree growth.
2. Aesthetic improvement to the urban environment.
3. Circulation.
4. Obstructions below and above grade.

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[1] Arnold, Henry F. *Trees in urban design.* New York: Van Nestron Reinhold, 1972.P34

[2] Ibid.P38

a. Direct sunlight.

Trees growing anywhere should have a minimum of three to four hours of direct sunlight each day of the growing season to remain healthy.

Tree leaves are capable of utilizing up to 25 percent of the direct sunlight that falls on them. A tree can be kept alive by harnessing as little as three percent of the direct sunlight that is normally available to it. From these generalized facts, we can analyze urban walkways conditions in relation to building heights and hours so summer sunlight and arrive at some guidelines for locating trees and designing cities.

The path orientation plays an important part in determining where trees should be planted in relation to building height. Because of local variations in building type and difference in latitude, this needs to be examined for each particular city . Figure 4-5 shows the ramifications of available sunlight on urban space with four story buildings street trees at the latitude of Philadelphia, Denver, and Salt Lake City.[1]

[1]Arnold, Henry F. *Trees in urban design.* New York: Van Nestron Reinhold, 1972. P36

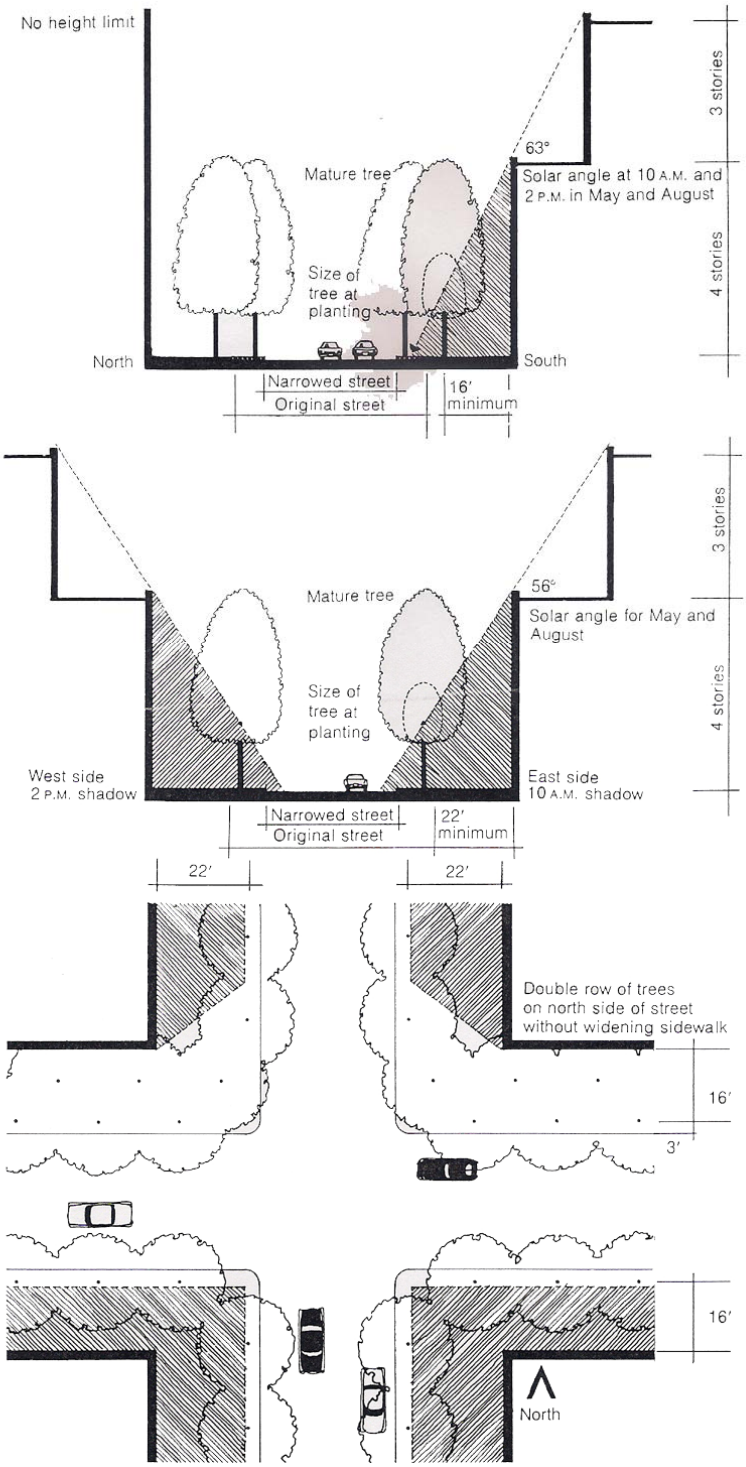

Figure4- 5 The effect of sunlight on urban trees within different heights .(Wilson 2009)

b. Aesthetics.

Where street trees are planted closely enough together to form a continuous arched canopy, visual unity is achieved, spatially reinforced by the resulting uninterrupted quality of light and shade. If trees are spaced too far wider spacing is to produce an interrupted pattern of contrasting light and shade that emphasizes each individual tree. In most urban situations, it is difficult to achieve a uniform spacing of tree trunks . the discontinuities in spacing.[1]

The architecture of the urban space creates an interlocking pattern of rhythms experienced by the pedestrian as he moves along the walkway. By locating trees so that they extend, reflect, or magnify these patterns, the street gains in coherence. By recognizing column spacings and duplicating their rhythms with trees, a living arcade is formed that extends the internal spaces beyond the building walls. Where the tree patterns were planned as part of the building design, this pleasing sense of spatial unity is amplified. Occasionally we come upon a street such as the one in Cleveland, where the trees echo a building colonnade to create a sense of continuity along the walkway.[2]

Figure4- 6 Arrangement of trees according to side archades and interlocking ground. (Arnold 1972)

[1]Trowbridge, Peter J. *Trees in the urban landscape.* New Jersey: John Wiley & Sons, 2004.P.119

[2]Arnold, Henry F. *Trees in urban design.* New York: Van Nestron Reinhold, 1972.P39

c. Circulation.

By planting close to the street curb in a continuous row at proper intervals, trees form a space frame branches that establish a pedestrian a pedestrian scale between street and buildings. This perceived as an extension of the building space— a kind of outdoor gallery. In perspective the trunks make a vertical screen along the street that reinforces the sidewalk space. If the trees were planted in single row on the opposite side of the walk, they would visually give more space to the motorist creating a less hospitable place to walk.

Traffic sight distance at intersections will not be impeded by tree trunks arranged to allow the driver of a vehicle a 75 foot view in both directions. At drive- way exits, trees along the street should be located far enough from the driveway to allow a driver to see at least 50 feet in both directions before entering the street.[1]

d. Obstructions.

Below grade utilities or structures may eliminate choice tree locations if street trees are not part of the planning criteria. Where utility lines are less than three feet deep, it is usually desirable to keep trees away from the space directly over the lines for future accessibility. However, trees can grow in soil lees than to feet deep, providing there is sufficient soil volume. Tree roots do not damage properly installed utility lines. Where utilities are in vaults, there should be a provision for a three foot soil depth and at least 200 square feet of soil area per tree dwarf trees, including shade trees in post. Are not fit the answer to above or below ground utilities because they do not fit the scale requirements for public urban spaces. Nor are small trees adapted to narrow spaces, while large trees cover and contain the space. Large deciduous trees adapt to a narrow space by producing a higher-branched, less dense crown that reinforces rather than interrupts the space.[2]

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[1]Arnold, Henry F. *Trees in urban design.* New York: Van Nestron Reinhold, 1972.P39

[2] IbidP40

4-4-2-3 Arrangement of trees

The thoroughness with which the principle of Euclidean geometry have been disavowed in our time for arranging trees is illustrated by a recurring attitude about straight lines, or any clearly geometric arrangement of trees. The admonition to avoid "rigid" lines of trees has become a cliché. [1]

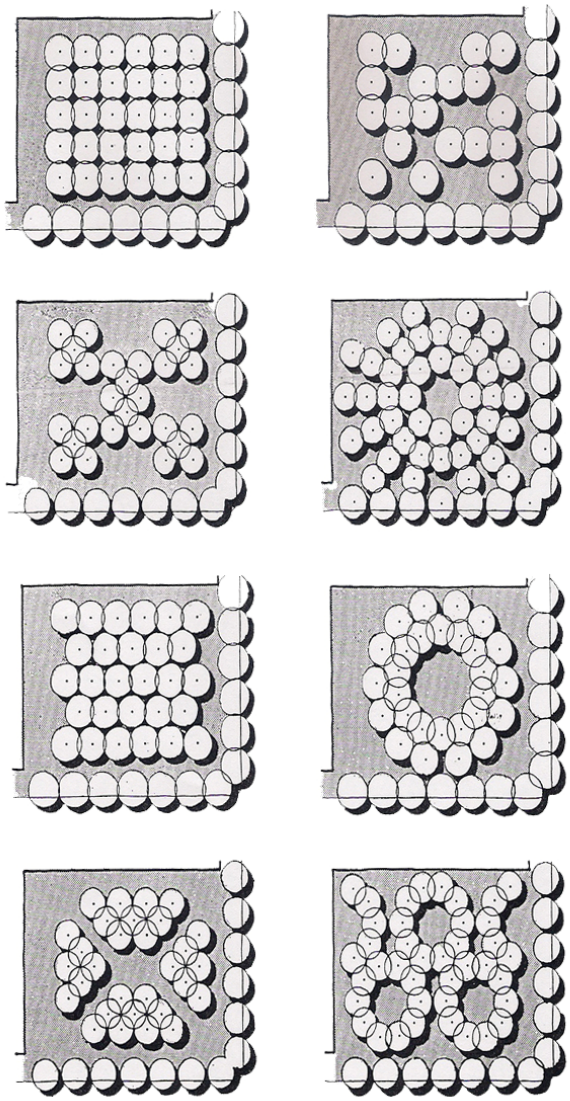

Figure4- 7 Arrangement of trees geometrically. (Wilson 2009)

Proponents of naturalistic landscapes speak of free flowing lines in nature as if the wilderness were an English garden composed more of sinuous curves than jagged edges. Even if regularly spaced trees in straight lines extended on an

[1] Trowbridge, Peter J. *Trees in the urban landscape.* New Jersey: John Wiley & Sons, 2004.P121

exact rectangular grid throughout an entire city, the effect would be no more "rigid" than the sky or forest or ocean.

4-4-2-3-A Pattern

Every tree has a different form and pattern making every segment in every line different. Though we are accustomed to making an arbitrary association between randomness and curves in two dimensional plan drawings, it is clear from looking at trees in perspective that we do not see them in this way. No matter how trees are arranged, we see straight lines and can construct only rows of trees in our memory-vision. The two perspective views of twenty trees in regular and irregular arrangements demonstrate this.[1]

The principal difference between the two views is the regularity in intervals between trees seen down the rows. When we move through the two arrangements, the difference is more dramatic. In the one with randomly spaced trees, regular movement produces an erratic and completely nonrhythmic visual impression. In the regular tree arrangement, the tree rows come to life creating a continuous and gradually changing view with rhythmic intervals.

4-4-2-3-B Rhythm.

It is this rhythmic order, expressed everywhere in art, that is lacking in random arrangement. Urban design depends on many of the same organizing principles as poetry., painting, and music. The intervals between the trees can be used as a metrical device reflecting the speed of movement through Urban spaces. In this way, purposeful tree spacing gives scale and rhythm. In urban situations, we need strong organizing devices such as these to surmount the prevailing confusion. Small subtle design ideas can easily be swallowed up in the urban visual turmoil.

[1]Trowbridge, Peter J. *Trees in the urban landscape.* New Jersey: John Wiley & Sons, 2004.P131

Arranging trees in random patterns in urban spaces creates disorder that is neither expressive of the intrinsic urban geometry nor like undisturbed nature. Deliberate randomization to produce a " natural" effect reflects a profound misunderstanding of natural order.[1]

4-4-2-4 Spatial opportunities.

The possibilities for spatial composition with trees remain almost unexplored. The experience of moving through geometric groves of trees makes the forest seem dull because the natural organization of trees is so much more subtle. Trees provide an opportunity to create exciting urban compositions combining the art of architecture at the scale of the city.

Trees organize spaces in two distinctly different ways-horizontally and vertically. Horizontally they do it by visually enclosing, completing or defining an area of open space. Vertically they define space by creating an airy ceiling of branches. Filling a space with trees actually means covering the area with a canopy of branches and leaves.[2]

4-4-2-4-A Horizontal enclosure.

Creating an horizontal enclosure with trees is different from using architectural building materials. Unlike the solid enclosure of a building, it depends on visual suggestion and illusion. When viewing a space from the ground, there is a feeling of enclosure when the surroundings are tall enough to intercept our entire cone of vision. A convenient rule of thumb is that the observer should not be further away from the defining edge than three times the enclosure height. To create a complete sense of enclosure with 50 foot tall trees, an observer in the space should not be more than 150 feet away from the defining tree line.

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[1]Trowbridge, Peter J. *Trees in the urban landscape.* New Jersey: John Wiley & Sons, 2004.P132

[2] Ibid.P134

4-4-2-4-B Vertical enclosure.

The vertical definition of space with trees is important where tall buildings can create an intimidating scale for pedestrians. Street trees, colonnades of trees, and tree covered squares each contribute in this way. The ever-changing translucent canopy of leaves and branches allows for a simultaneous experience of the smaller space within the larger volume. In this sense, trees are more valuable than a building arcade for reducing the overwhelming scale of large structures. They function as an arcade with skylights, provide filtered light to seasonally appropriate intensity, lend a sense of protection, and give rich detail to the space. [1]

Figure4- 8 Trees define space both vertically and horizontally. (Trowbridge 2004).

[1]Trowbridge, Peter J. *Trees in the urban landscape.* New Jersey: John Wiley & Sons, 2004. P134

4-4-2-4-C Spatial Patterns.

The employment of trees is of course not limited to creating these simple forms of enclosure. However in most urban contexts, trees in straight lines, circles, and rectangles are appropriate because they echo the city and fit comfortably within the man-made geometry of circulation and structure.

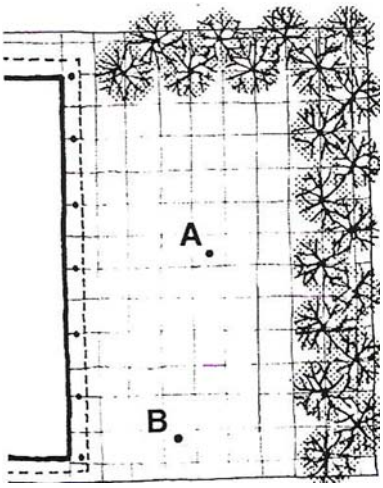

Figure4- 9 Spatial pattern. (A) observes the space more than (B). (Trowbridge 2004)

Some range of different size spaces. The trees would always provide & transition to a comfortable human scale. It is, of course possible to arrange trees patterns that satisfy predetermined mathematical criteria.

If a designer were ask to arrange of different size spaces. The trees would always provide a transition to a comfortable human scale. It is, of course, possible to arrange trees in patterns that satisfy predetermined mathematical criteria. If a designer were asked to arrange 16 trees in 15 rows, for example, the pattern shown in figure 4-9 is one solution to fit a predetermined set of conditions. Both this arrangement and the one shown in figure 4-40 are solutions to this type of mathematical problem. (Gardner) A practical application of these problems based on geometric criteria would be in the layout of a building courtyard where the architecture and planting are designed together, and to building structure suggest the tree location. The science of chaos has opened up an exciting potential for design. Fractal geometry provides a wide range of possibilities for developing a more subtle and sensuous geometry.

Figure4- 10 The space enclosure. (Trowbridge 2004)

4-4-2 Small trees and ornamentals.

Moving down the scale of plant size, we define small trees and ornamentals as trees that-grow to a maximum height of 15 (4.5m) to 20 ft (6m). European olive (Olea eurQaen), mesquite (Prosopis sp.), Cornehan cherry (Cornus mas) that has been limbed up, and fringe tree (Chionanthus virginnicus). Ornamental trees include such plants as crab apple (Males sp.), flowering dogwood (Cornus florida), and Canadian redbud (Cercis canadensis). Like large and intermediate trees, small trees and ornamentals have a number of potential uses in landscape[1]. See figure 4-11.

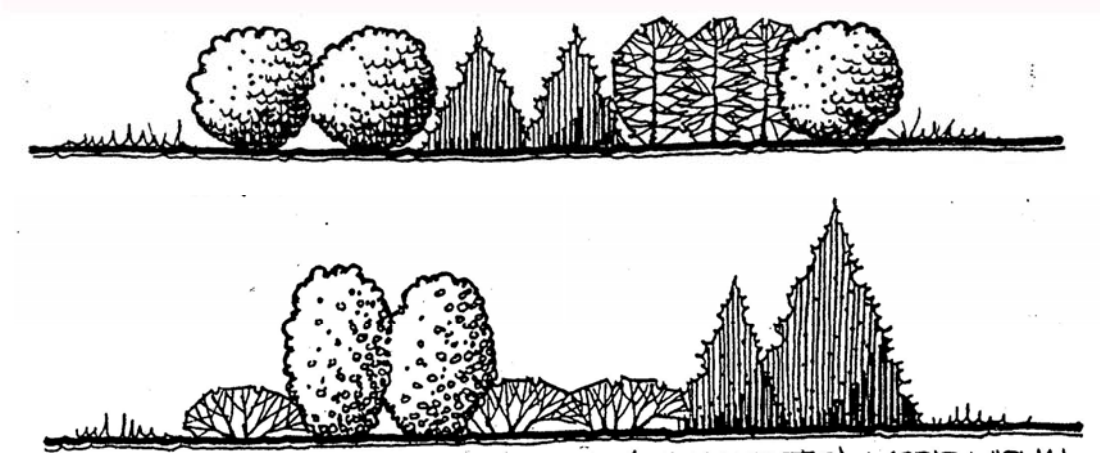

Figure4- 11 Different sizes affects the visual interest. (Booth 1989)

[1] Anderson, Rick. *rhythm-in-landscape-design.* june 8, 2006. http://whisperingcraneinstitute.blogspot.com/2006/06/rhythm-in-landscape-design.html (accessed september 7, 2009).

4-4-2-1 Small trees and ornamentals in space definition.

Small trees may define space in both the vertical and overhead planes. Depending on canopy height, small trees can imply spatial edges, in the vertical plane with their trunk or they can completely enclose space in the vertical plane if their canopy mass extends below eye level. When views are afforded through the trunks and lower branches of small trees, they may behave as a semi transparent foreground and thus give a greater sense of depth to the space one is looking into.

Overhead, the canopy of a small tree can establish the ceiling of an outdoor space that is often intimate in feeling. In some cases, the canopy may be so low as to prevent a person from walking beneath the tree. In all situations, small trees and ornamentals are appropriately used in small-scale spaces where area is limited and/or the designer desires to create a comfortably scaled spatial quality.[1]

4-4-2-2 Small trees and ornamentals in visual and compositional accents.

Small trees and ornamentals may serve as visual and compositional accents, as shown in Figures 4-12.This may result from & size_ contrast with lower plant material or from distinct form, flowers, and fruit in the case of ornamentals.

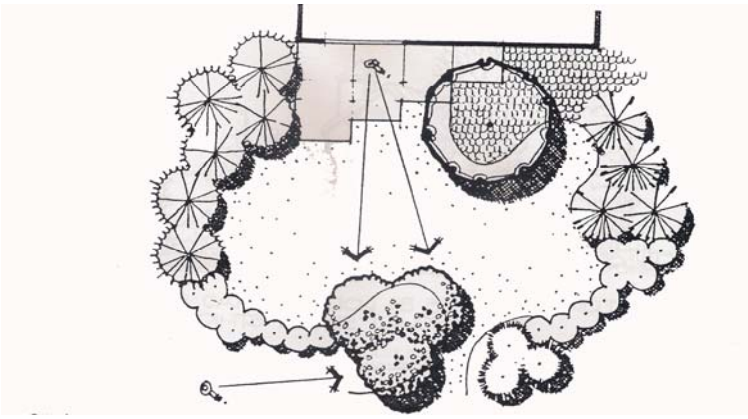

Figure4- 12 Small trees and ornamentals may serve as visual and compositional accents. (Booth 1989)

[1] Booth, Norman K. *Basic Elements of Landscape Architectural Design.* London: Waveland Press, 1989.P90

Ornamental trees are locally used as focal points in places where the landscape architect desires to attract attention (near an entrance, at the terminus to a space, on a projecting point, etc.) Ornamentals may be used at the end of a linear space like a piece of sculpture or abstract sign, as in Figure 4-12, to lead and draw people through the space. Used sequentially, ornamentals can lead a person from one space to another and then on to the next.

Smaller plant materials provide detail at a more personalized scale within the overall framework established by the larger trees. On small sites, caution should be exercised not to overuse large trees, as they are apt to overwhelm the scale of the design and the smaller elements within it.[1]

4-4-3 Tall shrubs

The next category of plant materials by size is tall shrubs, plants that grown to a maximum height of 10 (3m) to15 ft (4.5m). In comparison with small trees, tall shrubs are not only slightly shorter but are also distinguished by the lack of a canopy. Typically, the foliage mass of a shrub extends to or almost to, the ground while that of a small tree is located some distance above of the ground, forming a canopy _or _ceilings over_ an area. Although this difference is helpful in category

4-4-3-1 Tall shrubs in spatial enclosure.

Tall shrubs can be used in the landscape like walls to furnish spatial enclosure in the vertical plane. A space defined by only tall shrubs is contained on its sides but open above as illustrated in Figure 4-13. Thus the feeling of such a space is apt to be light and sunny with a strong orientation upward to the sky. Tall shrubs may also create strong corridor like.

[1]Booth, Norman K. *Basic Elements of Landscape Architectural Design.* London: Waveland Press, 1989.P92

Ornamental trees may simply be used in a design for their visual interest. Many ornamentals have four different seasons of attraction based on habit of growth, spring flowers, summer foliage, autumn color, and winter arching habit. [1]

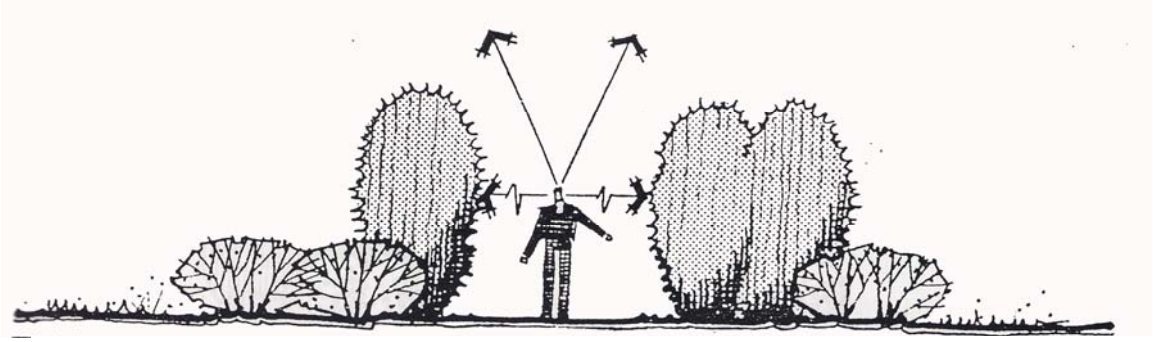

Figure4- 13 Tall shrubs and enclosing spaces. (Booth 1989)

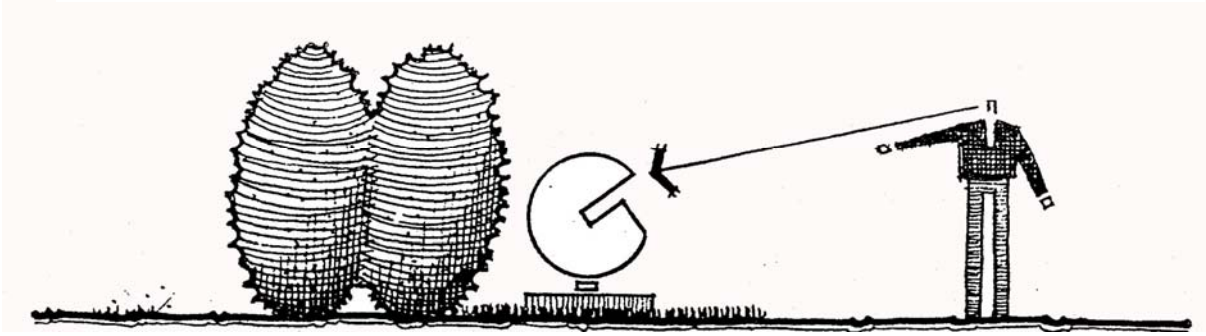

Figure4- 14 Tall shrubs serve as a background to an accent in the foreground. (Booth 1989)

4-4-4 Intermediate shrubs.

This category represents those plant materials between 3 (1m) and 6 ft (2m) tall. They may also be any shape, color, or texture. Again, their foliage mass usually extends tends to the ground or just slightly above it. Intermediate-sized.

Rising plants by size, it is not always so clear in actuality, especially when many tall shrubs can be "limbed up icy create a floating canopy. Nevertheless, the distinction is made here between tall shrubs and small trees for ease of understanding. Some functions of tall shrubs in the outdoor environment.[2]

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[1]Booth, Norman K. *Basic Elements of Landscape Architectural Design.* London: Waveland Press, 1989.P93

[2] Anderson, Rick. *rhythm-in-landscape-design.* june 8, 2006. http://whisperingcraneinstitute.blogspot.com/2006/06/rhythm-in-landscape-design.html (accessed september 7, 2009).

4-4-5 Low shrubs

Low shrubs are the next smaller plant category in the hierarchy of plant sizes. Low shrubs are 3 ft (l m) or fewer in mature height. However, low shrubs are usually thought of as being taller than 1 ft because plants below this height.

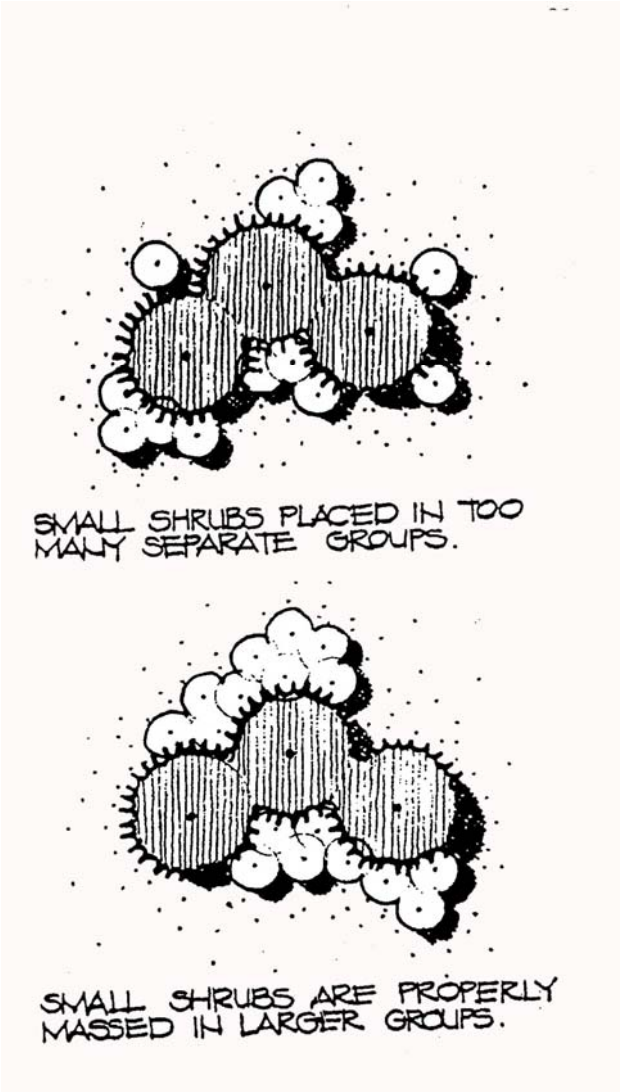

Figure4- 15 Location of low shrubs. (Booth 1989)

4-4-5-1 Low shrubs and space definition

1. Low shrubs may define space or separate spaces without inhibiting views into or from them. Because low shrubs lack significant height, they articulate Space more 6y implication than by actual physical enclosure. Thus a space that need to be open to the sides can be defined in the vertical plane with low shrubs. A related function is the use of low shrubs along a walk or path to contain pedestrians on the walk without affecting their line of vision.[1]

2. Low shrubs can be used compositionally to connect other unrelated elements visually. They do this, however, somewhat differently from ground cover. Ground cover can visually relate other elements by serving as a common base plane on which the unrelated parts are placed, whereas low shrubs function as vertical connectors similar to a low wall, as shown in Figure4-15.

[1] Booth, Norman K. *Basic Elements of Landscape Architectural Design.* London: Waveland Press, 1989.

Therefore low shrubs act as stronger visual links between elements in a composition when viewed from normal eye level.[1]

4-4-6 Ground cover.

The smallest plant category by size is ground cover. The term "ground cover" is used to describe any low or spreading plant material that reaches a maximum height 0- 6 (15 cm) to 12 in (30 an noun cover is found with a variety to characteristics, from flowering to non. And form woody to herbaceous. Examples of ground cover include English ivy (Hedera helix). myrtle Vinca minor), pachysandra (Pachysanra terminalis), and common ice plant (Carpobrotus edulis) . Ground cover can be thought of as the vegetative. “rug” or floor material of an outdoor space and such has a number of function

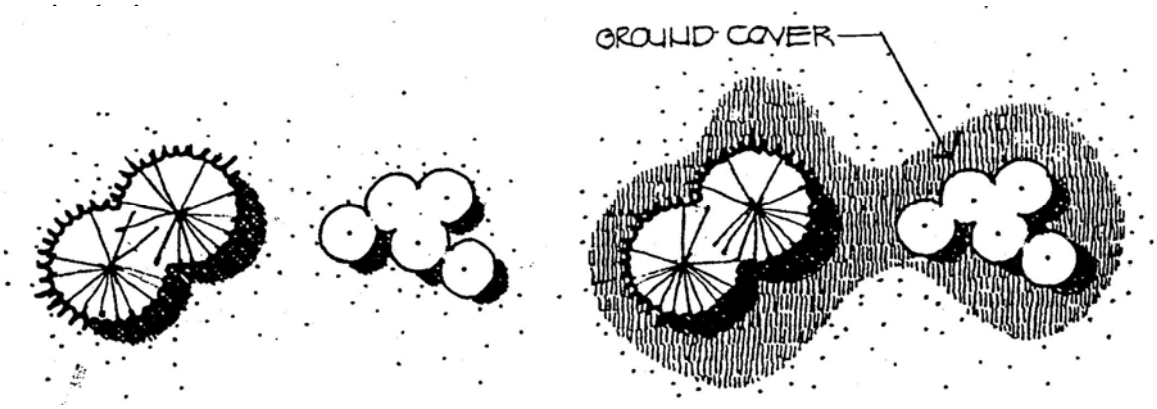

Figure4- 16 Functionality of groundcovers. (Booth 1989)

4-4-6-1 Functionality of Ground cover.

Different from the function just described is the use of ground cover to establish a uniform, neutral background or setting for other more obvious elements or focal points. An example of this is a bed of ground cover beneath a piece of sculpture or eye-catching ornamental tree. To serve as a neutral set-

[1] Anderson, Rick. *rhythm-in-landscape-design.* june 8, 2006. http://whisperingcraneinstitute.blogspot.com/2006/06/rhythm-in-landscape-design.html (accessed september 7, 2009).

ting, the area of ground cover must be large enough to eliminate the visual interference of nearby elements.

As previously mentioned, another design application of ground cover is to link together visually otherwise separate elements or groups of elements into a unified whole. It can function as a common element relating to all the various parts of a composition. As shown in Figure4-17 groups of unrelated shrubs or trees can be made to be part of the same composition by a ground cover bed that interconnects all plants into one common area on the ground plane. This is a common technique for "border planting" around the outside of an open lawn area[1].

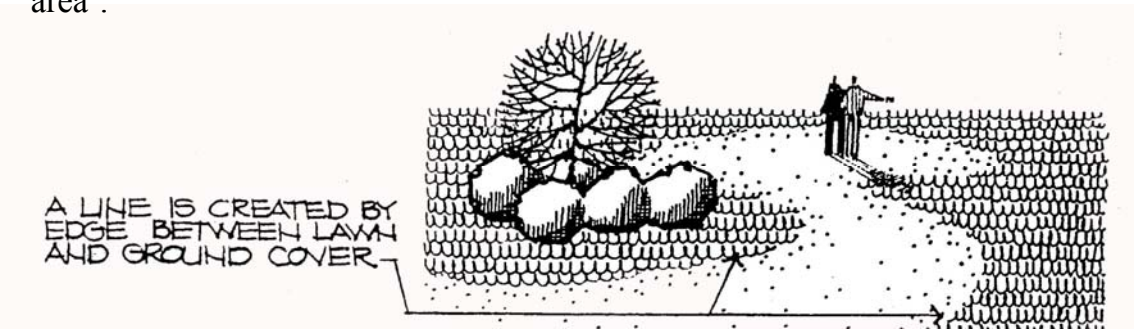

Figure4- 17 Creation of visual lines by using groundcovers. (Booth 1989)

4-5 Case study: Ohio University-Zenesville masterplan,Ohio,USA.

The campus plan showcases and unifies the campus through landscape elements, alignment of vehicular routes and addition of more functional spaces.

1. Street trees enhance character, lined by evergreen large trees for natural shading.
2. Central gathering area. Surrounded by deciduous trees and intermediate shrubs to signify the zone

Figure4- 18 Ohio University-Zenesville masterplan,Ohio,USA. (Marinelli 2007)

[1]Anderson, Rick. *rhythm-in-landscape-design.* june 8, 2006. http://whisperingcraneinstitute.blogspot.com/2006/06/rhythm-in-landscape-design.html (accessed september 7, 2009).

3. Conversion of parking area to landscaped green space enhances the quad's utility and brings better sense of balance to area
4. Addition of interior parking lot trees provide shade and enhance continuity with common quad alignment of access road separates parking traffic from pedestrians
5. Amphitheater with vegetation backdrop, provides gathering space for events, terminus for entry drive
6. Split alignment of entry enhances arrival character, directs traffic and relates to Herrold Hall (main conference hall).
7. alignment of pedestrian path by deciduous trees to allow sitting by decks.
8. Tree mass mitigates powerful winds which is place facing the powerful wind direction.
9. Addition of turn lane minimizes disruption by using masses of large trees.
10. Perforations in tree mass allow views to campus interior .
11. Passive Park parking, lined by evergreen trees for shading. [1]

[1] *Zanesville Campus Master Plan.* 2007. www.zanesville.ohiou.edu (accessed december 12, 2009).

4-6 Part Two : Integration of Hardscapes in campuses.

Hardscape, or "hardscaping" consists of the inanimate elements of landscaping, especially any masonry work or woodwork. For instance, stone walls, concrete or brick patios, tile paths, wooden decks and wooden arbors would all be considered part of the hardscape. But by extension, anything used in landscaping that is not part of the softscape can be considered a hardscape element.[1]

4-6-1Paving

Small paving units, such as bricks, tiles, block paving and setts, create an attractive, richly textured look, and allow you to pave small or awkward shapes more easily. However, the cost of laying a mass of small units will certainly be higher than using larger paving slabs.[2]

4-6-1-1Small pavers for patterning

Small pavers are perfect for creating surfacing patterns. Whereas with large paving slabs there is the expense of cutting them, small pavers can be combined to interlock in many ways, and different arrangements create distinctive effects that alter the look of a space. Static, densely patterned designs will hold the eye within the site, while dynamic, strong, linear patterns will create movement and lead the eye through the space to a visual conclusion.

Granite setts may be laid in lines, circles or fan-tail patterns. Frost-proof bricks may be laid face down, on edge to reveal a side, or they may be cut to interlock and create a variety of paving patterns. Over wide areas, particularly when using richly coloured bricks, remember that simple patterns work best. [3]See table4-2.

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[1] Beaulieu, David. *Hardscape.* March 2008. http://landscaping.about.com (accessed November 26, 2009).

[2]Brookes, John. *Garden design.* London: Alfred A. Knopf, 2003.P140

[3] Ibid.P142

	Type of paving	Figure of paving	Description
1	**Blue bridled pavers**		These bricks are laid out in stock bond, for a sharp, modern look.
2	**Multi-coloured pavers**		The rough, informal look of these clay pavers suits the random feel of the herring-bone pattern.
3	**Pressed concrete pavers**		Blue in colour, these pavers have a chamfered edge. While to me, concrete pavers lack the earthiness of a clay paver in a domestic setting, they look admirable in larger public spaces.
4	**Red multi-pavers**		The colour variation of these clay pavers, laid in a longitud-inal stretcher bond creates a mellowed effect. This bonding has a crisp look with strongly defined lines
5	**Red-brick pavers**		The colour variation of these clay pavers, laid in a longitud-inal stretcher bond creates a mellowed effect. This bonding has a crisp look with strongly defined lines
6	**Terracotta pavers**		natural slab made of clay, but dried in the sun. Porous and not frost-proof it is best used in a warm climate or in parts of the garden near the house.
7	**Wire- cut pavers**		The pavers featured in this garden have a dragged finish, and are used both radially and in a circular pattern.

Table4- 2 Typology of pavings. (Brookes 2003)

4-6-2 Steps

Outdoor steps might be incorporated into a walkway design where they are necessary *to lessen the steepness of the walk.* There might be a *raised patio* where a transition is required to get to a lower or upper level. Landscape steps can also be used where they would make for easier access along a steep area. When designing garden steps, it works well if the height of the riser multiplied times two, plus the depth of the tread equal *between 24" and 27".* For example, a 6" riser and 12" tread would be comfortable, according to the above math. This is a very common relationship.

Risers can be anywhere from 4" to 9" high. However, *staying below 8"* will be more comfortable when using the steps.
The materials used for the steps should go well with any paving adjacent to them, whether that be walkways or patio designs.[1]

Figure4- 19 Simon Fraser University, Vancouver Canada .steps used as chairs and decks to students. (Bell 2007)

4-6-2-1 Steps in campus

Steps in simon Fraser University are used to be chairs or decks, as it presents a gathering area to students.

Thus their dimensions are a bit larger than the normal scale to be appropriate to the students' use. See figure4-19.

Steps also can be used as a welcoming zone to the entrance hall,

to give richness to the main entrance.

As shown in figure4-20.

Figure4- 20 British University in Egypt, Cairo, Egypt. (Researcher)

[1]Beaulieu, David. *Hardscape.* March 2008. http://landscaping.about.com (accessed November 26, 2009).

4-6-3 Walls

There are broadly three types of walling material: stone, either random or coursed, brick, and concrete in its various forms. When selecting a material for a wall, consider how the color, size and texture echo the feel and architectural style of the surrounding buildings and setting, and try to envisage the massed effect.

Walls built of natural stone vary between regions, and the stone local to your area will be most appropriate.

Certain types of limestone and sand-stone with easily quarried strata allow a wall to be coursed, the stones fitting together like bricks. Other stones smoothed by glacial or water action, or picked up from the field or seashore, are rounded and can be used in a random wall. Traditionally, both types of wall were laid dry, without mortar jointing, while reconstructed stone (a formed stone pressed out of crushed rock and cement) is laid with mortar joints. Stone wall capping varies according to location.[1]

4-6-4 Pergolas

In order to select the correct pergola form for your garden, first decide whether the structure is directional, that is, leading from one space to another; or whether it defines a wider, static place, providing a shelter to sit beneath. A directional pergola has a dynamic visual effect, drawing the eye down its length to a focal point or an entrance, or framing a view. A pergola can also be used visually to extend an interior, creating an outside room.[2] See figure 4-21.

Figure4- 21 Linear pergolas. (Brookes 2003)

[1] Brookes, John. *Garden design.* London: Alfred A. Knopf, 2003.P150.

[2] Ibid. P152.

4-6-5 Sculptural Features

Although the positioning of a sculptural feature depends to a large extent on its scale and subject matter, it is more important when siting a sculpture to consider its density and the material from which it is made. For external works of art, whether they are classic or modern, need to have both solidity in order to read against vegetation or landscape, and simplicity of outline.

Figure4- 22 Sculptural elements. (Brookes 2003)

4-6-6 The water element.

Water can be used in the outdoor environment for a number of visual functions in addition to the more general uses just outlined . the process for integrating water In landscape for visual uses should be similar to that employed for the other design elements. That is, the landscape architect should first decide what functions water is to fulfill in an outdoor space and subsequently analyze what type and character of water meets these desired functions.

4-6-6-1 The water element in campus.

The most popular use of water element in the campus is modify air and ground surface temperature. Thus it is mostly used in climatic control in the form of fountains or otherwise.

Figure4- 23 The American University, New Cairo, Egypt. (Researcher)

As shown in figure4-23 a modular fountain is used in the American university campus in new cairo, where the fountain has a geometrical linear shape, signified by Washingtonia palms to nurture the pathway. The fountain decreases the air temperature, as the campus is located in a desert.

For the water element in cold countries, for example, the university of Kansas there is a popular fountain called Chi Omega fountain which acts as a weather improver to humid the weather, and a sculptural element as well; as the water freezes in the winter.See figure 4-24.

Figure4- 24 Chi Omega fountain, University of Kansas, USA.(Kansas 2004).

4-7 General conclusions and guidelines for campus planning.

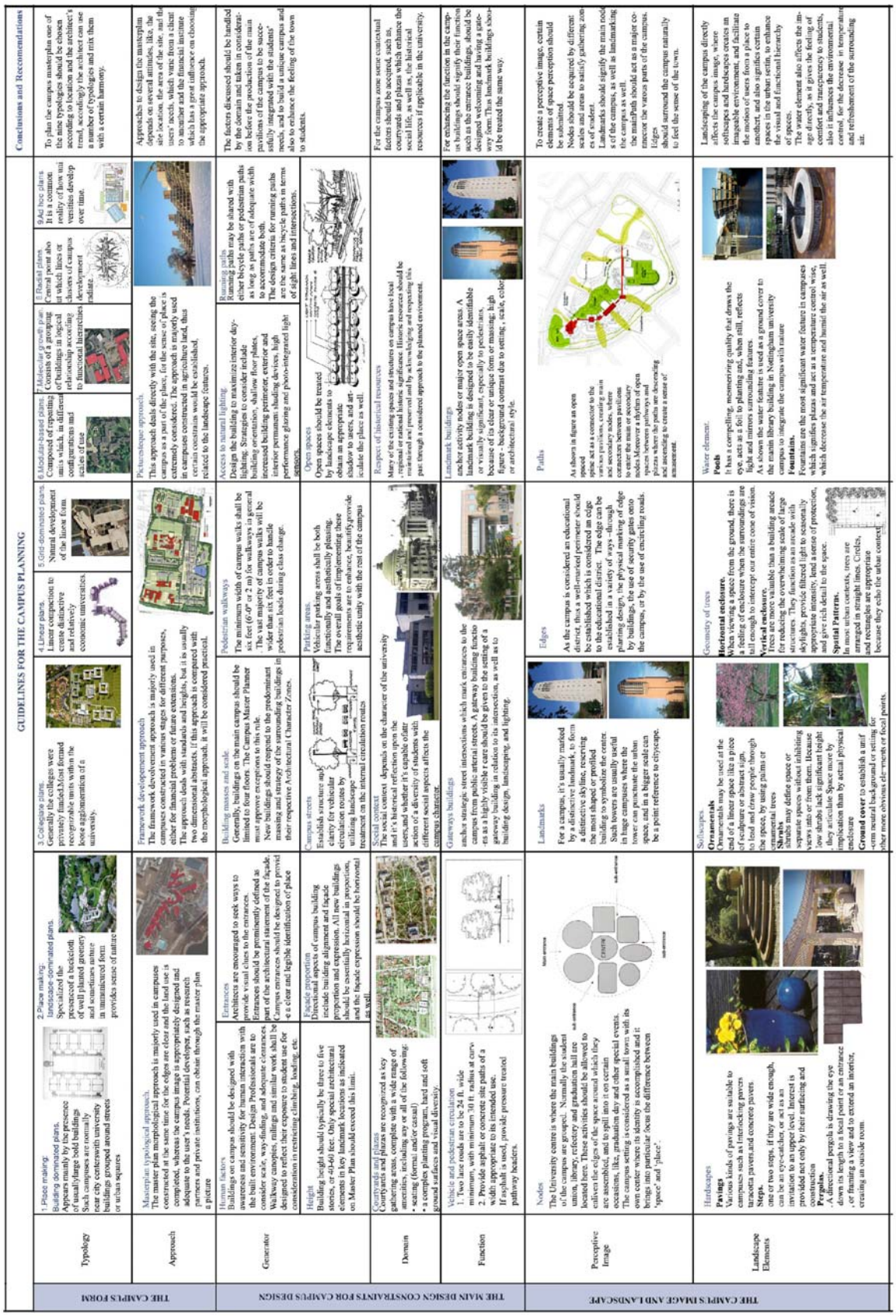
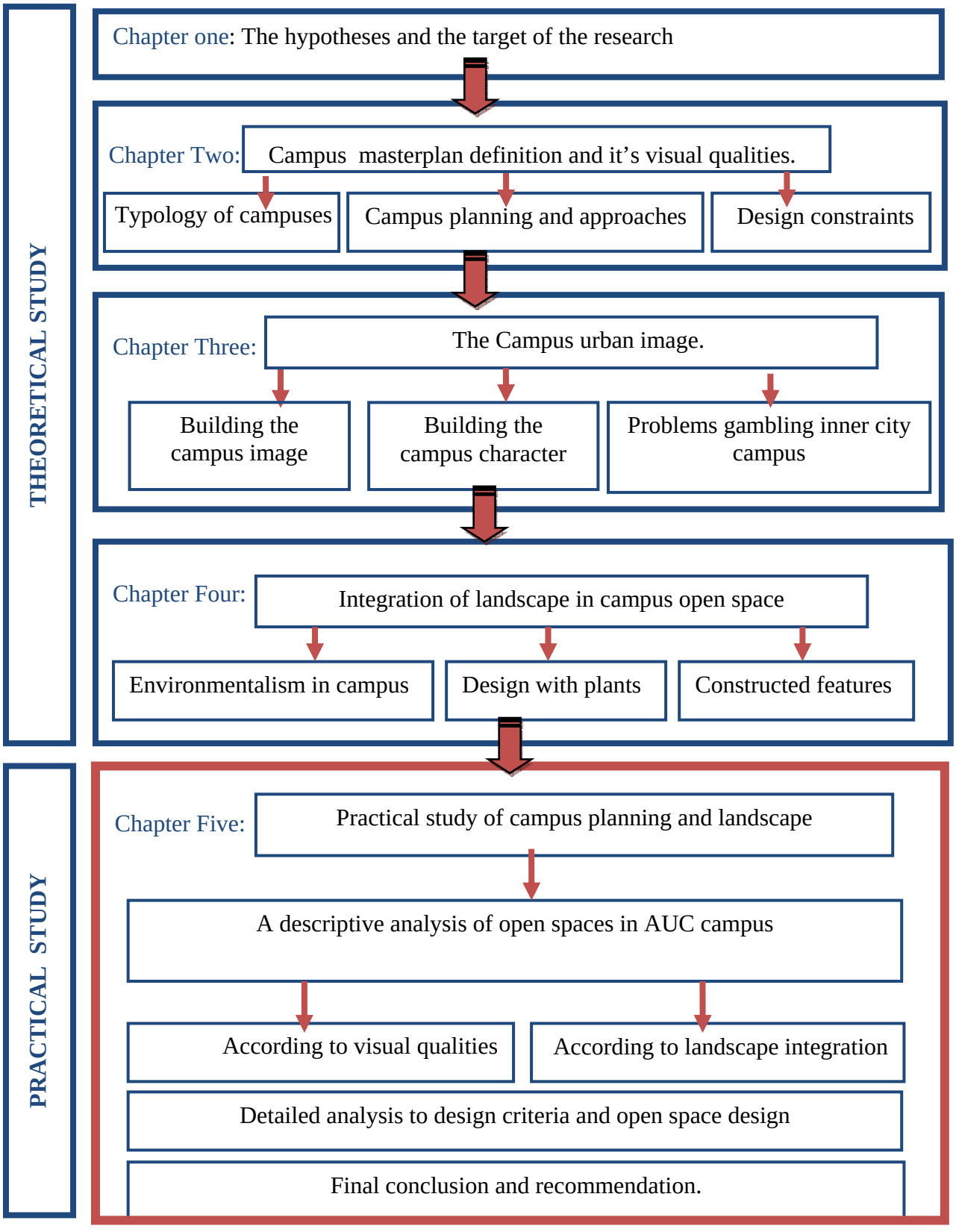


Table4- 3 Final guidelines of campus planning.

Chapter Five

Chapter Five.
Practical application on campus urban image and landscape.



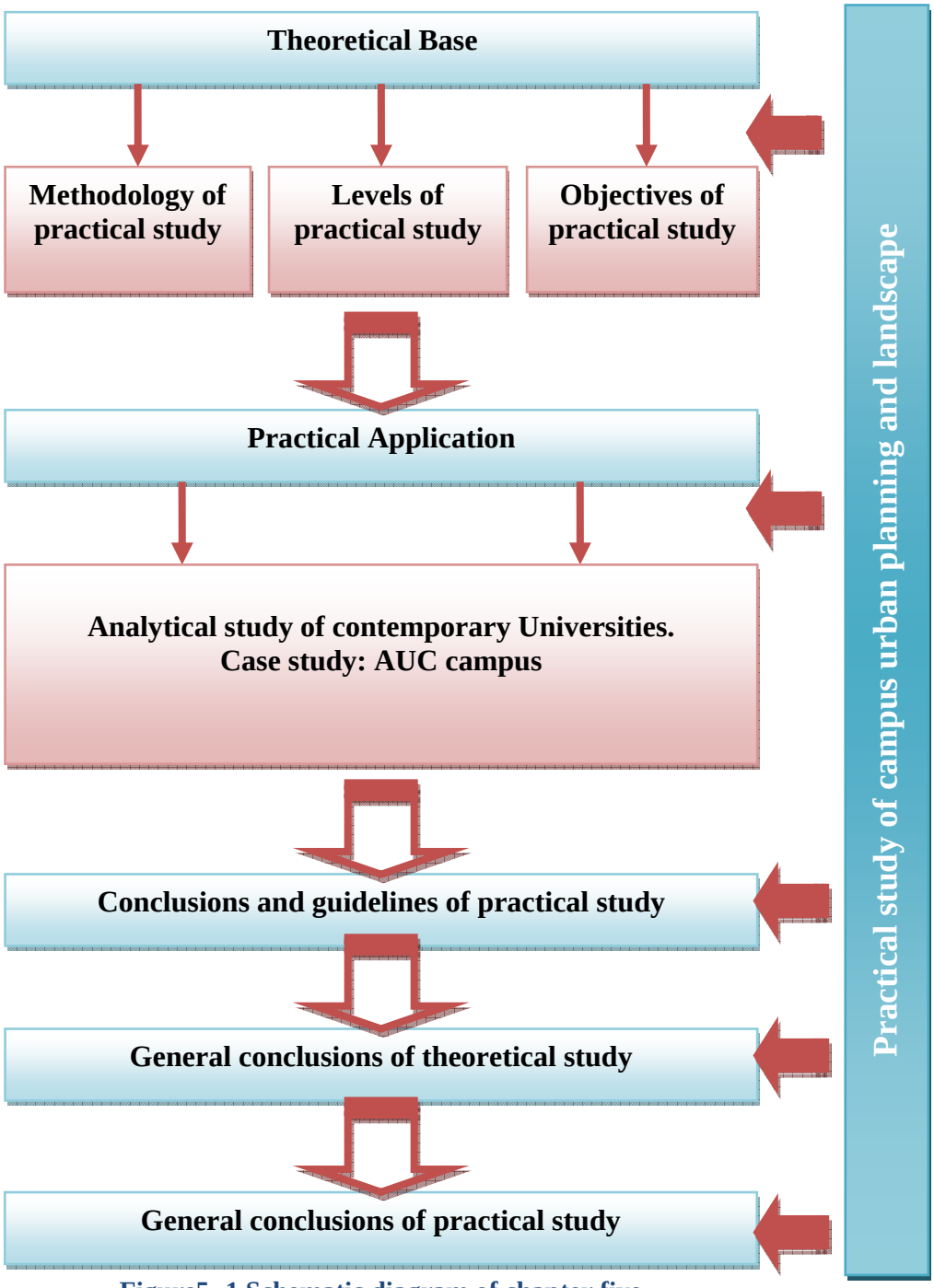


Figure5- 1 Schematic diagram of chapter five

5-1 Introduction.

In the previous chapters, a definition of campus planning and visual character was confronted, and how landscaping can be integrated successfully to the urban setting of the campus to be added to the campus image, then ending with a group of guidelines providing a vivid and unique image to the campus.

Thus this chapter discusses these guidelines practically, and this occurs in **three parts.**

Firstly: The theoretical base.

The theoretical base presents the methodology of the practical study moving to the objectives, then the levels of study.

Secondly: The main practical study.

The practical study depends on analyzing one of the contemporary campuses like the American University campus which presents a new trend of planning, which is supposed to present a developed solution of the major problems of campus planning.

Thirdly: Conclusions and recommendations.

The study presents a group of conclusions in a form of a matrix to be a preliminary schematic key plan to the campus planning design, then ending with a group of recommendations for the development of campus planning in Egypt.

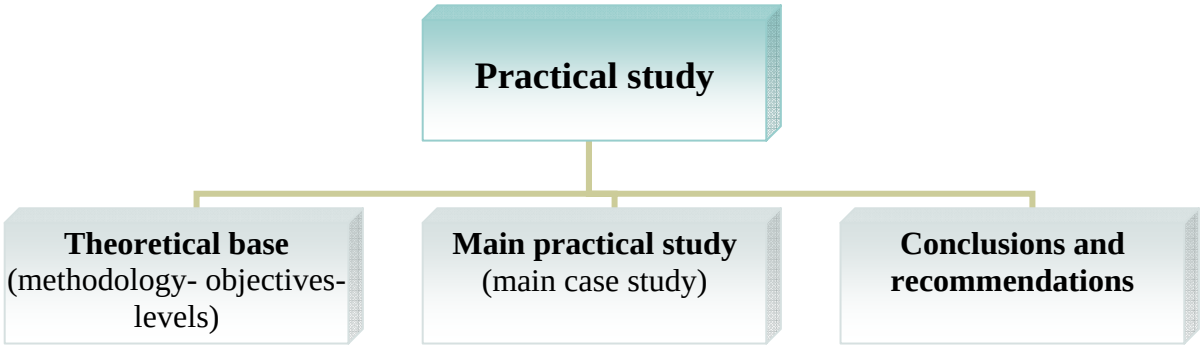


Figure5- 2 Practical study diagram

5-2 Theoretical base.

5-2-1 The study methodology.

The study tries to reach recommendations and results by:

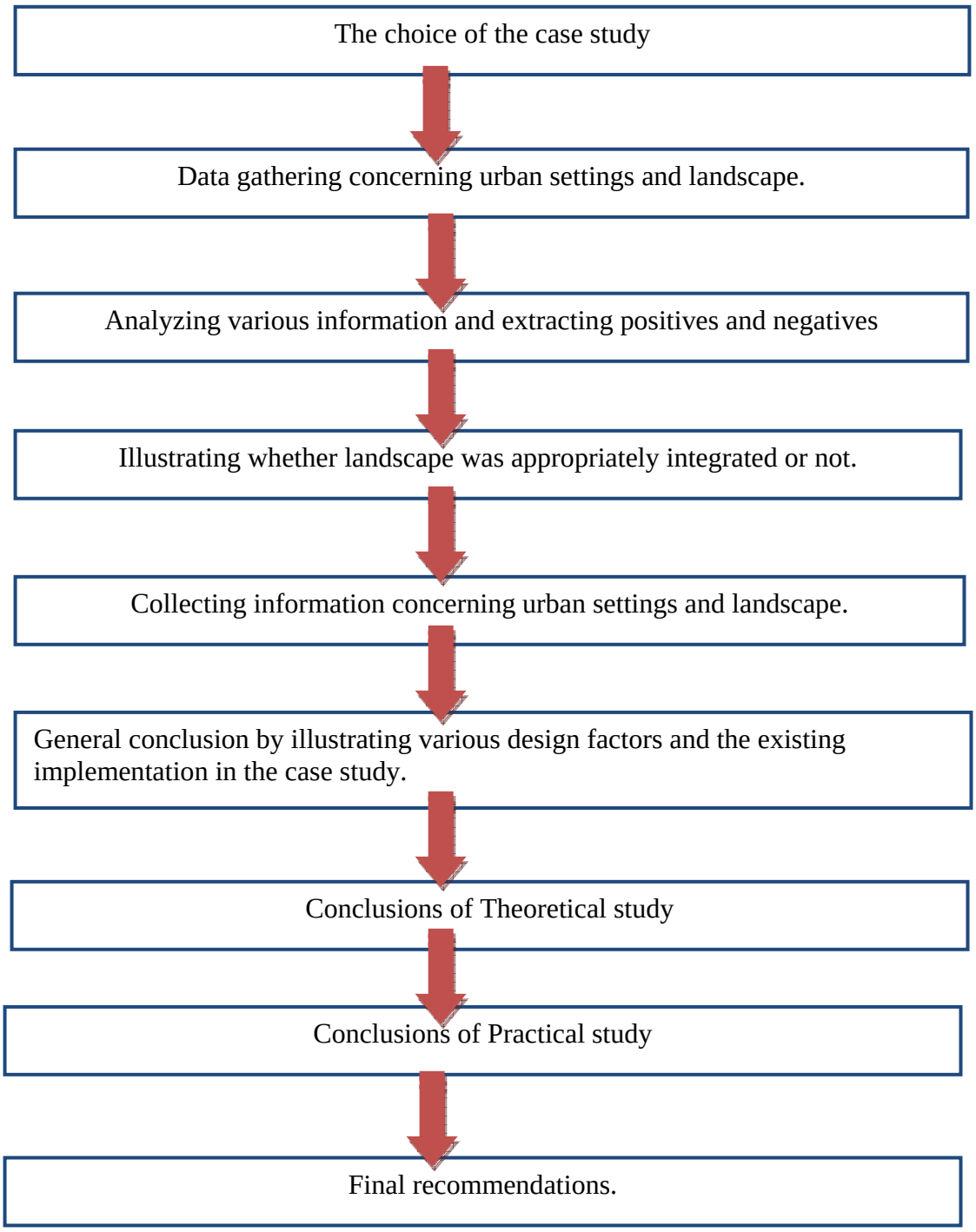


Figure5- 3 Methodolog of study (researcher).

5-2-2 Levels of study.

Level One: Problem analysis.

This level depends on the problem analysis, by analyzing the campus design in major campuses, and this occurs by using the guidelines matrix criteria, then a group of conclusions would be presented.

Level Two: Site analysis.

This level depends on visiting the site and noting the design criteria and whether the designer was able to fulfill the design criteria in the site or not.

Level Three: Interviews and questionnaire.

This level depends on interviews and questionnaire tools to analyze the design criteria in the point of views of a number of designers, distinguished according to their experience which exceeds ten years.

Level Four: Final conclusion.

In this level a preliminary schematic guidelines matrix will be successfully implemented in the AUC campus with approximated values ; thus certain conclusions will be presented to identify whether these criteria where successfully implemented in the local modern campuses.

5-2-3 Objectives of the practical study.

1. Implementation of the main study guidelines on contemporary campuses in Egypt.
2. Descriptive analysis of a sample of current campuses and presenting a conclusion of advantages and drawbacks for such campuses.
3. Conclusions would be tagged in a schematic chart for the results to be more accurate.

5-4 Case study: The AUC campus in New Cairo city.

5-4-1 Case study constrains.

1. **Land use:**

   It must be an area for Universities.

2. **Location:**

   It must be in a new city or a new development.

3. **Finance source:**

   There should not be a financial problem to be a case where we can extract guidelines.

4. **Study area size:**

   It should be a central campus with various faculties and a residential area included in the urban setting.

5. **Landscape existence:**

   there must be a landscape design to criticize and evaluate.

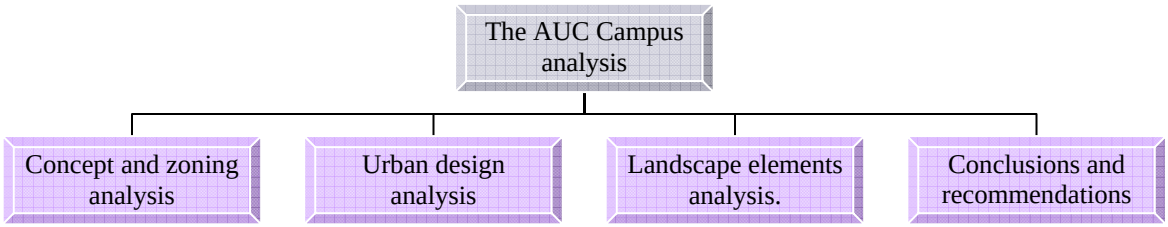


Figure5- 4The AUC analysis.(Researcher)

5-4-2 History of The American University.

Figure5- 5 A historical picture to the AUC in down town (Technologies 2008).

The American University in Cairo was founded in 1919 by Americans devoted to education and service in the Middle East. For its first 27 years, the university was shaped by its founding president, Dr. Charles A. Watson,

who wished to create an English-language university based on high standards of conduct and scholarship and to contribute to the intellectual growth, discipline, and character of the future leaders of Egypt and the region.

Initially, AUC was intended to be both a preparatory school and a university. The preparatory school opened in October 1920 with 142 students in two classes that were equivalent to the last two years of an American high school. The first diplomas issued were junior college-level certificates given to 20 students in 1923.

At first an institution only for males, the university enrolled its first female student in 1928, the same year in which the first university class graduated with two B.A.'s and one B.S. degrees awarded. Master's degrees were first offered in 1950.

Originally, AUC offered instruction in the arts and sciences, as well as education. In 1921, the School of Oriental Studies was added to the university, followed in 1924 by the Division of Extension. This division was renamed the Division of Public Service, and later the Center for Adult and Continuing Education. AUC's high school division, known as the Lincoln School, was discontinued in 1951.[1]

[1] Technologies, University Academic Computing. *About AUC's New Cairo Campus.* 2008. http://aucegypt.edu.html (accessed July 1, 2009).

5-4-3 The New Cairo site

AUC's new campus will be located in the planned community of New Cairo, a development comprising 46,000 acres of land and with a projected population of 2.5 million people. This new community is designed to be a predominantly middle-to-high-income residential community with schools, cultural facilities, commercial enterprises, government agencies, hotels, open spaces, parks and the AUC New Campus at its center.

Figure5- 6 New Cairo, Egypt. (Technologies 2008)

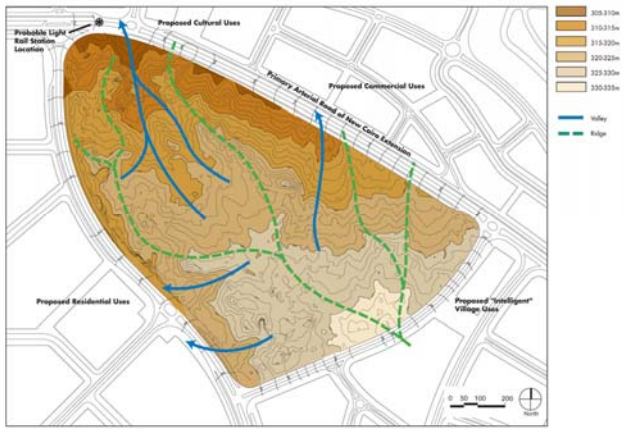


Figure5- 7 Site analysis (Technologies 2008)

New Cairo is located to the east of the Cairo suburbs of Heliopolis and Nasr City, between the roads leading to Suez and Ain El Sokhna and east of the new Cairo Ring Road.

5-4-4 Concept and Zoning analysis

5-4-4-1 Concept and inspiration

The concept was inspired from the old city of Fatimid Cairo where a complex of courtyards and a main path way act as a connector to the whole complex, thus a number of design principles were required for the campus which are.

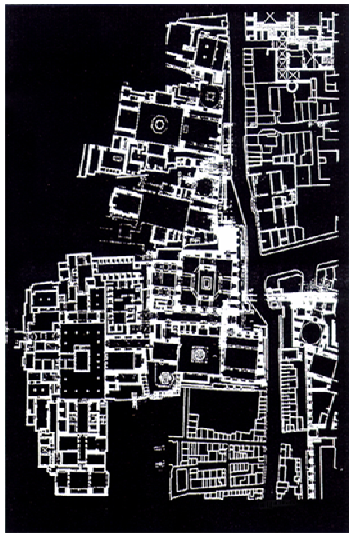


Figure5- 8 Fatimid Cairo. (Nezar 1991)

a. Compactness of form.
b. Integration of space.
c. Primacy of voids.
d. Environmental optimization.
e. Diversity within harmony
f. Interactive learning

5-4-4-2 Criteria of zoning.

1. Compact university layout with maximum walking distances not to exceed 10 minutes. Parking to building distance not to exceed 4-5 minutes.
2. Preservation of adequate land for future expansion, allowing the campus to grow 3times over.
3. Development of the campus layout, accommodating a system of courtyards, open spaces and passages for movement, introspection, interaction, and spiritual rejuvenation. Reflects the users' way of life, while simultaneously protecting them from local climatic conditions.

Figure5- 9 Zones of AUC campus. (Researcher)

5-4-5 Urban design analysis

5-4-5-1 General Characteristics

Figure5- 10 General Characteristics of AUC campus

The American University's new campus found in New Cairo and occupies round 260-acres of land which is considered an example of an Egyptian urban and architectural traditions into a modern campus that places a distinct emphasis on environmental sustainability.

The campus offers state-of-the-art resources to students and faculty from Egypt and around the world and is accessible to persons with disabilities.

New Cairo is chosen as a location in the Fifth avenue, as it's surrounded by an appropriate network of roads which is accessible for various districts in Cairo, moreover it's considered near from the main ring road of Cairo which facilitates the accessibility of other districts in down town

5-4-5-2 The main spine analysis.

Figure5- 11 **The main spine analysis.(Researcher)**

As shown in figure5-14 an open spaced spine act as a connector to the various pavilions, creating main and secondary nodes where connectors between pavilions to enter the main or secondary nodes. .Moreover a rhythm of open spaces between pathways and plazas where the paths are descending and ascending to create a sense of amusement.[1]

[1]Anderson, Rick. *rhythm-in-landscape-design.* june 8, 2006. http://whisperingcraneinstitute.blogspot.com/2006/06/rhythm-in-landscape-design.html (accessed september 7, 2009).

5-4-5-3 Solids and Voids analysis.

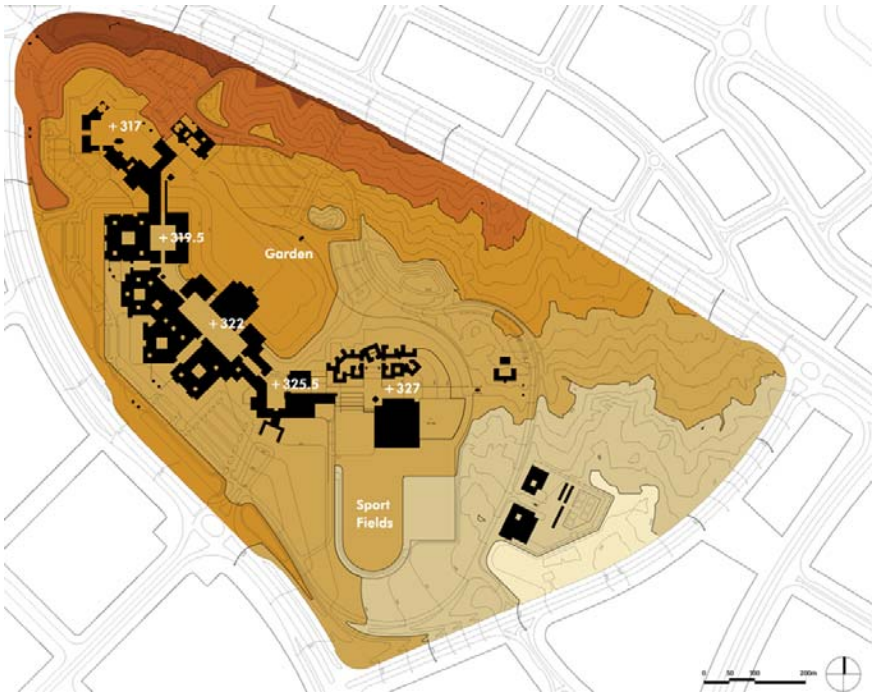


Figure5- 12 Solids and Voids analysis (Researcher)

The footprint of the campus pavilions does not exceed 14 acres to be increased to 120 acres in the future development, where the whole land is 260 acres, that means that the existing footprint is having a capacity of 5% of the whole land to reach 50% as a maximum percentage in the future expansions.

5-4-6 The Urban Image analysis.

5-4-6-1 Usage analysis.

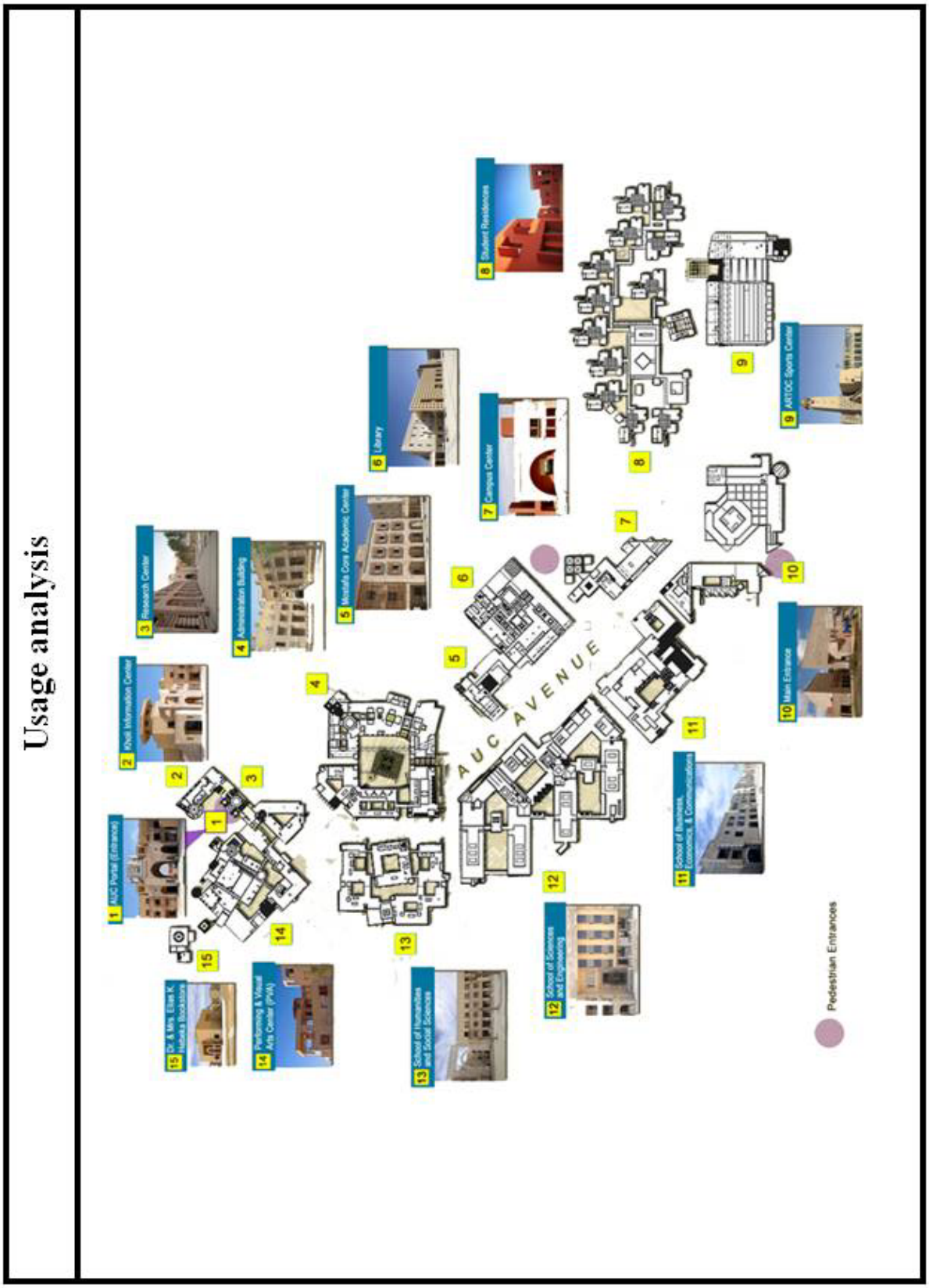


Table5- 1 The Usage analysis. (Researcher).

5-4-6-2 Landmarks and nodes analysis.

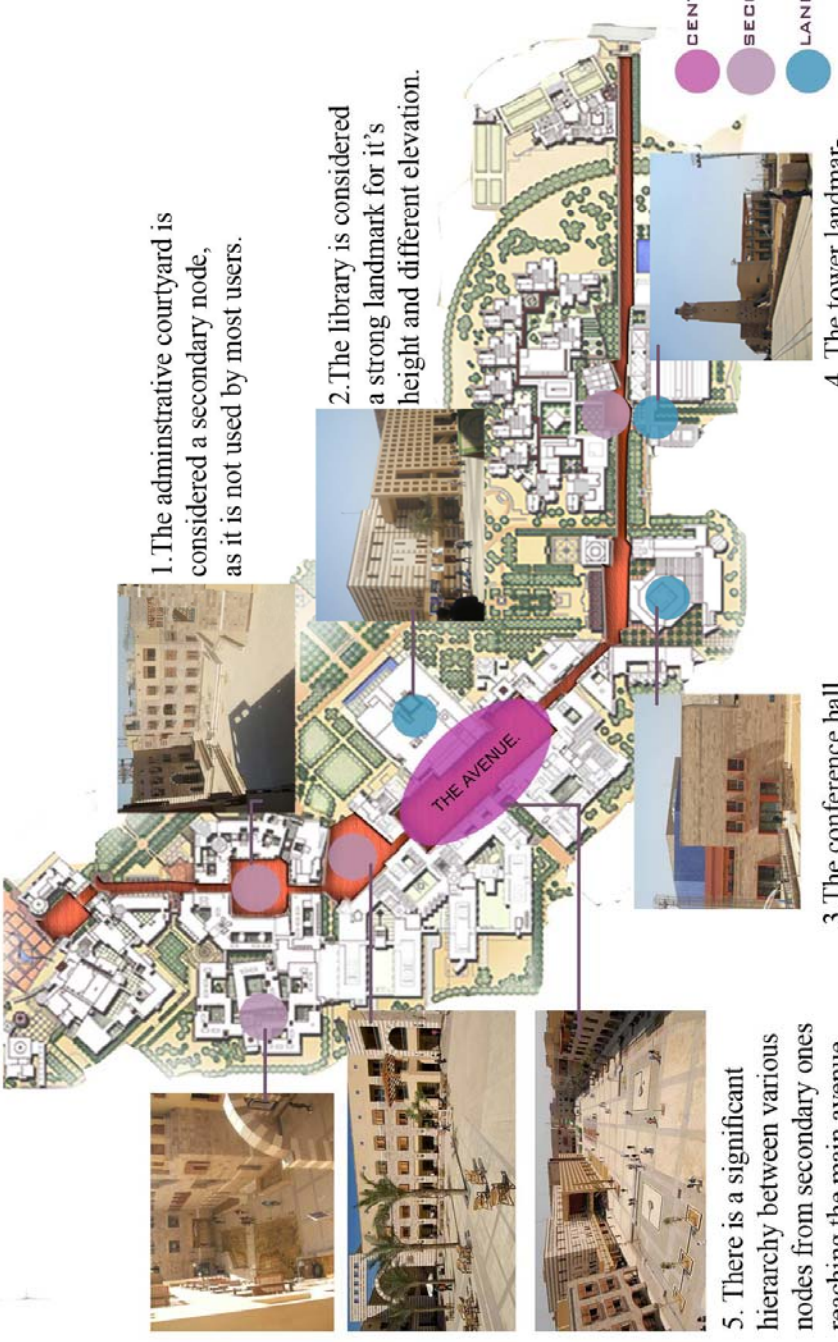
LANDMARKS AND NODES ANALYSIS	Analysis	Conclusion
		The campus consists of a number of significant nodes and landmarks, where a hierarchy of nodes appears to identify the meaning of the main concept, where the islamic planning of cities is the main inspiration of the whole campus. Moreover the landmarks are hierarchied between major landmarks and secondary landmarks to create a feeling of amusement, surprise, and marking various nodes at the same time.

Table5- 2 Landmarks and nodes analysis.(Researcher)

5-4-6-3 Plants' classification analysis.

Plant's Classification Analysis				
Landscape Elements	According to visual qualities	According to growth habits	According to species	According to foliage.
	1. speciman trees. Trees found at the centre of interest, but these kinds are rare inthe campus. 2. Accent trees: Not found 3. Massing plants: Not found.	1. Over head zone. 2. Intermediate zone. 3. Ground zone.	Palms: Palms are spreading in the whole Campus where the harsh environmet of the desert influenced the presence of Washingtonia palms in the inner and the outer courts. Trees: Most trees found there are young in age and found in tree grates surrounded by water.as shown in figure. Shrubs: Shrubs are found in small numbers and edging the spaces as shown. Groudcovers: a low water sopply ground-covers like Spectabilis, for the desert nature of the soil.	1. Evergreen. Evergreen trees are found in the outer courts, or in spaces connecting various pavilions, as shown 2. Decidous . Decidous trees and shrubs are found in inner courts where space is defined as shown.
Conclusion	Most trees and shrubs are specimen to direct user.There are a significant shortage in accent plants , and so as the grouped plants	Most plants are palms which are in an over head zone., few trees are in the intermediate zone, and most groundcovers are grassy.	Most species are palms according to the desert environment which are absolutely compatible with the low water supply in this space.	Most trees are evergreen specially at the outer courts, while the inner courts are filled with decidous trees.

Table5- 3 Plant's classification analysis.(Researcher)

5-4-6-4 Constructed features analysis

Constructed Features				
	Surfacing	Lighting poles	Steps	Other hardscapes
Landscape element	▪Pavements in the middle of the plaza takes a node form in order to centralize the plaza. ▪Pavements confirm the pathway. ▪Pavements are contrasting in color to add visual interest to space.	▪Lighting poles are majorly attached to the building facades where pavilions are Properly lighted At university nights. Indirect lighting appears in the main entrance where lighting poles are Placed inside the archades.	Steps in spaces are Leading to a platform Emphasizing the Space. Steps as shown leads from semi-public zone to buildings. Steps leading from semi-public zone to public zone.	Sculptures in A form of sphere To emphasize the Main path in the Campus. Tree grates: are Made of pre-cast Concrete to allow Water to be absorb Gateways: Leading to open Spaces and plazas, Having archades With double height. Archades: are used To emphasize the Pathway.
Ornaments	Characteristics of surfacing ▪Pavements are durable, non skid, and needs low maintenance requirements. ▪Marks lead users : For the space hierarchy and surfacing, users are easily pointed to spaces they need. ▪Provide visual interest to users: By using color contrast and various materials at the same area. ▪Eliminate hazard and ease circulation.	Characteristics of lighting poles: ▪Improve the legibility and emphasis of Building pavilions. ▪Lighting poles along the paths are needed. ▪Poles are well fixed and mostly attached to building facades, for building emphasis.		

Table5- 4 Constructed features analysis.(Researcher)

5-5 Conclusion of the case study analysis (The AUC Campus).

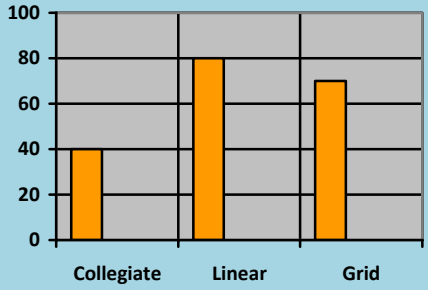
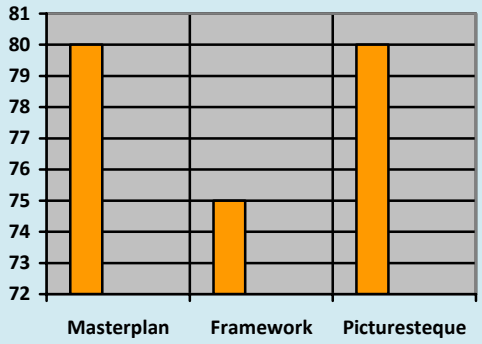
Guidelines for the urban planning of campuses.Case study: The American University campus in New Cairo, Egypt.

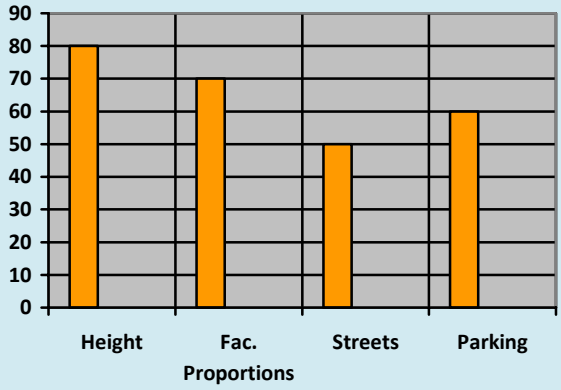
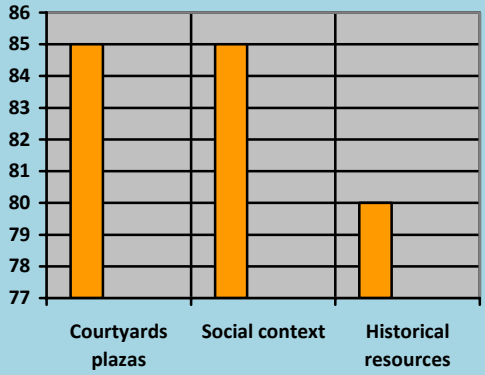
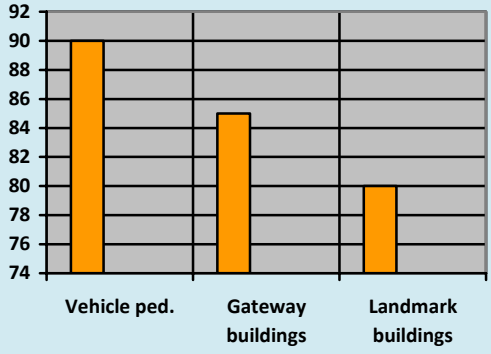
		GUIDELINES FOR THE CAMPUS PLANNING IN THE AMERICAN UNIVERSITY IN CAIRO			CONCLUSION
THE CAMPUS FORM	Typology	Collegiate Planning Colleges as political science and Alsun are having a form of various masses with significant courtyards as shown in figure to be collegiated in planning.	Linear Planning. The overall of the campus is having a main longitudinal pathway connecting the whole campus,further more the engineering calasses which take a longitudinal shape as shown in figure.	Grid Planning Plans of various colleges in the campus based on a number of formal grid connecting the urban setting of the campus.	The campus planning is a complex of various planning types which are collegiate, to compromise with the islamic character, and linear planning to signifies the main pathway, and finally the interfered grid to compromise with the educational design.
	Approach	Masterplan typological approach. The masterplan was articulated to be compatible with the functional uses as well as the conceptual plan which aims at reaching a community objectives found in traditional islamic urbanism.	Framework developement approach The footprint of the campus pavilions does not exceed 14 acres to be increased to 120 acres in the future development, where the whole land is 260 acres, t hat means that the existing footprint is having a capacity of 5% .	Picturesteque approach. The picture of the campus is obviously compatible with the islamic civilization for the image of its interchanging courts and the mamluks' facades identifies the concept of the dialogue between the historical civilization and modern technologies.	The AUC design is an integration of the morphological approach, the fracwork approach and the picturesteque as the masterplan is designed with a significant classical morphology and with a certain design to future developement.
THE MAIN DESIGN CONSTRAINTS FOR CAMPUS DESIGN	Generator	Human factors Human factors are highly preserved for the proportions of the facade doesn't exceed four storeys and walkways are well oriented. Height Heights differ in landmark buildings like the main library as well as the gateways	Building masses and scale. Masses of pavilions doesn't exceed four storeys, except for dominant buildings, like the library and landmarks. Entrances Entrances surrounds the whole land between vehicles and pedestrians which facilitates entering various pavilions. Facade proportion Facades are significantly horizontal in proportions, with archades at the bottom floor.	Pedestrian walkways Walkways are considered sufficient to the students' flow where their dimensions varies between 7to 17 meters Campus streets Use of a singular species for each street with a spacing of 72 to 85 on center is recommended. But that's not applicable.	Access to natural lighting. Natural lighting is significantly applicable in all pavilions by using timbered openings oriented as sun breakers. Running paths Not applicable. Open spaces The most distinct open space is the main avenue which is rectangular in shape with seats for students. while other spaces are open courtyards nearly squared in shape. Parking areas. Parking areas are found all around the campus, mostly in open spaces of the outer pavilions facilitating access points and decreasing walking distances.	The designer or the generator was able to apply a number of factors to create a unique campus like, the application of horizontal proportions and and a certain height which does not exceed four storeys, in order to signify the human factors in design, moreover the entrances and parking areas were designed carefully.
	Domain	Courtyards and plazas Courtyards as shown are between main outer courts and inner courts which are considered semi-private places. Plazas are considered key gathering areas	Social context The University continues to attract a diversity of students from allover the country; their different social aspects affects the campus character. the American University campus has a unique islamic character for the consideration of the identity conce	Respect of historical resources Many of the existing spaces and structures on campus have local , regional or national historic significance. Historic resources should be maintained and preserved and by acknowledging and respecting this past through a considered approach to the planned environment.	Courtyards and plazas are dicetly influencing the islamic culture, while the social context and the historical sources preserve identity.
	Function	Vehicle and pedestrian circulation All streets inside the campus are 7m in length, varies from the outside streets surrounding the campus which consist of two lanes of 50m lenght. For pedestrians' walkways, which are articulated with various dimensinons, between 7 to 17 m according to type of building facing the walkways.	Gateways buildings The building is key to creating an identifiable campus area for the portion of campus with which it is associated. Particular care is given to the setting of a gateway building in relation to its intersection, as well as to building design, landscaping, and lighting.	Landmark buildings A landmark building is designed to be easily identifiable or visually significant, especially to pedestrians, because of its clear or unique form or massing. high figure - background contrast.	The whole function facilities like the circulation, gateway buildings and landmark buildings are all key plans surrounding the whole campus and clear to pedestrians.
THE CAMPUS IMAGE AND LANDSCAPE	Perceptive Image	Nodes The campus consists of a complex of interfered courtyards which act as nodes which gather various students, moreover a main courtyard or a main node which is called the main avenue infront of the main library which is the main gathering area of all students, because the library is the only place which can gather various faculties for a dominant purpose which is reading. As shown in figure the difference between the main avenue and the other courtyards in proportion, scale, and mass.	Landmark Landmark buildings are shown in figure according to pavilions which is considered identifiable.	Edges The AUC's edge is a physical enclosure edge for it's an urban university where another type of should be used, as security and safety often require strong physical enclosure (with walls or buildings) and the use of security gates onto the campus.	Path As shown in figure an open spaced spine act as a connector to the various pavilions, creating main and secondary nodes, where connectors between pavilions to enter the main or secondary nodes.Moreover a rhythm of open spaces between pathways and plazas where the paths are descending and ascending to create a sense of amusement.	As the campus is considered a unique urban setting dealing with education which needs a certain perceptive image, where the designer dealt with it as a minor form of a city with it's elements of space perception and taking in consideration the islamic compact setting to influence the small city. The path was significant and perceptive, while nodes were clear, edges were well-known enclosures, and landmark were key plans to various places.
	Landscape Elements	Hardscapes Pavements in the middle of the plaza takes a node form in order to centralize the plaza. Lighting poles are majorly attached to the building facades where pavilions are Properly lighted At university nights. Steps in spaces are Leading to a platform Emphasizing the Space. Steps leading from semi-public zone to public zone.	Softscapes. Most species are palms according to the desert environment which are absolutely compatible with the low water supply in this space.	Geometry of trees The setting of trees and palms is mostly linear to identify the straight path ways and to height en the sense of the path which act the walls of the path. While in cortyards trees are set geometrical to be directly compatible with the the center of courtyards.	Water element. The water element in the campus appears clearly in the fountains which centers the pathways as shown in the figure. Moreover it can be found in tree grates as an aesthetic element, however it is not used as an environmental element because the desert climate needs a larger area to decrease the current tempeature. The water element is placed geometrically aloug the campus to be directly compatible with the islamic pattern in the whole campus.	Hardsapes are considered entirely sufficient for several elements are used specially pergolas and umbrellas which are significant to all the users, moreover the designer didn't miss the aesthetic elements beside the functional ones. Softscapes are not sufficient as it does not act fuctionally as shading elements nor aesthetically, except for the geometrical pattern of the palms. Water element is aesthetically designed in a geometrical way, however it is not used environmentally to treat the hot weather.

Table5- 5 Conclusion of the case study analysis.

5-5-1 Evaluation due to interviews and questionnaires

Evaluation was calculated due to the interviews and questionnaires done to the selected sample.

	GIDELINES CRITERIA	PERCENTAGE DUE TO EVALUATION
1	**TYPOLOGY OF MASTERPLAN**	
2	**DESIGN APPROACH**	
3	**GENERATOR PART1**	

4	**GENERATOR PART2**	
5	**DOMAIN**	
6	**FUNCTION**	

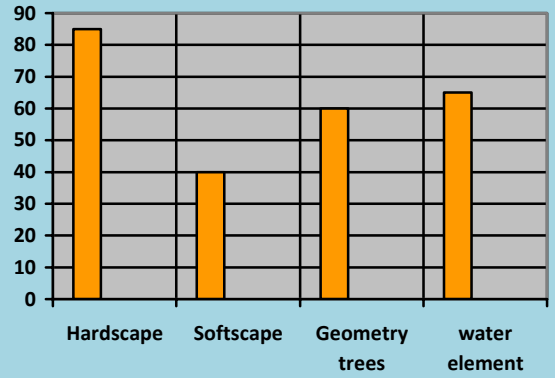
7	**LANDSCAPE**	

Table5- 6 diagramatic charts of the study conclusion.

5-6 Conclusions of the theoretical study.

1. There are several typologies for the campus masterplan which rely on the site and the community dealing with the university.
2. The types of Building dominated plans and Collegiate plans were commonly used in early universities for the inspiration from religious monasteries.
3. The designer can use a complex of typologies to fulfill the main design criteria and to compensate with the given site.
4. In the modern universities, the linear planning is commonly used as this kind is considered almostly compatible with the educational uses which need a longitudinal planning to fulfill the environmental criteria and the standard dimensions as well.
5. A number of approaches can be used in the campus planning singularly or using a complex of approaches to accomplish aesthetical and functional criteria.
6. When planning a campus, design constrains should be applied to add physical and non-physical values to the masterplan.
7. The design constraints –based on interaction, culture, history, and sustainability- provide a working framework to guide any changes to the campus that might be considered.
8. The design constraints are based on three main axes, which are, the generator (designer- client- user-legislator), the domain (internal-external), and the function (radical-practical-formal-symbolic).
9. The financial context in Egypt is not appropriately contributed to reinforce the campus development nor the open spaces in its urban setting , where the funding is directly oriented towards the increase of number of classes and lecture rooms and missing the open spaces and visual character of the campus.
10. Before developing or building a new campus the user should be engaged directly in the design process, where a survey of specific points should be tagged to several users and students of different fields.

11. Campus design character has a great influence on user, including staff, students, and administrators and influences the academic aspect as well.
12. The respect of cultural and historic resources should be considered as a character influencing the user directly, where the feeling of identity can be accomplished.
13. The campus is a distinct urban unit; a district devoted to higher education, which needs a definition of centre, edge, path, and landmark.
14. The campus center needs a processional and dignified space , which takes a linear nature due to distinct activities needed in this gathering area.
15. The main paths of the campus should be designed due to number of criteria to create a well perceived path, and to prevent getting lost in the urban setting of the campus.
16. The landmark should be designed to punctuate the urban space, and in a bigger scale can be a point of reference to cityscape.
17. The edge is considered the main perimeter of the campus which has man ways to be well marked.
18. Certain characteristics can build certain character to the campus like verticality, human scale, richness, variety, and unity.
19. The setting of planting elements in the urban plan of the campus depends on the functional and visual uses of plants.
20. Enclosures with special patterns and rhythms can be created in the open spaces of campuses by using planting materials and hardscape elements to add a unique image to the campus.
21. The water element can be added to the campus landscape to improve the environmental conditions of the campus.

5-7 Conclusions of practical study

1. The designer was able to use various typologies to form an articulated plan compatible with the Islamic forms and functional educational uses as well.

2. The designer was able to use the three main approaches successfully, specially the picturesteque approach, where a picture of an Egyptian Islamic city was performed to signify the main concept used.
3. The designer was able to manipulate the design constraints in the campus urban setting and pavilions with approximated percentages.
4. The campus center or the main avenue had a longitudinal shape, which created a dignified shape where different activities could be encountered.
5. There is a main path in the campus which had special dimensions and special paving as well, which acts as a connector to the various campus pavilions.
6. The landmarks were various in shapes and volume according to the area of plaza needed to be punctuated.
7. The edge is considered physical, for a fence is used to surround the whole perimeter of the campus.
8. Landscape was designed inspired from Islamic gardens where geometrical shapes and variation of grids were used.
9. Softscapes are not successfully integrated, as there are no variations in the use of planting elements, for the landscaper depended only on hardscapes to fulfill the functional and architectural uses, like, shading , creation of spaces, closures, etc…

   Thus the landscape was slightly monotonous and lost the sense of nature.
10. The planting elements were not appropriately oriented in the sight.
11. Colors and textures in the landscape elements are not rich, where no variations occurred.
12. Finally the campus was capable to present "A City within a city", but the city is a desert one.

5-8 General recommendations.

1. The designer should be aware of designing campus pavilions considering human factors to enhance the interaction of users with the built environment.
2. The designer should be aware of new trends considering green architecture and eco-buildings to enhance sustainability and to create an environmental friendly community, which can be a step forward towards a sustainable educational community.
3. The designer should be able to use various typologies to form an articulated plan compatible with the conceptual forms and functional educational uses as well.

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إعـداد

إيمان احمد صالح الدين عبد الحليم

رسالة مقدمة إلى

كلية الهندسة جامعه القاهرة

كجزء من متطلبات الحصول على درجه الماجستير

فى الهندسة المعمارية

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تحت إشراف

ا.د. محمد مدحت حسن دره	**ا.م.د.أيمن حسان أحمد**	**ا.م.د. أحمد محمد أمين**
أستـاذ ورئيـس قسـم الهندسـة المعماريـة	أستـاذ مساعـد بقسم الهندسة المعماريـة	أستـاذ مساعـد بقسم الهندسة المعماريـة
كليه الهندسة	كليه الهندسة	كليه الهندسة
جامعة القاهرة	جامعة القاهرة	جامعة القاهرة

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فى الهندسة المعمارية

يعتمد من لجنة الممتحنين:

أ.د. محمد مدحت حسن دره (مشرف رئيسي ورئيس القسم)

أ.د. خالد محمد دويدار (عضو)

أ.م.د. نائله فريد طولان (عضو)

أ.م.د. ايمن حسان احمد (مشرف)

أ.م.د. أحمد محمد أمين (مشرف)

كلية الهندسة، جامعة القاهرة

الجيزة، جمهورية مصر العربية

ينـايـر 2010

ملخص البحث

يعتبر التصميم الحضري للجامعات في مجتمعنا غير متناسب بما فيه الكفاية لمواجهة العديد من الاحتياجات للمستخدمين , وذلك نتيجة لعدة مشاكل مجتمعية منها الازدحام الشديد وتكدس الاراضى ونقص الموارد الماليه مما ادى الى تفرق عناصر الحرم الجامعى وعدم الشعور باحساس المدينه الجامعيه لدى المستخدمين .

تختلف هذه الاحتياجات من البيئات الاقتصاديه والاجتماعيه والثقافيه للمستخدمين وغالبا ما يقوم المصمم بتجاهل اهميه تكامل تلك الجوانب فى التصميم بموجبها تحدث بعض السلوكيات السلبيه نحو التصميم مثل العنف او التدمير فى كثير من الحالات , مما يدل على عدم الانتماء للحرم الجامعى .

فى هذا البحث يتم دراسه التصميم الحضرى والمناطق المفتوحه الخاصه بالجامعات من مختلف الجوانب حيث ينبغى تدعيم المناطق المفتوحه من خلال توفير انواع واحجام مختلفه فى التصميم وذلك عن طريق توفير الاتجاهات والانواع المختلفه لتصميم المبانى الجامعيه بمختلف عنا صرها وتنسيق تلك المبانى مع بعضها البعض لتحقيق مفهوم متوازن للحرم الجامعى متوائم شكليا وضمنيا مع اتجاهات المجتمع والتطور العلمى والتكنلوجى الحديث .

بالاضافه الى ذلك يتم دراسه الصوره الذهنية لمنطقه الحرم الجامعى وكيفيه الحصول على مجموعه من العناصر تؤدى الى الاكتفاء الذاتى للطلاب ودعم شعور المدينه الصغيره لديهم مما يدعم الشعور بالانتماء والخصوصيه وذلك قد يؤدى بطريقه غير مباشره للنهوض بالمستوى التعليمى للطلاب .

بالاضافه الى ذلك يقوم البحث بدراسه ميدانيه لتحديد المشاكل الخاصه بالحرم الجامعى المتواجد بداخل المدينه مثل جامعه القاهره ثم تحليل وصفى للتنسيق الحضرى للحرم الجمعى الجديد للجامعه الامريكيه وتحديد مدى قدره المصمم على تحقيق المبادئ الاساسيه التى تم استنباطها فى البحث لتحقيق التميز والجمال فى الحرم الجامعى الجديد.

في نهاية البحث يتم اسخلاص بعض النتائج الخاصه بالجزء النظرى والعملى ثم بعض التوصيات النهائيه لتنميه التصميم الحضرى لمبانى الجامعات .