VOT 71999

APPROPRIATE, FLEXIBLE AND COMPETITIVE ARCHITECTURAL EDUCATION

PENDIDIKAN SENIBINA YANG BERSESUAIAN, FLEKSIBEL DAN KOMPETITIF

MOHD. HAMDAN AHMAD
SYED AHMAD ISKANDAR SYED ARIFFIN
AMINATUZUHARIAH MEGAT ABDULLAH
DILSHAN REMAZ OSSEN
ZATUR RAWIHAH OMAR

UNIVERSITI TEKNOLOGI MALAYSIA

VOT 71999

APPROPRIATE, FLEXIBLE AND COMPETITIVE ARCHITECTURAL EDUCATION

PENDIDIKAN SENIBINA YANG BERSESUAIAN, FLEKSIBEL DAN KOMPETITIF

MOHD. HAMDAN AHMAD
SYED AHMAD ISKANDAR SYED ARIFFIN
AMINATUZUHARIAH MEGAT ABDULLAH
DILSHAN REMAZ OSSEN
ZATUR RAWIHAH OMAR

FACULTY OF BUILT ENVIRONMNET
UNIVERSITI TEKNOLOGI MALAYSIA

2005

UNIVERSITI TEKNOLOGI MALAYSIA

BORANG PENGESAHAN
LAPORAN AKHIR PENYELIDIKAN

TAJUK PROJEK : Appropriate, Flexible and Competitive Architectural Education

Saya MOHD HAMDAN BIN AHMAD
(HURUF BESAR)

Mengaku membenarkan **Laporan Akhir Penyelidikan** ini disimpan di Perpustakaan Universiti Teknologi Malaysia dengan syarat-syarat kegunaan seperti berikut :

1. Laporan Akhir Penyelidikan ini adalah hakmilik Universiti Teknologi Malaysia.
2. Perpustakaan Universiti Teknologi Malaysia dibenarkan membuat salinan untuk tujuan rujukan sahaja.
3. Perpustakaan dibenarkan membuat penjualan salinan Laporan Akhir Penyelidikan ini bagi kategori TIDAK TERHAD.
4. * Sila tandakan (/)

☐	SULIT	(Mengandungi maklumat yang berdarjah keselamatan atau Kepentingan Malaysia seperti yang termaktub di dalam AKTA RAHSIA RASMI 1972).
☐	TERHAD	(Mengandungi maklumat TERHAD yang telah ditentukan oleh Organisasi/badan di mana penyelidikan dijalankan).
☑	TIDAK TERHAD	

TANDATANGAN KETUA PENYELIDIK

Nama & Cop Ketua Penyelidik

Tarikh : 25.10.2005

CATATAN : **Jika Laporan Akhir Penyelidikan ini SULIT atau TERHAD, sila lampirkan surat daripada pihak berkuasa/ organisasi berkenaan dengan menyatakan sekali sebab dan tempoh laporan ini perlu dikelaskan sebagai SULIT dan TERHAD.*

ACKNOWLEDGEMENT

We wish to thank our research partners Zatur Rawihah Omar, Izalisa Ahmad and Dilshan Remaz Ossen for their help in this research from the begining until the report writing. Our gratitude also to Halimah Yahya for her help in managing the accounts. Our sincere thanks also to Roshida Abdul Majid for helping with the translations. Last but not least our sincere thanks to Research Management Centre, UTM for the continuous financial support making this research a success.

ABSTRACT

Architectural education embraces all aspects of sciences and arts. Liberalization of markets, globalization and advancement in technology demand high responsibility in professional standards. Architectural education has no option but to stay parallel to the needs of the society. Consequently, architectural education has to respond to these demands of global market and provide education of highest international standards. This changes required architecture schools to conform to different expectations within university settings. The struggle to reconcile the disparate demands has led the schools to seek professional accreditation for their respective curriculum. However, these accreditation standards mainly emphasize only on practice-related skills. Thus, architectural education in universities experience tension between educational demand and the professional demand. This report reviews the pedagogical changes in the current architectural curriculums to face these new challenges and thereby determine factors influencing the appropriate, flexibility and competitiveness of architectural education in general. The analysis was based on the degree of core and elective subjects, degree conferred and the duration, and level of professional accreditation of the architectural education. The analysis of curriculums was carried out based on RIBA criteria for validation. The RIBA requirements were further evaluated using Blooms (1956) intellectual behaviors of learning outcome. The study was conducted on twelve selected universities from the Asian region, Australia, New Zealand, United Kingdom and America. The results showed that architectural education in universities are far beyond professionalism and demand for research based curriculums.

ABSTRAK

Pendidikan senibina mencakupi semua aspek sains dan kesenian. Kebebasan pasaran, globalisasi dan kemajuan dalam teknologi memerlukan tanggungjawab yang tinggi pada tahap professional. Pendidikan senibina tidak mempunyai pilihan tetapi harus berdiri seiring dengan keperluan masyarakat. Oleh kerana itu, pendidikan senibina harus bertindak terhadap keperluan pasaran dunia dan menyediakan pendidikan bertaraf internasional yang tinggi. Perubahan ini memaksa institusi pengajian senibina untuk menyesuaikan dengan kehendak yang yang berbeza dalm persekitaran unniversiti. Dalam perjuangan untuk menyesuaikan dengan kehendak yang berbeza telah mengarahkan institusi pengajian untuk mendapatkan akredetasi professional bagi kurikulum mereka. Walau bagaimanapun tahap akredetasi menitik beratkan hanya pada skil yang berkaitan latihan. Oleh itu, pendidikan senibina di dalam universiti mengalami ketegangan diantara kehendak pendidikan dan kehendak professional. Laporan ini mengkaji tentang perubahan pedagogi dalam kurikulum senibina sekarang untuk menghadapi cabaran-cabaran baru dan selain daripada itu menetapkan factor-faktor yang mempengaruhi kesesuaian, kelonggaran, dan daya saing bagi pendidikan senibina secara umum. Analisa adalah berdasarkan taraf matapelajaran utama dan pilihan, taraf anugerah dan jangkamasa, dan tahap akredetasi professional bagi pengajian senibina. Analisa kurikulum dijalankan berdasarkan syarat-syarat RIBA untuk pengesahaan. Keperluan RIBA kemudian dinilai menggunakan Blooms (1956) kelakuan intelek terhadap hasil pembelajaran. Kajian ini dijalankan pada dua belas universiti terpilih dari negaraa Asia, Australia, New Zealand, United Kingdom dan Amerika. Keputusan menunjukkan bahawa pendidikan senibina di universiti adalah jauh mengatasi profesionalisma dan keperluan pada kurikulum berdasarkan kajian.

TABLE OF CONTENTS

LIST OF TABLES

LIST OF FIGURES

LIST OF APPENDICES

CHAPTER I

GENERAL INTRODUCTION

1.1 Background

In the face of globalization and internalization, architecture profession is posed with the question of its own existence and sustainability. Architecture schools around the world are recognizing this fact that conventional paradigm may be out dated. The curriculum may not be able to produce the kind of graduate that can survive within the challenging world, where the typical nature of the profession is now either becoming specialized or marginalized. Thomas Fisher (1994) in his article entitled 'Can this profession be saved?' raised an interesting question to the practitioners and academicians. He predicted that the profession would become more diverse, thus should be less protective.

1.2 Issues on Architecture Education

The discipline of architecture draws on knowledge and skills from the human and physical sciences, the humanities, fine and applied arts. It addresses the accommodation of all human activity in all places under all conditions, understanding our place within differing physical, historical, cultural, social, political and virtual environments. Thus, architectural education comprises gaining scientific knowledge as well as acquiring artistic skills. Due to this large scope, the range of subjects are related to building materials and construction, climate and environmental factors, engineering structures, building services, social sciences, economics,

legislation and more importantly design. Thereby architectural education is therefore is neither solely a science nor an art but an interdisciplinary of both. However, the courses in all schools of architecture are pre dominantly design oriented (Hodgkinson, 1990). In other words, design is considered to be the main teaching program and is indeed so treated weakness in a candidate's design ability means overall failure. The other subjects are all supportive to make design more practical and aesthetic.

The subject of architecture design is where the student applies his/her knowledge and develop the designing skills while testing out the other theories and methods learned in other courses like socio-cultural, environmental, technological and professional streams (Kamalapurkar, 2002). Thus creativity needs to arise within oneself, from the internalization of the thinking process. Lawson (1997) points out that design education is directing the student to acquire knowledge and experience, and yet not merchandizing his or her thought process to the point of preventing the emergence of original ideas. A similar argument was made by Sri Nammuni (1991) that it is important to understand student's solutions, listen to the student; to analyze them, with them, to their roots and mode of thinking; to discuss, correct and re-orientate it so that alternative and more mutually acceptable solutions may be formulated by the students themselves. Further he claims that architecture design education should not adopt the practice of 'cloning' the students. In the cloning approach the students are treated as apprentice, teaching by examples or giving 'if I were you solutions'. This eventually makes the student become the followers of those examples or the teachers rather than understanding the process of thinking behind that example. E.g. followers of Zaha Hadid , Frank Guhrey etc. Also doing things in line with the thinking of the teacher, rather than their own, lose the development of their own thinking.

At the same time, a common argument is that, concepts adopted for discussing architectural design in studio are far removed from the real world. Whether this is true or false is not the issue. As Dayaratne (2001) points out that the dichotomy of theory versus practice; studio versus outside world continues to divide the academics and practitioners alike. What is interesting to note is that we have

failed to distinguish between architecture education and the profession of architecture. Further, according to Mehta (2002) the architectural education is an idea, free from circumstantial while the profession is an activity, which results in partial manifestations of that idea with market value. Nevertheless the professionals still complain that new architectural graduates do not have the necessary technical proficiency to withstand the rigor of the professional work. In fact it is the responsibility of the employer to train the recruits to be professionally competent and they should not expect the university to do vocational training. The role of the universities largely is to mould the young minds to a critically thinking being. However, in the process, many architectural schools are thoroughly emasculated by the profession into mechanically churning out graduates who can readily be absorbed into the existing framework of professional practice (Mehta, 2002). He further claims that adopting to this complaint and demands for technical proficient graduates, is a symptom of a profession still paranoid about a possible challenge to its legitimacy from the engineer. It is acceptable that technical proficiency is indeed a prerequisite for practicing architecture but to be complacent by achieving that alone is to confuse the role of architect and his responsibility toward the society.

1.3 Method

This research was an attempt to review the present state of architectural education in Universiti Teknologi Malaysia, which has had scant changes for the past 30 years. The method implemented was by comparing the architectural education curriculum adopted by selected prominent schools of architecture. However the amount of Architecture Schools worldwide is endless and the types of curriculum that are offered vary tremendously from one another. This reflects the plurality and variety of architecture education on the global scale.

The process of determining the Universities is based on the reputation of each individual university, as well as its appropriateness in relation to the objective of the research. Since the internet is the main source of research, the relevant information on architecture curriculum of the correspondence universities was obtained from

their respective websites. Hence the information and descriptions of curriculum are based on the amount of details disclosed on their websites. Further, the descriptions of the curriculum were from 2003 to 2005 academic years, which may applicable for changes. Therefore acquiring complete and detailed information was limited to ten universities from South East Asian region, United Kingdom, America and Australia.

The analysis of the curriculum was based on;

- The requirements for recognition of Part1 and Part 2 courses stipulated by Royal Institute of British Architects (RIBA).
- Philosophy of the school
- Degree conferred

1.3.1 Selection of University

The selection of the Universities are based on the credibility, reputation and any unique or special characteristics which emphasize an extra edge in the education world as well as on the education system in their respective countries. The following universities were determined as potentially advantageous and worth of comparison with the UTM system and in general Malaysian education system as well as the existing demands of the profession. The respective Universities consist from eight Commonwealth countries and one from America. Among the Commonwealth countries six universities are from South East Asian region and each from United Kingdom, Australia and New Zealand respectively.

Table 1.1: Selected Universities and the Region

UNIVERSITY AND COUNTRY	
	SOUTH EAST ASIAN REGION
1	National University of Singapore
	Singapore
2	Chulalongkorn University Thailand
	Thailand
3	Chiang Mai University
	Thailand
4	National Cheng Kung University
	Taiwan
5	University of Hong Kong
	Hong Kong
	AUSTRALIA AND NEW ZEALAND
6	The University of Melbourne
	Australia
7	Victoria University, Wellington
	New Zealand
	UNITED KINGDOM
8	The University of Bath
9	Wales School of Architecture, Cardiff University
	UNITED STATES OF AMERICA
10	Yale University
11	University of Miami
	MALAYSIA
12	**Universiti Teknologi Malaysia, Malaysia**

1.4 Purpose of the Study

- To provide background material for development of a competitive and flexible curriculum thus improve the qualitative aspects of architectural education

- To review different approaches of curriculum and course structure together with their quality assurance frame work for conferring the correspondent degrees

1.5 Outline of the Report

The organization of the report is as follows;

Chapter one underlines in general the main issues of architectural education. This chapter also discusses the methodology adopted in selecting the case studies and the means of obtaining relevant data. The overall report structure is also presented in this section.

Chapter two reviews the historical background of architectural education. The accreditation of architectural education is also reviewed. Based on the accreditation requirement, appropriate criteria for validation to review the architectural curriculum were set in this chapter.

Chapter three is divided into two sections. The selected universities and their architectural programs were reviewed in the first section. Section two discusses the findings of the section one based on following aspects; curriculum, architectural degree conferred and the influence of accreditation on architectural education.

Chapter four presents the overall conclusion of the report.

CHAPTER II

LITERATURE REVIEW

2.1 Architectural Education: An Overview

The education of an architect, is a complex process that encourages students to develop new ways of seeing, thinking and doing in order to become capable and quality-assured designers of the built environment. Most architecture students enter higher education with little experience of architecture as a discipline, and therefore a large part of architectural education is concerned with the development of new cognitive abilities, values and conceptions. It is true that architectural education is almost universally project based, with the majority of activity centred on the design studio. The discourse on architectural education is dominated by tensions between the need to provide students with a broad liberal education and the vocational need to prepare students well for a professional career. Some of the questions raised by us are; what does a liberal education have to do with architecture? Why is it necessary for an architect to acquire competence in various disciplines?

There have been different connotations about architectural education at different time periods of human history. Vitruvius attitudes toward architectural education have been regarded as to be central rather than peripheral to architecture and architectural education. Vitruvius states in his *The Ten Books of Architecture* that persons "have no right to profess themselves architects hastily, without having climbed from (childhood) the steps of . . . knowledge of many arts and sciences (to) the heights of the holy ground of architecture." Further, Vitruvius says that the well educated architect should be "skillful with the pencil, instructed in geometry, know much history, have followed the philosophers with attention, understand music, have

some knowledge of medicine, know the opinions of the jurists, and be acquainted with astronomy and the theory of the heavens." And if it is not possible for an architect to be an expert in these various disciplines, it is nevertheless desirable that he be acquainted with them all; for all these studies "have a common bond of union and intercourse with one another," and "a liberal education forms, as it were, a single body made up of these members." Vitruvius's comprehensive view of architecture leads him to insist that architectural education be a comprehensive liberal education. Although the craft of building, the knowledge of materials and how to put them together, seems to be missing from all this, it too is implicit in Vitruvius's concern for durability and is addressed explicitly in his book; for, as he says, "knowledge is the child of practice and theory . . . (and) those who have a thorough knowledge of both have the sooner attained their object and carried authority with them."

In addition to Vitruvius's theory, there had been several other patterns of architectural education. The European tradition which followed Ecole's philosophy of "Beaux Arts system". The cornerstone of the Beaux Arts system was the "design problem" assigned to the student and carefully developed under close guidance. The Beaux Arts teaching systems relied heavily on brilliant teachers and learning-by-doing. Competition was intense and the end results were beautifully drawn projects in traditional styles which were often defensible only on grounds of "good taste" and intuition. Projects were judged by a jury of professors and guest architects, usually without the students present. The jurors used the same criteria by which the students designed-"good taste." In most Asian schools adopted the European system under the British colony. Hence most schools still use some type of "jury" or review system today.

In contrast to Beaux Arts system, practical education system was adopted in most American schools. This contrasted strongly with European traditions that more clearly separated education and training. In other words, at the university you were "educated," and, once in the office, you were "trained." . Nevertheless later the Americans borrowed the European standard and settled on the prestigious Ecole des Beaux Arts in Paris as the ultimate in architectural training.

By the beginning of twentieth century, like all emerging disciplines, architectural education grew up under very different roofs on different campuses, usually depending on the nature of other colleges already established at the time the decision was made to offer architecture programs. There are separate and autonomous schools or colleges of architecture; departments and programs within graduate schools; schools of art or design; schools oriented toward engineering, technology, or sociology; and, more recently, schools of urban planning and design.

At the same time with the advent of modern movement, architecture education was influenced by this trend. Thus the schools in Europe and in United states start to adopt two basic elements of the "modern" movement in architectural education. These are affiliation with all the allied arts (painting, crafts, sculpture, etc.) rather than with engineering, and a non-competitive, individual approach to learning. In 1919 apart from the French methods (Beaux Arts system), a modern German movement exemplified by the Bauhaus school, influenced the education system throughout the world. According to Walter Gropius (founder of Bauhaus school) , 'design was neither an intellectual nor a material affair but simply an integral part of modern concepts of mass production and modern technology', which the Beaux Arts had refused to accept. Instruction at the Bauhaus was of a practical nature, providing actual work with materials in the shops and on buildings under construction.

The last 30 years have demonstrated rapid developments in the field of architecture and pedagogical conflicts in meeting the current professional requirements. In the forties, Harvard's Joseph Hudnut made a list of all the subjects that he deemed essential for a sound and complete architectural education. When the list was complete he calculated the length of time it would take to learn everything on it-22 years. As the architectural curriculum expanded beyond the art of rendering to include utilitarian subjects such as mechanical equipment and structural analysis, the standard programs began to bulge in schools of architecture and universities. Architecture currently continues to increase in complexity. Perhaps the most complex issues in recent architecture are not new at all but rather matters that were obvious to any sharp observer all along. These are the impacts of social,

psychological, political, and economic issues on the built environment. A work of architecture, like any other human artifact, embodies values and cultural priorities. Thus, architectural education has been translated from a setting of vocational training in distinct schools to university-based professional education. This change of context has required architecture schools to conform to different expectations within university settings. Concurrently, the profession demanded that graduates be competent in practice, ready to deal with other professionals and clients, emphasizing a more practice-oriented curriculum.

2.2 Accreditation

Professional disciplines need accreditation. Accreditation is the establishment or re-statement of the status, legitimacy or appropriateness of an institution, programme (i.e. composite of modules) or module of study (Harvey, 2003).

Institutional accreditation effectively provides a licence to operate. It is usually based on an evaluation of whether the institution meets specified minimum (input) standards such as staff qualifications, research activities, student intake and learning resources. It might also be based on an estimation of the potential for the institution to produce graduates that meet explicit or implicit academic standard or professional competence (Harvey, 2003). It is worth emphasizing that schools of architecture are not accredited - only specific professional degree programs are accredited.

Programmes may be accredited for their academic standing or they may be accredited to produce graduates with professional competence to practice; usually referred to as professional accreditation. Thereby the appropriateness of the programs was judge on their ability to prepare the graduates to enter a profession.

The selection of Universities for higher education is largely depending on the recognition element. Most students prefer to enrol for an 'accredited professional

degree program'; thereby they will be able to obtain professional recognition at the end of their study tenure. Thus, professional accreditation is a tool of marketing device of the programme and that failure to achieve accreditation would be problematic. In other words, it does also provide an ancillary means of verifying that the programme is adequately, if not fully, 'in touch' with the professional 'real world out there'.

In addition, programme accreditation also set to safe guard the public interest, and represents the interest of the professional practitioners indirectly through the professional body. It also enables professional and regulatory bodies to control access to the profession by making accreditation of the programme a prerequisite for graduate entry. In most Asian and commonwealth countries, academic accreditation of programmes is about ensuring adequate standards, a function fulfilled, in effect, in the UK by the external examining system.

Validation systems can play a significant role reconciling the tensions between education and practice. Professional accreditation through validation review is different in nature. Validation of architectural education typically focuses only on *learning outcomes* and hence is usually based on a process of scrutinizing educational programmes based on students' accomplishments (Kvan, Thomas and Thilakaratne, Ruffina, 2003).

Accreditation services are now increasingly seen as an international service. For example, the RIBA and the CAA are the key professional bodies that perform accreditation beyond their original national borders; these two bodies provide services widely in Asia. Where local systems have evolved, the practices of long-established accreditation systems are still highly influential. Local validation systems practiced in Asia are highly influenced by these validation systems, for example, the systems used in Malaysia are closely modeled on current practice in Britain. Therefore, changes to validation systems in Britain will have profound and widely felt impacts elsewhere. Similarly, the National Architectural Accrediting Board (NAAB) is the sole agency authorized to accredit US professional degree programs in architecture.

Although validation systems are expected to play a role reconciling tensions between education and the practice, criteria indicated by the ARB, RIBA and NAAB have indicated a friction between education and practice.

2.3 Appropriate Criteria for Validation

The common objective of higher education quality assurance systems, local professional or international professional validation systems is to maintain standards of education. These standards are accepted as goals and objectives collectively defined by stakeholders of validation processes; for professional courses, these stakeholders are typically limited to the professional bodies and peer institutions of learning. Quality assurance systems adopt different mechanism to accomplish their objectives.

In 1956 Bloom presented educational objectives as outcomes that students are expected to achieve. Since then there has been discussion on replacing objectives with learning outcomes (Miller et al. 1998). Bloom presents a comprehensive classification of educational objectives. Bloom (1956:7) reports three major taxonomies: cognitive objectives, affective objectives and psychomotor. Cognitive objectives refer to thinking skills and ability to manipulate knowledge while affective objectives referring to attitudes and values, e.g. developing desire to read is an affective objective and developing reading skills or ability to recite are cognitive skills. The psychomotor domain is skill based. The student will produce a product. The three practical instructional levels include *imitation, practice,* and *habit.* Bloom refers to six levels of objectives in the cognitive domain: knowledge, comprehension, application, analysis, synthesis and evaluation. Knowledge in Bloom's taxonomy refers to awareness that is considered as the lowest level while evaluation referring to the highest level of cognition. The objectives of the six are as follows:

Knowledge: Knowledge is regarded as the lowest level of cognitive objective, which is considered to be the easiest to test (Miller et al. 1998). Knowledge

refers to the ability to recall and remember information without necessarily understand it and includes behaviours such as describing, listing, identifying and labelling.

Comprehension: A low level understanding that include understanding learned material, translating, interpreting and extrapolation. This also involves behaviours such as explaining, discussing and interpreting.

Application: Application is the ability to put ideas and concepts to work in solving problems. It includes behaviours such as demonstrating, showing and making use of information.

Analysis: Analysis involves breaking down information into its component parts to see interrelationships and ideas among the elements. Related behaviours include differentiating, comparing and categorizing.

Synthesis: Synthesis is the ability to put parts together to form something authentic. It involves using creativity to compose or design something new.

Evaluation: This involves judging the value of evidence based on definite criteria. Behaviours related to evaluation include concluding, criticizing, prioritizing and recommending.

The above categorization was the first attempt to classify learning behaviors and provide concrete measures for identifying different levels of learning. The development of taxonomies is closed related to the use of instructional objectives and the systematic design of instructional programs. These different levels of knowledge are considered as a foundation to analyze the professional knowledge and competence expected by the NAAB and ARB/RIBA system.

2.3.1 National Architectural Accrediting Board (NAAB), United States

The NAAB list of performance criteria begins with fundamental skills and knowledge, continues with technical skills and knowledge, and concludes with a focus on practice and societal roles. This sequence is intended to foster an integrated approach to learning that cuts across subject categories. These criteria encompass three levels of accomplishment.

Awareness: familiarity with specific information, including facts, definitions, concepts, rules, methods, processes, or settings. Students can correctly recall information without necessarily being able to paraphrase or summarize it.

Understanding: assimilation and comprehension of information. Students can correctly paraphrase or summarize information without necessarily being able to relate it to other material or see its fullest implications.

Ability: skill in relating specific information to the accomplishment of tasks. Students can correctly select the information that is appropriate to a situation and apply it to the solution of specific problems.

The NAAB intends to establish performance criteria that assist programs in preparing students for the broad requirements of the profession, while also encouraging educational practices suited to the circumstances of particular programs. In addition to assessing whether student performance meets the expectations of professional education outlined by the criteria, the visiting team will also assess performance in relation to the program's stated curricular goals and content.

2.3.2 Architects Registration Board (ARB) and Royal Institute of British Architects (RIBA)

The criteria for validation adopted by the Royal Institute of British Architects (RIBA) for the recognition of Part 1, Part 2 and Part 3 are considered five thematic headings: Design, Technology and Environment, Cultural Context, Management Practice & Law and Communication. The RIBA Part 1 is considered as the first degree course which covers the technical and theoretical aspects of architectural design. The RIBA Part 2 which is considered as the second degree is concerned with broadening the design consciousness and ability. It is also important to note that the analysis of the curriculum is based on subject modules and not on the number of credits. This method was adopted as all schools do not follow the credit system in their assessments. The Part 3 provides the required academic qualification and eligibility to become a 'Corporate member of the professional body'. A new detail description of a common validation criterion is formulated by the RIBA and the ARB for the benefit of all involved in architectural education is included in appendix A.

The new criteria differ from those previously published by the RIBA in that:

- Separate requirements for Parts 1, 2 and 3 are clearly stated stipulating the progression required between these three key stages of an architect's education;
- Greater emphasis is placed on ***knowledge*** and ***understanding*** of Technology and Environment and the ***ability*** to integrate this within design projects;
- Management, Practice and Law have a higher profile at Parts 1 and 2 than previously;
- The opportunity to pursue related, specialist and optional studies is stipulated as a requirement of the criteria.

The required level of achievement and student progression through the course of study is indicated by the accomplishment of following taxonomies:

Awareness: acquaintance with general concepts, topics, rules, methods or procedures, without necessarily being able to paraphrase or summarize information.

Students should be able to identify the limits of their awareness and be able to refer to source material for more in depth knowledge.

Knowledge: familiarity with specific information, including facts, definitions, rules, methods, process or settings, without necessarily being able to see its fullest implication or application.

Understanding: identification, assimilation and comprehension of information. Students can correctly paraphrase or summarize information and can relate it to other material, including its practical application.

Ability: skill in relating specific information to the accomplishment of tasks. Students can correctly select information that is appropriate to a situation and apply it to the solution of specific problems.

Different schools adopt different routs to architectural education depending on the country and cultural backgrounds. However, variations in educational practice and innovations in academic programs must not compromise the delivery of the essential content of requirements. Since, most of United Kingdom, Asian, Australian and other Commonwealth countries refer to RIBA validation; this study will be based on the above validation criteria to evaluate the architectural curriculum in selected universities. The evaluation of twelve universities including Asia, Australia, New Zealand, United Kingdom and United States will be discussed in the following chapters.

CHAPTER III

SURVEYS OF ARCHITECTURAL PROGRAM

This section reviews the selected architectural schools, the philosophy and the curriculum in order to understand the pattern of architectural education in each region. This will be followed by a discussion to identify aspects of related subjects, types of architectural degrees and influence of professional accreditation on architectural education.

3.1 Overview of University and Architectural Curriculum

Evaluations of architectural education in selected schools were carried out in three parts. The first section reviews the historical background of the university and the faculty of architecture. In the second section, philosophy of the university and the faculty were reviewed. Finally, the curriculum is analyzed to understand the appropriateness, competitiveness and flexibility of the architectural education. These factors were determined based on the RIBA validation criterion and the distribution of subjects at each year of study.

The subjects were evaluated in two forms; first, based on RIBA criterion, number of subjects was categorized at each year of study. Secondly, each subject was evaluated based on the overall number of subjects for the respective degree levels. This was indicated in percentage value.

The core and elective subjects were reviewed for each year of study. This enables to understand the pattern of distribution of subjects as well as to understand the organization of the curriculum of correspondent universities. The following colour codes are used to designate each subject.

Table 3.1: Main subjects and their respective colour codes

Criteria For Validation	Colour Code
Design	
Technology & Environment	
Cultural Context	
Communication	
Management Practice & Law	
Other Subjects	
Elective Subjects	

3.1.1 National University of Singapore – Singapore

3.1.1.1 Overview

National University of Singapore was first established in 1958. The Architecture faculty of National University of Singapore is still the only architecture school in Singapore. Its history began at the Singapore Polytechnic. In June 2000 it was reorganized from School of Architecture as to the "Faculty of Architecture, Building and Real Estate" into the Department of Architecture of the School of Design and Environment (SDE).

3.1.1.2 Philosophy

The mission of the Department is "To foster a creative and intellectually vibrant environment with a global outlook that would establish design and professional excellence in New Asian Tropical Architecture".

3.1.1.3 Curriculum

The Department of Architecture of National University of Singapore offers two undergraduate degrees namely; Bachelor of Arts (Architecture) honours degree and a Bachelor of Arts (Architecture) without honours degree. The BA (Arch) is a 4-year Bachelor of Arts (Architecture) course leading to the following classifications- First Class Honours, Second Class (Upper) Honours, Second Class (Lower) Honours, Third Class Honours and Pass. However, a student may be permitted to graduate with a BA (Arch) degree without honours at the end of the third year provided certain conditions are met. Graduate of this course will have RIBA Part 1 accreditation. The BA (Arch) degree without honours is a 3 year course which includes a total of 132 module credits. The students are required to attain a CAP of at least 2.0 at the completion of the study. The BA (Arch) course is the undergraduate program which provides the foundation for students to further their studies in the professional courses leading to the practice of Architecture, Planning, Urban Design and other related areas of studies and professions. The BA (Arch) course operates under the modular system, which offers Essential Modules, General Education Modules (GEM), Singapore Study Modules (SS) and Unrestricted Elective Modules (UE).

The degree program for Master of Architecture is the final year of the architecture course following a four-year undergraduate honours course in architecture. Students who have fulfilled the graduating requirements for the four year undergraduate honours programme are eligible for the M (Arch) Programme. Graduates of this course will have RIBA Part 2 accreditation and a prerequisite degree for professional registration in Singapore. The one year course includes three core modules; Architectural Practice, Dissertation and the Design Thesis.

Design modules are taught through design studios. Critique sessions will form part of the studio procedure in teaching. Lecture modules include formal lectures, followed by seminars/tutorials. Field trips, site visits, measurement and study of buildings for research, investigation and documentation may be involved.

a) Distribution of Subjects

The course curriculum is structured in two modules under the 'University requirement' and 'School and Department Programme Requirements'. The major five disciplines of core subjects are included in the School and Department program. The core subject is Design supported by a range of essential subjects to form the basic framework for a strong foundation program in architectural studies. However the less emphasis is given to communication, professional studies and management subject areas. This stresses that at undergraduate level the most important aspect is to orientate the course towards design related subjects than profession oriented matters. The program is well established with the mission of the school and focus the student towards the achieving the mission.

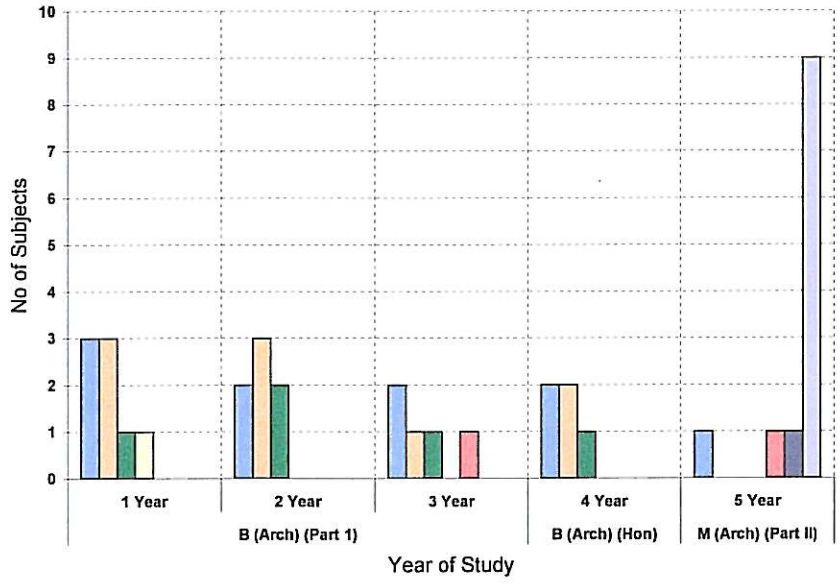

Figure 3.1: Distribution of Subjects, National University of Singapore

Figure 3.1 illustrates distribution of subject at each study year. The design subjects are included in all five years of study. Further, technical and cultural subjects are also integrated with design subjects in the first four years of the course. It is important to notice that communication subjects are introduced only in the first year. Professional related subjects are introduced at third year which is the final year of the first degree. Even if the student is unable to continue the study, the basic

knowledge of profession enables him to be an eligible contender in the professional field. The number of design subjects reduced with the year of studies. In the fourth year the syllabus further strengthens the theoretical studies and offered with honours degree. All design related core subjects are completed by the end of the fourth year and in the final year (fifth year) the students will be concentrating on the final design project and on the dissertation. However, elective subjects were introduced at the Masters' degree level to further strengthen the students' knowledge on specific area of studies. In the first semester the students will be entitled to gain practical working experience in an architectural firm before they return for the final year project.

The curriculum offers several options for the candidate to pursue in the field of architectural profession. At the end of first three years of studies the students are accredited with RIBA part I and a Bachelors degree. Completion of fourth year offers a Bachelors degree with honours, which will permit the student to obtain a Masters degree within a one year. The Masters degree is accredited with RIBA part II and primarily a professional course. Hence within five years the student is able to complete two degree courses and be exempt from part I and part II professional exams. Therefore the Architectural program at NUS can be recognized as 3+1+1 program.

According to figure 3.2, design and technological consist of 35% of overall subjects taught in the first three years. Communication and professional practice subjects had the least interest (5%) during the first three years. At honours level only design, technical and cultural subjects were continued. The program also does not include any elective subjects at undergraduate level. At Masters Level the core subjects are limited to design and professional practice, however numbers of elective subjects (75%) were introduced making the curriculum flexible for the students.

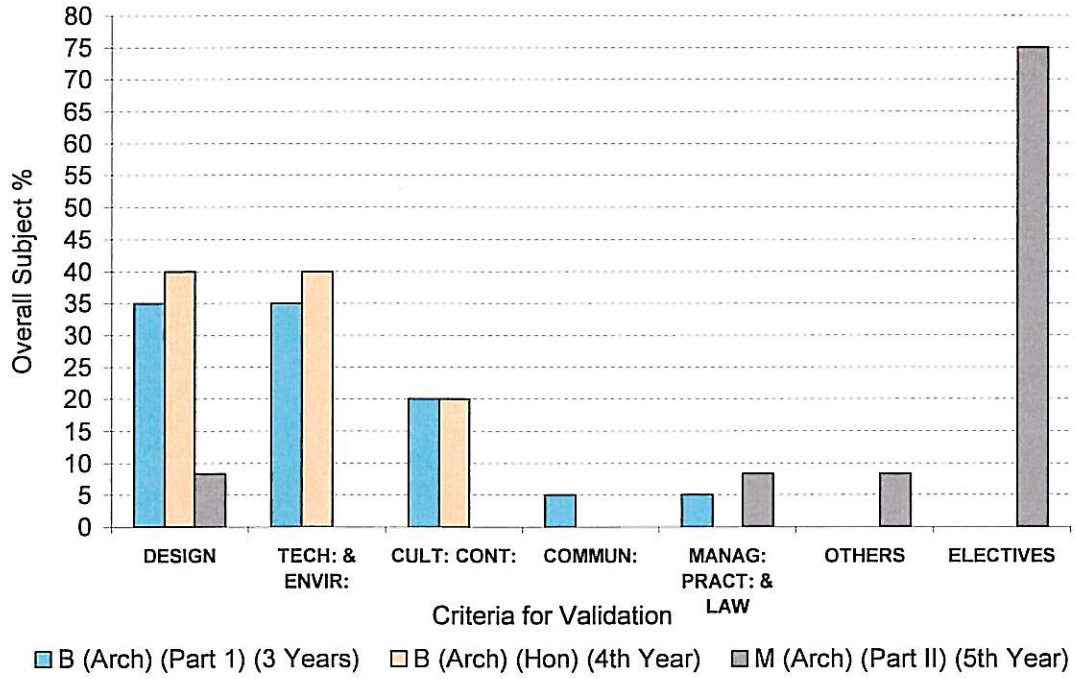

Figure 3.2: Overall percentage of subjects at each degree level, National University of Singapore

3.1.2 Chulalongkorn University Thailand – Thailand

3.1.2.1 Overview

Chulalongkorn University, Thailand's first institution of higher learning officially came into being in March, 1917. The groundwork and preparation for it in terms of planning and development, however, took place more than a century ago. Thus King Chulalongkorn (Rama V) has royal policy to strengthen and improve government so that the country could successfully resist the tide of colonialism. One of the major parts of the policy, which would later prove to be deep-rooted and highly effective, was to improve the Siamese educational system so as to produce capable personnel to work in both the public and private sectors. As a result, a school was founded in 1871 at the Royal Pages Barrack within the Grand Palace compound. After the Civil Service College had been in operation for some time, King Vajiravudh considered that it had achieved a level of readiness. Therefore, he

declared that it should become Chulalongkorn University, in honour of King Chulalongkorn,on March 26, 1917.

The Faculty of Architecture was originally founded in 1930 when it was first established as the School of Architecture within the National School of Arts and Crafts. Two years later, it was transferred to Chulalongkorn University where it became Department of Architecture in the Faculty of Engineering. Its curriculum consisted of a three-year program of studies towards a Diploma in Architecture. In 1934, it became an independent department with a separate administrative body. Then finally, in 1939, it was granted the status of a Faculty. As a result, a five-year program of studies was offered leading to a Bachelor of Architecture Degree. In 1972, a two-year Master's Degree program was first offered and in 1990 Ph.D. programs in Architecture and Urban and Regional Planning were first offered.

3.1.2.2 Philosophy

The basic goals of the university are to break new ground, search for, uphold and transmit knowledge along with ethical values to university graduates so that they are endowed with conscience and intelligence. Most significant is the knowledge that contributes to the prosperity of individuals and society at large, deriving from diverse academic disciplines which are instrumental in the conduct of livelihoods. As for ethical standards, Chulalongkorn deems it a duty to instil into its graduates self-knowledge, inquisitiveness, constructive initiatives, circumspection, sound reasoning, sense of responsibility, far-sightedness, morals and devotion to the common good.

3.1.2.3 Curriculum

The Department of Architecture offers both Bachelor's and Master's degree programs. There are two options within the Bachelor's level; Architecture and Thai

Architecture. The master program also consists of eight options: History and Theory in Architecture, Architecture and Urban Conservation, Thai Architecture, Architectural Construction Technology, Architectural and Environment Technology, Computer Aided Architectural Design, Architectural Design and Architectural Management. The official language of instruction is Thai.

Candidates for any Bachelor's Degree Program have to pass the national entrance examination organized by the Ministry of University Affairs. Candidates for a Master's Degree have to pass a written and oral exam organized by the Graduate School and the Department.

The Faculty of Architecture offers a five-year architectural study leading to the Bachelor of Architecture degree. The objective of the undergraduate curriculum is to provide the students a balance approach to architectural design based on developing creative ability, design theory, architectural history, construction, environmental technology as well as arts and cultural competence. Within five years of the undergraduate study, the students are required to complete 177 credits of which 81% are compulsory courses required by the Department of Architecture, 17% are of general education such as English language courses and mathematics. The 3% left are designated for general electives.

The Master of Architecture program consists of 36 credits of courses in which 12 credits are required courses and 12 credits are elective courses. In the final year, a candidate must submit an acceptable thesis for 12 credits.

Each academic year divided into two semesters include first and second semester. And if necessary, summer semester may be offered after the second semester. Each semester consists of no fewer than 15 weeks. Summer semester consists of about 6-8 weeks.

a) Distribution of Subjects

The subject criteria for undergraduate and master's degrees are similar to the RIBA format for part 1 and part 2 professional requirements respectively. Although the school does not directly apply the RIBA criterion as a bench mark, the student has to complete both degrees to qualify as candidate for the professional exam. The main emphasis has been on design and technological subjects at undergraduate level (figure 3.3). The cultural and communication subjects also were considered as core subject. However, a basic knowledge on the professional aspect is taught at this level. This emphasis that the course is more design oriented than on the profession at undergraduate level. The curriculum also has created opportunity to select certain elective subject which gives more flexibility for the students.

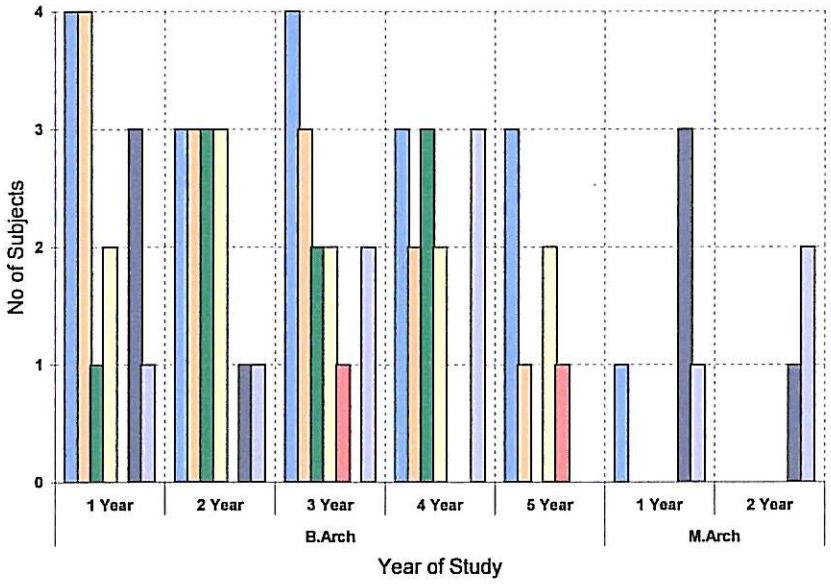

Figure 3.3: Distribution of Subjects, Chulalongkorn University, Thailand

According to figure 3.3 main core subjects such as design, technical, cultural and communication are included from first year until the fourth year. In the third year professional practice is introduced and all the core subjects were included. In the first year more emphasis were given to design, technical and other subjects. It is important to notice that cultural subjects continue till fourth year and the communication subjects were taught in fifth year as well. The students are given

choices with elective subjects until fourth year in undergraduate level. Professional practice is included in third and fifth years only.

At masters' degree level the only design is included as core subject and rest of the subjects are research oriented. Therefore all those subjects are categorized as others and electives.

The master degree program consists of three modules: core modules, selective modules and the final thesis. The curriculum is more oriented to develop the students in research and also to demands of professional organizations. The core module incorporates four subject areas: methodology in architectural research, development of architectural knowledge, seminar on architecture and advanced architectural studies.

The department divided selective modules into eight groups for students' emphasis. Students can select modules within or among groups. In case of emphasizing on any particular field, no fewer than 2 modules in a group must be selected. The options consist of the following subject areas: History and Theory in Architecture, Architecture and Urban Conservation, Thai Architecture, Architectural Construction Technology, Architectural and Environment Technology, Computer Aided Architectural Design, Architectural Design and Architectural Management. However based on the amount of subject been taught this can be further categorized into three main areas: technology, cultural studies and professional practice. Thereby the curriculum is oriented to prune the students in technical aspect, better understanding of the Thai culture, the social structure and finally to be professionally competent. This enables master graduates for the demands of any organizations and to be more research oriented which is in line with the philosophy of the university.

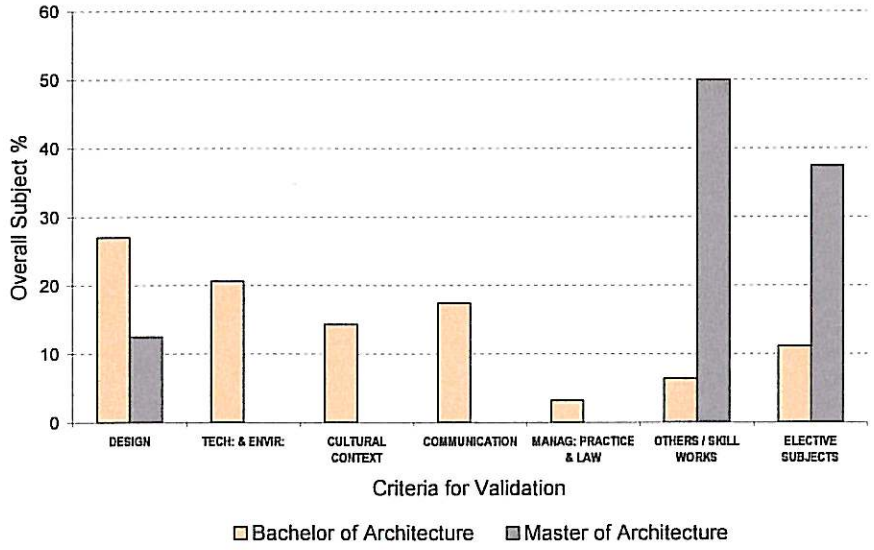

Figure 3.4: Overall percentage of subjects at each degree level, Chulalongkorn University, Thailand

Figure 3.4 indicates that design has the highest percentage (27%) of overall subjects at undergraduate level. This is followed by technological subjects (20.6%), communication (17.5%) and history and culture related subjects (14.3%). However lowest overall percentage was indicated for management practice and law subjects. Design subjects indicated a 12.5% at master's degree and is the only core subject included. The general university (other subjects) and elective subjects resulted 50% and 37.5% of overall subjects. This shows that the master's curriculum has a more liberal approach than the first degree program.

There is lack of data and information regarding the accreditation of the degree conferred and the Thai architectural practice. However, the curriculum has maintained an equal weight of the main core subject in the undergraduate course. Further, the curriculum has given opportunity to broaden the knowledge in the field by introducing several elective subjects at undergraduate level.

3.1.3 Chiang Mai University –Thailand

3.1.3.1 Overview

The Ministry of University Affairs endorsed the founding of a Department of Architecture as part of the Faculty of Fine Arts, Chiang Mai University, on April 5, 1992. In September 1992, a committee was formed to begin the establishment of the Department of Architecture and start the planning of the program curriculum. The department began offering the first-degree program in Architecture in June 1995; however it was not until October 12, 1995, that the Department was officially founded. On December 23, 1996, the idea of founding a Faculty of Architecture was approved and on May 22, 1997 the Office of the Deputy Director of Chiang Mai University approved the establishment of the Faculty of Architecture, however due to the economic crisis in Southeast Asia this was subsequently postponed. The Faculty of Architecture was officially established on June 3, 2000 after moving into its own purpose-built building in July 1999. The faculty is part of Chiang Mai University and is a government unit, but is partially financially independent, therefore, is different than most faculties.

3.1.3.2 Philosophy

The motto of the Faculty of Architecture is in Sanskrit, the languages of Buddhism, because the founding committee wanted to profess a conduct based on Dharma and hopes that this motto will become the pattern of conduct for faculty members, officials, graduates, and students. It is the utmost goal of the faculty to set standards, discipline, and ethics in the profession through its graduates so they can contribute to a good quality of life for all the people of Thailand. The meaning in English is basically "Complete everything with high standards, to the best of your ability, appropriate to the task, with dignity and pride." The multiplicity of interpretation of the symbol is by itself a symbol of freedom of creativity which is indefinite and which has no boundaries. This freedom is in harmony with the faculty's philosophy, which emphasizes learning strategies, thinking, and research for

the individual's highest level of creativity, rather than teaching architecture per se. The faculty does not intend for its graduates to become merely "builders", but rather "creators" of meaningful architectural works for their society.

3.1.3.3 Curriculum

The Bachelor of Architecture curriculum is a five-year programme with 178 credit hours consisting of 34 credit hours of General Studies, 30 credit hours of Core Courses, 108 credit hours of Major Electives and 6 credit hours of Free Electives. A lecture class comprises of 3 credits, a lab class 6 credits and a thesis class 12 credits.

Students study about history and technology to support their study of theories and philosophy of contemporary architectural design, which is an amalgam of local and Western architecture. Lanna architecture of the region is used as case studies and exercises in their studying and researching. It is hoped that this combination will enable students to reach an understanding of design and that they learn to employ imagination in creating works which come from the highest level of their intellect. Their works should also be appropriate to their community, society, culture and tradition, as well as promote Thai arts and culture and permanently preserve the environment. Moreover, the curriculum aims at producing qualified, moral, and ethical, architects who can provide qualified services to their society and who obtain international standard of expertise.

Applicants to the Bachelor Programme are normally required to complete grade 12 (students are usually 17 or 18 years old) through the Thai central entrance system. Currently, admission for exchange students is made on a course-by-course basis.

The Master of Architecture (M.Arch) is research oriented and designed to strengthen the integrative study of local intelligence and global technology in architecture. The two-year program includes coursework and research totaling 36

credit hours, consisting of 9 credit hours of core courses, 12 credit hours of major elective courses, 3 credit hours of free electives and 12 credit hours for the thesis. The program provides opportunities for students to study and conduct research at Chiang Mai University, as well as to study and conduct research abroad for up to 5 months under the Sandwiched Graduate Programs.

Applicants should be graduates with a Bachelor of Architecture or equivalent qualification. Annual admission is taken once a year, November through January. Applications can be made in person or by postal mail to the Chiang Mai University Graduate School. Admission procedures consist of an application review, document evaluation, interview and consideration of professional experience.

a) Distribution of Subjects

Figure 3.5 indicates that design subject continues in all five years of study. In third and fourth years number of design related subjects are increased. Further in the first year, subjects other than core and elective were given higher priority. The technological subjects are introduced only on second year and continue in third and fifth year. Subjects relating to management practice are introduced only in the fourth year, thus it indicates that the curriculum mainly has theoretical and design based approach. Further the subject categories reduced to three in the final year of the undergraduate study. However, the student has to complete five years of study in order to obtain his first degree. In other words the curriculum does not provide options for the students and is less flexible.

The hierarchy order of the core subjects stands as design (34%), technical subjects (20%), communication (13%), cultural studies (8.5%) and professional studies (2%). The elective and other skill indicate 13% and 11% of overall subjects respectively (figure 3.6). This indicates that the curriculum is primarily design oriented and theoretical based. Also less emphasis is given on the professional knowledge.

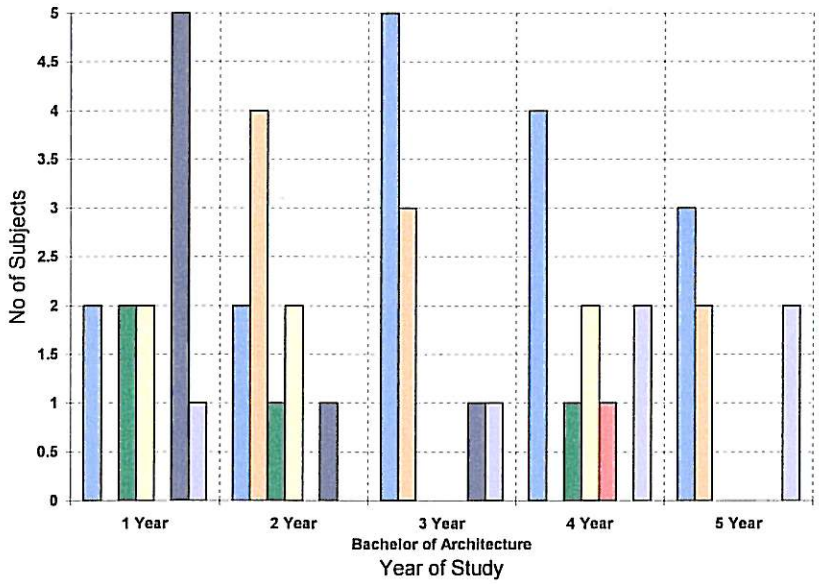

Figure 3.5: Distribution of Subjects, Chiang Mai University, Thailand

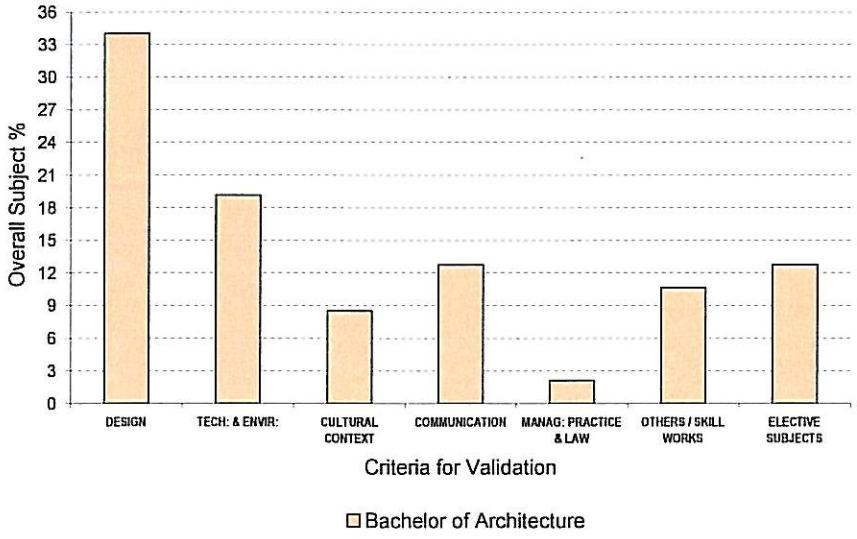

Figure 3.6: Overall percentage of subjects at undergraduate degree level, Chiang Mai University, Thailand

3.1.4 National Cheng Kung University – Taiwan

3.1.4.1 Overview

The School was established as Tainan Technical College in 1931 and located on the present Cheng-Kung Campus. In 1942 the school was renamed in Japanese but its English name was unchanged. In 1946 the school was renamed as Taiwan Provincial Tainan Junior College of Technology and later on the same year upgraded to Taiwan Provincial College of Engineering School. The engineering school consisted of six departments: Mechanical Engineering, Electrical Engineering, Chemical Engineering, Electro-Chemistry, Civil Engineering, and Architectural Engineering. In 1956 the school was reformed as Taiwan Provincial Cheng Kung University.

The Department of Architecture, established in 1944 under the name of Architectural Engineering, is the first institute of architecture at college level in Taiwan. By 1968 the Master degree was offered for the mastery of professional knowledge and skill in design and technology. The Doctoral program was later established in 1991 for advanced studies in academic research. Among the hallmarks of architecture education at NCKU are the establishment of the nation's first undergraduate major in architecture program, the first Master program, and the first PhD program. Benefiting from the special collaborations fostered in a university of science and technology, the Department continues in the forefront of architecture education in the nation.

3.1.4.3 Philosophy

The central theme of the educational programs is first, to broaden students' views and deepen their understanding about the natures of the living environments, and secondly, on the basis of such views and understandings to equip them with profound knowledge and professional skills to intervene. The common base is commitment to cultivation of the mind and the spirit of students in the framework of

values that is humanistic-ally, socially, and environmentally responsible. Through carefully structured courses, students will intellectually advance not only their domain knowledge but also their analytical, organizational, and imaginary capabilities that are the fundamentals to their future developments in design and design-based research fields.

3.1.4.3 Curriculum

The Department offers undergraduate, graduate, and PhD degrees. At the undergraduate level, students enrol in a 4-year program leading to the Bachelor of Science (BS) in Architecture degree. Master of Science (MS) degrees are offered in the area of architectural design, environmental planning, and building technology. Admission to the master of architecture programs requires prior completion of at least a 4-year undergraduate major in architecture or a bachelor's degree in a related field. PhD degrees are offered for those who have potential and interest to engage in advanced research and teaching. The program is competitive for applicants holding a master degree or equivalent.

The undergraduate program is mainly focusing on the liberal education along with basic professional training. To achieve this goal, the mandatory core courses are reduced to the extent that will provide students with entry level practice competence and background knowledge for advanced studies. The elective program is expanded to allow some concentration of study in certain area for the development of special interests.

The diversity of working approaches and positions in the department makes possible a variety of career developments and academic programs. The most shared value in the graduate program is to develop attitudes of responsibility for leadership in each disciplinary field, and the attitudes that will lead to the advancement of knowledge and the professional arts.

a) Distribution of Subjects

In Taiwan National Cheng-Kung University, the curriculum is mainly focused on design, technological and cultural aspects (figure 3.7). The design subjects in the undergraduate level have an average of three subjects per each year. In the second and third years more emphasis is given on technological subjects. However, the final year in the undergraduate the management and profession related subjects are given main concern. The number of subject categories remained at four in the first two years and in the final two years the subject categories were increased to five. Increase number of technological studies indicates that the curriculum is very appropriate in preparing the students to be design and technologically competitive.

The Masters Degree curriculum further strengthens the design and technological studies. Also all the core subject areas are included in the degree program. It is important to note that both undergraduate and graduate curriculum are structured into three courses namely distribution courses, concentration courses and elective concentration courses. However, with the data obtained it has been difficult to differentiate the subjects into the above categorization. Based on the objectives of the department the undergraduate and graduate programs are mainly focusing on the liberal education along with basic professional training. To achieve this goal, the mandatory core courses are reduced to the extent that will provide students with entry level practice competence and background knowledge for advanced studies. Further the elective program has been expanded to allow some concentration of study in certain area for the development of special interests.

In the undergraduate and graduate curriculum, design and technological subjects are integrated with over 50% and 74% subjects included in respective degree levels. In addition cultural subjects at undergraduate level and professional subjects at master's level also indicated more than 15% of overall subjects. Thereby the curriculum is competitive in term of design and technological aspects.

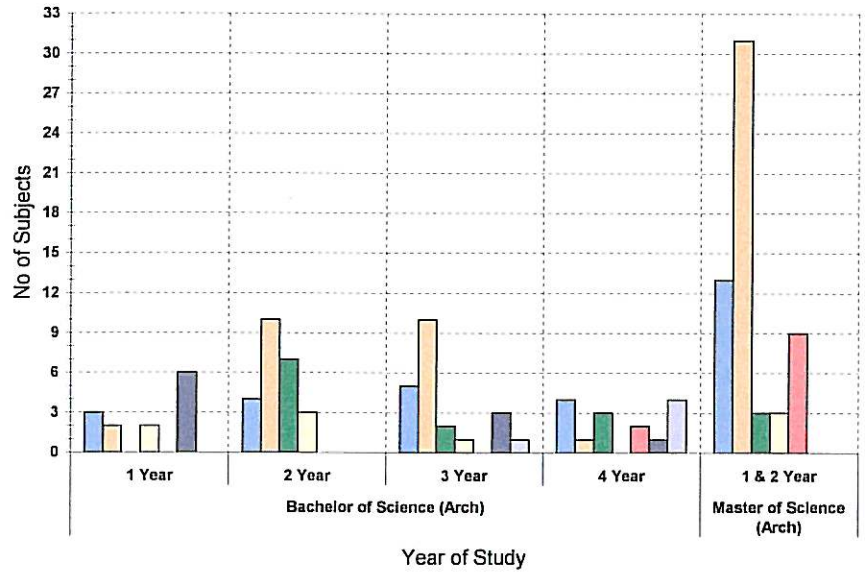

Figure 3.7: Distribution of Subjects, National Cheng-Kung University, Taiwan

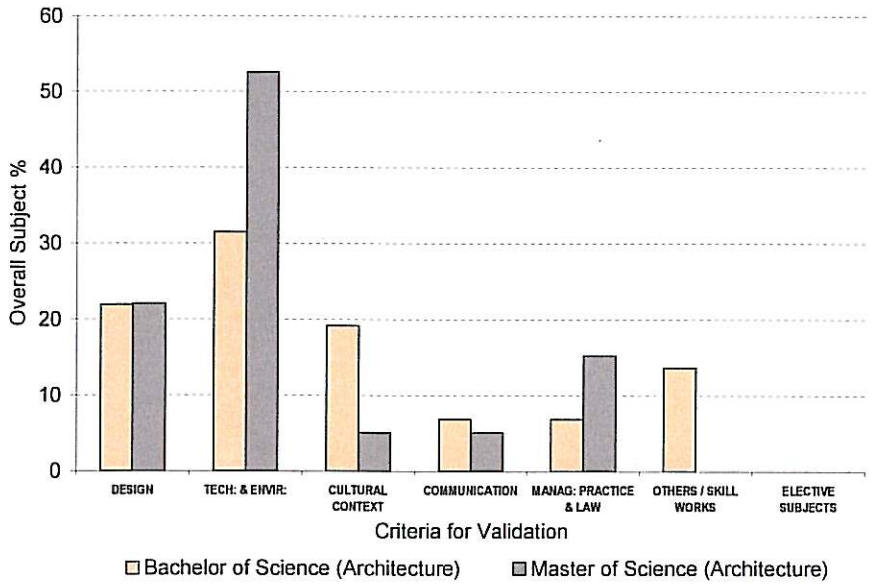

Figure 3.8: Overall percentage of subjects at each degree level, National Cheng-Kung University, Taiwan

3.1.5 University of Hong Kong – Hong Kong

3.1.5.1 Overview

The University of Hong Kong is the oldest tertiary education institution in Hong Kong. On March 16, 1910, Sir Frederick Lugard, the then Governor of Hong Kong, laid the foundation stone for the University, signifying the birth of Hong Kong's first tertiary institution.

On March 11, 1912, the University launched its official opening with its founding Faculty of Medicine which had evolved from the Hong Kong College of Medicine, founded in 1887. Of the College's early alumni, the most renowned was Dr Sun Yat-sen, 'the founder of modern China'. The Faculties of Engineering and Arts were established within a year of the official opening.

The University of Hong Kong started to provide professional education in architecture in 1950. Since then, the teaching of architecture has grown steadily and diversified to include, in 1975, a building programme, which later developed into the current surveying programme. As part of this continuing development, the Faculty of Architecture was established in 1984 from the former School of Architecture to provide professional education in both architecture and surveying. The Faculty of Architecture now has two departments, the Department of Architecture and the Department of Real Estate and Construction. It is well equipped with its own studio facilities and laboratories, computer facilities, workshops, photographic and reprographic units. All facilities, including the Faculty Office, are located in the Knowles Building.

3.1.5.2 Philosophy

The University of Hong Kong will endeavor:

- To advance constantly the bounds of scholarship, building upon its proud traditions and strengths

- To provide a comprehensive education, developing fully the intellectual and personal strengths of its students while developing and extending lifelong learning opportunities for the community

- To produce graduates of distinction committed to lifelong learning, integrity and professionalism, capable of being responsive leaders and communicators in their fields

- To develop a collegial, flexible, pluralistic and supportive environment that will attract, retain and nurture scholars, students and staff of the highest caliber in a culture that inspires creativity, learning and freedom of thought, enquiry and expression

- To engage in innovative, high-impact and leading-edge research within and across disciplines

- To be fully accountable for the effective management of public and private resources bestowed upon the institution and act in partnership with the community over the generation, dissemination and application of knowledge

- To serve as a focal point of intellectual and academic endeavour in Hong Kong, China and Asia and act as a gateway and forum for scholarship with the rest of the world

The Department of Architecture at The University of Hong Kong aims to teach within a balance of education and training, and of theory and practice. The design must be created within a theoretical framework and must always be sensitive to its context. The context of respecting the richness and variety of local Chinese subcultures and the cosmopolitanism of the West.

3.1.5.3 Curriculum

Selection for admission is made on the basis of a broad and liberal education and a vocation for architecture as determined by aptitude tests and/or interviews, academic performance in HKCEE and HKALE, and reports of school principals. Students wishing to study architecture should also have read outside the minimum number of subjects required for University entrance and should have a good command of spoken and written English.

The Bachelor of Arts in Architectural Studies, BA (Arch Stud), aims to prepare students for the M. Arch professional course and for the parallel Masters courses in urban design, landscape architecture and architectural conservation. It seeks to equip students with basic technical skills and a basic knowledge of architecture.

The objective of the curriculum includes the development of a sense of community by project-based design. The studio design programs are based on topical issues, and encourage diversified approaches to give exposure to different environmental, contextual and problem solving challenges. The curriculum is structured on the development of five fundamental areas of architectural concern: culture, society, environment, technique and finance/management. Architectural diversity is intrinsic to Hong Kong because of the position as a Special Administrative Region in the People's Republic of China, location in the Pearl River Delta, and status as an Asian World City.

The BA (Arch Stud) degree is a first degree leading to the degree of Master of Architecture, and then to a professional license. The professional degree of Master of Architecture is recognized by the Hong Kong Institute of Architects (HKIA), and the Architects Registration Board (ARB).

Full professional status may be gained after two years of approved practical experience and sitting the requisite examination held by HKIA in Hong Kong. Upon passing the HKIA examination, candidates are eligible for membership of HKIA and

ARB (HKSAR). Graduates of the University of Hong Kong holding the degree of Master of Architecture are recognized as having an educational qualification equal in standard and scope to that awarded by a recognized school in the UK.

a) Distribution of Subjects

According to figure 3.9 and 3.10, the undergraduate curriculum in Hong Kong University concentrates only on the mandatory core subjects. The number of design subjects gradually reduced from first year to third year. In contrast, the technological and cultural subjects are increased from first to third years. This is mainly aligned with objective of the department which is to concentrate on development of the community based design projects. Therefore the programs are based on topical issues, and encourage diversified approaches to give exposure to different environmental, contextual and problem solving challenges. The professional subjects were introduced only on the third of the undergraduate curriculum. Although the duration of the first degree is short compared to other universities of the region the required subjects are included in the curriculum.

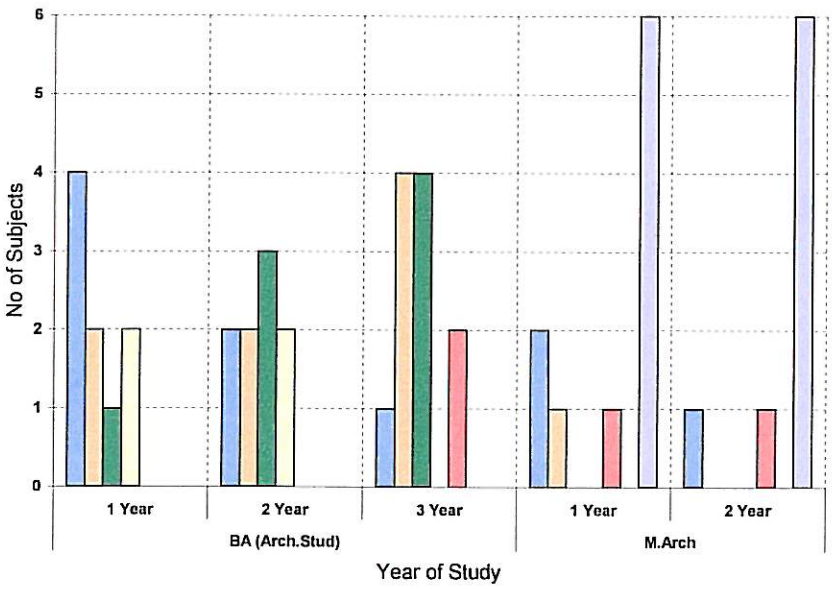

Figure 3.9: Distribution of Subjects, University of Hong Kong

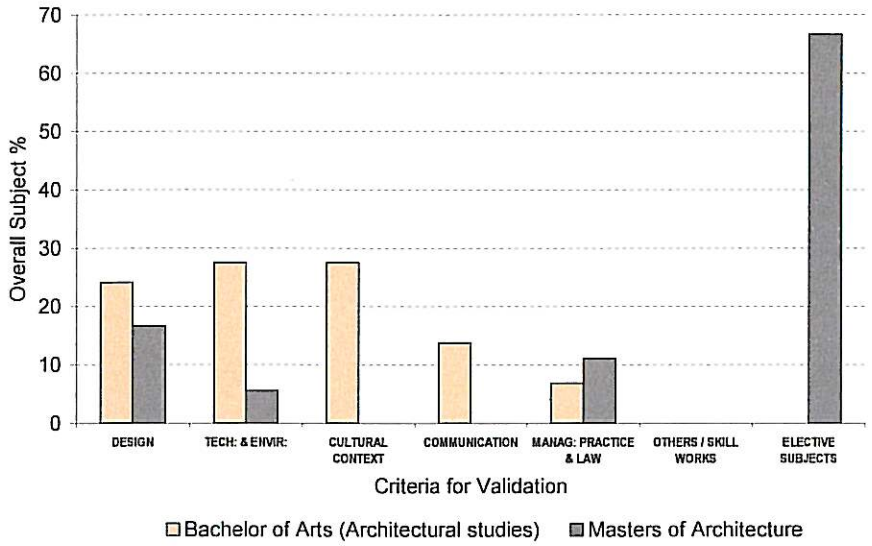

Figure 3.10: Overall percentage of subjects at each degree level, the University of Hong Kong

The Masters Degree program is mainly professional based. Therefore the curriculum concentrates only on design (16.7%), technological (5.5%) and management practice (11.1%) core subjects. The students are given the opportunity to broaden their knowledge on related subject area by providing more elective subjects (66%). Thereby liberalized the Masters Degree, thus making it more appropriate and flexible.

3.1.6 The University of Melbourne - Australia

3.1.6.1 Overview

The University of Melbourne was founded very early in the history of the colony of Victoria. It was a conscious move by the raw and young community to cloak itself with some of the culture and sophistication of the parent country, and to assert its equality with Sydney whose university opened in 1852. Melbourne's University was also intended to be an agency of civilization - to improve the moral character of the colony. The legislation establishing the University of Melbourne was introduced late in 1852 and passed early in 1853, making it older

than all the universities in England except Oxford, Cambridge, Durham and London, and older than most in the British Empire. In 1857 law was introduced, in the early 1860s medicine and engineering. The University played two principal roles; one was to provide professional training (now including commerce) for young men and women of the affluent classes, and occasionally offering the chance for poor but brilliant scholarship students to rise professionally and socially. The other role was as a significant site for research, an activity which had emerged late in the nineteenth century but which grew increasingly important as the twentieth century advanced.

The University of Melbourne introduced Australia's first studies in architecture in the 1860s. Architecture Building & Planning (ABP) established the first full-time architecture course in 1927. Since then, courses in other disciplines of the built and natural environment have followed. The Faculty of Architecture, Building and Planning, encompasses four main professional disciplines: architecture, property and construction, landscape architecture, and urban planning. The Faculty aims to produce professionals skilled in investigation, analysis, problem solving and communication who are motivated to contribute significantly to professional and community life. Course flexibility allows students special opportunities to explore new fields of professional and intellectual activity and to tailor courses to match individual interests and goals. The Faculty maintains close links with the appropriate professional institutes, each of which recognizes and accredits academic qualifications awarded by the Faculty. They are the Royal Australian Institute of Architects, Australian Institute of Building, Australian Institute of Landscape Architecture, Australian Property Institute, Australian Institute of Quantity Surveyors, the Board of Quantity Surveyors Malaysia, the Singapore Institute of Surveyors and Valuers, Royal Institution of Chartered Surveyors and Planning Institute of Australia.

3.1.6.2 Philosophy

The VISION is of a University of Melbourne international in character and focus, and world class in the staff and students it attracts, the research and scholarship it produces and the academic standards to which it adheres; a university adding immense intellectual, cultural and professional energy to the City of Melbourne, and serving Victoria and Australia by performing and being acknowledged as one of the finest universities in the world. The mission is "To make the University of Melbourne one of the finest universities in the world."

The general objectives of the Faculty of Architecture, Building and Planning, are to:

- Establish opportunities for exploring, debating and communicating architectural, landscape, planning, design, construction, management and property issues, with a focus on Australia and the Asia-Pacific region;

- Develop research programs in architecture, building, property and construction, quantity surveying, urban planning, landscape architecture and other areas involved in the transformation and management of the built and natural environment;

- Produce graduates who have professional commitment, well-developed, problem-solving and communication skills, and who will make a maximum contribution to the community and maintain the habit of curiosity and inquiry;

- Contribute actively to the discussion and solution of major community problems.

3.1.6.3 Curriculum

The Faculty of Architecture offer undergraduate, graduate and post graduate studies. The emphasis of the architecture program is on the design of buildings and the management of the building process, involving studies in design, building technology, history and theory, and architectural management. The Bachelor of Architecture degree enables graduates to become architects following registration who can undertake general practice or choose to specialize. The range of specializations open to architects includes commercial, industrial and institutional developments, housing, historic building conservation and renovation, and building interiors. The flexible structure of the course allows students to gain experience of the wider professional and cultural context of architectural practice by taking subjects in landscape architecture, urban design, urban planning, as well as additional building subjects.

The Bachelor of Planning and Design (Architecture) is a three-year, full-time course of 300 points. It is the pre-professional degree leading to entry into the BArch or BArch/BPC. On completing the BPD (Architecture), students who have obtained the required standard in their BPD pass degree and who wish to pursue a career in architecture are required to undertake a period of practical work experience (one academic year or minimum of 26 weeks) before enrolling in the two-year BArch course. The BArch is the professional degree recognized by the Royal Australian Institute of Architects and the Architects Registration Board of Victoria.

Graduates of the BPD (Architecture) course who have obtained the required standard in their BPD degree may choose to undertake a combined professional degree in architecture, property and construction - the BArch/BPC. Alternatively, they may choose to pursue professional careers in building, landscape architecture, urban design or urban planning by enrolling directly in the BPC, MLArch, MPD or MUP degree courses. These professionally recognized courses are generally of two years duration (and may require further preliminary studies). BPD (Architecture) graduates may also choose to undertake the BArch followed by the MUP or the

MLArch, completing the second professional degree with as little as one year of additional academic study.

The BArch is a two-year, full-time course of 200 points. The course satisfies the academic requirements for registration by the Architects Registration Board of Victoria and for membership of the Royal Australian Institute of Architects. An additional requirement of registration is up to two years of approved professional experience in architecture (experience as a student of architecture can count for up to one of these two years). Students are considered to be in a particular year level of the course until they have completed all the compulsory and elective points requirements for that level of study. Generally, to gain entry into the BArch course, graduates of the BPD (Architecture) or its equivalent must have completed one academic year (26 weeks minimum) of approved practical experience undertaken after the completion of the BPD.

The Master of Architecture by coursework is normally a two-year program. Credit may be given to applicants who have a five-year professional degree with honours and to students who have completed four years of a five-year professional degree at honours standard. The MArch may be undertaken either by research and submission of a thesis, or by design involving preparation of a series of designs with accompanying dissertation.

a) Distribution of Subjects

The first year of the undergraduate degree of University Melbourne include only four core subjects. The design and technological subjects continue up to third year (figure 3.11). However in the second year more emphasis is given on technological and cultural subjects and also has introduced elective subjects as well. This increase the number of subject areas into five in the second year. In the final year of first degree is reduced to four subject areas and management and profession related subjects were introduced. Thereby the students were able to work in the field by the end of their three year first degree. This also enables them to pursue professional careers at the higher level of studies.

The number of subjects taught at second degree program is limited to three in both years and only three of mandatory core subjects were included in the curriculum. However, the students were given opportunity to select subjects of interest from several elective subjects. Thus the curriculum is more liberal at second degree level compared to the first degree.

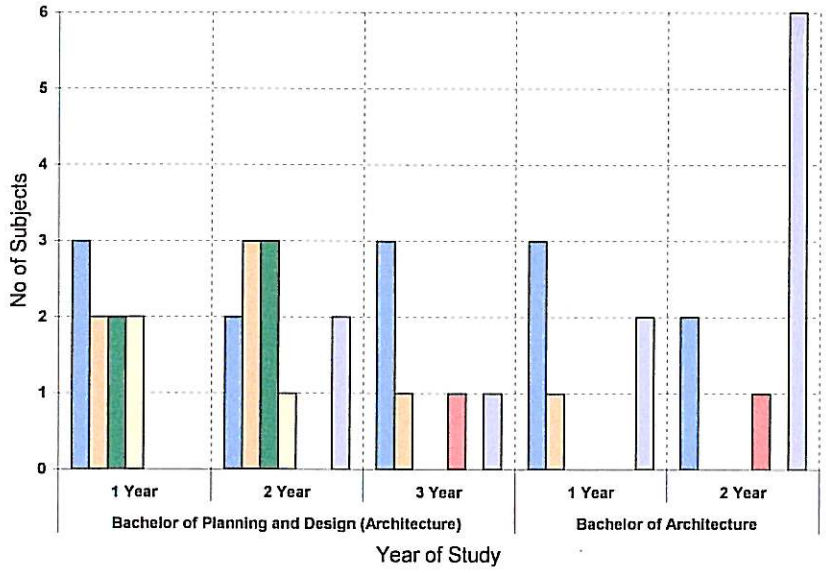

Figure 3.11: Distribution of Subjects, University of Melbourne, Australia

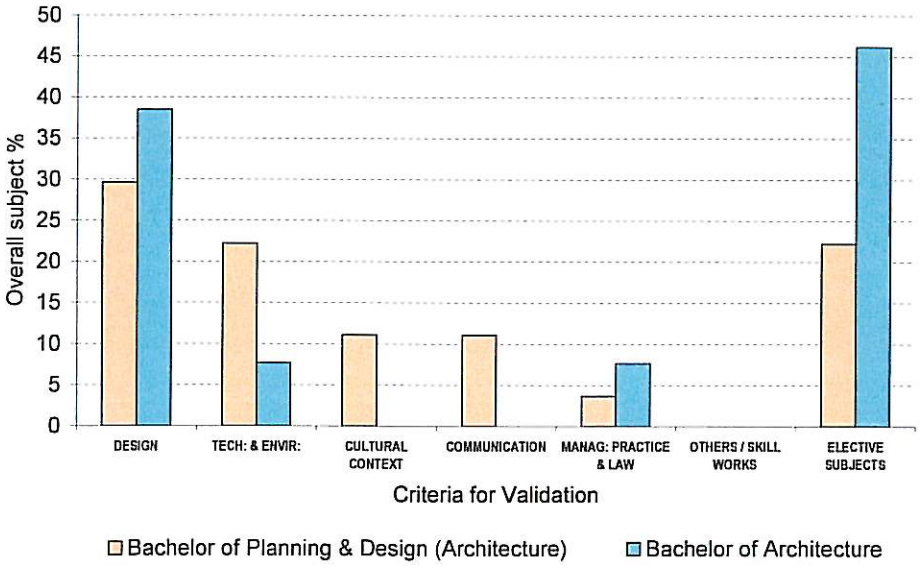

Figure 3.12: Overall percentage of subjects at each degree level, University of Melbourne, Australia

Figure 3.12 illustrates the overall percentage of subjects incorporated at each degree level. At first degree level, the design subjects included 30% followed by technological subjects with 22%. The cultural and communication subjects recorded 11% each and professional subjects recorded about 4%. This indicates that at first degree level the emphasis is more towards design and technological aspects and professional studies are given less priority. Also elective subjects illustrates of 22% from overall subjects included in the curriculum. At the professional degree stage (Bachelor of Architecture) much emphasis is given to design (38.5%) and elective (46%) subjects. Other core subjects included were about 7.7% each of the overall subjects. This indicates the liberal approach of the curriculum by increasing the amount of elective subjects than the core subjects.

3.1.7 Victoria University, Wellington – New Zealand

3.1.7.1 Overview

Victoria College was founded through an Act of Parliament in 1897, the year of Queen Victoria's Diamond Jubilee celebrations, and named in her honour. The first few years, lectures took place in rented accommodation in the city while a debate raged over where the new University's home should be built. Eventually, the College Council decided to build on 'six vertical acres' in Kelburn, the site of the Kelburn Campus today. In 1961, the University of New Zealand system (degree candidates were presented to an independent body that assessed all candidates throughout the country) was dissolved, and from 1962 Victoria College became Victoria University of Wellington, an independent university.

Victoria's Faculty of Architecture and Design "Te Wāhanga Waihanga-Hoahoa" is a unique, and leading, centre of Design and Architecture in New Zealand. The Faculty's facilities are widely acknowledged as some of the best in Australasia - all in a radically remodeled former cargo building, which is an award-winning

landmark in central Wellington city. Architecture has been taught at Victoria University since 1975 and Design since 1992. The Faculty is located in the heart of a city that takes building and design seriously - Wellington has long been at the forefront of architectural and design thought in New Zealand. New, exciting projects are being undertaken in the city constantly; and leaders in the architecture and design professions frequently lend their expertise to the Schools.

3.1.7.2 Philosophy

It is important to state that there is no statement of philosophy or teaching ideology found in the related information on the Victoria University.

3.1.7.3 Curriculum

The architecture curriculum at Victoria University offers undergraduate and masters degree programs. The degrees conferred in undergraduate program are in three major subject areas; Bachelor of Architecture, Bachelor of Building Science and Bachelor of Design. A Bachelor of Architecture degree requires five years of full-time study with 600 credit points. Students required a university entrance qualification to enroll in a B Arch program. It is useful to have studied mathematics, physics, English, technology, and one creative subject such as art, design, or graphics. If the student does not have the required level of achievement in mathematics and/or physics, it is required to include a maths or physics course in first-year programme. Students can plan a first-year programme that gives them the option to apply for a second year in Architecture, Building Science or Design. Entry to second-year Architecture is competitive and is based on academic performance in first year. The School will consider applications for second year from students who have successfully completed first-year Design. However, if Architecture is first choice, the student can enroll in first-year Architecture.

A Bachelor of Building Science requires three years of full-time study with 360 credit points. To enroll in a BBSc , student need a university entrance qualification. It is useful to have studied mathematics, physics, English, technology, and one creative subject such as art, design, or graphics. Victoria's Bachelor of Building Science (BBSc) graduates have expertise in the science, technology, and economics of building, and an understanding of architecture. Their combination of theoretical knowledge and practical experience is meeting an urgent need for building science professionals. Building Science has been taught at Victoria's School of Architecture since 1975 and the University is an international leader in the field. The School's high-tech Centre for Building Performance Research, established in 1985, was New Zealand's first. Entry into second-year Building Science is competitive, based on academic performance in first year. A BBSc can lead to postgraduate study in environmental science, construction, or structures, and it combines well with other degrees, particularly in Law and Commerce.

A Bachelor of Design degree requires four years of full-time study with 480 credit points. Students are selected through a university entrance qualification exam. It is useful to have studied subjects in the creative areas as well as traditional academic subjects. Entry to second-year Design is competitive and is based on academic performance in first year. Graduates in related disciplines with relevant practical experience may be considered for direct entry to second-year Design. The School will consider applications for a second year from students who have successfully completed first-year Architecture. However, if Design is first choice, the students should enroll in first-year Design. Three specialisations are offered for the Bachelor of Design. First-year design gives students a basic grounding in design strategies and skills. In subsequent years the study courses specific to area of specialisation.

The Master of Architecture degree program is research based. Therefore the MArch is not accepted as a professional qualification for the purposes of registering as an architect. Major research are centred on: the development of participatory processes in architectural practice; the evaluation of buildings in use; the efficient

use of energy in architecture; building performance, construction and project management; building control reform; and New Zealand architectural and design history. Other current projects include studies of: architectural theory and criticism; cultural influences in architecture and design; (day) lighting design and technology; timber structures; strengthening of earthquake-prone buildings; building construction performance and building failure; wind around buildings; solar design; value management; office space utilisation; facility management; Southeast Asian architecture; and aesthetics and symbolism in design. A research-based degree examined by thesis. The duration is minimum of 12 months full-time and 2 years for part-time courses.

a) Distribution of Subjects

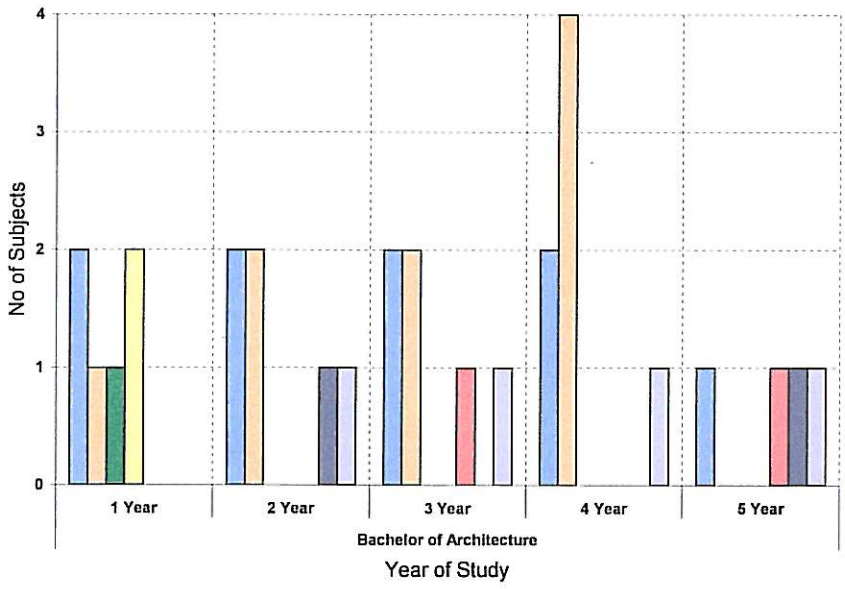

Figure 3.13: Distribution of Subjects, Victoria University of Wellington, New Zealand

According to figure 3.13, the main emphasis of the curriculum is on design and technological subjects. In the first and third years only four and three main core subjects are included respectively. In the second, fourth and fifth years the core subjects are reduced to two. Elective subjects are introduced from second year and

Management practice is included in both third and in the fifth year. Thus in the higher years the curriculum is more flexible.

The overall subject analysis illustrates (figure 3.14) that design and technological subjects comprise 31% each at Bachelor of Architecture degree program. The elective subjects also comprised of 14% of overall subject. This highlights that more than 60% of subjects are related to the developing the creative and technical skills in the students. In the Building Science degree has been oriented more towards technological aspects. By providing 42% of elective subjects the curriculum has given freedom for the student to select subject depending on his/her interest. Although the BBS degree is research oriented, it has not been accredited by the professional body.

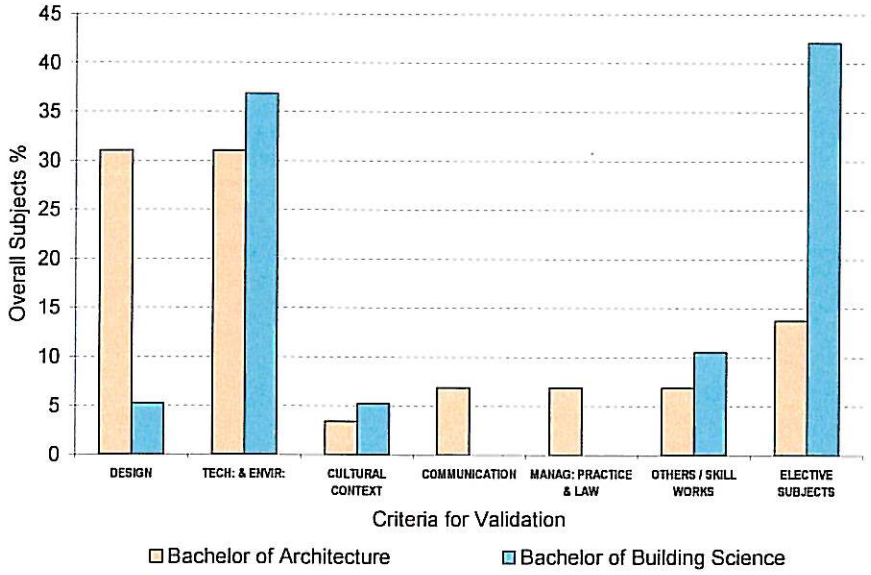

Figure 3.14: Overall percentage of subjects at each degree level, Victoria University of Wellington, New Zealand

Compared to East Asian countries, the Australian and New Zealand Universities has lesser concentration on cultural context and on communication subjects. However, more emphasis is paid on the design and technological subjects.

3.1.8 The University of Bath – United Kingdom

3.1.8.1 Overview

The University received its Royal Charter in 1966, but it can trace its history back to the Bristol Trade School of 1856, which from 1885 came under the patronage of the Merchant Venturers' Society as the Merchant Venturers' Technical College. In 1949, when it came under the control of the Bristol Education Authority, the College took the name of the Bristol College of Technology; it changed again in 1960 to the Bristol College of Science and Technology when it became one of the ten Colleges of Advanced Technology administered by the Ministry of Education. The adoption by Government of the recommendations of the Robbins Committee assured the College's transition to University status. A chance conversation between the College Principal and the Director of Education in Bath culminated in the City of Bath offering the nascent University its present site, for which government approval was obtained in 1964. In its teaching and research the University is still strongly oriented towards the sciences and technology, but with a very successful School of Management and Faculty of Humanities and Social Sciences.

3.1.8.2 Philosophy

The objects of the University shall be to advance learning and knowledge by teaching and research, particularly in science and technology, and in close association with industry and commerce.

> "...the advancement of knowledge, the dissemination and extension of sciences and arts, the provision of technological, liberal and professional education ..."

The mission of the University of Bath evolves from the above quotations from the Charter and Charter Petition. The principal aim of the University is to deliver that mission by the continuing development of its distinctive academic style,

based on a belief that teaching and research are enhanced by being conducted in an atmosphere where the application of knowledge to useful ends, in the light of the requirements of the contemporary world, is seen as complementing on an equal footing the basic processes of acquiring and disseminating knowledge. The University looks resolutely to the future, and sees itself as a research university whose context is European and international as much as local and national; three strands can be identified in such development: quality, balance and diversity.

3.1.8.3 Curriculum

The faculty of architecture at Bath University offers undergraduate and post graduate courses. The undergraduate degrees consist of Bachelor of Science (BSc) in general architectural studies and Master of architecture program. The post graduate courses include with Master of Science, Master of Philosophy and Doctoral programs. The BSc in General Architectural Studies and the Master of Architecture are equalled to RIBA part 1 and part 2 programs respectively.

The BSc in General Architectural Studies is a 4 year thin sandwich course which offers students an opportunity to combine academic study with placements in architectural practice. The 1st year is full-time and there are placements in both the 2nd and 3rd year. The placements run from March and are a minimum of 12 weeks for each. The 3rd year is international in outlook. Some students can choose to spend this year or part of it one of the Schools of Architecture in Europe recommended by the faculty, on an EU SOCRATES exchange. This course has been recognised by the Higher Education Funding Council for England and exempts students from Part 1 of the RIBA examination.

The M Arch is unclassified, though a distinction may be awarded at the discretion of the examiners to work of outstanding quality. The degree offers exemption from Part 2 of the RIBA examinations.

a) Distribution of Subjects

At Bath, the emphasis of core subjects is significant. In the first year only design, technological and cultural subjects are concentrated (figure 3.15). Also the criteria for technology had similar number of subjects in the first, second and fourth year of study. Professional skills are introduced as early as in the second year. This is mainly to prepare the students for the 'SOCRATES exchange' in the third year. It is important to notice although the third year includes core subjects, they are offered as optional. In this sense the curriculum is more liberal compared to other universities in United Kingdom. However, the undergraduate curriculum is mainly professional oriented.

The main focus of Masters Degree is on design, technological, cultural and professional subjects on first year. Thus the main objective is to develop a profound understanding of the relationship between design ideas, technology and culture in architecture. In the final year the students were given more flexibility on selecting a single subject from three elective subject areas. Similar to the undergraduate, the Masters curriculum too design and professional oriented.

According to figure 3.16 all core criterions result in 94.1% and only 5.9% electives of overall subjects in undergraduate degree level. The design and technological criterion indicate 26% each of overall subjects. Subjects on cultural studies also indicate 20%, while professional studies subjects are 15% of overall ratings. In general the curriculum is mostly tried to accomplish knowledge, design comprehension, application and synthesis in the students.

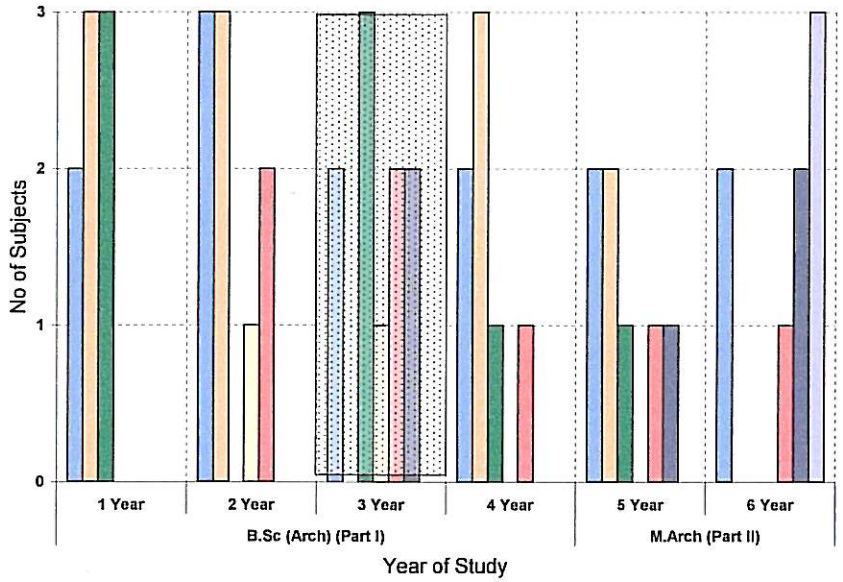

Figure 3.15: Distribution of Subjects, University of Bath, United Kingdom

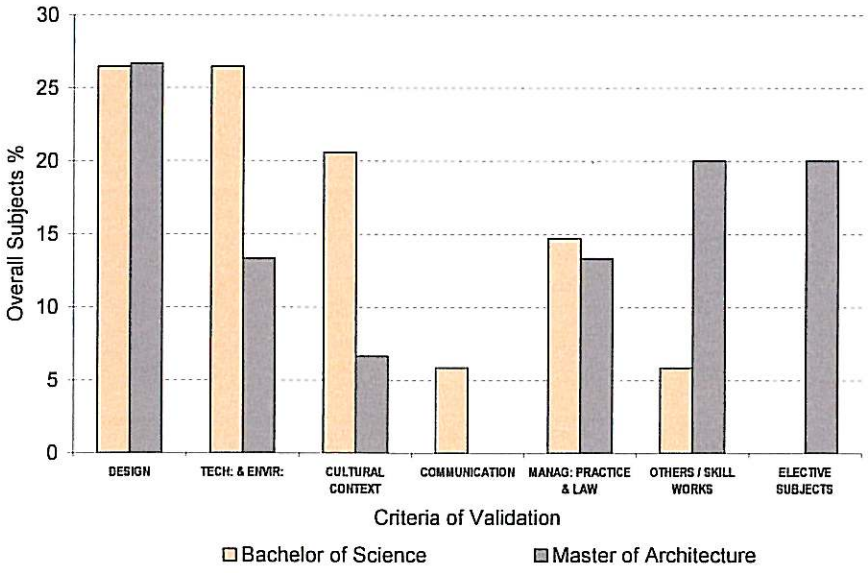

Figure 3.16: Overall percentage of subjects at each degree level, University of Bath

The master degree only design criterion is offered with more than 25% and elective with 20% of overall subjects. However the technological and cultural criterions are less at master degree level. The ratio between core (60%) and elective and university subjects (40%) indicated that the curriculum had more weight on core subjects.

3.1.9 Wales School of Architecture, Cardiff University

3.1.9.1 Overview

Cardiff University is recognised in independent government assessments as one of Britain's leading teaching and research universities. Founded by Royal Charter in 1883, the University today combines impressive modern facilities and a dynamic approach to teaching and research with its proud heritage of service and achievement. The University's breadth of expertise in research and research-led teaching encompasses: the humanities; the natural, physical, health, life and social sciences; engineering and technology; preparation for a wide range of professions; and a longstanding commitment to lifelong learning. Cardiff is a member of the Russell Group of Britain's leading research universities.

Having gained national and international standing, Cardiff University's vision is to be recognised as a world-class university and to achieve the associated benefits for its students, staff and all other stakeholders. Many of the University's degree schemes provide partial or complete exemption from relevant professional examinations and more than forty schemes of study benefit from accreditation and input from professional bodies.

The Welsh School of Architecture University of Wales College of Cardiff UK is a part of Faculty of Engineering and Environmental Design with the departments of Planning, Maritime Studies and Engineering. It is one of Britain's leading centre for teaching and research in Architecture, and is the only school of architecture in Wales. The impact of the built environment on both society and the landscape is a subject of national and global concern and the School's work has an impact in many important areas, including sustainable economic development and quality of life. Their holistic approaches to design embraces all aspects of architecture have gain the reputation for being one of the best schools of architecture in the UK.

3.1.9.2 Philosophy

The vision is to be a world-class university. The mission is to pursue research, learning and teaching of international distinction for the benefit of Wales and the wider world. Features of our vision and mission are a striving for excellence, integrity and innovation in every aspect of activity; a strongly collaborative approach; open and effective communications and an inclusive culture based on dignity, courtesy and respect.

3.1.9.3 Curriculum

The Welsh School of Architecture is one of the few schools of architecture that provides a complete professional education for architects through its BSc in Architectural Studies (Part 1, RIBA), BArch (Part 2, RIBA) and Diploma/MA in Professional Studies (Part 3, RIBA). BArch and BSc degrees are offered at undergraduate level and MSc, MA, MPhil and PhD degrees are offered at postgraduate level. All degrees are validated by the Architect's Registration Board (ARB) and Royal Institute of British Architects (RIBA).

The BSc in Architectural Studies is a three-year undergraduate degree scheme that provides a thorough grounding in architectural design, associated with lecture courses on building technology, architectural history and analysis, landscape and urban design, building economics and professional practice. The BSc satisfies Part 1 of UK professional qualification for architects, validated jointly by the Architects Registration Board (ARB) and the Royal Institute of British Architects (RIBA). Provided a suitable Honours standard is achieved in the BSc, it leads to the BArch scheme of study and eventual qualification for the profession of architecture.

The BArch (Bachelor of Architecture) is a two-year degree scheme, which is taken after the BSc (or other equivalent degree in architecture). The first year of the BArch- the Year in Practice - is spent in architectural practice, and has a modular

structure of associated coursework. The second year is spent back in the School. The degree takes students to an advanced level of architectural design, includes teaching in building economics and professional practice, and provides a lively forum for the exploration and discussion of contemporary issues in architecture. This is the second stage of the two-tier BSc/BArch scheme of study. It is a two-year modular undergraduate scheme and is intended for those who wish to continue their education towards becoming qualified architects. It combines experience in architectural practice with advanced challenges in architectural design. The BArch is open to applicants with a good first degree in architecture from another university.

The BArch at the Welsh School of Architecture is different in structure from second degree or diploma schemes in other UK schools of architecture. In other schools a 'year out' is followed by two years back in the university. In *wsa*, the year in practice is integrated into the BArch and has its own modular structure. Based back in the School, the second year of the BArch gives students the opportunity to set their own agenda for design. The focus of the year is the Final Design Project, in which students define and research their own brief for a major design project. The scheme is validated by the Royal Institute of British Architects (RIBA) and the Architects' Registration Board (ARB) and provides exemption from the second stage of the architectural professional qualification (RIBA Part 2).

The Diploma/MA in Architecture: Professional Studies examines the legal and economic aspects of architectural practice and construction procurement. It is a 2-stage postgraduate Diploma/Masters scheme of study. Stage 1, leading to the qualification of Postgraduate Diploma, comprises six taught modules. Stage 2, leading to the Masters, consists of a dissertation. Both the Diploma and the Masters have RIBA/ARB recognition for the RIBA Examination in Professional Practice (Part 3), and therefore successful completion of either entitle the student to register with the Architects Registration Board, and to join the RIBA. The scheme is undertaken while the student is in an approved work placement. It is taught largely by distance learning methods, with three short residential courses, assessed by coursework, and written examination. There are varieties of flexible routes through

the scheme including a full time route (one year) a part time route (three years), and a full-time/part-time route (two years).

a) Distribution of Subjects

The curriculum at Welsh School of Architecture focuses mainly on the mandatory core subjects (figure 3.17). However, only design and technological subjects have been consistent in the first and second degree level. The cultural studies are taught only up to second year and professional studies were introduced in the third year of the first degree. It is important to notice that the communication subjects are not included in the curriculum. The maximum amount of subjects is limited to three in the first four years of study. In the second degree, design and professional studies were given the priority. At Masters level only the professional subjects were further continued. Thus the BSc curriculum is mainly focussed on knowledge and awareness of design aspects while BA and MA curriculum are focused on the professional aspects. The significance of the curriculum is that it strictly follows the RIBA criterions.

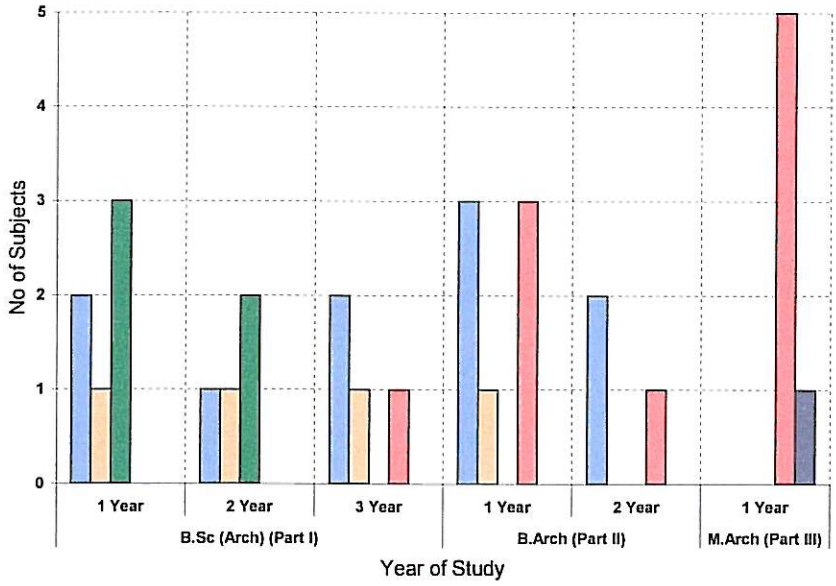

Figure 3.17: Distribution of Subjects, Wales School of Architecture, University of Cardiff, United Kingdom

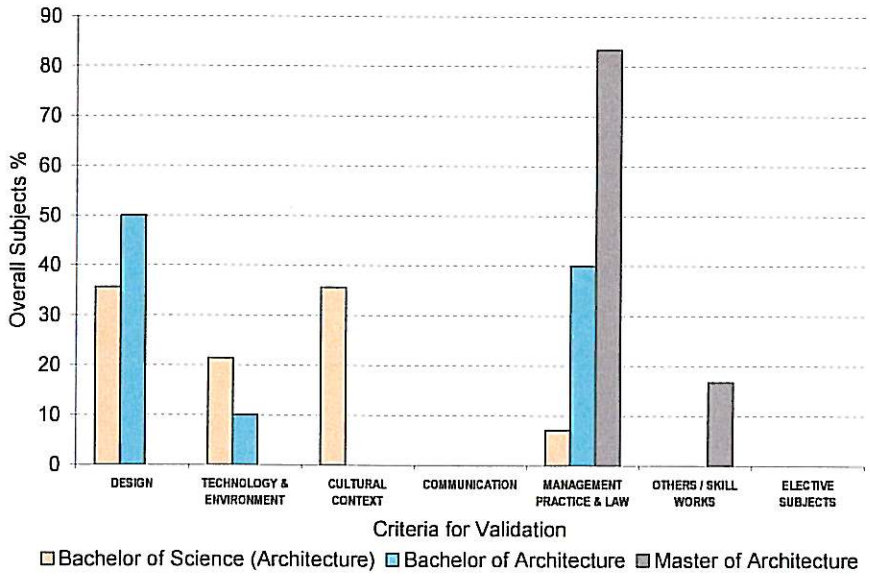

Figure 3.18: Overall percentage of subjects at each degree level, Wales School of Architecture, University of Cardiff

The percentage values of design and cultural studies are same (35.7%) at first degree level, thus emphasising the importance of community based design aspects (figure 3.18). However at second degree (B.Arch) subjects emphasize on design (50%) and the professional (40%) aspect. The masters degree is primarily professional oriented with 83% overall subjects.

3.1.10 Yale School of Architecture – United States of America

3.1.10.1 Overview

Yale University was founded in 1701 as the Collegiate School in the home of Abraham Pierson, its first rector, in Killingworth, Connecticut. In 1716 the school moved to New Haven and was renamed Yale College in 1718. Yale embarked on a steady expansion, establishing the Medical Institution (1810), Divinity School (1822), Law School (1843), Graduate School of Arts and Sciences (1847), the School of Fine Arts (1869), and School of Music (1894). In 1887 Yale College became Yale University. It continued to add to its academic offerings with the School of Forestry & Environmental Studies (1900), School of Nursing (1923), School of Drama

(1955), School of Architecture (1972), and School of Management (1974). Yale University comprises three major academic components: Yale College (the undergraduate program), the Graduate School of Arts and Sciences, and ten professional schools. In addition, Yale encompasses a wide array of research organizations, libraries and museums, and administrative and support offices.

Yale is uniquely committed to the arts. Art was first taught at an American college or university in 1869 when the Yale School of the Fine Arts was established. Even earlier, in 1832, Yale opened the Trumbull Art Gallery, the first college-affiliated gallery in the country. The Department of Architecture was established in the School of the Fine Arts in 1916. In 1959 the School of Art and Architecture, as it was then known, was made into a fully graduate professional school. In 1972 Yale designated the School of Architecture as its own separate professional school.

3.1.10.2 Philosophy

The fundamental philosophical breadth of our approach is not only curricular and geographical but also artistic; we refuse to promote a single conception, artistic or otherwise, of what architecture is or might become.

3.1.10.3 Curriculum

The School offers an undergraduate major in architecture. The standard major, which is limited, provides a nonprofessional introduction to the visual, spatial, and intellectual basis of architecture. The introductory courses to the study of architecture are open to all Yale College sophomores, juniors, and seniors, and are required prior to applying for the architecture major. With permission of the director of undergraduate studies, the prerequisite may be waived for students with sufficient experience in architecture or in relevant subjects; they may enter directly into the major.

The purpose of the undergraduate standard major in architecture at Yale is to include the study of architecture within the broader context of a liberal arts education. While the core requirements focus on architectural design, the overall curriculum includes theory and history of architecture, leading to a Bachelor of Arts degree. In this manner students are prepared for advanced study in architecture, art, history of art, city planning and development, the social sciences, or public affairs.

The Master of Architecture I curriculum provides a disciplined approach to the fundamentals of architecture in a setting that ensures the flexibility and latitude necessary for students to develop their individual talents and skills. In the United States, most state architectural boards require a degree from an accredited professional degree program as a prerequisite for licensure. The School's Master of Architecture program is fully accredited by the National Architectural Accrediting Board (NAAB), which is the sole agency authorized to accredit U.S. professional degree programs in architecture. The M.Arch. I program is for students holding undergraduate liberal arts degrees, such as a B.A. or B.S., who seek their first professional architectural degree. This program requires a three-year (six-term), full-time in residence program, although in exceptional cases, advanced standing may be granted.

a) Distribution of Subjects

The significance of Bachelor's Degree curriculum is that the criterion for cultural subjects is 34% of the overall subjects. This is mainly due to the art degree. The design (18%), technological (25%) and communication (14%) are the other core subjects offered (figure 3.19). The other noticeable feature is that exclusion of professional subjects from the first degree. In most American universities the first degree is recommended as a pre-professional degree.

The Master of Architecture degree includes six subject criterions. Design (25%) and elective (25%) have more subjects than other criterions. The technological, cultural and communication subjects had similar number of subjects. Although it is a professional degree, only 4% of subjects were included for

professional criterion. The core subjects offered 75% of and electives only 25% of overall subjects. It is important to notice that due to lack of data, subject distribution at correspondent years was not performed for Yale University.

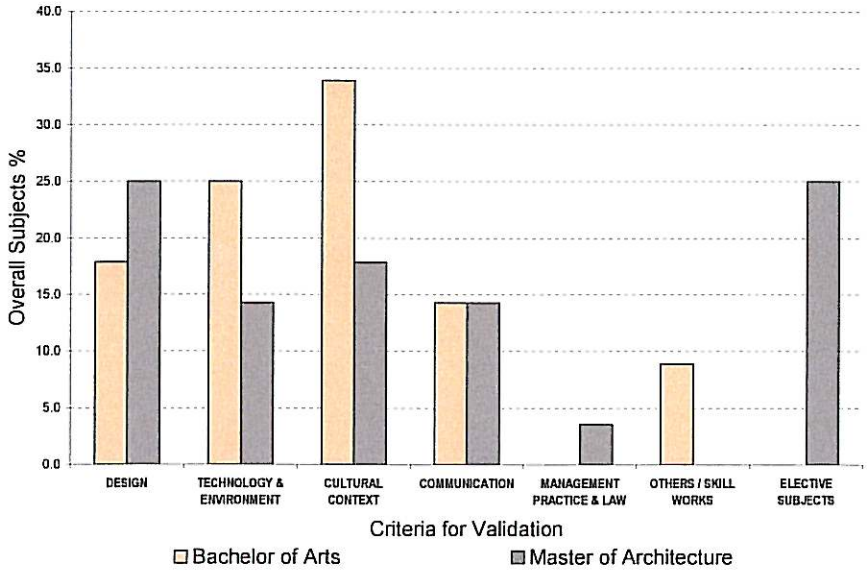

Figure 3.19: Overall percentage of subjects at each degree level, Yale School of Architecture

3.1.11 University of Miami- United States of America

3.1.11.1 Overview

The University of Miami was chartered in 1925 by a group of citizens who felt an institution of higher learning was needed for the development of their young and growing community. The South Florida land boom was at its peak, resources appeared ample, optimism flowed, and expectations were high. Supporters of the institution believed that the community offered unique opportunities to develop inter-American studies, to further creative work in the arts and letters, and to conduct teaching and research programs in tropical studies. The University of Miami has grown to become one of the largest private research universities in the southeastern United States.

When the University opened in 1926, it consisted of the College of Liberal Arts, the School of Music, and the Evening Division. The University added the School of Law (1928), the School of Business Administration (1929), the School of Education (1929), the Graduate School (1941), the Marine Laboratory (1942; presently the Rosenstiel School of Marine and Atmospheric Science), the School of Engineering (1947), and the School of Medicine (1952). The University of Miami is accredited by the Southern Association of Colleges and Schools and 21 professional accrediting agencies. It is a member of the American Association of University Women, the American Council on Education, the American Council of Learned Societies, the Association of American Colleges, the Florida Association of Colleges and Universities, and the National Association of Independent Colleges and Universities.

John Llewellyn Skinner initiated the first program in architecture at the University of Miami in 1927-28. By the mid-1930's a number of factors caused the University to reduce its scale of operation and the architecture program was one of the first affected. The architecture program did not re-emerge until 1950 in the new College of Engineering in the department of architectural engineering. Professor Jan Hochstim entered that program and graduated in 1954. He provides a valued present day link to the renewal of architecture at the University of Miami. The graduate program was important in attracting the interest of faculty and students to the first professional, M. Arch. Degree which was initially awarded to the class of 1993.

3.1.11.2 Philosophy

The University of Miami's mission is to educate and nurture students, to create knowledge, and to provide service to our community and beyond. Committed to excellence and proud of the diversity of our University family, we strive to develop future leaders of our nation and the world.

The School of Architecture's mission begins with community and a focus on the city as a work of art and architecture. The school has become a forum for the work of New Urbanism, an international movement with a charter of 27 principles addressing issues ranging from the scale of a region to individual buildings. Those principles form a foundation with which the programs of UMSA Graduate Studies share a common mission.

3.1.11.3 Curriculum

At the graduate level, the School offers both professional and post-professional degree programs. The professional Master of Architecture is designed for college graduates desiring a first professional degree in architecture. It consists of two tracks. The 3.5-year program is designed for students holding undergraduate degrees in non-design fields. The Advanced Standing Track program is for students holding a previous non-professional degree in architecture or a closely related field. Both tracks fulfill the requirements for professional licensing.

At the graduate level, the School offers both professional and post-professional degree programs. The three Master of Architecture post-professional programs provide an environment for serious inquiry into the nature of architecture. Post-professional study is available to students wishing to develop a specialization in architectural theory and practice. Applicants must have an accredited degree in architecture or its equivalent. Three areas of study offer students the opportunity to investigate specific aspects of architecture and to elaborate their understanding for future teaching, research, publications and professional practice.

a) Distribution of Subjects

Figure 3.20 illustrates the subject distribution of University Miami on respective study years. Within the first three years the main core subjects are introduced and design subject has been consistent in the undergraduate curriculum.

The professional subjects were included in the third year to fifth year and the elective subjects were introduced at second year onwards. Although the core subjects are reduced in the fourth and fifth years, the curriculum has provide options for the students to broaden the knowledge according to their subject interest.

The course at Master's Degree level comprises of three years. This is a longer duration compared to other Master Degree programs in the world. However, the curriculum is limited to the main core subject areas in the first year. The second year consists of only two core subject areas, elective and other skill subjects. Technological subjects are further elaborated in the second year, thus to strengthen students ability with state of art of the century. The elective subjects in the final year consist of professional subjects and only one is considered mandatory. Thus, the course focuses on producing professionally competitive candidates.

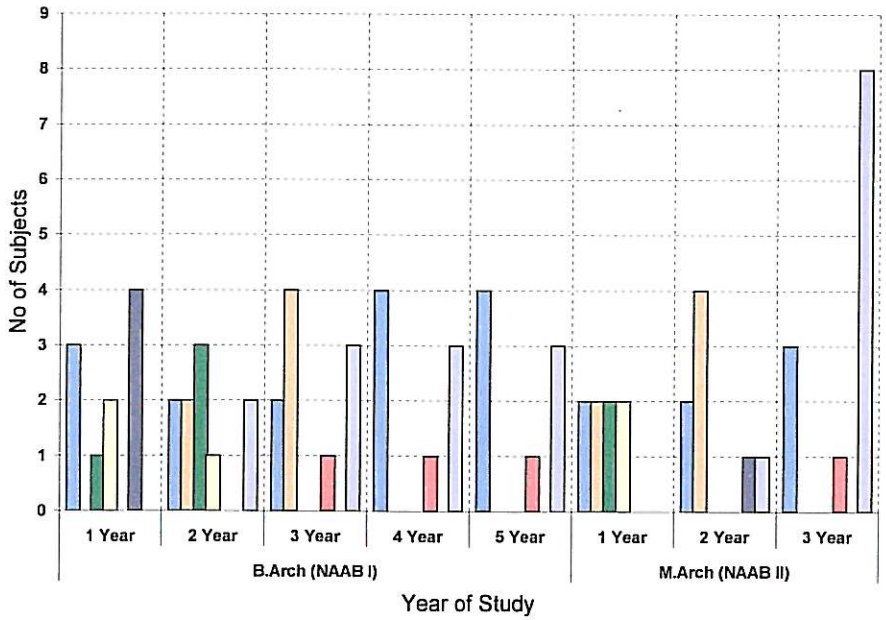

Figure 3.20: Distribution of Subjects, University of Miami, Florida USA

The significant feature of the curriculum is that all subject criterions were offered in both degree levels. The design and elective subjects offer over 32% and 24% of overall subjects at undergraduate level. Technological subjects also indicate 13% while all other core subjects have less than 10% of overall subjects (figure 3.21). The percentage ratio between core and elective subjects are 67% to 33%

respectively. At master's degree level the ratio between core and elective subjects are 64% to 36% respectively. This emphasizes that both curriculum are appropriate and liberal in terms of selection in subject of interest.

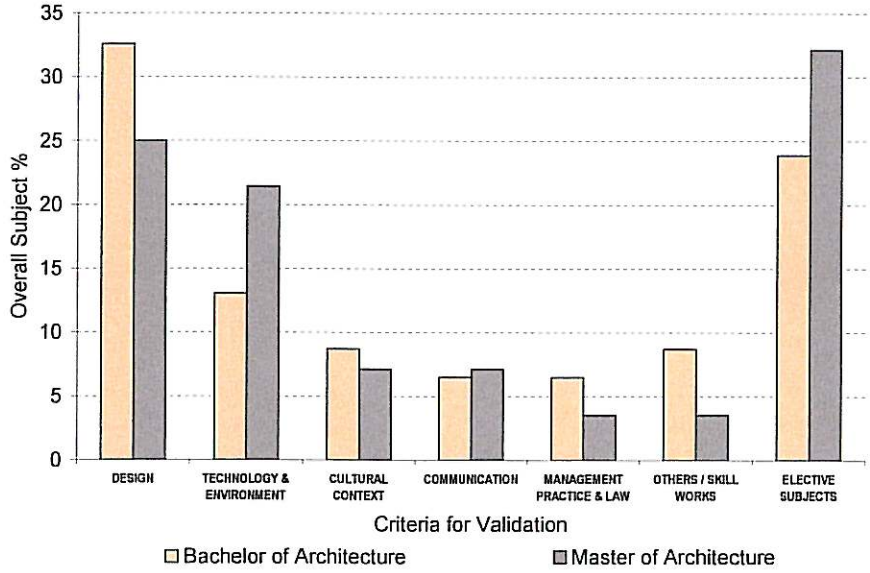

Figure 3.21: Overall percentage of subjects at each degree level, University of Miami, Florida USA

3.1.12 University Teknologi Malaysia – Malaysia

3.1.12.1 Overview

This institution began in 1904 as a class for technical studies at the Kuala Lumpur City Council building. In 1941, it was recommended that the Technical School be upgraded to the status of a college. However, with the advent of the Second World War, the suggestion could only be implemented in 1946. The construction of the new Technical College in Jalan Gurney (Jalan Semarak) Kuala Lumpur began in 1951 and became operational in March 1955.

In 1960, engineering courses at degree level were offered. Students pursuing these courses had to sit for the professional examinations conducted by the Institution of Civil Engineers, Institution of Mechanical Engineers and Institution of

Electrical Engineers, United Kingdom. The rate of success was most encouraging. In 1967, the Planning Committee for Higher Learning decided to upgrade the Technical College to the level of Institute of Technology with university status from 1969 onwards. However, it was only on 14th March 1972 that the decision was implemented with the establishment of the Institute Teknologi Kebangsaan (ITK). On 1st April 1975, the name was changed to Universiti Teknologi Malaysia (UTM).

UTM now comprises of two campuses i.e. the 18-hectares Jalan Semarak campus in Kuala Lumpur and the main campus in Skudai, Johor. The first phase of the construction of the new Skudai campus was completed in 1985 consisting of two faculties: the Faculty of Built Environment and Faculty of Surveying. The Skudai campus was officially declared open on 1st Muharram 1406 (16th September 1985) by His Royal Highness, Sultan Iskandar as the second Chancellor of the university. Faculty of Civil Engineering (FKA) is one of the ten faculties offering undergraduate and postgraduate programmes in UTM.

3.1.12.2 Philosophy

"The divine law of Allah is the foundation for science and technology. UTM strives with total and unified efforts to attain excellence in science and technology for universal peace and prosperity in accordance with His will". The main vision is to be a world-class centre of academic and technological excellence through creativity. The university mission is to lead in the development of creative human resource and technology in line with the aspirations of the nation.

3.1.12.3 Curriculum

The Faculty of Built Environment offers Bachelor Degree programmes from 3 to 4 years depending on the programme. There are five types of Bachelor Degree programmes:

- Bachelor of Architecture with Honours.
- Bachelor of Science in Construction with Honours.
- Bachelor of Landscape Architecture with Honours.
- Bachelor of Quantity Surveying with Honours.
- Bachelor of Urban and Regional Planning with Honours.

Academic programmes are also offered through the external studies unit of the University, or S.P.A.C.E. (School of Professional And Continuing Education) for the following awards:

- Diploma in Architecture
- Diploma in Quantity Surveying,
- Diploma in Urban and Regional Planning
- Bachelor of Architecture with Honours
- Bachelor of Quantity Surveying with Honours
- Bachelor of Urban and Regional Planning with Honours.

a) Distribution of Subjects

The significant features of the UTM curriculum is the number of subjects included as 'General Educational Requirements' (or 'other subjects'). It is important to mention that this criterion include most of cultural and social studies subjects. It is reflected by the less number of cultural studies in the curriculum. Thereby, it offers a solid rationale for a strong education in the humanities and social sciences. Although the curriculum is design based, however, much emphasis is given to technological subjects at Diploma level. Only three core subjects are included in the first year, design, technology and communication. Communication and Professional subjects has been given less preferences (figure 3.22). Elective studies are introduced in the second year. The curriculum provides theoretically and technologically background at Diploma level. Thereby, those who do not continue with higher degree can work in design related fields with part I professional accreditation or continue study in other related field. The B.Arch program continues for another three years of study including six months of practical training. At professional degree curriculum, only

design, technology, cultural studies and professional studies are included as core subjects. Reducing the core subjects and including more elective subjects indicates a liberal approach of the curriculum.

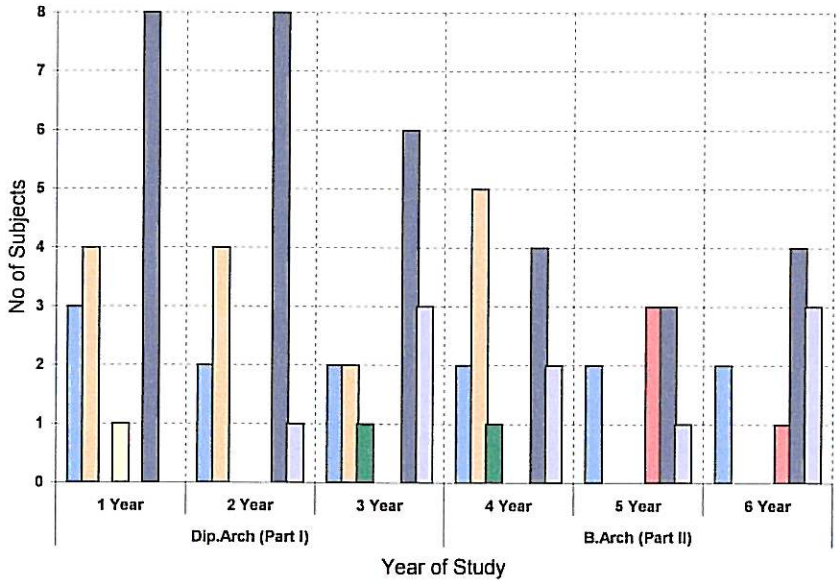

Figure 3.22: Distribution of Subjects, Universiti Teknologi Malaysia, Malaysia

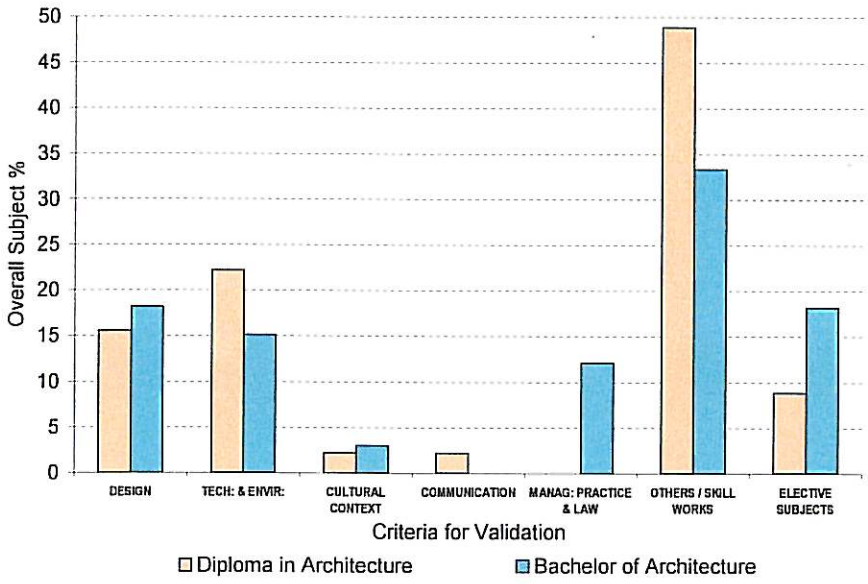

Figure 3.23: Overall percentage of subjects at each degree level, Universiti Teknologi Malaysia

Other and skilled criterion included highest amount of subjects in both degree levels (49% and 33% at Diploma and B.Arch level respectively). Figure 3.23 indicates that more Technological subjects were offered than design subjects at first degree level. However at second degree level the design and technological subjects

had almost similar number of subjects. Further, professional subjects were included and elective subjects were increased at part 2 compared to part 1 level. Comparison of core and elective subjects indicated 42% to 58% of overall subjects at Diploma and 48% to 52% at Bachelors degree level. This indicates that UTM offers a very liberal curriculum at both degree levels.

3.2 Discussion

3.2.1 Curriculum: Core and Elective Subjects

The study indicated that existence of different curricula in architectural education, and in many schools there are a number of options that lead to the completion of the degree requirements. The following simply discusses the degree of core and elective subjects and more common components of the study of architecture at most schools (refer table 3.1a, 3.1b, 3.1c, 3.1d and 3.1e for details).

The main core subjects resulted over 75% in first degree architectural curriculums in all schools considered except at UTM. In UTM this may be due to the mission of the university which has incorporated enriching national integrity among the students. Therefore the elective and university subjects are highlighted at the first degree level. Although this may indicate a more liberal approach, the time and credit hours spent on important core subject may reduced. The pattern of core and elective subjects at second degree or the professional degree level showed a significant difference between the Asian universities and non Asian universities. In Asian universities, the elective and other subjects (other than core subjects) range between 51% to 87% of overall subjects. The elective and other subjects at correspondent two American, Australian, New Zealand and two British universities ranged between 25% and 37%, 42%, 46% and 40% -17% respectively. The number of elective and other subjects received a high percentage value than the core subjects in Asian universities compared to non-Asian universities. Is this a trend towards liberalization or lack of focus of the curriculum need further investigation

Table 3.1a: Overall percentage (%) of subjects at each degree level, Asian Universities

Asian Universities	UTM		NUS			NCKU	
Degree conferred	Dip(Arch)	B(Arch)	B.Arch	B.Arch (Hon)	M.Arch	BSc	MSc
Design	15.6	18.2	35	40	8.3	21.9	22.0
Tech: & envir:	22.2	15.2	35	40	0	31.5	52.5
Cultural context	2.2	3.0	20	20	0	19.2	5.1
Communication	2.2	0.0	5	0	0	6.8	5.1
Manag: practice & law	0.0	12.1	5	0	8.3	6.8	15.3
Others / skill works	48.9	33.3	0	0	8.3	13.7	0.0
Elective subjects	8.9	18.2	0	0	75	0	
Total Subjects							
core	42.2	48.5	100	100	16.7	86.3	100.0
elect/others	57.8	51.5			83.3	13.7	

Table 3.1b: Overall percentage (%) of subjects at each degree level, Asian Universities

Asian Universities	CHULA'CORN		CHING MAI	HK Uni	
Degree conferred	B.Arch	M.Arch	B.Arch	BA	MSc
Design	27.0	12.5	34.0	24.1	16.7
Tech: & envir:	20.6	0	19.1	27.6	5.6
Cultural context	14.3	0	8.5	27.6	0.0
Communication	17.5	0	12.8	13.8	0.0
Manag: practice & law	3.2	0	2.1	6.9	11.1
Others / skill works	6.3	50	10.6		0.0
Elective subjects	11.1	37.5	12.8		66.7
Total Subjects					
core	82.5	12.5	76.6	100.0	33.3
elect/others	17.5	87.5	23.4		66.7

Table 3.1c: Overall percentage (%) of subjects at each degree level, Australian and New Zealand Universities

Australia / NewZealand Universities	Uni Melb		Vic.Uni NZ	
Degree conferred	**BPD**	**BA**	**B(ARCH)**	**BBSc**
Design	29.6	38.5	31.0	5.3
Tech: & Envir:	22.2	7.7	31.0	36.8
Cultural context	11.1	0.0	3.4	5.3
Communication	11.1	0.0	6.9	0.0
Manag: practice & law	3.7	7.7	6.9	0.0
Others / skill works			6.9	10.5
Elective subjects	22.2	46.2	13.8	42.1
Total Subjects				
core	77.8	53.8	79.3	47.4
elect/others	22.2	46.2	13.8	42.1

Table 3.1d: Overall percentage (%) of subjects at each degree level, United Kingdom Universities

United Kingdom Universities	Uni. Of Bath		WSA, Cardiff		
Degree conferred	**BSc(Hon)**	**March**	**B.Sc(Arch)**	**B.Arch**	**M.Arch**
Design	26.5	26.7	35.7	50.0	
Tech: & envir:	26.5	13.3	21.4	10.0	
Cultural context	20.6	6.7	35.7	0.0	
Communication	5.9	0.0	0.0	0.0	
Manag: practice & law	14.7	13.3	7.1	40.0	83.3
Others / skill works	5.9	20.0	0.0	0.0	16.7
Elective subjects	0.0	20.0	0.0	0.0	
Total Subjects					
core	94.1	60.0	100.0	100.0	83.3
elect/others	5.9	40.0	0.0	0.0	16.7

Table 3.1e: Overall percentage (%) of subjects at each degree level, United States Universities

United States Universities	Yale Uni		Uni. Of Miami	
Degree conferred	**MAJOR**	**MSc**	**B(ARCH)**	**M(ARCH)**
Design	17.9	25.0	32.6	25.0
Tech: & envir:	25.0	14.3	13.0	21.4
Cultural context	33.9	17.9	8.7	7.1
Communication	14.3	14.3	6.5	7.1
Manag: practice & law	0.0	3.6	6.5	3.6
Others / skill works	8.9	0.0	8.7	3.6
Elective subjects		25.0	23.9	32.1
Total Subjects				
core	91.1	75.0	67.4	64.3
elect/others	8.9	25.0	32.6	35.7

The review showed that the main subject of concern Architectural education is 'design' at first degree level. This is evident where in all considered schools, design subjects required at every semester or years of study. The other core subjects and elective subjects are supportive to make design more practical and aesthetic. However it is difficult to identify a systematic integration of design and other subjects at each level of study. In other words there is no significant reason or reasons for selection and combination of subjects at respective years. Similar pattern for design subjects are illustrated at pre-professional degree level or at second degree level.

One of the main criticisms made by the professional bodies is that too much emphasis is placed on the design studio without enough attention given to technical instruction. Technical competency plays a major role in professional requirement. The modern building requirements, energy issues and advancement in technology have made significant influences on the curriculum. Therefore most schools have made concrete efforts to incorporate more technical and environment related subjects into their curriculum. These subjects range between 22% and 40% of overall subjects in the first degree curriculums considered. Most of Asian universities had higher percentage values compared to non Asian countries. At second degree level only

NCKU in Taiwan had very high percentage (52%) of technical subjects in the curriculum. In other universities it ranged between 0% and 15.5% at second degree level. This emphasizes that technical subjects are more concentrated on initial years of the curriculum. It is important to stress that the role of the architecture school is not to develop technical skills; rather, it is to provide a broad framework of knowledge and a basic understanding of the desired objectives.

Although the design and technological skills often has high demands among the architecture profession, most curriculums realize that architecture should not and cannot be practiced in isolation from the rest of our cultural studies. Most programs offer a solid rationale for a strong education in the humanities, social sciences, psychology, philosophy, history, geography, urban studies and political science to parallel with professional offering. The first two years in undergraduate architecture programs typically have a greater emphasis in the cultural studies. In Asian universities the percentage for cultural studies rages between 2.2% and 27% of overall subjects. The two United Kingdom and American universities illustrate a higher percentage ranging between 8.7% and 35.7%. However the scope of these subjects differs according each country. Since subjects related to cultural studies include a vast spectrum some curriculums have incorporated them under electives.

Communication studies have been recognized as the primary requirement to be selected to the architectural program. Most architecture programs initiate with graphic skills and early instruction will be given in freehand drawing and graphic description. Various media will be explored, including pencil, ink, color, and often computer graphics to develop a fundamental understanding of both two- and three-dimensional forms. In addition, computer-aided design (CAD) is also taught as an increasingly important design tool that may be integrated into later design studio courses. The first year in the undergraduate studies have greater emphasis on graphic skills and at very few instances these subjects were taught in higher years. However, communication studies illustrate a very low percentage values compared to overall subject percentages in all schools considered. Whether this a trend due to the increasing number of computer usage and how it can affect on the students skills of communication need to be further investigated. Among Asian schools UTM

illustrated the lowest percentage for number of subject taught in communication studies.

In most instances architecture graduates do not become project leader in architectural offices, and there is some criticism that too much emphasis is placed on the design studio without enough attention given to professional studies. This is evident by the low percentage illustrated for management practice and law subjects. The Asian, Australian, New Zealand, United Kingdom and American universities range between 2.1% and 15.3%, 3.7% and 7.7%, 6.9%, 13.3% and 14.7%, 7.1% and 83.3%, 3.6% and 6.5% respectively. The Australian universities had the lowers values and United Kingdom universities illustrated higher values. Among Asian universities UTM illustrated the second highest percentage for professional studies.

Most programs offer a solid rationale for a strong architectural education to parallel the professional offerings. Any architectural curriculum should provide a broad framework of knowledge and a basic understanding of the desired objectives-realizing that five or six years of formal education cannot possibly provide all the necessary training an architect will ultimately need.

3.2.2 Architectural Degree Conferred

The architectural curriculums include wide range of subject and the types of curriculum that are offered vary tremendously from one another. All degrees conferred in architectural education can fit into following three categories:

a). Pre-professional architecture degree.

b). Professional architecture degree.

c). Post-professional degree and non-professional degree.

a) Pre-Professional Architecture Degree.

Pre-professional programs are not professionally accredited and vary widely with respect to title, emphasis, electives, requirements, and specific architecture offerings. This system is largely introduced in United States and in some Australian schools. These degrees have such titles as Diploma in Architecture, Bachelor of Planning and Design (Architecture), Bachelor of Science in Architectural Studies, Bachelor of Arts in Architecture, Bachelor of Environmental Design, Bachelor of Architectural Studies, etc. The amount of architecture work in the program varies and has an appreciation of building, engineering, planning, interior design and landscape as related professional disciplines. The pre-professional architecture program may have only basic introductory courses in architecture with the majority of the course work focusing on the arts, humanities, and sciences. Also, pre-professional degree will determine the length of time required to complete further professional architecture studies. Thus, pre-professional degree plus professional master's degree is the predominant route to obtaining a professional architecture degree. This route normally requires six years to complete and the program commonly referred to as the "four-plus-two" or "three plus three" route. The flexibility in the program is readily apparent.

b) Professional Architecture Degree.

A professional architecture degree is one that is accredited by professional body. These accredited degrees are required by most jurisdictions for licensure as an architect. These degrees are either the Bachelor of Architecture (B Arch) degree or the Master of Architecture (M Arch) degree. The Bachelor of Architecture normally requires between four to five years to complete. The Master of Architecture requires from one to three years to complete depending on the individual student's previous education. According to RIBA criterion, the professional degree is exempted from part II exam.

Most of the architectural schools follow these two programs in offering professional architectural degrees. Although a five-year B (Arch) program provides

the quickest route to satisfy the academic requirements for licensure, speed is not necessarily synonymous with what may be best for every individual. Many Bachelor of Architecture programs begin with a concentration of architecture courses in a fairly prescribed manner, although some schools begin with a general course of instruction. Electives tend to be few and exposure to other fields limited. As a result, those students who do not complete the program may have difficulty moving into another area without some loss of credit.

Many professional architecture degree programs, however, have devised curriculum structures which allow for flexibility. These programs are broken into yearly components of 2+3, 3+2, 4+1, etc. These breaks indicate logical entry and exit points from the various phases of the full five-year program. In most schools the student's work is carefully reviewed before advancement to the next phase. Such points provide a relatively easy means of transfer into an architecture program; transfer to another institution, particularly between degrees; or transfer to another academic discipline. The logical break points may also be used by the faculty to transfer out students who have demonstrated little progress. The early segments of the curriculum mix "pre-professional" design courses with liberal arts and often serve as a common base for several different environmental design disciplines such as architecture, landscape architecture, industrial design, graphic design, etc. In most commonwealth countries (Asian, United Kingdom, Australian and New Zealand) follow the RIBA categorization in structuring the professional degree in to segments. The students who select that architecture is to be their chosen career field, the five-year professional degree programs offer excellent opportunities. Students seeking slightly more flexibility should also examine five-year programs offering logical curriculum decision points.

In addition some universities have recognized a five-and-a-half-year Master of Architecture program, which may be entered directly from high school. In this case, students enroll in a program that may lead directly to a Master of Architecture degree, following a curriculum that is similar to that of a Bachelor of Architecture program. Those who do not qualify for graduate study have the option of completing a non-professional undergraduate degree, with the possibility of pursuing the

master's degree in one of the more traditional paths at another institution. Several schools are now considering converting their B Arch programs over the coming years to M Arch programs, either along the lines described above or by offering a bachelor's degree and an M Arch simultaneously at the end of a five- or five-and-a-half-year period of study.

In United States, the NAAB has recognized offering architectural professional degree for non-architectural degree holders. In this case the student with non-architectural degree has to obtain a professional master's degree. This route normally requires seven-and-a-half years of study (a four-year undergraduate degree plus a three-and-a-half-year Master of Architecture degree), followed by a three-year internship. This route is usually taken by those who have embarked on a career other than architecture and later decide to study architecture. Many people enter the profession this way; their average age is in the late twenties and their undergraduate backgrounds range across every imaginable discipline. Students entering the profession this way are usually quite mature and serious about their studies. This course of study requires three to four years beyond the undergraduate degree.

c) Post-Professional Degree and Non-Professional Degree.

This is a graduate degree offered to students who already have a professional degree in architecture. The degrees concentrate on specialized areas of study such as urban design, architectural education, design theory, health care facilities, conservation, interior design, energy and environmental science related studies, etc. This type of degree can be either research or taught course leading to a master's degree or, in a few cases, a PhD or other doctorate.

3.2.3 Architectural Education and Accreditation

Most architectural schools follow validation criteria implement by local or international professional body. Asian Architectural programs in Asian universities

strictly follow the ARB/RIBA validation criteria apart from their respective local professional association criterions. The review showed that only specific professional degree programs are accredited and none of the schools of architecture are accredited. Most schools offer only one or two accredited architectural degrees, but included other related degree programs. In most Asian universities, only the undergraduate degree program is accredited, while post graduate degrees offered research oriented curriculums. This emphasizes that academic credibility of university education has a wider scope than the validation requirement from the professional institutions.

The ARB/RIBA and NAAB outcome criteria mainly focus on; Awareness, understanding, ability and knowledge. According to Blooms cognitive domain the above criteria only focuses on knowledge, comprehension and application, which are the lower level objectives of learning outcome. In other words the professional bodies still prefer to maintain a practice oriented curriculum even with the complex nature and the development of architectural requirements. On the contrary the schools integrate higher order-learning objectives such as analysis, synthesis and evaluation in their education process as central to architectural knowledge, design activities and research. Thus, architectural schools have placed a considerable importance on architectural knowledge compared to the ARB/RIBA and NAAB validation criterions.

CHAPTER IV

CONCLUSION

The architecture profession is as old as the first civilization of the world, which is part of arts and crafts. Nevertheless, history of architectural education is less than 200 years old. Increase in societal needs, environmental issues, various human aspirations and human safety has demanded for professionalism in architecture discipline. With time, several architectural school of thoughts emerged around the world.

This report presented review of different architectural education systems followed in several leading architectural schools in the world. The evaluation of different educational systems was based on the ARB/RIBA criterion for validation. By its nature, architectural education is rich, varied and interdisciplinary. However, the subjects included in different curriculums were categorized into seven main sub topics, namely; design, technology and environment, cultural context, communication, management practice and law, other skills (university subjects) and elective subjects. Following are the findings of the review.

Most architecture students enter higher education with little experience of architecture as a discipline, and therefore a large part of architectural education is concerned with the development of new cognitive abilities, values and conceptions. The architectural education is almost universally project based, with the majority of activity centred on the design studio. Compared to other universities UTM had the lowest overall percentage for design subjects at both degree levels.

Comparison of core and elective subjects also indicated that UTM had more elective and university subjects than other universities. Although this may indicate of a liberal education system, the compartmentalization of the subjects creates difficulty in prioritizing the required criteria of the curriculum.

The degrees conferred at each university was broadly categorized into three based on the professional degree program, namely; pre-professional, professional and post professional (non-professional) degrees. It has been difficult to make comparison between different universities degrees conferred for each professional stage. The most common routs followed by the universities for their professional degree are six year and five year programs. Six year program which is the longest rout was further divided into 'four plus two' or 'three plus three' rout. The five year programs provide two options. First was to follow a well professionally oriented full five years or secondly the curriculums were broken into yearly components of 2+3, 3+2, 4+1, etc. Most architectural schools prefer to follow the five year program. However, the best carrier oriented curriculum is offered at Wales School of Architecture, which has six years of study program with 'three plus two plus one' routed. At the end of six years the student is conferred with master's degree as well as exemption from RIBA part III exams.

The discourse on architectural education is dominated by tensions between the need to provide students with a broad liberal education and the vocational need to prepare students well for a professional career. Although most universities follow validation criteria for their professional degree, it is clearly indicated that university education is holistic than merely obtaining a professional degree. This is evident as most universities offer higher research and taught courses relevant to the field of architecture. Thus architectural knowledge is beyond professionalism and demand for research based curriculums. However, the ARB/RIBA or NAAB accreditation requirements are still emphasize on practice based skills and lack in engage on the role of research.

BIBLIOGRAPHY

Abdul Razak Rahman, Fawazul Khair Ibrahim, Gurupiah Mursib and Ra'alah Mohamad (1994). "Memorandum CAEM visit 1994". Department of Architecture, Faculty of Built Environment, Universiti Teknologi Malaysia

Architecture, The University of Cardiff (Search April 2005) http://www.cardiff.ac.uk/schoolsanddivisions/academicschools/archi.html

Bloom B. S. (1956). "Taxonomy of Educational Objectives, Handbook I: The Cognitive Domain." New York: David McKay Co Inc.

College of Planning & Design, National Cheng-Kung University, Taiwan (April 2005) http://www.arch.ncku.edu.tw/eng/english.htm

Dayaratne, R (2001) "Teaching Architecture as an Intervention in Thinking: The Moratuwa Experiment Revisited" Sri Lanka Architect, Vol. 2 No 1: (2-11)

Department of Architecture, National University of Singapore (Search April 2005) http://www.arch.nus.edu.sg/courses.html

Department of Architecture, The University of Hong Kong (Search April 2005) http://fac.arch.hku.hk/

Department of Architecture and Civil Engineering, The University of Bath (Search April 2005) http://www.bath.ac.uk/ace/people/

Faculty of Architecture , Chulalongkorn University (Search April 2005) http://www.arch.chula.ac.th/english/department.html

Faculty of Architecture, Chiang Mai University (Search April 2005) http://www.arc.cmu.ac.th/

Faculty of Architecture Building & Planning, The University of Melbourne, Australia (Search April 2005) http://www.abp.unimelb.edu.au/

Faculty of Architecture and Design, Victoria University of Wellington, New Zealand (Search April 2005) http://www.vuw.ac.nz/home/subjects_degrees/subjects/arch.aspx

Fisher, Thomas (1994) "Can This Profession be Saved?" Progressive Architecture, (Feb.1994): 44-49,84

Harvey, Lee (2003) *"The Power of Accreditation: views of academics"* Centre for Research and Evaluation, Sheffield Hallam University, UK (Search November 2004) http://www.enqa.net/files/workshop_material/UK.pdf

Hodgkinson, Patrick (1990) "Schools of Architecture and Their courses". In: Linda Parkin and Jonathan Grosvenor "The Ivanhoe Guide to Chartered Architects 1990", Great Britain: The Ivanhoe Press Limited. 67-70

International Association of Universities (IAU) online database (Search April 2005) http://www.unesco.org/iau/

Kamalapurkar, Shubhada (2002) "Market Driven or Market Dragged?" Architecture Design: a Journal of Indian Architecture, September & October Vol:xix No 5 (86)

Lawson, B (1997) "How Designers Think". 3rd Edition. Elsevier Architectural Press, Oxford UK.

Mehta, Jaimini (2002) "Identity Crisis" Architecture Design: a Journal of Indian Architecture, September & October Vol. xix No 5: (82-84)

Miller, A., Imrie, B. & Cox, K. (1998) "*Students Assessment In Higher Education.*" London, Kogan Page

NAAB (1998) The National Architectural Accrediting Board 1998 Guide to Student Performance Criteria and its 2002 Addendum, http://arch.ou.edu/naab/#performance. (Search April 2005)

RIBA (2002, March) *ARB/RIBA Criteria for Validation.*). (Search November 2004) http://www.riba.org/fileLibrary/pdf/CriteriaforValidation1.pdf, 2002 (RIBA)

Sri Nammuni, V (1991) "Teaching of Architectural Design: A Moratuwa Experiment" Part 1 Sri Lanka Architect, 100(7):21

Thomas Kvan & Ruffina Thilakaratne, Dept. of Architecture, The University of Hong Kong, HongKong (Search pril 2005) http://www.brookes.ac.uk/schools/planning/LTRC/conference2003papers/papers.htm

University of Miami, Florida USA (Search April 2005) http://www.miami.edu/webcams/

Yale School of Architecture, Yale University United Kingdom (Search April 2005) http://www.architecture.yale.edu/#

APPENDICES

APPENDIX A

ARB/ RIBA Criteria for Validation

ARB/ RIBA PART 1

P1.1 Design

The studio based design projects will focus on:

- Architectural languages, ordering principles, aesthetics, human environmental needs and generators of architecture
- The ways of analysis, research, contextual studies, budget, preparation and development of a brief inform a design proposal
- The regulatory frameworks, health and safety considerations that guide design and building construction
- Architectural histories and theories of physical, artistic and cultural context. Emphasize their use in informing the design process
- Group assignments related to design projects

P1.2 Technology and Environment

Under technology and environment students will demonstrate, within coherent architectural designs and academic portfolio, to integrate knowledge of:

- Environmental physics and user comfort
- Sustainable design principles
- Building construction principles
- Building services, principles and applications
- Structural principles

- Building codes of practice, legislation, health and safety in construction and occupation of a project
- Building quantities and estimating
- Building Materials

P1.3 Cultural Context

Students will demonstrate within coherent architectural design and academic portfolio awareness of:

- Architectural civilization and socio-cultural aspects
- History of architecture and theories
- Urban design, planning, conservation and theories
- Socio-cultural studies and theories
- Landscape studies and theories

P1.4 Communication

The students will demonstrate within coherent architectural design and academic portfolio ability to:

- Develop visual, verbal, graphical and written communication methods and use of appropriate media (sketching, modeling, digital and electronic techniques) to clearly and effectively convey and critically appraise design ideas and proposals
- Use of computer applications
- Listen and critically respond to the views of others

P1.5 Management Practice & Law

The students will demonstrate within an academic portfolio an awareness of:

- Principles in small office setup and management
- Basic ethics of professional practice

- Time management and team work

P1.6 Other Subjects

Other subjects are those not included under the above thematic headings. Different universities offer prerequisite subjects to develop the student's knowledge and character. These include:

- Proficiency in Language studies
- Civilization studies (out of main discipline subjects)
- Religious studies
- Vocational training subjects

ARB/ RIBA PART 2

P2.1 Design

The students will produce and demonstrate coherent and well resolved architectural designs that integrate knowledge of:

- The social, political, economic and professional context that guides building construction

An understanding of:

- Briefs and how to critically appraise them to ensure that the design response is appropriate to site and context, and for reasons such as sustainability and budget
- The regulatory requirements, including the needs of the disabled, health and safety legislation and building regulations and development control, that guide building construction

- An appropriate philosophical approach which reveals an understanding of theory in a cultural context

And ability to:

- Generate and systematically test, analyze and appraise design options, and draw conclusions which display methodological and theoretical rigour
- Work as part of a team

P2.2 Technology and Environment

The students will demonstrate, within coherent architectural designs and academic portfolio, the ability to integrate knowledge of:

- Environmental physics and user comfort
- Sustainable design principles
- Building construction principles
- Building services, principles and applications
- Structural principles
- Building codes of practice, legislation, health and safety in construction and occupation of a project
- Building quantities and estimating
- Building Materials

P2.3 Cultural Context

The students will demonstrate within coherent architectural designs and academic portfolio understanding of:

- Architectural civilization and socio-cultural aspects

- History of architecture and theories
- Urban design, planning, conservation and theories
- Socio-cultural studies and theories
- Landscape studies and theories
- Architecture and critical theory

P2.4 Communication

The students will demonstrate within coherent architectural designs and academic portfolio understanding of:

- Seminar and topical studies
- Develop visual, verbal, graphical and written communication methods and use of appropriate media (sketching, modeling, digital and electronic techniques) to clearly and effectively convey and critically appraise design ideas and proposals
- Use of computer applications
- Listen and critically respond to the views of others
- Documentation and reports

P2.5 Management Practice & Law

The students will demonstrate within academic portfolio knowledge of:

- Project management
- Code of ethics and professional practice
- Building economics
- Legislation and Building by-laws

P2.6 Other Subjects

Other subjects are those not included under the above thematic headings. Different universities offer prerequisite subjects to develop the student's knowledge and character. These include:

- Proficiency in Language studies
- Civilization studies (out of main discipline subjects)
- Religious studies
- Research methodology

APPENDIX B

HIGHER EDUCATION SYSTEMS

Information on higher education systems of each country selected in the study is reviewed. The details were obtained from the International Association of Universities (IAU) online database (http://www.unesco.org/iau/).

1. Singapore

Higher education is provided by three kinds of institutions, universities, polytechnics, and other centres of public and private training. There are two institutions of university level, the National University of Singapore (established in 1980 through the merger of the University of Singapore and Nanyang University) and the Nanyang Technological University (founded in 1981 as Nanyang Technological Institute, and acquired present autonomous status and title in 1991). They are almost wholly financed by the Government, whose representatives are members of the governing councils. All post-secondary programmes offered by public and non-public institutions must be approved by the Ministry of Education, Higher Education Division.

1.1 University level first stage: Bachelor's Degree

Admission to first degree courses is on the basis of GCE 'A' level results. Bachelor (Pass or Pass with Merit) Degrees are normally obtained after 3 to 5 years, depending on the subject. Bachelor degrees in Dentistry, Law, Engineering, Building and Estate Management require four years, Architecture (excluding a year out for practical experience) and Medicine five. An Aergrotat degree may be awarded to students who have completed the course but were unable to sit for the final examinations necessary for the award of the regular degree.

1.2 University level second stage: Master's Degree

The Master's degree is obtained after one to three years of postgraduate study. Candidates must hold a good Honours degree and submit a thesis. The minimum entry qualification for a Master's by course work and dissertation is a Bachelor's degree or its equivalent, although requirements vary from course to course.

1.3 University level third stage: Doctor of Philosophy

The Doctor's Degree is awarded after a minimum of two further years following upon a Master's Degree. Candidates are required to submit a thesis. The Doctorate in Business requires a combination of course work and dissertation. The Doctor of Letters, Doctor of Laws and Doctor of Science are conferred on the basis of published work.

1.4 Admission requirements to university-level studies

To enter the National University of Singapore and Nanyang Technological University students must hold passes in two subjects at Advanced level and a pass in the General paper in the Singapore-Cambridge GCE A level examinations; to enter the Singapore Polytechnic, Ngee Ann Polytechnic, and Temasek Polytechnic, they must hold the GCE O level with passes in English, Mathematics and relevant Science subjects; to enter the Institute of Education, they must hold GCE A levels for admission to the Certificate in Education programme and a university degree in a relevant subject for the Diploma in Education.

2. Thailand

The higher education system comes under the responsibility of the Ministry of University Affairs and Ministry of Education. The Ministry is also responsible for standardization of curricula, personnel management, and recommendations for budget allocation. Degrees are offered at these institutions at all three levels, i.e., Bachelor's, Master's and Doctoral. Advanced training and research programmes are offered in many specific disciplines. Non-university level and post-secondary institutions come under the jurisdiction of the Ministry of Education, and are usually

authorized to award qualifications up to Bachelor's degree level only. Specialized universities are: nursing colleges, cadet schools and Buddhist universities.

2.1 University level first stage: Bachelor's Degree

Bachelor's Degree studies require four years in most courses, with the exception of some academic disciplines, e.g. Architecture and Pharmacy, five years; Medicine, Dentistry, and Veterinary Medicine, six years. Programmes are structured in groups of general education studies in Sciences, Liberal Arts, and Social Sciences relevant to the course's discipline and Philosophy. Specialized studies in theoretical and advanced subjects are the core group, with a number of selective subjects. To obtain the Bachelor's Degree, students must obtain at least 2.0 average grade point.

2.2 University level second stage: Master's Degree

Further post-graduate studies for a Master's Degree require a minimum of two years' further study. Students with graduate grade points average 2.5 and above may choose to enter the Master's programme of direct or related disciplines. Programme modules comprise advanced course work and research. Liberal Arts and Social Science programmes offer an alternative of comprehensive study and examination in place of a thesis, whereas all Science and Applied Science programmes require a research thesis. To obtain the Master's Degree, students must obtain at least 3.0 average grade point.

2.3 University level third stage: Doctor of Philosophy

Advanced level of studies and research for a Doctorate require 3 years of intensive research and knowledge acquisition. A doctoral thesis is expected to contribute to the highest level of academic advancement in the discipline. Students are also expected to produce study reports and give academic seminars during the course.

2.4 Admission requirements to university-level studies

All undergraduate students require sitting for the National University Entrance Examination. However, since year 2000, a combination of achievement records from secondary school (10%) and test scores in main subjects and special subjects (90%) and interview/physical examination were conducted as preliminary entrance to universities. Private universities organize their own entrance examinations or selection for the admission of students.

3. Taiwan

Higher education is provided by universities, 4-year colleges, and junior colleges, both public and private. There are also institutes of technology, and national and municipal Open Universities. To qualify as a university an institute must consist of three or more colleges or faculties. Admission is based on the results obtained in the Universities and Colleges Joint Entrance Examination. Under the educational reform policy, all public universities have become autonomous. The Ministry of Education no longer allocates the totality of the budget to each public university. Instead it only allocates 80% of the funds, the universities having to seek the rest.

3.1 University level first stage: Bachelor's Degree

Admission to the first stage is based on the results obtained in the Universities and Colleges Joint Entrance Examination. Most Bachelor's Degree courses last for four years. The exceptions are Medicine (seven years), Dentistry (six years), and Veterinary Medicine (five years). A total of 128 credits are required for a Bachelor's Degree. At the Open University, Bachelor's courses last seven to eight years.

3.2 University level second stage: Master's Degree

Further specialization leads to Master's Degrees which normally require two years study following upon a Bachelor's Degree.

3.3 University level third stage: Specialization and individual research, Doctor of Philosophy

The third stage leads to the highest university degree, the Doctorate, which requires a minimum of a further two years' study.

3.4 Admission requirements to university-level studies

They are selected on the basis of their performance in the Senior High School Examination.

4 Hong Kong

Higher education is provided by universities, polytechnic universities, and institutions of professional education. The University Grants Committee (UGC) is the advisory body which makes recommendations about the development of the tertiary sector, the financing of institutions and the administration of government grants. Currently, there are eight UGC-funded institutions offering publicly-funded programmes at the sub-degree, degree, taught-postgraduate and research-postgraduate levels. Of the eight institutions, seven are universities with self-accrediting status. The UGC commissions the Hong Kong Council for Academic Accreditation to validate the degree courses of the remaining institution (HKIEd). Each of these institutions is an autonomous corporation with its own Ordinance and governing Council. They are free to manage their internal affairs within the restraints of the laws of Hong Kong.

4.1 University level first stage: Associate Degree and Higher Diploma, Bachelor's Degree and Honours Degree

Associate degrees and Higher Diploma program are normally last for two to three years. The first stage of higher education leads to a Bachelor's Degree normally after three years. Some may take up to six years depending on the subject areas.

4.2 University level second stage: Master's Degree

The Master's Degree is conferred after one to two years' full-time study (three years' part-time) following upon the Bachelor's Degree. Postgraduate Diplomas and Certificates are offered after one year of postgraduate studies.

4.3 University level third stage: Doctor of Philosophy

The third stage leads to the award of a Doctorate after a period of research work and on submission of a thesis. Studies generally last between two and seven years.

4.4 Admission requirements to university-level studies

They are selected on the basis of their performance in the Hong Kong Advanced Level Examination.

5. Malaysia

Higher education is provided by universities, polytechnics and colleges. Private universities have recently been established. All institutions of higher education are under the supervision of the Minister of Education. The Higher Education Division of the Ministry of Education coordinates and monitors the activities of institutions of higher learning. The polytechnics fall under the jurisdiction of the Technical and Vocational Education Division of the Ministry. Universities are self-administered and government financed. Universities can only be established in accordance with an Incorporation Order signed by the King. The International Islamic University was founded under co-sponsorship between the Malaysian Government, Maldives, the Organization of Islamic Conference, Bangladesh, Pakistan, Turkey, Libya and Saudi Arabia. Under the University and University Colleges Act 1995, the highest university authorities are the Administrative Board (Council) and the Senate. Three foreign universities have recently established campuses in Malaysia: Monash University, Curtin University and Nottingham University-Malaysian campus.

5.1 University level first stage: Bachelor's Degree

Courses leading to the award of the Bachelor's degree last for three to five years. They are awarded as First Class degrees, Second Class Upper with Honours, Second Class Lower with Honours, and General degrees. In Medicine, Dentistry, Veterinary Medicine and Architecture, the Bachelor's degree is awarded after five or six years.

5.2 University level second stage: Master's Degree

The Master's Degree is conferred after two years' further study. Students must hold a Bachelor's degree with Honours at least at Second Class level and be able to pursue in-depth study in a given field or a combination of fields as well as a project in the proposed field of study. For the Postgraduate Diploma, the entry requirements are a Bachelor's Degree from the university or equivalent qualifications or other qualifications and experience acknowledged by the Senate.

5.3 University level third stage: Doctor of Philosophy

The Doctor of Philosophy degree is awarded after a minimum of two years' further study and research. The minimum entry requirements are a higher level Master's degree and the ability to pursue research in the proposed field. In addition, candidates must pass oral examinations and, in some cases, written examinations. Students must defend a thesis. There are also Higher Doctoral degrees for outstanding contributions to knowledge, e.g. Doctor of Science (DSc), Doctor of Letters (Dlitt) and Doctor of Laws (DLl). Some universities award a Doctoral Degree to known scholars on the basis of published work. An Honorary Doctoral Degree is awarded to those who have made an outstanding contribution to the field without pursuing typical academic careers.

5.4 Admission requirements to university-level studies

The students need acquire to obtain a secondary school credential named 'Sijil Tinggi Pelajaran Malaysia' (STPM). However for the minimum admission requirements, a student must hold credits in at least five subjects, Bahasa

Melayu/Malay, Mathematics and two other subjects. Such qualifications must be obtained in one examination.

6. Australia

Higher education programmes and awards offered by non self-accrediting institutions must be accredited by the relevant State or Territory higher education accreditation authority. The accrediting authorities are listed in the Register of Authorities Empowered by Government to Accredit Post-Compulsory Education and Training Courses. The quality of the Australian higher education sector is guaranteed by a quality assurance framework developed and supported by the State, Territory and Australian governments. Self-accrediting institutions have primary responsibility for academic standards and quality assurance. They are accountable to the Australian Government and are also subject to audit by the Australian Universities Quality Agency (AUQA). In addition, professional bodies and associations play a significant role as external arbiters in the quality assurance framework through their accreditation of professional courses in areas such as Nursing, Medicine, Law, Accounting, Engineering and Architecture. These bodies and associations also have an on-going role in monitoring the quality of such courses.

6.1 University level first stage: Undergraduate Studies

The main stage of university education leads to the Bachelor's Degree. Undergraduate studies last between three years (Arts, Science, Commerce), four years (Education, Engineering), five years (Veterinary Science, Dentistry, Architecture) and five or six years (Medicine and Surgery) full-time. Arts and Science faculties usually offer either a Bachelor Degree (Pass) obtained in three years or a Bachelor's Degree (Honours) obtained in four years; candidates for the latter undertake extra work in their speciality. An Honours Degree is normally required for access to higher research degrees. Some institutions offer postgraduate Bachelor degrees in a number of professional fields such as Medicine, Law and Architecture.

6.2 University level second stage: Postgraduate Studies

The holder of a Bachelor's Degree can proceed to a Graduate Certificate (one semester) or a Graduate Diploma (two semesters) in a particular subject or to a Master's Degree, which constitutes the second stage of higher education. Master degrees typically require two years following a three-year Bachelor degree and one or two years following an Honours or four-year Bachelor degree and are normally by coursework and project/research work or by research and thesis.

6.3 University level third stage: Doctor of Philosophy

The holder of a four-year Bachelor degree with Honours at a sufficiently high level, or a Master degree may proceed to a Doctoral programme. The most common Doctoral programme in Australia is the Doctor of Philosophy (PhD). The PhD is typically undertaken by thesis after research and normally requires a minimum of three-years of full-time study. A number of Australian universities offer the Professional Doctorate with an orientation towards professional practice, typically in fields like Education, Business Administration and Psychology. Most universities also award a Higher Doctorate (e.g. DSc, Dlitt) on submission of published work representing a substantial contribution to knowledge in a particular field.

6.4 Admission requirements to university-level studies

Entry to a higher education course is normally determined by the student's tertiary entrance score, rank or index (referred to here as the tertiary entrance score) which is calculated on the basis of results in the senior secondary school certificate.

7. New Zealand

Higher education is provided by four kinds of state tertiary institutions, each defined in legislation. They are universities, institutes of technology and polytechnics, colleges of education and wananga (Maori centres of higher learning). Governance and funding, also defined by legislation, are identical for each type of institution. Each institution is governed by its own council, and is accountable to public sector accounting processes. Each institution determines its own programmes.

In addition, there are several thousand private training establishments in New Zealand. A small number are accredited by the New Zealand Qualifications Authority to offer degrees. Private training establishments may be considered for government funding on a per student basis although the total amount available is capped.

7.1 University level first stage: Bachelor's Degree

The first stage of tertiary education leads to the award of certificates, diplomas or Bachelor's Degrees. All three are available in all universities, some institutes of technology and polytechnics, wananga, private training establishments, and colleges of education associated with universities. A Bachelor's Degree course is normally of three years' duration for Arts, Commerce, Science, Agriculture and Horticulture, four years for Engineering, Law, Pharmacy, Medical Laboratory Science, Optometry and Physiotherapy, five years for Architecture, Dentistry and Veterinary Science, and six years for Medicine. Entry to a Bachelor's Degree with Honours is usually after the award of a first degree. In some Honours programmes selection may take place during the first degree programme on the basis of merit.

7.2 University level second stage: Master's Degree

The second stage of tertiary education is available in universities and some institutes of technology and polytechnics and leads to a Master's Degree. A prerequisite is a Bachelor's Degree (sometimes with Honours) and the course of study is sometimes one year, more frequently two years, and may be as long as four years. A Master's Degree is typically awarded on the results of a piece of research through the presentation of a thesis. Becoming more common are Master's Degrees by coursework (often including a substantial research component) or by coursework combined with a thesis.

7.3 University level third stage: Doctor of Philosophy

The third stage is where specialization becomes more focused and properly-directed research is crucial. After a minimum of two years' study (generally four years or longer) and the presentation of a thesis, for which a viva voce examination is

normal, a student may be awarded the degree of Doctor of Philosophy (PhD). This degree is available at all universities in most subjects. A Master of Philosophy (MPhil) is available at some universities. This may be completed in one year of full-time research, but typically requires longer. Candidates for the PhD or the MPhil must previously have completed at least a Bachelor's degree with first-or second-Class Honours.

7.4 Admission requirements to university-level studies

Credential required for university entrance is with minimum of 42 credits at level 3 or higher on the National Qualifications Framework. The certificate is referred as National Certificate of Educational Achievement.

8 United Kingdom

Higher education is provided by three main types of institutions: universities, colleges and institutions of higher education and art and music colleges. All universities are autonomous institutions, particularly in matters relating to courses. They are empowered by a Royal Charter or an Act of Parliament. As a result of the Further and Higher Education Act of 1992, the binary line separating universities and polytechnics was abolished and polytechnics were given university status (i.e., the right to award their own degrees) and took university titles.

8.1 University level first stage: Undergraduate stage

This stage lasts for three or four years and leads to the award of a Bachelor's Degree in Arts, Science or other fields (Technology, Law, Engineering, etc.). In some Scottish universities the first degree is a Master's Degree. The Bachelor's Degree is conferred as a Pass Degree or an Honours Degree where studies are more specialized. The Bachelor's Honours Degree is classified as a First Class Honours, a Second Class Honours or a Third Class Honours. In some universities and colleges of higher education, a two-year course leads to a Diploma in Higher Education (DipHE). This is a recognized qualification in its own right. Some universities have adopted the credit-unit or modular system of assessment. In some universities students must follow a foundation course before embarking on the course leading to

the Bachelor's Degree. Students of foreign languages are sometimes required to study or work for an additional year in the country of the target language. Sandwich courses generally involve an additional year's work experience. Some institutions have introduced accelerated two-year degrees which require students to study during the normal vacation period. The majority of degree courses also involve the research and writing of an extensive thesis or dissertation, normally making up around 50% of the final year assessment.

8.2 University level second stage: Master's Degree, Master of Philosophy

Study at master's level is at the forefront of an academic or professional discipline. Students must show originality in their application of knowledge and advancement of knowledge. The normal entry requirement for a Master's degree is a good Bachelor's degree. A Master's degree is normally studied over one year. Some Master's programmes, including the M.Eng, are integrated in undergraduate programmes and result in a postgraduate qualification, not an undergraduate one, after four years of study.At a university, after two years of additional study and the successful presentation of a thesis, students obtain the Master of Philosophy (M.Phil) degree.

8.3 University level third stage: Doctor of Philosophy, Higher Doctorate

After usually three years' further study beyond the Master's Degree, the candidate may present a thesis for the Doctorate of Philosophy (D.Phil. or Ph.D.).A further stage leads to Higher Doctorates which may be awarded by a university in Law, Humanities, Science, Medical Sciences, Music and Theology after a candidate, usually a senior university teacher, has submitted a number of learned, usually published, and works.

8.4 Admission requirements to university-level studies

Admission requirement for university entrance is to complete General Certificate of Education Advanced Level with minimum of 2/3 passes. Universities may also impose their conditions, such as a certain combination of passes or a particular standard achieved in subjects taken at A -level.

9 United States

Higher education in the U.S. is also called postsecondary education. It is not divided into different sectors (university, non-university, etc.) as are some other national systems and it is a diverse and autonomous community of publicly and privately supported institutions. The higher education system is characterized by accessibility, diversity, and autonomy and is known for both its size and quality. The federal government has no jurisdiction or authority over the recognition of educational institutions, members of the academic professions, programmes or curricula, or degrees or other qualifications. Nearly all U.S. postsecondary institutions are licensed, or chartered, by a state or municipal government to operate under the ownership of either a government (if public) or a private corporation (if independent). Quality assurance is achieved via state requirements, voluntary accreditation, and the reputation of institutions and among their academic peers and employers of graduates. Accreditation is a self-regulating process of quality control engaged in by the U.S. postsecondary education community to ensure minimum standards of academic capability, administrative competence, and to promote mutual recognition of qualifications within the system. Six (6) regional accreditation associations set minimum standards for institutions chartered in the states of their respective jurisdictions. In addition, other recognized accrediting associations set and regulate minimum standards for individual subjects or related subjects, particularly in professional fields, and for specialized institutions.

9.1 University level first stage: Associate Degree, Bachelor degree, Advanced Certificate, 1st professional degree

The Associate Degree is the first academic or professional degree that can be awarded in U.S. postsecondary education. Holders of this Degree may apply to enter other first degree programmes (such as those leading to the Bachelor's Degree), but are not qualified to apply directly for advanced (graduate) studies programmes. Programmes of study for this degree are usually designed to take 2 years of full-time study, but some programmes take longer to complete. Persons who pursue this degree on a part-time basis also take longer than 2 years to finish. The Associate Degree may be awarded in the liberal arts and general studies as an academic

qualification or it may be awarded in a professional occupational field. Associate Degree programmes generally fulfil 2 years of the course requirements needed for a Bachelor's degree. Credit for Associate Degree studies is usually transferable to Bachelor's degree programmes, especially where transfer agreements have been established between or among institutions. The Bachelor's Degree is the second academic degree that can be awarded in U.S. postsecondary education, and is one of two such undergraduate (first) degrees that qualify a student to apply to programmes of advanced (graduate) study (the other such degree is the first-professional degree). Programmes of study for this degree are designed to take between 4 and 5 years of study, depending on the field of study and whether the degree is pursued on a full- or part-time basis. Honours programmes are offered by many institutions that award the Bachelor's degrees. These generally require the completion of additional requirements such as preparation of an undergraduate thesis, honours paper or project, advanced coursework, or special examinations. Advanced certificates requiring a year or less of study following (and sometimes accompanying) completion of a Bachelor's are sometimes awarded to signify a concentration in a sub-specialization or completion of a related set of competences. First professional degrees comprise a limited number of second first degrees. Students are only admitted to first professional degree programmes after completing most, or all, of a Bachelor's degree programme in another subject. The study content of the first professional degree programmes is 'undergraduate' in nature and the degrees are prerequisites for entry-level access to certain regulated professions. Confusion sometimes arises because several first professional degrees use the term 'doctor' in the title even though they are not advanced research degrees. First professional degrees are awarded in Medicine (MD), Dentistry (DDS/DMD), Veterinary Medicine (DVM), Osteopathic Medicine (DO), Optometry (OD), Podiatry (DPM), Chiropractic (DC), Pharmacy (D.Pharm), Divinity (M.Div), Rabbinics (MHL/Rav), and Law (JD).

9.2 University level second stage: Master's Degree, Post-Master's Degree, Diploma or Certificate

The Master's Degree represents the second stage of higher education and is the first advanced (graduate) degree awarded. U.S. Master's Degrees may be taught (without thesis) or research (with thesis) and may be awarded in academic or professional fields. Most Master's Degrees are designed to take 2 years of full-time study, although the time may vary depending upon the subject, the preparation achieved by the student at the undergraduate level, the structure of the programme, and whether the degree is pursued on a full- or part-time basis. Master's degrees generally require completion of a series of course requirements and may, depending on the type of Master's programme, require completion of a research thesis, special project, examinations in one or more subfields, satisfaction of special requirements (such as linguistic or quantitative skill), or a combination. U.S. awards that fall between the Master's and the research doctorate may be of several types, but all of them fall within the second stage of U.S. higher education. Examples of awards given at this level include the degree of Education Specialist (E.Sp. or Ed.S.), Certificates, and Diplomas of Advanced Study (C.A.E., D.A.E.).

9.3 University level third stage: Research Doctorate

The Research Doctorate represents the third and highest stage of higher education in the United States and may be awarded in academic disciplines and some professional fields. This degree is not awarded by examination or coursework only, but requires demonstrated mastery of the chosen subject and the ability to conduct independent, original research. Doctoral programmes require intensive study and research in at least one subfield and professional level competence in several others. Following a series of research seminars and comprehensive examinations, the student must prove his or her capability in original research or independent practice through the preparation and defence of a published dissertation or project thesis and the passage of a battery of oral and written examinations before a committee of senior faculty, including both the examining committee and invited guests. Most doctoral degrees take at least 4 or 5 years of full-time study and research after the award of a Bachelor's degree or at least 2 to 3 years following a Master's degree. The actual time

to degree varies depending upon the subject and the structure of the programme. Research Doctorates are awarded in the academic disciplines and for theoretical research in some professional fields, with the most common such degree being that of Doctor of Philosophy (PhD). There are a variety of equivalent degree titles used in some institutions and disciplines. The focus of professional doctoral studies is usually on applied rather than theoretical research, and there is a wide variety of degree titles in use.

9.4 Admission requirements to university-level studies

The secondary school credential required for university admission is referred as the High School Diploma. The High school marks depend on standards & policies of individual institutions. Further the Certificate of General Educational Development (GED Certificate) is legally recognized in all states as equivalent to the High School Diploma. Achievement tests or Advanced Placement tests may also be required. These tests may also be taken that gauge knowledge in specific subject fields.