Environmental Architecture Education; A comparative study between the curricula of Kuwait University and Newcastle University with reflection on policy making and end users

BY

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Abstract

This study investigates how, if at all, sustainable architecture education is practised in the Department of Architecture at Kuwait University. The thesis begins with the development of sustainable design and a brief history of education in Kuwait. Furthermore, it includes a critical discussion of architectural education theory, the role of architecture bodies in regulating both the profession, and architecture education competencies.

The thesis begins with a background of the history of education, architectural education from apprenticeship level to formal Higher Education, the initiation of architecture accrediting bodies, and how environmental concepts were introduced into the curriculum through architecture accrediting bodies.

The thesis exhibits different cases of theoretical approaches of architecture education, beginning with the UK, in which the political situation is a major driving force behind environmental education, and shifting to architecture education in SAPL, America (Texas A&M University), Kuwait University and Australian Sydney University., The different case studies also contribute to the debate about whether architecture schools, due to their different educational approaches, should be more strongly linked to other fields of study such as engineering and/or sociology, biology, building services, etc.

The thesis displays the actual methods used in collecting field data, a summary of data analysis results using graphs, charts, etc., with more details of raw material included in the appendix section.

The thesis identifies and discusses the influences upon sustainable architecture including policy, regulations, market forces, etc. These influences are identified as part of the three drivers of sustainability; environment, economy and society. It further concludes by linking the drivers of sustainable architecture with the attainment of sustainable architecture in Kuwait by implementing policies promoting it in accordance with international environmental policies and strategies.

The thesis constructs a thorough argument for a new teaching environment for sustainable architecture in Kuwait drawn from the data analysis results and

architecture education theories examined within. The recommended architecture education delivered provides a diagram of curriculum recommendations, and new teaching, learning and assessment methods within the right environment. Indicators to monitor the success of the proposed approach are included.

The final recommendation of the research thesis provides a constructive description of the overall study, the key findings and the implications of the research, with a suggested framework for future research into curriculum development.

Dedication

I would like to dedicate this work to:

The soul of my father who encouraged me and who had faith in my ability to achieve the impossible. I love him and miss him all the time.

My Mother Merriam for her continuous love and care all through my life.

My family who provided me with their valuable assistance and support during the course of my research.

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Acronyms List

AA the Architectural Association, London

AIA American Institute of Architects

SAPL School of Architecture, Planning, and Landscape

BRAC Building Regulations Advisory Committee

CEC Commission of the European Communities

CIAM Congrès International d'Architecture Moderne

CSD Commission on Sustainable Development

CSR Corporate Social Responsibility

EAP European Union Environmental Action Programme

EC European Community

EEA European Environment Agency

EEC European Economic Community

EU European Union

CNAA the Council for National Academic Awards

IEEP International Environmental Education Programme

IUCN International Union for the Conservation of Nature and Natural Resources

KAL Kuwait Architects League

KES Kuwait Engineering Society

KU Kuwait University

LIFE European Union Lending Instrument for the Environment

MARS Modern Architectural Research Group

NAAB National Architectural Accrediting Board

NFE Non-formal education

RIBA Royal Institute of British Architects

SEA Single European Act 1986

SPSS Statistical Product & Service Solutions (formerly Statistical Package for the Social Sciences)

UK United Kingdom

UN United Nations

UNDP United Nations Development Programme

UNEP United Nations Environment Programme

UNESCO United Nations Educational, Scientific and Cultural Organisation

USA United States of America

WCED World Commission on Environment and Development (Brundtland Commission)

Glossary

Ability: the undergraduate's aptitude for establishing links between certain kinds of information and the tasks that it relates to by applying it in certain situations or to solve specific problems.

Academic year: the university year for the purposes of teaching, which is usually different from the calendar year.

Accreditation: the formal approval of a programme deemed to transmit the competencies required to progress toward registration as an architect. The requirements of the Accrediting Authority may vary from one country to another.

Accrediting Authority: the legislative body which sets accreditation conditions for academic programmes. It is responsible for ensuring that programmes promote a satisfactory level of academic achievement to enable registration and practice as an architect.

Active Learning: a learning process that focuses on learners rather than instructors. The learning and teaching process engages the students to create their own learning experience.

Assessment: a process through which a person's performance is measured in units of study/course against performance criteria described in documents known as units of competency or competency standards. This includes all kinds of examinations, essays, laboratory-based work/projects, written assignments, and other forms of evidence eliciting proof of students' competence due to academic and administrative/educational support programmes and services provided by the university for improving student learning and development. Assessment examines quantitative and qualitative evidence regarding student competence, uses this evidence to improve learning for current and future students, and presents results to stakeholders. It determines skills, knowledge and values gained from the university experience.

Assessment criteria: based on the intended learning outcomes for the work being assessed, the knowledge, understanding and skills markers a student is expected to display in the assessed task and which are taken into account in marking the work.

Awareness: undergraduates' acquaintance with general concepts, topics, rules, methods and procedures, without necessarily being able to paraphrase or summarise this information. Students should be capable of identifying the limits of their awareness and to perceive its fullest implication or application.

Award: a qualification or certificated credit conferred upon a student who has achieved the intended learning outcomes and passed the assessments required to meet the academic standards set by an institution for the award. Awards may be divided into modules, units or elements set at various levels and requiring different volumes of study, each of which has attached to it intended learning

outcomes and academic standards to be achieved by students in order to receive the final award[1].

Bachelor's Degree: the highest university award offered to undergraduates upon successfully completing their degree requirements. It usually takes 3-4 years to obtain a Bachelor's degree.

Competency, plural competencies: the skills acquired by learners through work experience, life experience, study, or training.

Core courses: also called *compulsory courses*, must be successfully completed as a requirement of graduation from any architecture programme.

Course: or *a subject*, involves contact with academic staff and other students over a period that lasts for multiple weeks. This contact takes different forms: lectures, tutorials, seminars, workshops and so on. A number of courses could make up a *major* or *minor* or a *stream.*

Credit points: or *Units,* are the value or weighting contributed by each course towards completion of the total programme requirements.

Diploma: the award provided following the successful completion of the requirements of a diploma course.

Electives: a range of course in any architecture programme that can be taken in addition to compulsory courses. Students select electives according to their interests, to complete the programme.

Embedded course: award courses in higher education which allow unit of study credit points to count in more than one of the awards.

Faculty: a formal part of the university's academic governance structure, consisting of academic staff members and headed by a dean.

Faculty Vision: a statement outlining a far-reaching objective that the college/faculty aspires to achieve within a timeline. The vision statement sets forth long term direction. It suggests an ability to see possibilities and imagine the world differently from others' perspectives.

Goals: broad objectives that the college/faculty wants to achieve in order to fulfil its mission.

Graduate: an individual who holds an award from a recognised higher education institution.

Grade descriptors: a summary of the student's level of achievement in relation to bands of marks. For individual assignments, they indicate how well the assessment criteria have been met; for award classifications, they indicate the level of achievement across a programme of study as a whole.

Honours: the successful completion of a degree requirements plus an extra separate honours year course.

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[1] source: http://www.qaa.ac.uk/academicinfrastructure/codeOfPractice/section6/default.asp#p1

Knowledge: undergraduates' acquaintance with, and understanding of, specific concepts, facts, definitions, rules, methods, processes or settings.

Major: the chosen field of study that consists of specified units of study that student has selected to pursue his/her higher education. This is mainly used in US, rather than UK, higher education.

Minor: studies undertaken by student to support a Major. They require less credit points than a major. Also a term found in US, rather than UK, higher education.

Non-formal education: all education that takes place outside the formal education system, that is, outside schools, universities, and so on.

Professional registration: a procedure followed by accreditation bodies such as NAAB and RIBA to ensure that architects comply with their requirements.

Recognition: the formal endorsement of a programme by an accreditation board, stating that the programme meets the requirements for graduation as set by the board and therefore that its graduates are eligible for membership as architects.

School: the entity that delivers the professional qualification for students joining an educational institution.

Semester: half an academic year teaching. A division found mainly in US rather than UK higher education. Higher education in the UK is divided into three terms (Trimesters).

Social capital: the aggregate of actual or potential resources which are linked to possession of a durable network of more or less institutionalized relationships of mutual acquaintance or recognition.

Strategy: combined actions that the College/Faculty administration has taken or intends to take to achieve its strategic objectives and to pursue its mission.

State Visiting Panel (SVR): the panel that makes annual visits to schools/ programmes to ensure that a dialogue is conducted between the school and the profession.

Undergraduate: a student enrolled in a course leading to a diploma/bachelor's degree.

Understanding: an undergraduates' identification, assimilation, and comprehension of information that enables them to paraphrase, summarise information and relate this information to theoretical and practical applications.

Unit of study: a term used by The University of Sydney to describe both a course leading to a diploma or bachelor's degree and a student enrolled in such a course.

Chapter 1

Introduction

1.1 General background

At Kuwait University, architectural education started in the autumn of 1997, in response to the need for Kuwaiti architects to be familiar with their own cultural needs and able to serve their country's future requirements.

This research commenced with two primary aims: to determine sustainability concepts within the Architecture syllabus of the Department of Architecture at Kuwait University (in terms of building the undergraduates' awareness of sustainability); and to compare this with the well established syllabus of the School of Architecture, Planning and Landscape (SAPL) at Newcastle University.

The research will be a theoretical investigation of sustainability curricula in architectural education and how to develop a robust curriculum for Kuwait. The thesis touches on architectural design teaching theory, but the main emphasis of the research is sustainability curricula and the teaching methods or methods used only as part of the curricula and will be developed in Chapter 1 and 2. The main focus of the research will be on the holistic need to develop sustainability curricula in Kuwait.

1.2 Statement of the problem

From the 1960s onwards the environment has become a priority for many countries around the world, attracting activists from different disciplines, from biologists and educators to policy makers and so on. After *The Silent Spring* (Carson, 1965) was published, the world's attention was attracted to the detrimental effects of human activities on the Earth. Subsequently a number of international gatherings and conferences took place under the guidance of the UN, the most significant outcome of which was the 1987 Brundtland Report; *Our Common Future,* including its famous definition of sustainable development: *Development that meets the needs of the present without compromising the ability of future generations to meet their own needs* (World Commission on Environment and Development, 1987).

Since then, sustainable development has become a United Nations target. Many conferences and meetings have taken place since, discussing ways to realize sustainable development in a world beset by poverty, low literacy, gender inequality, diseases and other problems that need solving as a precondition to the achievement of sustainable development. The most significant conferences were those that took place in Stockholm in 1972 and in Rio de Janeiro in 1992 resulting in Agenda 21 and the Kyoto agreement (1997) (Dodds and Middleton, 2001).

In spite of global efforts to build criteria to implement sustainable practices, to save non-renewable resources and to slow down the consumption of renewable resources, the results are at best described as insufficient to achieve sustainability, and at worst as useless in preventing present and future natural catastrophes.

In the last decade, the world has observed a rapid and unprecedented increase in natural disasters in many regions. Tornados, glaciers melting in the North Pole, global warming, and even an increase in certain human diseases; all speak of humanity's neglect of nature while pursuing activities related to economic development. In response to this phenomenon, the European Union (EU) has revised its policies, issuing new, enforceable, sustainability legislation and urging its members to adhere to a time frame in implementing it, if possible.

As a member of the EU, the United Kingdom is obliged to implement sustainability legislation in the fields of architecture, education, heath, energy consumption and other state sectors. Achieving sustainable development is said to be very much interconnected with other issues such as education, health, human rights, economic issues and gender equality (Dresner, 2002; O'Neill et al., 2008). For all that, the UK has not saved enough energy to meet its targets, neither under the previous Blair administration nor at the present time under Gordon Brown.

The new millennium commenced with major challenges facing humanity, including climate change, the depletion of the Earth's resources, mass

migration, the impact of natural disasters and the ever-growing demand for housing. Such disasters call for a response that uses and engages with vernacular built knowledge and experience (Afshar and Norton cited in Asquith and Vellinga, 2006) . This is especially salient, in that buildings are considered as the major factors influencing the Earth's environment (Halliday, 2008; Edwards and Hyett, 2001). Architectural academics all over the world question architectural education and to what extent the curriculum responds to present universal human needs and the demand for sustainable construction (Davis, 2006; Salvestrinin, 1995). The curriculum places a particular emphasis on education regarding building design, especially because the future energy and resources consumption rate is determined at the design stage (Thackara, 2007).

UK schools of architecture work within the RIBA umbrella and must meet certain competencies in the domain of sustainability to gain validation for their Architecture degrees. Consequently, all RIBA-recognised schools of architecture in the UK include sustainability concepts within their curricula for the Architecture degree. Here, one might question the nature of these sustainability concepts, their quantity and the learning outcomes that are included in these schools' syllabi.

Kuwait has signed many international environmental agreements that were later ratified by the UN organisations. Yet the actual implementation of these agreements in Kuwait needs to be examined, in order to learn how well they are actually enforced.

The Kuwait University Department of Architecture was started after consultation with experts and the analysis of sample curricula from American and Saudi Arabian Universities. At present Kuwait University sets its own curriculum for the Bachelor of Architecture degree. Architecture education in Kuwait differs from that in the UK in terms of the source of curriculum development and validation. The Kuwaiti curriculum is determined within the Department of Architecture, whilst in the UK, an external body (RIBA and ARB) determines the curriculum which all schools of architecture should follow.

This PhD research raises the following questions:

- How do the Kuwait University Department of Architecture academics set their syllabus, and on what basis do they design and renew their curriculum?
- Do students acquire sufficient sustainability concepts during their undergraduate years?
- What criteria do they follow in setting up their undergraduate curriculum since there is no main architecture accreditation body to validate their undergraduate programme?
- What is the role of both society and policy makers in pushing the sustainability education agenda to meet international sustainable development targets?
- What are the external factors affecting the development of the Kuwait University curriculum?

The thesis examines Kuwait University's Department of Architecture as a case study, comparing it to Newcastle University's School of Architecture, Planning and Landscape, SAPL. The reason for comparing the two universities' curricula is that they embody many differences in terms of their history, their regional location, their cultures, their sustainability strategy, their curricula and teaching criteria and the fact that the graduates will face different kinds of social consumption patterns and future sustainability agendas from their governments. However, they *should* share one important goal: their wish to achieve sustainable development through education backed by enforceable legislation, environmentally aware policy makers and the public. Therefore, the PhD thesis aims to determine the extent to which both universities have succeeded in embedding environmental concepts within their curriculum towards the goal of achieving Sustainable Architecture Design.

1.3 The research questions

To achieve its main aim, the research raises several questions. The research investigates and compares the two curricula in terms of:

- Environmental content in general and sustainability concepts in particular;
- Raising undergraduates' awareness about sustainability;

- Building undergraduates' professional experience;
- The role of the political agenda in setting and revising the curriculum;
- The role of the members of the public, policy makers and end users in influencing the education system, for example through creating pressure groups; and
- Analysis of ways of improving sustainable architecture education outcomes; improving the roles of both policy makers and society.

1.4 The research hypothesis

The research hypothesis is that in spite of the fact that the two curricula stem from different sources (APL from the Royal Institute of British Architects [RIBA and Kuwait University Department of Architecture from National Architectural Accrediting Board Inc. [NAAB] of USA, they both will share the same enthusiasm for achieving excellence in their educational outcomes. The two systems will aim to produce graduates who can successfully design sustainable buildings that mimic natural systems and reconnect people to nature. The research also assumes that both syllabi aim to raise the undergraduates' sustainability awareness in response to the policy makers' and end users' need to fulfill international targets.

1.5 The scope of the research

The research was designed in a holistic way to answer key questions including: what does a good sustainable architectural education include? To what extent do the current curricula in Kuwait and the UK contribute to achieving sustainable architecture? Who contributes to the creation of good curricula?

The research question indicated that a holistic approach would be required, drawing upon qualitative, quantitative and mixed methods (Muijs, 2004; Silverman, 2004) within a framework of:

- literature research;
- interviews and questionnaires;
- a historical review; and
- Internet research.

The epistemological positioning of the methods within this framework is with the aim of cross-validation. Cross-validation encompasses an iterative cycle, from theory to observation, between investigating the curricula content, checked against the quantification of the results of the questionnaire surveys, and verified again against results from the structured interviews. The epistemological assumption underpinning the methodology is of positive realism, that is, a combined qualitative and quantitative methodology to maximise the potential for obtaining rich data.

1.5.1 Data Sources: qualitative and quantitative desk research

1- The literature review aimed, first, to perceive how widely the research issues had already been covered in previous research and through the analysis of recent research reports (studies), and, second, to establish an understanding of both the terminology and concepts relating to architectural education in general and environmental architecture in particular. Sustainable development is another issue covered in the literature review. A literature review should be both a critical analysis of the existing literature on the proposed research subject and helpful in clarifying and framing research questions, as the researcher will find out what has been done (and not done) (Birley and Moreland, 1998) by examining articles in journals, contributions in books, government publications, theses, and mimeographed materials.

2- A historical review of architectural education in both the UK and Kuwait. Printed texts and documents relating to architectural education in both countries were reviewed in a chronological order.

3- Interviews

a. A set of questions were planned prior to the intended interviews. The questions were first used in a pilot study to determine their effectiveness and to discard any negative aspects in advance (Stake, 1995). The interviews were mostly semi-structured to provide the interviewees with the chance to express their own ideas within a certain period of time and to avoid irrelevant details.

Semi-structured questions can sometimes lead to gaining new information about the topic under investigation.

b. The *Target group* included undergraduates of the School of Architecture, end users, academics, architects and architecture experts. For the university academics and undergraduates, the interviews were arranged to take place within the university premises while for the architecture experts, the interviews were conducted at their place of work (see Chapter 3)

c. Academics in the Department of Architecture (KU) were interviewed to learn their views regarding the educational system, public awareness of sustainability and undergraduates' environmental background when they joined the university and during their school years, as well as the current content of the architecture curriculum and ways of reviewing it.

d. Senior undergraduates of the Department of Architecture were interviewed to ascertain their expectations when they joined the department and whether they were interviewed prior to enrolling in the School of Architecture or not.

e. Architects were interviewed to learn their opinion of their clients, and whether they showed any environmental awareness, as well as their views about public opinion concerning sustainable building design.

f. Architecture experts were also interviewed whenever possible to ascertain their opinion of the future of sustainable building design, the ability to set an architecture curriculum that conforms to international environmental policies, and ways to raise the environmental awareness of the public and policy makers.

j. The interviews were transcribed using Express Scribe Software. A process called *'member checking'* was used, where rough drafts of writing were examined to review for accuracy and palatability, and to minimise misperception (Stake, 1995).

4- Scan primary resources: the existing architecture syllabi of both the SAPL (UK) and the Department of Architecture (KU) were scanned using overall content analysis. The scanning looked at environmental concepts in general and architecture in particular, comparing the content with the scope and sequence set by both ARB (RIBA) and NAAB.

5- Literature scans of secondary sources (*document review*) included any official documentation that related to the curriculum of both the UK and Kuwait, and ways they were reviewed or discussed and so on. Reviews were also undertaken of all official prospectuses, catalogues, scientific bulletins, and undergraduate handbooks of both the Department of Architecture at the University of Kuwait and the SAPL at Newcastle University. According to (Stake, 1995) the documents should be analyzed for frequencies or contingencies such as the schools' emphasis on environmental issues and how often the curriculum was revised and improved.

6- Questionnaire surveys were designed and conducted to measure the environmental awareness of the target audience, including end users, undergraduates, academics and architects.

7- Analysis strategies varied according to each method: for questionnaires, SPSS software was used to analyze the data; for the interviews the data analysis results were compiled using *discourse analysis* and were *triangulated. Content analysis* was used to measure the environmental concepts within architecture curriculum text books. Furthermore, the data analysis results were compared with images and visual data gathered about graduation projects and private sector housing design.

1.5.2 Chronological sequencing in the implementation and research process

The selection of Kuwait University's curriculum came after a thorough investigation, in which data resources and literature were examined. The preliminary stage of the research involved conducting a pilot study. The data obtained were used in designing a mixed methodology, which was employed in the intermediate phase. Figure1.1. illustrates the theoretical framework of the implementation of the research methodology described in section 1.5 and its subsections.

Literature areas consulted:
- Architecture
- Education
- Sustainability
- Architecture Education
- Sociology

Theories used:
- Education
- Curriculum
- Lifelong learning
- Building public sustainable awareness
- Drivers of sustainability
- Social behavior

Methodology (social science based)
- Case study (Kuwait & UK)
- Qualitative

Methods developed for the investigation
- Survey questionnaires
- Interviews
- Document content review/analysis
- Observation

Analytical methods:
- Holistic review and analysis of drivers of sustainability at international-regional and local levels
- Observation of new and old neighbourhoods: levels of implementation of sustainable architecture design and construction
- Observation of old and new neighbourhoods (public and private): levels of law implementation for building codes.
- Analysis of consumption rates and GDP
- Questionnaires aimed at measuring total sustainable attitudes (undergraduates, academics and end users) were analysed using SPSS package.
- Analysis of interviews (undergraduates, academics, end users, architects and experts) using discourse analysis.

Development of recommendations:
- Developing sustainable architecture education in Kuwait (curriculum)
- At decision making level (policies)
- Ways of developing a wider knowledge about sustainability (end users)
- Building public sustainability awareness

Figure 1.1 The theoretical framework of the research

1.6 Development of sustainable architecture design

Sustainable building design has taken many shapes in history before reaching its current state. Past communities had to work with their climate without the benefit of abundant energy on demand. In hot climates, buildings were shaded to avoid direct sunlight, while in semi-arid regions many households had large rainwater storage cisterns built underground, and in cold climates people built their shelters with low ceilings, thick walls and few windows (Pearson, 1994).

Sadly the link with the knowledge and values formerly passed down from generation to generation has been broken resulting in a huge misunderstanding of past indigenous cultures and traditions.

Vernacular architecture is found in virtually any human settlement. It is sometimes called *rural,* or *indigenous*, or even *anonymous.* But basically, vernacular architecture is that type of traditional architecture passed down from one generation to the next by skilled craftsmen rather than professionally trained architects. It is based on constructing buildings in keeping with their geographical surroundings, traditions and culture. Hassan Fat'hy[2] has designed vernacular buildings in Egypt from natural materials using local tools, that established a natural symbiosis with the local ecosystem and its economies on raw materials and energy (Steele, 1997). Vernacular buildings record lifestyles of the past when people had to find a *sustainable way* of life or perish, just as we must now do (Abu Ghazzeh, 1997). Very well known architects sometimes imported their building designs from nature. For example, the ideas of Antoni Gaudi Cornet (1852-1926) were inspired by nature. Much of his work was saturated with the forms of the landscapes on the coast near Tarragona; the intense light, the rock formations, the reflections and the movement of the sea (Aguilar, 2002).

The term *Bionics* was first introduced in the 1960s by the American Jack E. Steel at the Wright-Patterson Air Force Base in Dayton, Ohio. It is derived from the Greek *bios* (life) and *ikos* (unit): a living unit, a term that refers to all artificial constructions modelled after living systems. Bionics is interested in creating functions and forms analogous to those of the living organism. To reach this objective it links different sciences such as psychology, electronics, maritime engineering and aeronautics, among others, to create a better habitat for humans (Aguilar, 2002).

Paolo Soleri created a new kind of urban design which he called *Arcology*; literally interpreted as derived from the two words *Architecture* and *Ecology*. He called for the creation of habitats that lead to preservation and the inhabitants' enjoyment. This is achieved by designating a three dimensional habitat that

[2] Hassan Fat'hy (1900-1989), Egyptian architect recognised with Agha Khan Award for Architecture Chairman's Award in 1980 for re-establishing the use of mud brick/adobe in Egyptian architecture as opposed to Westerns building designs architecture.

requires less ground area than a conventional city and by designing it at different scales, depending on the geography and climate of the city (Soleri, 2003). Soleri's ideas have mostly remained in the domain of theory, and were considered to be a kind of science fiction writing about the future urban background (*ibid*: xi).

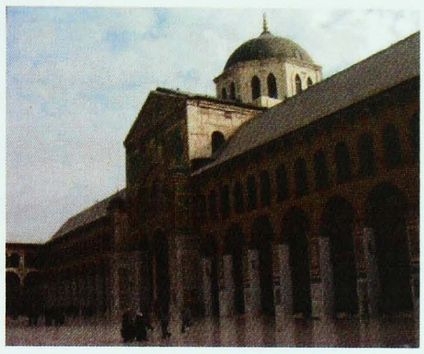
Organic architecture[3] is one type of architecture philosophy that promotes harmony between the building's inhabitants and its surrounding natural world by creating a unity between them. Every element of the building design and structure forms are interrelated and in harmony with the living and non-living environment. The word *Organic* in architecture means a part of the whole and all of the parts (Frank Lloyd Wright 1958 cited in Aguilar, 2002). Therefore, organic architecture refers to the entity or to the integral or intrinsic natural logic of a form. As an organic architect, Haring suggested that the solution is found in Michelangelo's ideal: both talk about finding the shape instead of giving the shape, of freeing the shape instead of imposing it. They both see their work as helping things to find their correct and appropriate form. Wright called his own proposal 'Organic Architecture', while in Germanic and Scandinavian countries *Baubiologie*, or *Building Biology* emerged, based on the idea of combining healthy buildings with an ecological and spiritual sensitivity (Pearson, 1994).

1.6.1 Ancient sustainable architecture practices

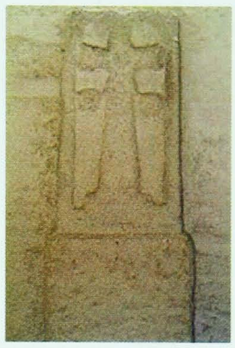
The term 'sustainability' is said to emerge from forestry practices in 18th and 19th century Europe, when foresters realized that they needed to plant enough trees to ensure that the wood fibre lost to harvesting was replaced (Davoudi and Layard, 2001). Sustainable forestry meant monitoring the growth of wood fibre and assessing what was needed to replace that lost to harvesting. From the beginning, 'sustainability' showed a distinctive affinity with the older discourse of 'limits'. Sustainable architecture took place in ancient civilizations through, for example, reusing building materials. An example of this is the prevalence of reused materials in the Great Mosque of Damascus, which was built during the rule of the Umayyad Caliph al-Walid, with its complex, mysterious and surprising structure (Stierlin, 2002). In ancient Britain, the recycling of building

[3] Promoters of organic architecture include A. Gaudi, B. Goff, B. Zevi, A. Alberts and others.

materials was a common practice in building construction. Surtees (1922) reported that around AD660 many pagan Anglo Saxon buildings were deliberately demolished and the masonry taken to build the church at Escomb (UK) (*see* Figure 1.3).



a. Omayyad mosque in Damascus



b. Saxon preaching cross/grave marker placed behind the alter in Escomb church[4]

Figure 1.3 Two examples of sustainable buildings

Sustainable building designs have also been created in response to environmental scientists stressing the need to sustain the Earth's finite resources. Environmental concerns have been raised in many religions, but the actual steps towards addressing them were taken after World War II, when the attention of environmentalists, educators and politicians was drawn towards the idea of maintaining a better environment for future generations by educating the current generations about sustainable ways of benefiting from the Earth's resources.

1.6.2 Theoretical and practical approaches to architectural education

Architecture could co-operate to the improvement of sustainable cities by its concrete existence within the urban or rural environment, when correctly built, as a practical contribution to the operation of a city; and by its generative power in composing an appropriate project and in solving many otherwise unsolvable problems (Los, 1998). This role could be achieved only through better architectural education (Salama and Wilkinson, 2008). Strong local communities that sincerely acknowledge the foundational importance of education to their

[4] Source: www.britainexpress.com (last accessed 14/06/2009)

longevity and vitality are the best environments for excellence in education. To be most effective and relevant, education cannot isolate learners from the context of the larger world in which they must ultimately function. Sustainability can be used as an integrating force in education to improve and facilitate academic and community relationships.

It is essential that sustainability becomes incorporated into the architectural curriculum and instructional practices at all levels of schooling, which in turn can strongly influence programmes for community education. Thus its foundation in scientific, environmental, technological, economic, societal, and ethical learning can become a paradigm for analysis, decision making, planning, and action.

The development of architectural education can be broadly linked to the way that human civilization has developed (see Appendix I), but generally speaking, it has evolved from learning about what took place on the building site through word of mouth (Tschumi, 1995). This was the case until an apprenticeship system became the standard for some time. Then a pupilage system was adopted. Cunningham (2005) pointed out that the present state of architectural education is a direct product of the dialectic between customary activities and the intellectual developments which have resulted from examination of the subject in order to teach it. Architecture is not a discipline in the traditional sense, since it is not served by a definable body of knowledge. Greeks taught architecture as a subsection of mathematics since they focused on geometrical shapes in their building designs. Vitruvius pictured architecture education in Greece and Rome as an amalgam of two aspects: the theoretical, which includes things such as proportion and practical geometry, and training in the actual technicalities of building.

In medieval times teaching architecture was treated as matter of such high secrecy that the Masonic movement was initiated, creating its own rituals of passing down knowledge, while the Renaissance saw a more practical use of geometry rather than its exclusive application to building design. This was because during the Renaissance architecture gained acceptance as a profession within Fine Arts as artists were given the task of designing buildings

and public spaces. Well known artists such as Michelangelo and Leonardo da Vinci were apprenticed in sculpture, drawing and painting rather than building construction, leading their expertise to be used in aesthetics instead of structural decisions (Carpenter et al., 1997: 6).

Jacques-François Blondel, opening his own French Academy in 1743, indicated his perspective on architectural education which was very similar to the approach of the Italian academies. He pictured skilled architects as masters in all relevant arts, including painting, sculpture, garden, design, masonry, joinery, carpentry and locksmithery (Cunningham 2005). But the establishment of the École des Beaux Arts in France initiated a new philosophy of architecture education which promoted the teaching of theory in the classroom and of design in the ateliers. This form of rational classicism attracted many architects from all over the world in the 19th and 20th century (Conways and Roenisch 2005).

Salama and Wilkinson (2007b) identified two basic modern philosophies for design pedagogy: positivism and anti-positivism, from which two positions can be derived in existing teaching practices - ontology and epistemology. Ontology is a branch of metaphysics that deals with the nature of being, examining the relationship between mind and matter, while epistemology is a branch of philosophy that examines the nature of knowledge, its foundation, extent and validity and how it is acquired and conveyed (Salama and Wilkinson, 2007b: 42). Positivism, focusing on the ontology of architecture, deals with buildings as real objects that have components, parts and elements that can be both observed and measured; whilst anti-positivism, taking an approach founded in epistemology, assumes that universal laws do not exist externally to the human mind. Anti-positivists state the call for a radical change in architectural pedagogy within the design studio, although adding that formation through the studio teaching format should be completed before thinking of taking such steps. Salama (2008) proposed a theory for knowledge integration in architectural design education.

Yanar (2007) pictures architectural pedagogy inside the design studio as a form of cultural production through which students learn how to react to members of

their professional community, although such behaviour patterns are not officially recognised within the design curriculum nor explicitly taught. Yanar emphasises Thomas Duttons's hidden curriculum, arguing that the epistemological position and the process of indoctrination are built into the pedagogical practices of the studio, adding that the architectural design studio is a platform through which knowledge, meanings, values and subjectivities can be easily reproduced and transmitted to the next generation of professionals.

Elsheshtawy (2007) dismisses the idea of incompatibility between science and architecture as false, adding that the notion that architecture should become more like a science does not advance the production of architecture, because architecture is about finding solutions. Further, he adds that the act of problem solving is linked to creativity, as the solution of the problem itself might not be of greater importance than attempts to define the problem.

Teymur (2007) questions architectural pedagogy inside the design studio based on Vitruvius' triad of *Utilitas*, *Firmitas* and *Venustas,* (usefulness, strength and delight) which has been a fundamental credo of architecture up to the present day. He questions the perception that the building that satisfies all three dimensions is perfect, wondering on what basis it was judged to be so, since the design studio operates a theoretical basis and the teaching criteria are based on each school's educational strategy. And he introduces his own architectural education model under the heading "4x4" which includes (1) Objectives and Contexts; (2) Objects and Content; (3) Methods and the Medium; (4) Management and Structure of architecture education. These four elements correlate with (1) Sociology; (2) Ideology; (3) Epistemology; and (4) Pedagogy of architecture education.

Mahgoub (2007) calls for the design studio to be the capstone (at the top) of future architectural education rather than at its core, because of the tremendous increase in the amount of information that undergraduates are required to learn that has taken place in the last few decades. He criticises the existing vertical structure of the curriculum that has been adopted globally, proposing instead a horizontal structure for the architectural programme for Kuwait University. The

proposed curriculum is based on the idea of imparting knowledge specific to architecture and using that as a way of training individuals to design buildings - *see* Figure 1.4 (ibid: 198).

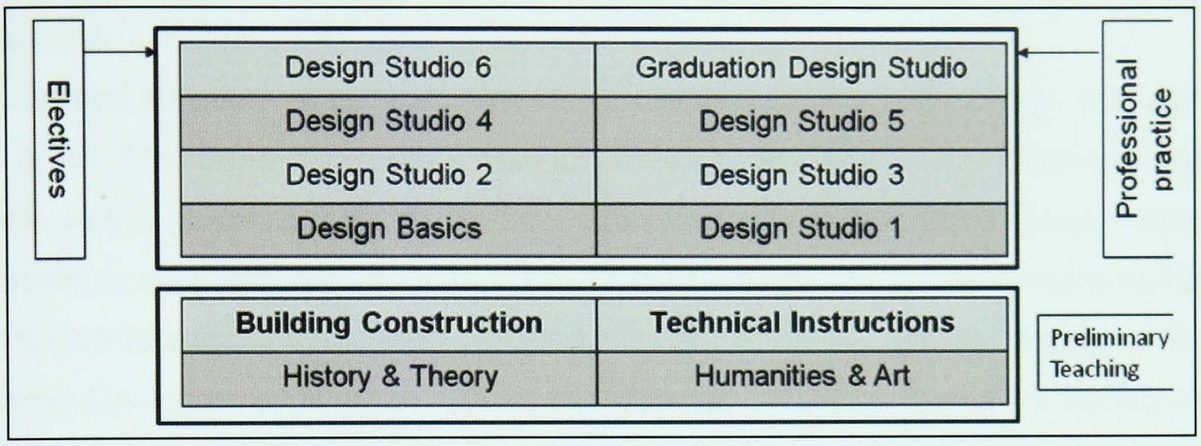


Figure 1.4 Mahgoub proposed a horizontal architecture curriculum for Kuwait University

Some architectural academics such as Mazzoleni (2007) argue that architectural education should be about teaching globally related issues such as cultural identities, sustainable development and environmental hazards. On the other hand, some architectural academics call for a greater emphasis to be placed on the utilization of information technology inside the design studio, for a better design future. Reffat (2007) proposes better IT training of the academic staff in schools of architecture, for an improved architectural pedagogy that integrates newly created specialities into the old. This step comes at a time when buildings have reached a level of complexity where the building process involves a multi-disciplinary, multi-interest and multi-party process that demands highly technical skills from all parties involved. Furthermore, Caneparo (2007) advocates a synthesis between method-oriented and case-oriented architectural education that will lead to a compromise between design studios and formal lectures in schools of architecture.

The schools of thought discussed above show a range of different strategies competing for better architectural education, but it is not possible to single out one strategy as the unsurpassed victor. Furthermore, the proposed strategies depend mainly on the academic staff's educational background and where they were trained, as well as the social structures of their universities. These

approaches assume that at the conclusion of the educational process or project knowledge is implanted into the student. However the student soon forgets and is often distracted by the next bright object. For teaching to be wholly effective the process must be repeated and at each cycle more knowledge will be retained.

In the last 40 years or so, architecture has moved from a qualification in design to a qualification in designing buildings. Notable architects were taught design skills which enabled them to provide innovative designs in other fields; Arthur Davidson, who was employed in a Madison Architects Office and while enrolled at the University of Wisconsin presented to the world his brilliant design of the Harley-Davidson motorcycle, whilst the designer Philippe Starck presented to the world unique ideas such as his lemon squeezer, *see* Figure 1.5.

a- Davidson b- Starck

Figure 1.5 Learning design skills in schools of architecture may serve other disciplines

The following section will provide a brief background to the development of formal and informal education in Kuwait in the last century.

1.7 Kuwait: history and education

Kuwait is a Middle Eastern Arabic country located in the North East part of the Gulf. It was part of the British Empire until it gained independence in 1961. Education in Kuwait began following similar steps to other Islamic countries, in that it took place in the mosque. By 1887, education had transferred to institutions called *Alkottab* (*see* Figure 1.6). Both genders had access to education at the same level, until 1912 when the first formal school, *Al-Mobarakeya* was officially opened followed by Al-Ahmadeya in 1921 and subsequently *Al-Muthana*, all catering for males (*see* Figure 1.7). In 1917 the

first school teaching English language was opened by the American missionaries in Kuwait. Two girls' schools; Alwosta and Alqebleya were opened in 1937 successively.

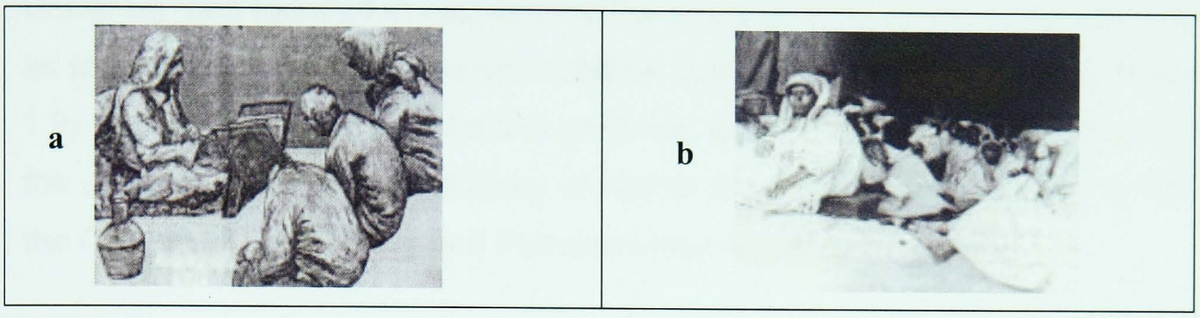


Figure 1.6 a & b. Kottab education in Kuwait c1887

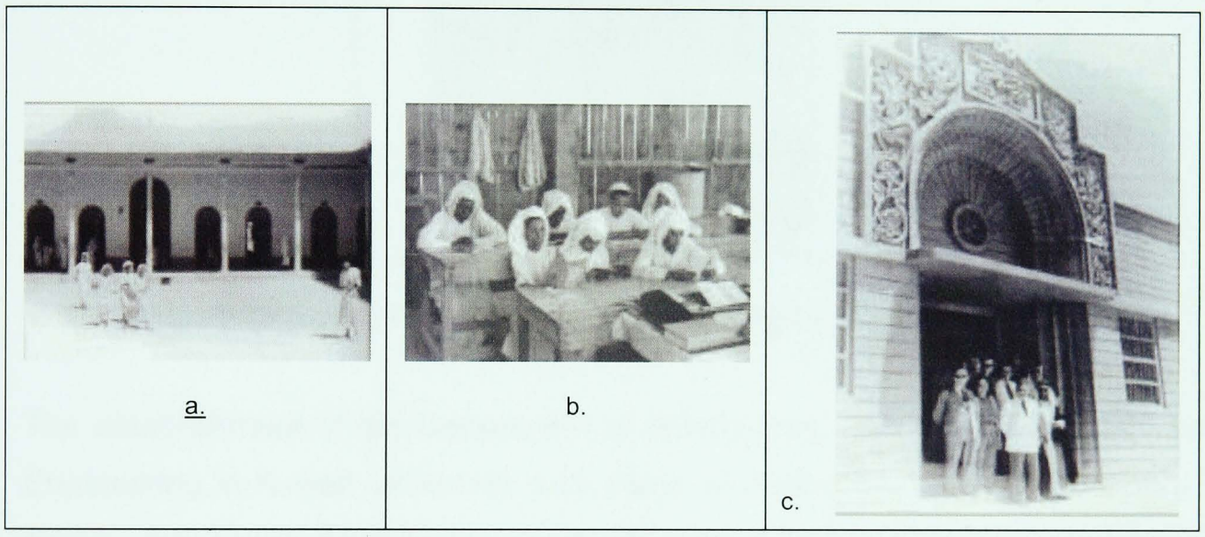


Figure 1.7 a, b Al-Mobarakeya School (1911) and c. Almuthana School (1952)

In 1936 the first Committee for Education was founded, and in 1937 the first schools for girls were started; Alwosta and Alqebleya were opened successively. In 1939, the first scholarships were to Iraq, then later to Egypt and the UK. In 1953 Alshuwaikh High School was opened (*see* Figure 1.8).

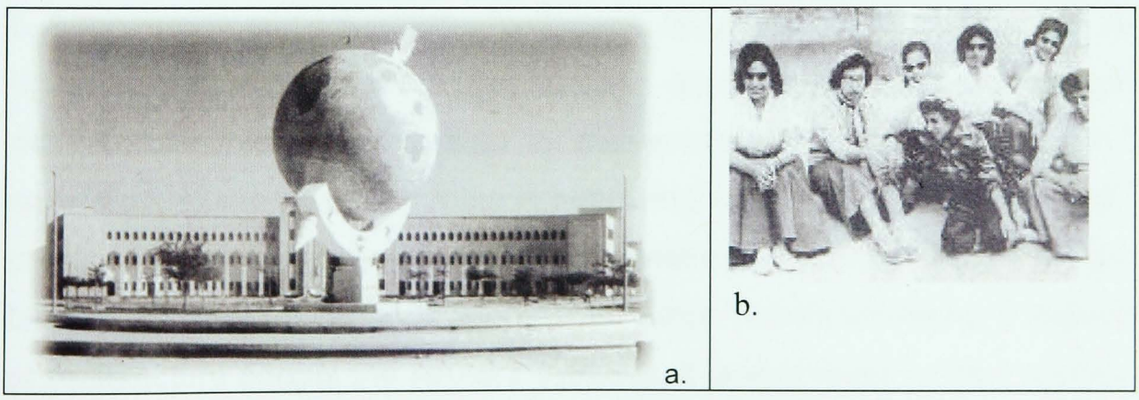


Figure 1.8 a. Alshuwaikh High School (1953) and b. First scholarship in 1956 in support of girls studying in Egypt

In 1955 Alnoor Special Needs School was opened and in 1955 the first secondary school for girls called Almorqab was opened. In 1966 Kuwait University was founded in response to the growing need for professionals such as teachers, economists, lawyers, medical doctors and technicians (*see* Figure 1.9). Kuwait University was the first university established in the Gulf area under the umbrella of the Kuwait Ministry of Higher Education. In the autumn of 1975 the College of Engineering and Petroleum was founded.

Figure 1.9 Kuwait University - Faculty of Arts and Law, founded in 1966

The establishment of the Department of Architecture as part of the Faculty of Engineering in Kuwait University took place in collaboration with the American NAAB, the Texas A&M University team, and the Massachusetts Institute of Technology (MIT), along with the Saudi Arabian King Saud University. Since architectural education in Kuwait is directly related to architectural education in the United States of America, one could draw certain inferences as to how the system in Kuwait University is working. Although as a subject, sustainability has been well researched in US literature over the last few decades, sustainable building design and sustainable landscape design have yet to take their place in US schools of architecture (Thompson and Green, 2005). The government does not interfere with specifications in the education system, but leaves it to specialists to exercise their roles in improving education. Kuwait University has created its own independent board that revises the curriculum every so often to bring in any alterations or developments. Since Kuwait University's Department of Architecture adopts the NAAB's syllabus, it is very much to be expected that

[5] Source of Figures 1.6-1.9: www.moe.edu.kw/.../girls/asmaa/edu_kw.htm (last accessed January 2008)

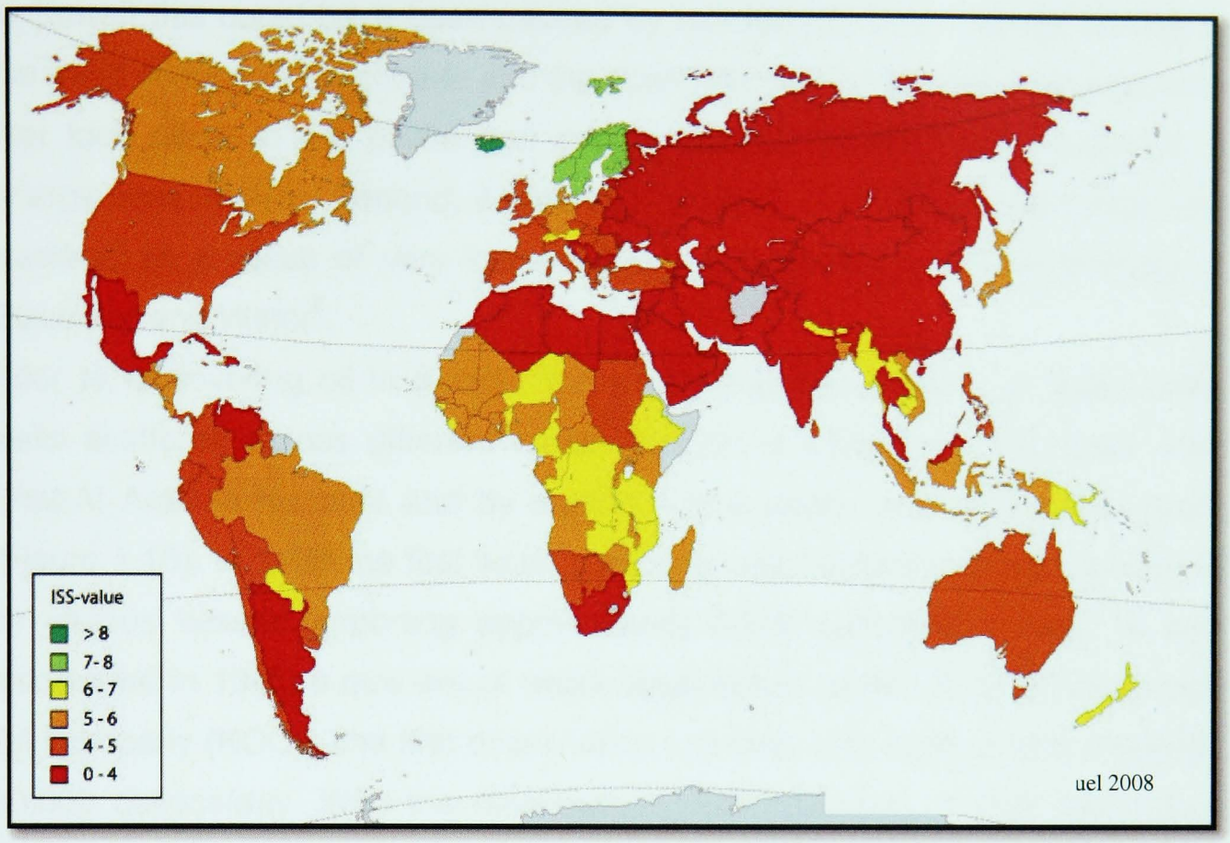
teaching building codes will be heavily influenced by the American system, especially because Kuwait's building codes need so much work, having been set in the mid 1970s and left largely unaltered for a long time. Although Kuwait representatives attended many international conservation meetings which set a range of recommendations for improving environmental conditions, such as the Kuwait Regional Meeting which was held in 1999 (Kimbal, 2001), none of the recommendations have actually been enforced in the educational system.

1.8 Kuwait: Carbon Dioxide emissions

Kuwait CO_2 production is one of the highest per capita in the world

In a country with temperatures rising rapidly 7 months a year until it soars to 50°C all types of air-conditioning of buildings is the single largest consumer of electricity; it accounts for nearly 75% of the nation's peak power demand and over 50% of annual energy consumption. The rapid increase in energy consumption results in increasing carbon dioxide emission and destruction of the environmental system balance (Hajiah, 2006). The transport sector (road and air transportation) in Kuwait consumes gasoline, diesel and aviation fuel in the process, with the road mode alone accounting for 85% of the total energy requirements (Eltony, 1999: 151)

According to Van de Kerk and Manuel (2008: 237) on the world's list of sustainable use of renewable water resources and consumption of renewable energy which measures the sustainable use of water and energy resources in order to prevent depletion of resources, Kuwait scores zero, which places it last along with other Middle Eastern, Caspian Sea and North African countries (see Map 1).



Map 1: Kuwait's scores for sustainable use of resources and consumption of renewable energy is zero, placing it in the red-zone in the world map.

Electricity was first introduced to Kuwait in 1913 through the British Indian agent Mr. N. S. Bayankar, who signed an agreement to use diesel machines with Kuwait's then ruler, Shaikh Mubarak Al-Sabah. In 1934, the country produced electricity for the first time through two small electricity plants, each providing a constant current (DC) of 200 volts at that time. This was sufficient, since most of the citizens at that time used oil lamps for light and the population was very small. In 1949, the electricity current was switched from DC to AC with a frequency equal to 50 Hertz. In the coming years, Kuwait entered a new era when new power plant units were built with different capacities to meet the demands of a growing population.

The electricity load shot up to 32% in the 1950s, to 26% in the 1960s, to 15% in the 1970s and 8% in the 1980s. In the last decade, the energy consumption rate has decreased, yet this is in comparison with industrial countries that had a rate of growth between 3-2% during these decades. In 1998 electricity plants produced 7498 MW, where the electricity load reached 5,800 MW.

In Kuwait this could have been caused by two factors: first, it could be due to the rapid change in the climate and the economic and construction development that took place in the public and private sectors, leading to an increase in energy consumption. Second, it echoes high rates of energy consumption and wastage as a result of very low electricity unit tariffs set by the Ministry of Electricity and Water[6].

Prior to discovering oil in Kuwait, the whole population relied on fresh water wells scattered across different areas. In 1925 a sailor imported water from Shat-Al Arab in his boat and by storing it in a water tank on the sea shore (Figure 1.10). In 1939 the first water company was founded and was sustained by various vessels importing approximately 8,500 gallons/day. After oil was discovered in 1946, a new era of water desalination started through the Kuwait Oil Company (KOC). The first desalination unit was very costly and it produced 80,000 gallons/day. With the development and operation of high technology desalination units, water production reached 258 million gallons/day in 1998.

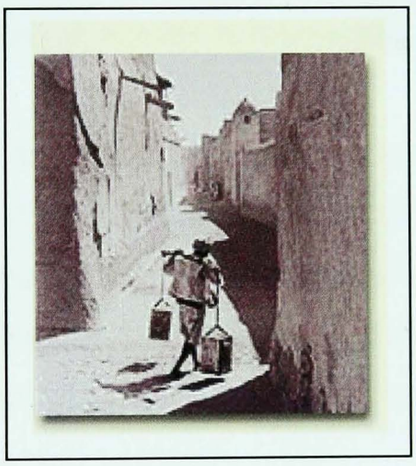


Figure 1.10 Selling water imported from Shat Al-Arab[7] in Kuwait prior to water desalination

1.9 Outline and organization of the thesis

This thesis is divided into six chapters. *Chapter* 1 introduces the background of the research, the research aims, the research questions and hypothesis, and the methodology and limitations of the study.

Source of information: http://www.mew.gov.kw/Default.aspx?pageId=26 last accessed on 12/09/'07.

[7] Literally Coast of the Arabs is a 200 km long river formed from the joining of river Euphrates with the River Tigris in Al-Qurnah town in Basra Governorate in the south of Iraq.

Chapter 2 includes a critical review of the evolution of environmental architectural education up to the point when it was formally taught in schools of architecture on an international scale, as well as the development of the environmental movement, and introduces terminology related to the three relevant disciplines (architecture, education, and environmental studies). Further, it addresses the role of policy makers and end users in developing a sustainable architecture based on the awareness of all contributing parties.

Chapter 3 describes and summarises the methodology, results and initial data analysis.

Chapter 4 discusses the findings of the research in relation to sustainability and the three drivers of Sustainability; Environmental, Economic and Social. The Environmental and Economic drivers are briefly discussed and the Social driver reviewed in more depth as this has a relationship with Education. The attainment of sustainability in Kuwait is discussed.

Chapter 5 provides a suggested framework for achieving more sustainable architecture in Kuwait by improving the roles of Kuwaiti government policies. The roles of the education system, and the awareness levels of Kuwaiti society are also tackled. The chapter concludes that architectural education can never take place in isolation from state policy and the needs of end users.

Chapter 6 provides a summary and evaluation of the research as a whole, revisiting the methodology and data analysis results, and the conclusions reached on ways to improve sustainable architecture education in Kuwait. It places emphasis on the idea that sustainability awareness and behaviour are acquired through learning and enforced through state policy. In this way, curricula are nothing short of a tool in the hands of the legislators and end users that should be positively invested in the development of learners from an early age. Furthermore, future areas for study are proposed.

1.10 The limitations of the study

While conducting the research, the researcher encountered limitations such as increasing the sample population in the surveys and at the same time achieving equal gender participation. To fulfill this target, the end users' questionnaire was in fact administered in three rounds. Another limitation was that of achieving greater participation of undergraduates in the survey; to this end, the undergraduate survey was repeated twice. A third limitation was the small number of academic staff in the Department of Architecture of Kuwait University which made quantitative/statistical analysis of the data unreliable. For this reason, the staff questionnaires were supplemented with face-to-face interviews.

Prior to conducting the questionnaires, surveys and content analysis, a problem of bureaucracy was faced in which a letter was written to officials to obtain their consent, resulting in a further delay. Although gaining official consent took some time, it is nevertheless considered essential as an ethical requirement of the research.

1.11 Suggested future research

Kuwait belongs to the Arab world, sharing with it a similar climate, cultural background and future expectations. Therefore, it is suggested that future research should cover all aspects of architectural education within the Sustainable Development umbrella in Kuwait and the Gulf area to ameliorate the outcomes. Accordingly, another issue that should be investigated is increasing public participation in environmental decision-making in Kuwait and the GCC countries. Suggested future research is discussed in Chapter 6.

Chapter 2

Architectural Education

2.1 Introduction

This chapter aims first to explain the background of architectural education. It begins by explaining what education is and how it developed over time until it reached formal and informal education channels. Aspects of education are explained, including the nature of a curriculum. Secondly, Chapter 2 explains the development of architectural education, architectural education theory and sustainable architecture. Environmental education in the UK is very much organized according to the political situation, as will be explained in Chapter 2 and later in Chapter 4. Furthermore, Chapter 2 explains how sustainability concepts cannot be prescribed, but rather a holistic teaching approach is needed which creates environments within which scholarship, research, learning and teaching are effectively integrated in order to equip students with adequate skills and knowledge for understanding sustainability and to incorporate it into their design projects.

Finally Chapter 2 aims to present the different architecture curricula set by different architectural bodies and universities including RIBA in Britain, the NAAB and the University of Texas A&M in the US, the Australian AACA and University of Sydney and University of Kuwait, showing that there are no universally specific criteria for setting the architecture curriculum.

The chapter's conclusion is that architecture is rapidly changing, leading to the development of architectural education by governmental bodies such as validation bodies, to equip graduates with the experience and knowledge that enables them to serve their profession. Different countries around the world follow different architecture pedagogical themes guided by architectural organisations, the political situation, university policy or other parties, depending on their strategies.

2.2 Definition of education and its development

The 'definitions of the terms will help clarify their meanings, especially where words are used in quite different ways within different contexts; far from having the clarity which the terms themselves imply, [terms used] in education [are] very confused' (Sockett, 1976: 106). Educational philosophers have used a variety of approaches to explain the term *education* including examining possible etymological derivations of the word. The term *education* is derived from the Latin *educare*, meaning to rear or foster, and from *educere* which means to draw out or develop (Carr, 2003: 3). At present, the most common meaning of education is more to do with instructing or teaching than the original intended meaning. The word *education* could refer to either a formal or informal process that shapes a maturing person's potential. *To educate* someone is commonly used to mean a process, and *education* (as a noun) is often shorthand for the 'educational system' which involves policies, institutions, curricula, actors and so on. In Kuwait, the Ministry of Education is literally translated to *Wizarat Eltarbeya wel Taleem*[8] which means the Ministry of Formation and Education, where the emphasis is raising morally fit generations. Other Arab countries call it the Ministry of Knowledges; *Wizarat el ma'aref*[9].

Learning at a simple level is the process through which new knowledge, values and skills are acquired. At a deeper level, it involves a movement of the mind (Senge, 1993). It is usually acknowledged that there is far more to be learned than is possible during the period of school education and so some kind of selection has to be made (Nicholls and Nicholls, 1972a). *Higher Education* in the UK and in Kuwait is education that usually begins after completing Grade12. It is usually provided by *universities* and other institutions that award academic degrees, such as *university colleges* and *liberal arts colleges.* It includes both the teaching and the research activities of universities and comes within the realm of teaching for both the *undergraduate* level and the *graduate* (or *postgraduate*) level. Higher Education differs from other forms of post-secondary education such as *vocational education.* However, most *professional* education such as architecture, medicine and law is included within Higher Education, and many

[8] The Arabic translation: وزارة التربية والتعليم
[9] The Arabic translation: وزارة المعارف 'Knowledges' suggests various kinds of knowledge

postgraduate qualifications are strongly vocationally or professionally oriented. Universities are considered as institutions central to modern civilizations, and are seen by others as the institutions responsible for a society's passage between youth and adulthood (Goodlad, 1995).

2.2.1 Development of Education

In ancient Greece, education was restricted to freemen studying Homer, mathematics, music, and gymnastics. The Greek Hellenistic period (4th century BC), was known for the concept of general education *enkuklios paideia,* in which, irrespective of whether or not the student intended to study philosophy, he should be familiar with or have mastered a branch of learning within the seven liberal arts: grammar, rhetoric, dialectic, geometry, arithmetic, astronomy and musical theory (Kennell, 1995: 103-110; Lolah, 1986). Knowledge or *illm* plays a central role in the Muslim attitude towards many aspects of life, especially because *Allah*[10] and Knowledge are thought to be inseparable. The prophet Muhammad explained and interpreted his revelations in the mosque, which became the centre for instruction, and later in other explanatory circles. Higher Education was offered by the Sophists and philosophers before the rise of the *Academy* and the philosophical schools. Schools or *Madrasa* were established later to formalize the delivery of Higher Education. Different schools offered different qualities of education such as the *Darsel nizami* (a popular circular model), the *Deo-bandi* schools, the *Farangi-Mahal* (pre 1850), the *Nadwat al-Ulama* (post 1870s) and others, which produced scholars and intellectuals. The schools' syllabi at that time included language, metaphysics, rhetoric and logic, with some of them focusing more on religion. After Islamic countries gained independence from Western colonisation, they tried to indigenize their school curricula by 'Islamizing' them. This resulted in establishing a parallel system of educational institutes for the compulsory school years that transmitted a mixture of secular and traditional school subjects. For Higher Education, little modification was made to include the kind of imported universal knowledge which is defined by industrial states (Zia, 2006: 123-124). In medieval Western Europe, education was typically the

[10] Allah (الله) English translation: the God.

responsibility of the church: the monastic schools and universities were the chief centres and virtually all students took Holy Orders. Lay education consisted of *apprentice training* for a section of the populace, or education in the *usages of chivalry* for the more privileged. With the Renaissance, the education of boys (and some girls) in classics and mathematics became widespread. After the Reformation, both Protestant and Roman Catholic groups began to offer formal education to greater numbers. There was a great increase in the number of private and public schools, although the norm remained the classical-mathematical curriculum.

The development of scientific inquiry in the 19th century brought new methods and materials to the educational process. As elementary and secondary schools were established and as larger proportions of the population attended, the *curricula* became differentiated to include *vocational education* training designed to advance individuals' general proficiency, especially in relation to their present or future occupations, but did not include training for the professions such as law, medicine, and so on. Prior to the Industrial Revolution, the *apprenticeship system* was a principal source of vocational education. Since then society has been forced by the decline of artisan manufacture and the specialization of occupational functions to develop institutions of vocational education. *Apprenticeship* is a system of learning a craft or trade from one who is engaged in it and of paying for the instruction by a given number of years of unpaid or low-paid work. It is a common practice in primitive societies where children undergo training to learn and acquire customs of adults, that they would not otherwise learn on their own (Dewey, 1916: 7, 8). The practice was known in ancient Babylon, Egypt, Greece, Rome, modern Europe and to some extent in the United States (Gardiner, 1983). Typically, in medieval Europe, *a master craftsman* agreed to instruct a young man (*apprentice)*, to give him shelter, food, and clothing, and to care for him during illness until he became a *journeyman,* eligible to work for a master for wages, or else set up as a master himself. In the 19th century, *Pupilage* was the respectable method of entry to the Architecture profession (Kaye, 1960). The pupilage system differs from apprenticeship in that under the pupilage system, the student pays tuition fees for office instruction (Sennott, 2004: 388).

Since the 17th century well-recognised thinkers such as *John Comenius*, *Jean Jacques Rousseau*, *Johann Pestalozzi*, *Friedrich Froebel*, *Maria Montessori*, and *Horace Mann* called for *education that is directed at individual development* (Downey and Kelly, 1975: 105, 146). In the 20th century John Dewey declared that young people should be taught to *use the experimental method* in meeting problems of the changing environment (*ibid*: 138). Later in the century the psychologist *B. F. Skinner* developed a theory of learning based on the method of *programmed instruction.* Through his learning theory, Skinner's influence was significant in both the USA and UK (Kelly, 1980). Skinner criticized teachers for attempting to redesign the curriculum instead of learning how to employ "available engineering techniques which would efficiently build the interests and instil the knowledge which are goals of education" (Downey, 1980). More recent educational models based on the theories of *Jean Piaget*, *Jerome Bruner, Howard Gardner* and *Lev Vigotsky* have gained wide support.

According to Lawton (1988, 1983) there are at least *three basic educational ideologies*.

1. *Classical humanism*, originated in Greece by Plato in the 4th century, enduring until the Renaissance and sometimes presented in a modified way in the 19th century by Matthew Arnold and in the 20th century by T. S. Eliot. Under this ideology, education is directed towards the elite. Geoffrey Bantock wrote about two types of education for two different classes of the community and the effect of the environmental factors on IQ by Social Class and Educational Opportunity (Bantock, 1965: 138-152). Because of its anti-democratic approach classical humanism has since been rejected by many societies;
2. *Progressivism*, which was initiated by Jean-Jacques Rousseau's *Emile* (1762), is known for rejecting traditional approaches to education, and being child-centred by encouraging the child to discover for him/her self and follow his/her own impulses (Dworkin, 1959). Here, the curriculum is to focus on experiences and topics chosen by the pupils. Sockett (1976) expressed admiration for Rousseau's *Emile*, for Arnold's work with the sixth form and for Pestalozzi and Froebel for their utopian approach. However, he expressed reservations regarding how their ideals might be used in an educational system

in a complex industrial society. In the UK, H.G. Wells, Bertrand Russell and Karl Mannheim were associated with progressivism; as well as the third ideology:
3. *Reconstructionism.* Unlike the two above, this is society-centred. It was developed by John Dewey in the USA, with his view of democracy and the relation between society and education. Using education to improve individuals in industrial society was the main priority of progressivism. The success of reconstructionism is attributed to the introduction in the manufacturing industries of the techniques of mass production; the revolution in behaviourist psychology led to the development of observation techniques and the development of new techniques of training personnel with speed and efficiency using required skills analysis followed by the order and process of training (Sockett, 1976).

In 1925, the Year Book of the National Society for the Study of Education (N.S.S.E 1927) revealed that the curriculum had not changed because text book writing was commercially very profitable and the writers were in influential positions to determine curriculum content (Sockett, 1976). Cave reported that the UK owes a great deal of its curriculum development to the USA which began the first large scale examination of Curriculum Theory with the 1946 University of Chicago Conference (Cave, 1971: 13). Skilbeck (1976) as cited by Lawton (1983: 9-10) summarised the new ideology by seven characteristics: education should encourage change in society; it is distinguished from certain other social processes; it aspires to form a new kind of person who would be better and more effective than average; it adopts a core curriculum in which prevailing social norms and practices are analysed, criticised, and reconstructed according to rational democratic and communitarian values; it involves projects and guided problem-solving strategies; it elevates teachers and other carefully selected educators; and it entails a relative neglect of countervailing forces.

According to the manifesto *Education for Capability* published in 1981, cited in Reeves:

> There is a serious imbalance in Britain today in the full process which is described by the words 'education' and 'training'. Thus the idea of the 'educated man' is that of a scholarly, leisured individual who has been neither educated nor trained to exercise useful skills. Those who study in

> secondary school or Higher Education gain knowledge of a particular area of study, but they are not trained to exercise useful skills. This imbalance is harmful to individuals. As a result, the Royal Society of Arts Recognition Schemes published in 1982 recommended promoting education that 'gives due regard to competence, to coping, to creativity and to co-operation with others, for the art of living requires 'the development to act wise' rather than to pursue knowledge for its own sake (Reeves, 1988: 86).

The shift of education from informal to formal education and from education as a luxury for the higher classes of society in ancient civilizations, to education as a necessity for all layers of society in modern civilizations, was a long process. In the coming sections, other aspects of education in the 21st century will be elaborated upon, beginning with the curriculum structure.

2.3 The curriculum and its development

The idea of a curriculum is hardly new but the way it is understood and theorized has altered over the years. Definitions of the curriculum can vary widely (Sockett, 1976). Generally speaking, the term curriculum originated from the running/chariot tracks of Greece. It was literally translated to mean a course. In Latin, a curriculum was a racing chariot: *currere* was to run. In Arabic, curriculum literally means a course: *manhaj*[11] . According to Beauchamp (1961 cited in Cave, 1971: 11), by curriculum we mean the planned experiences offered to the learner under the guidance of the school. It is reported that "curriculum is what happens to children in schools as a result of what teachers do. It includes all of the experiences of children for which school should take responsibility" (Maclure, 1971). John Kerr defined curriculum as, "all the learning which is planned and guided by the school, whether it is carried on in groups or individually, inside or outside the school" (cited in Kelly, 1983: 10; see also Kelly, 1999]. Prini defined curriculum as "All planned learning opportunities offered by the organization to learners and the experiences learners encounter

[11] *Manhaj* is written in Arabic: منهج

when the curriculum is implemented" (Prini, 1993). This does not include the 'hidden curriculum' (*ibid*: 9).

According to Hirst (1975) a curriculum is a "programme of activities designed to promote certain ends, i.e. introduction of children to the main modes of experience or forms of knowledge." In 1967, Gagné argued that a curriculum is a series of content units arranged in such a way that the learning of each unit may be accomplished as a single act, provided that the capabilities described by specified prior units (in the sequence) have already been mastered by the learner (Tyler et al., 1967). A more recent definition of curriculum (plural *curricula*) is "the set of courses and their contents offered by an institution such as a school or university". In some cases, a curriculum may be partially or entirely determined by an external body, for example, the architecture curriculum set by RIBA in the UK. In the US, the basic curriculum is established by each state with the individual school districts adjusting it to their preferences (non-centralised education). US schools of architecture obey a NAAB curriculum, as will be explained later in this chapter. Recently, the curriculum has been perceived as dynamic, and viewed as a self-organized process, entailing entirely different ways of understanding and organizing our interactions (Fleener, 2002).

In any curriculum planning, conceptual clarity is a *sine qua non* of effective practice. Concepts such as 'aims', 'objectives', 'processes', 'approaches', 'standards', 'ability', 'progression', 'continuity', 'coherence', 'evaluation', 'appraisal', 'accountability', or even 'subjects' or individually named projects, are far from being non-problematic in their meanings, just as they are equally far from being value-free (Kelly, 1999: 8). According to Marsh (1997) curriculum can be defined as a content, or a product or as a 'set of performance objectives', as 'a set of objectives', as 'what is taught in schools', or indeed 'as an amalgam of plans and experiences which students complete under the guidance of school'; *see* Figure 2. 1.

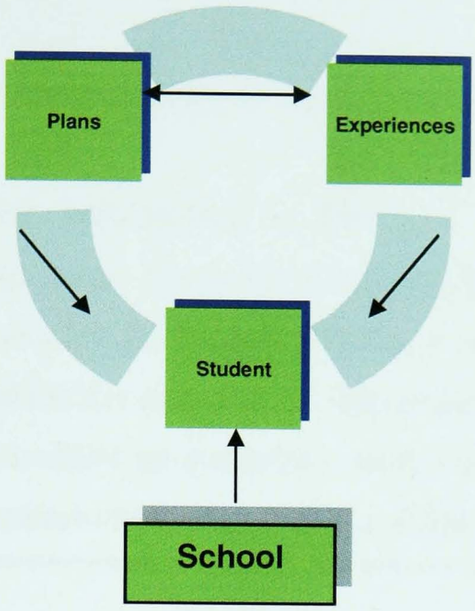


Figure 2.1 Definition of curriculum (Marsh, 1997)

The curriculum can be approached in different ways:

- In a curriculum in which *learning is planned and guided*, the outcomes are determined in advance and ways to achieve those outcomes through the learning process are specified.
- There is the curriculum which is *managed as a schooling system* and in relation to other schooling ideas such as subject and lesson.

Many teachers mistakenly equate a curriculum with a *syllabus* which results in their limiting their planning to a consideration of the content of the body of knowledge they wish to transmit (Kelly, 1989). This results in teachers neglecting other issues of curriculum as they become of no concern to them, which adds to the limitations of curriculum development. At the other extreme, the concept of curriculum would seem to include the whole of educational studies (Lawton, 1983).

There are four ways of approaching curriculum theory and practice:

1- Curriculum as a *body of knowledge to be transmitted*, e.g. the Herbatian that points to the teacher as the only source of knowledge and the student as the receiver (Bantock, 1965: 134).

2- Curriculum as an *attempt to achieve certain ends in students* – a *product* (Hirst, 1968).

3- Curriculum as *process (objectives)* raising the question 'What is being done in order to get the learners to achieve?' Its emphasis is on intellectual

objectives, neglecting other possible aims that seem to be involved (Bruner, 1960), see Table (2.1).

4- Curriculum as *praxis* (people informed or committed to action guided by moral disposition).

Curriculum theory can be approached in the light of *Aristotle*'s influential categorization of knowledge taught in schools into three disciplines: the theoretical (to intellectualize), the productive (to make) and the practical (to do) (*see* Figure 2.2), whilst Comte's classification is based on dependency relationships among disciplines (biology is dependent on chemistry, which is dependent on physics, which is dependent on mathematics, etc.) (Schiro, 2008: 28).

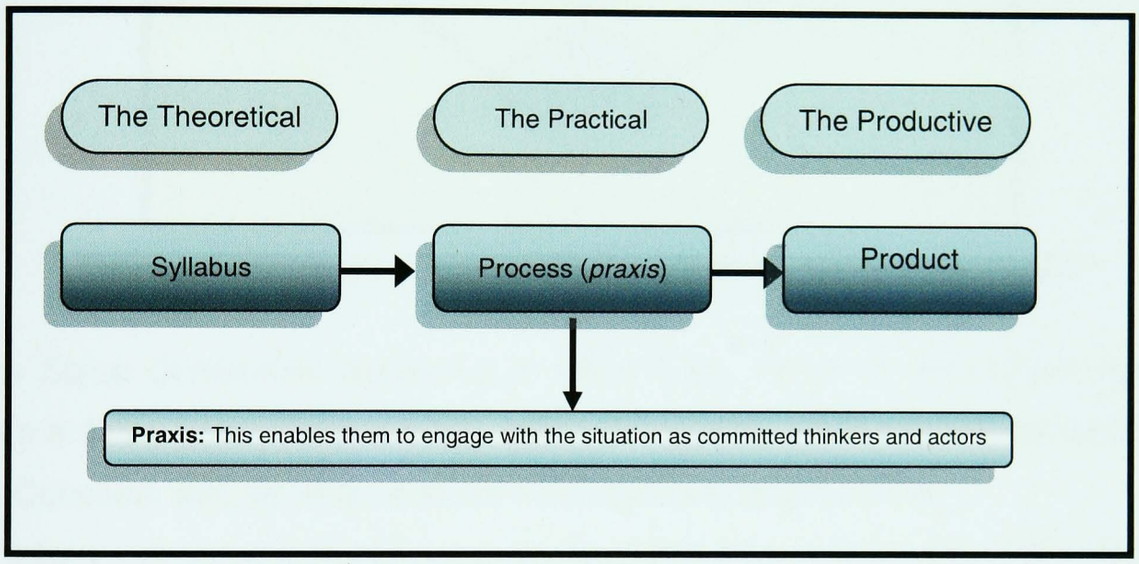


Figure 2.2 Aristotle's categorization of knowledge into disciplines: theory, practice and product

Figure 2.2 demonstrates that the body of knowledge to be transmitted first is classically valued as 'the canon'; the process and praxis models come close to practical deliberation; and the technical concerns of the outcome or product model mirror elements of Aristotle's characterization of the productive.

Elements of the curriculum include: objectives, content, methods, and evaluation. The four elements interact with each other as shown in Figure 2.3. During the *curriculum development process* the four elements undergo thorough study and evaluation (Nicholls and Nicholls, 1972b). Changing the curriculum should be planned carefully and introduced on a rational and valid basis according to a logical process. Curriculum content development should

follow criteria that ensures its significance, validity, social relevance, utility, learnability, and which also raises learners' interest (Prini, 1993: 140-150).

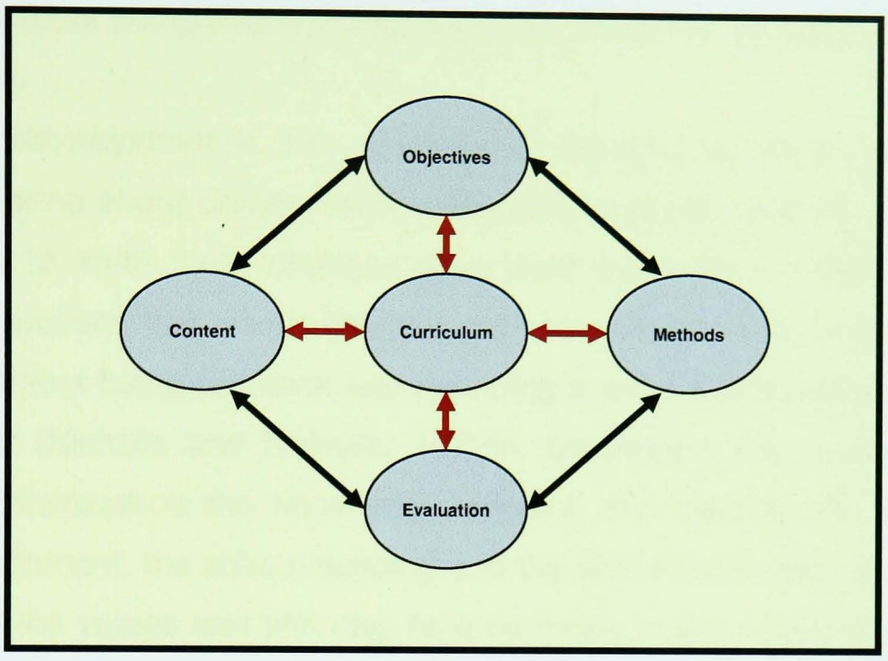


Figure 2.3 The elements of the curriculum (Nicholls and Nicholls, 1972b)

The Spiral Curriculum, according to Hilda Taba, refers to the subject matter seen at three levels of knowledge, with each serving a different means/function:

- Concepts that serve as threads weaving many grade levels;
- Ideas that serve as focal points for selection and organisation of the content and represent foundational learning; and
- Specific facts that serve as samples through the analysis of which students might reach important ideas (Taba, 1967).

While John F. Kerr sees the spiral curriculum as separate from integration within and between areas of knowledge, two further criteria should be followed by the teacher. They are the reiteration and sequence of the elements, that is, the repetition of certain concepts in the courses wherever possible and building new concepts upon preceding ones (Kerr, 1968).

Curriculum workers include school-based personnel such as teachers, principals, and parents, university-based specialists, industry and community groups, government agencies and politicians (Marsh, 1997: 8). The monitoring of the curriculum involves the use of processes to determine to what extent the approved curriculum has been implemented; to check on its efficiency; to check

on its consistent development; to monitor whether the teachers are alert and on task and finally to help the principal to become more visible and involved with the curriculum. Without monitoring, teachers will place emphasis on what they know best without being overly concerned with the whole curriculum (Glatthorn, 2000: 93-94).

Curriculum development is the process of planning learning opportunities intended to bring about certain desired changes in pupils, and the assessment of the extent to which these changes have taken place (Prini, 1993: 23). It is a continuous process that never finishes, with knowledge and insights derived from assessment being fed back and providing a fresh starting-point for further development (Nicholls and Nicholls, 1972b). Developing the curriculum must take into consideration the knowledge content, the teacher, the pupils, the school environment, the school building and the school's climate, which are the sum total of the values and attitudes held by those in the school (Nicholls and Nicholls, 1972b). The way education experts set about curriculum development is determined by tacit assumptions about values - social, political and educational (Maclure, 1971: 7) (see Figure 2.4). In the USA, three different curriculum styles of development can be recognized between the 1950s and 1970s, which reflect, in general, the national approaches to problems in each period of their history (Tony Beches cited in (Maclure, 1971).

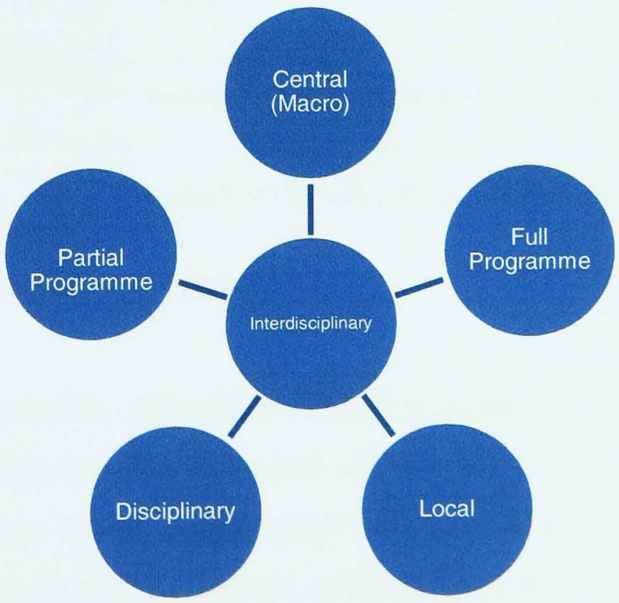


Figure 2.4 Dimensions of Curriculum Development (Maclure, 1971)

Curriculum evaluation aims at establishing its accountability by supplying information about the success or failure of the teaching-learning situation, which results in making useful curricular decisions and judgments (Prini, 1993). Curriculum evaluation differs from other kinds of educational evaluation, in that it focuses upon how teachers and students interact over a particular curriculum or syllabus. It also involves an examination of the goals, rationale and structure of a teacher's curriculum, a study of the context in which interactions with students occur, including parent and community inputs, and analysis of the interests, motivations and achievements of the students experiencing a particular curriculum (Marsh, 1986: 137 cited in Prini, 1993).

Curriculum reform and development is concerned with revalidating and reshaping the educational aims and objectives, and examining the ways in which these can best be achieved, placing teaching staff at the centre of the process (Cave, 1971: 11).

Table 2.1 Tyler model of the curriculum process

Objectives	What educational purposes should the school seek to attain?
Selecting Learning Experiences	What educational experiences can be provided that are likely to attain these purposes?
Organizing Learning Experiences	How can these educational experiences be effectively organized?
Evaluation	How can we determine whether these purposes are being attained?

Source: (Tyler 1949 cited in Prini, 1993: 65)

As part of the research, interviews were conducted and will be covered in Chapter 3. An interview was conducted with Dr. Attia, who stated that in Kuwait, curriculum evaluation takes place every four years for standard (compulsory) education, whilst for the Department of Architecture of Kuwait University, the administration sends an invitation to the American NAAB visiting team to pay them an inspection visit to evaluate the architecture syllabus and provide them with their report.

Professor Attia[12] stated that developing any existing course follows certain steps that involve the academic member who wants to update it, followed by meetings with other colleagues who teach the same course, and then the Curricula Development Committee evaluates the suggested new syllabus. Finally the head of department ratifies/approves the committee's decision. It is possible to add a new course to the measure sheet, in which case it becomes an elective rather than a compulsory course since all the compulsory courses are already set up.

Introducing a new course generally involves only one member of staff. Once the department agrees to their proposal their role ends with listing all the academic details of the course (syllabus content, references required, lab requirement) and they are not responsible for the financial side. He adds that, theoretically speaking, updating university programmes is a constant process that never stops, depending on how much each academic is active in developing their subject. But actually, the whole outcome depends upon how much the member of staff is willing to work and participate in such a process, that is, what is said is not what is actually done (Attia, 2007).

2.4 Hidden Curricula, objectives and curriculum outcomes

Schools do more than simply transmit knowledge as laid down in the official curricula. The term *Hidden Curriculum* is often used to criticize the social reality of schooling. This term was reportedly coined by Philip W. Jackson who argued the need to understand education as a socialization process (Jackson, 1968). Sockett (1976: 7) listed three aspects of the hidden curriculum: first, there is in every school a curriculum of a kind that is a pupil's curriculum, that includes all facets of a pupil's life in school. Second, there is a distinction between what teachers see themselves teaching and what the pupils learn while they are teaching and, third, a sense of the hidden curriculum is where a teacher has a hidden agenda, i.e., has attitudes which direct the way of teaching.

[12] Personal communication: Dr. Talat, Vice President for Research, Kuwait University 2007.

The hidden curriculum consists of that learning which is unintentionally passed on to students during the presentation of the intended curriculum (Prini, 1993: 9-14). It is also referred to as the unwritten curriculum (Marsh, 1997: 33). More recent definitions were given by (Meighan et al., 1997): 'the hidden curriculum is taught by the school, not by any teacher...something is coming across to the pupils which may never be spoken in the English lesson or prayed about in assembly. They are picking up an approach to living and an attitude to learning'. Haralambos and Holborn (2004) define the hidden curriculum as consisting of those things pupils learn through the experience of attending school rather than the stated educational objectives of such institutions (Haralambos and Holborn, 2004).

The *objectives* are there to guide the selection of content, materials and methods and must be referred to constantly when decisions about these are being made (Nicholls and Nicholls, 1972a). Curriculum objectives must always be pre-specified in terms of measurable changes in student behaviour (Lawton, 1983). *A competency* is the quality of being adequately or well qualified physically and intellectually. Competencies were under the spotlight in the 1980s and 1990s because of the need for more effective learning, greater breadth of education and training programmes, more flexible workers and greater levels of standards monitoring (Marsh, 1997: 69).

Curriculum outcomes are the intended results of the teaching-learning process, as identified in the curriculum document (usually referred to as the syllabus) and expressed as a set of broad comprehensive, assessable and observable indicators of student achievement. Taken together, a set of curriculum outcomes statements should cover not only the knowledge and skills domains of a subject syllabus, but also the attitudes and values domain as well. A *syllabus* typically is a list of the areas which are to be assessed; sometimes the list is extended to include a number of objectives, as well as learning objectives (Prini, 1993: 7). Figure 2.5 summarises the inputs and outcomes of a student-centred education perspective.

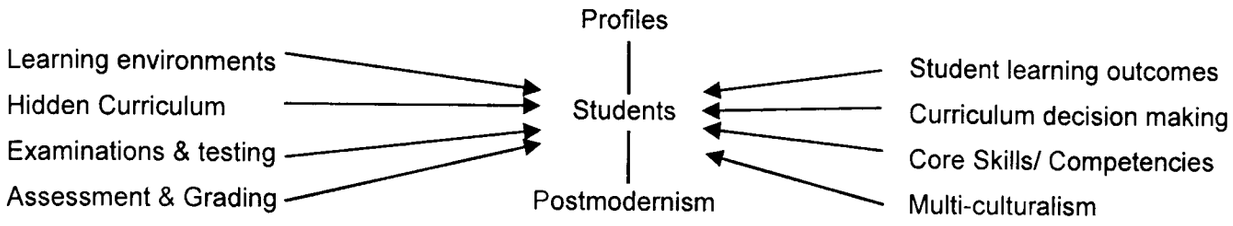


Figure 2.5 Concepts included in a student-centred perspective (Marsh, 1997)

2.5 Scope and Sequence

The term scope is derived from the Greek *skopos;* akin to the Greek *skeptesthai,* to watch; and the Italian *scopo:* purpose, goal[13]. Scope is used in conjunction with sequence to refer to the structural content within a curriculum; scope refers to the breadth and depth of the content to be covered in a curriculum at any time, whilst sequence refers to the order tin which hat content is presented to learners over time (Prini, 1993: xxi).

2.6 Informal and formal education and the role of lifelong learning

Informal education takes place because every social arrangement is to some degree educational in effect, and where knowledge is passed from the older generation to the younger. It results from the constant effect of the environment; and its strength in shaping values and habits cannot be overestimated. *Formal education* is considered a necessity as society becomes more complex in resources and structure. It is a conscious effort by human society to impart the skills and modes of thought considered essential for social functioning (Dewey, 1916: 9). Techniques of instruction often reflect the attitudes prevailing in wider society, that is, authoritarian groups typically sponsor dogmatic methods, while democratic systems may emphasize freedom of thought.

Continuous learning is critical to renewing the expertise and skills needed in this information age to keep up with the explosion in information and challenges of technology. Those in employment are required to continually renew their skills and expand their knowledge to keep up with everyday progress.

Lifelong learning is the concept that "It's never too soon or too late for learning". It sees citizens provided with learning opportunities at all ages and in numerous

[13] See Miriam-Webster online dictionary: http://www.m-w.com/ (last accessed 03/February/2009)

contexts within formal and informal channels such as at school and in Higher Education, at work, at home and through leisure activities. It is a form of pedagogy often accomplished through *distance learning* or *e-learning*, *home schooling* or correspondence courses or *non-formal education*. It also includes postgraduate programmes for those who want to improve their qualifications, bring their skills up to date, or retrain for a new line of work. Lifelong learning is thought of as a mechanism that helps in the development of the nation, economy and the individual and at the same time it reflects global equality (Fiala, 2006).

The need for success motivates students to learn more and work hard throughout their school years. Motivation to learn can be attributed to many factors; natural curiosity to learn; self-efficacy; a positive attitude towards learning and receiving external motivation such as grades, praise and encouragement. Sometimes satisfaction in the new knowledge obtained provides the motivation to learn more (Big and Hunt, 1980). In the UK, RIBA members are obliged to do Continuous Professional Development courses (CPD) each year, which is a form of lifelong learning. CPD helps them to retain their membership, their professionalism, their competence, and to enhance their career development as well as ensuring that they keep up-to-date with their rapidly changing profession. As a priority for the Association, continuing education is sponsored and delivered by every office and division within RIBA. In Kuwait, architects are not obliged to pursue a CPD programme, and it is up to them to decide whether they need to or not.

Subject content has a close relationship with *teaching methods*. The methods used often have as much influence on what the learners are taught as does the content. In the past, more consideration was given to teaching methods and content, ignoring the objective of the course. Curriculum content must conform to certain *criteria* to be *valid*, and it should be authentic and up-to-date. The content is judged as valid if it is possible for the objectives to be achieved through its use. For example, if the objective is concerned with the concept of the relationship between a person's way of life and their environment, and the content chosen for the achievement of this objective does not show this

relationship in a form which can be perceived by the learners, it does not satisfy the criterion of validity.

2.7 Development of architectural education

The present state of *architectural education* is a direct product of the dialectic between customary activities and the intellectual developments which have resulted from examination of the subject in order to teach it. Architecture is not a discipline in the traditional sense, since it is not served by a definable body of knowledge (Cunningham, 2005). As architecture originated in prehistoric times, it developed new techniques and ideas as humans learnt more about their environment and their needs over time. Passing down architectural knowledge started simply through observation, until it was enshrined in official educational institutions and attained its current state. The coming sections will elaborate more on the development of architecture education in time.

2.7.1 Man and the built environment

Architecture is a product of a society, since buildings and the buildings arrangements reflect the nature of that society. Buildings are considered by some as one of the most important man-made factors that play a key role in sustaining life on Earth. People know little about the pyramids of Giza in Egypt, nor the Great Wall of China which have endured on Earth for thousands of years. and until these landmarks are fully interpreted and placed in context, humans will know little about their rich and diverse culture (Conway and Roenisch, 2005).

After the industrial revolution, man became more capable of harming the environment without necessarily realizing to what extent this was happening (Jardins, 2001). Concern for the environment is lacking in most modern projects due to a lack of initiative and foresight as well as the architect's self-imposed limitations in designing for a particular task. As a result, problems concerning the needs of communities in urban areas remain unresolved and the effectiveness of the architect as a participating professional member of a community becomes negligible (Doshi, 1986).

Today's children will be adults by 2035. They and their children will see the world of 2070 or 2080. Therefore, it is essential to bequeath to them an

ecologically sound world and educate the future generations to spot the warning signs of environmental damage at an earlier stage (Kavka cited in Pojman, 1994: 230). It is essential to develop a responsive architectural education system that will provide its learners with knowledge that they can use, and flexibility in any future variables. If towns and cities are shaped by buildings and buildings are designed by architects, then their education must be a major factor in the formation of the design philosophies which will see them through the course of their career.

Up until 1949 the average person in the UK would have included architecture among the Fine Arts (Braddell, 1949). However, Lethaby had a different perspective: according to Lethaby the two processes that have changed the surface of the world are agriculture and architecture (Lethaby, 1912). Although he did not specify the extent of the effect of architectural activity, at the present time it is agreed that buildings consume approximately 50% of the Earth's non-renewable resources, making the construction industry the least sustainable industry (Edwards and Hyett, 2001). Buildings alone account for one quarter of the world's wood harvest, and they consume one sixth of fresh water supplies (Jenks and Burgess, 2000). Architecture schools influence the built environment in many ways by re-moulding the minds of future generations, providing the breeding grounds for new architectural imagery, experiments, styles, theories and fashions, developing new ideas, forming embryonic practices amongst talented students, and through being considered one of the three drivers of the profession by RIBA, the other two pillars being public sector building and the British planning system established following World War II (Crinson and Lubbock, 1994).

2.7.2 Meaning of architectural education

To explain what architectural education is, one must understand the meaning of each of the two terms independently, and then try to understand them combined together. The term architecture is derived from the Latin term *architectus*, which is derived from the Greek term *architekton*; *archi* is a person of authority and *tekton* is a builder, fabricator, or craftsman (Carpenter et al., 1997: 2).

The term *architecture* is explained in The Oxford Dictionary of Architecture as follows:

> Ruskin, in his Seven Lamps (1849), stated that architecture was the 'art which so disposes and adorns the edifices raised by man...that 'the sight of them contributes to his mental health, power, and pleasure, which proposes aesthetic, beneficial, and spiritual aspects rather than a utilitarian or *Functionalist agenda...'.
>
> Also:
>
> Architecture is concerned with the creation of order out of chaos, a respect for organization, the manipulation of geometry, and the creation of a work in which aesthetics plays a far greater role than anything likely to be found in humdrum building. Philip Johnson, in the *New York Times* (1964) went so far as to claim that 'architecture is the art of how to waste space' (Curl, 1999).

A more direct definition of Architecture is "any shelter or enclosure, grand or mean, good or bad, erected at any time, for any social purpose, anywhere, and by any individual or group". It is thought that architectural education has always been in tension with architectural practice. Architectural practice should be corrected by architectural education whenever it gets self-satisfied. *An Architect* includes a designer, worker, and manager of the process of building, while *structuralism in architecture* is the understanding of architecture as a social phenomenon or a social process, whose end result is, invariably, a material entity which encloses or shelters a particular social activity (Chadirji, 1986: 112, 113). *"Architectural" Education* is "the transmission of the values and accumulated knowledge of a particular society to an individual, so that the individual can learn the culture of the society, mould his behaviour in the ways approved by the adults in that society, and prepare himself for his eventual role in that society as a performer and/or recipient." (*ibid:* 112).

It is argued that at an international level students are nowadays being taught to use globally-published reference books, which has resulted in a new trend of unified education, such as learning about the same iconic buildings and the same small group of architectural 'superstars'. Surfing the internet has also

guided them to the very same backgrounds, and they even buy their books from the limited number of well known book sellers on the internet, such as Amazon (Williamson et al., 2003). In the modernist period, architectural discourse paid greater attention to regional and national differences. However, that recognition is not equivalent to operating from within a culture, an approach which resulted in concepts of vernacularism, regionalism, critical regionalism, heritage conservation and cross-cultural differences being seen by the 'global citizen' (*ibid*: 150).

The future practice of architecture and planning will probably depend on architecture graduates' motives. There will always be those who offer to work for a minimum fee and thus will have to provide only a nominal and minimal service. Their buildings and developments are the ones that will require remodelling, reconditioning and rebuilding, as well as the continuous use of consultants and specialists to upgrade or correct faulty original decisions. In contrast, there will be those architects who offer comprehensive services. Australian architect Glenn Murcutt advised his students in Arizona in 1991 to be good to 'nature', at a time when it was considered that Architecture and Planning were taught in such a way as to lead to their graduates acting as enemies of our host environment (Cook, 1994).

The following section will demonstrate how architectural education started and how it has developed up to the present day.

2.7.3 Development of architecture

Building design has existed since the beginning of human life, since there has always been a human need to organize closed environments. This activity has developed through time and become the profession that not only organizes the immediate environment, but also organizes the surrounding area, to the extent that building cities respond to society's needs and aspirations. Christian Norberg-Schulz discussed the concept of '*Genius Loci*', relating man-made places to nature in three evolutionary ways: first, that man visualizes his understanding of nature; second, that man symbolizes his understanding of nature; and third, that man creates a 'micro-cosmos' from his understanding of the world (Stoltz and Brown, 1994).

Building styles have evolved from pre-historic times up to the present day in response to many factors, but there is a basic set of major factors that influence architecture design. These factors can be summarized as follows:

1. The availability of building materials in the local surroundings;
2. The development of science and geometry in each architectural era;
3. The architectural concepts that are passed from generation to generation;
4. The extent of popular faith and belief expressed in building massive monuments and places of worship in unfriendly environments with a harsh climate and
5. The presence of 'people with power', for example, royals and religious leaders, who push their followers to construct in accordance with their perspectives of large monuments.

2.7.4 Architectural education theory and architectural development

As the architecture profession develops, this reflects on the architecture curriculum and the teaching of architecture in the design studio. The first university to introduce the *Tripod Day* in the eighteenth century was University of Cambridge. Moorhouse et al., (1991) reported that a traditionally trained architecture graduate who learned design through a series of projects for theoretical buildings will sit and argue with undergraduates about their projects. This learning process differed from that of the *Ecole des Beaux Arts*, in that in the latter, the atelier tutor defended his students' projects, as they justified his own teaching status and experience (Doidge et al., 2000). Vasques De Velasco and Zhang (2004) noted that the existing critical review system in architectural education supports the design learning process where students present their design work, and the tutor's role is to deliver a critical assessment of the project and help students to improve their work during the design learning process. The instructor expected role is to draw the learner's attention to their designs weaknesses and facilitate the means of improving them by suggesting alternative approaches by other architects or discus historical precedents (Stover, 2004). Milton (2003) observes that *Learning by Doing* is a process of architectural education taking place through desk tutorials, interim interviews, crits and final design juries. The process sometimes involves peer students,

tutors, lecturers and visiting professors commenting on and assessing the students' work in a one-to-one or a group environment.

Problem Based Learning is another form of teaching architecture in the design studio (Kvan, 2001). With this learning method, students seek solutions to architectural problems under their tutors' supervision. Students use verbal and non-verbal means of communication in the design studio, which replicates the conditions of the real world. A third type of teaching method is via *Case-studies* that allow critical analysis and interpretation of design solutions adopted by experienced architects in order to satisfy specific users' needs (Salvestrini, 1995).

A fourth way of learning architecture is *Learning by Criticism*. Salama (1995) reports that learning by criticism takes place when students engage intellectually and socially, shifting between analytic, synthetic and evaluative modes of thinking, in different sets of activities. And finally, Dutton (1987) reported teaching architecture and urban design through the use of a *Hidden Curriculum Model*, (see Section 2.4 about aspects of the hidden curriculum).

From the discussion above and in Section 1.6 in Chapter 1, it will be clear that there are various approaches regarding how architecture should be taught, especially in the design studio. Whilst all the approaches are valid, one cannot claim a single approach as pre-eminent. This research is concerned with the architectural curriculum and teaching architecture forms one aspect of the curriculum (see Section 2.3). While the approach to teaching architecture is important, this thesis is concerned with an holistic approach to architectural education, that is, the curriculum. It accepts that there is no one clear approach to the best teaching theory and that the approach used will depend on the policy and strategy of the teaching institute.

Reffat (2008) cited the successful architecture curriculum as outlined by Bermudez (1991) and Rittel (1986) as being one that:

1- Produces flexible professionals who are adaptable to change and the uncertainty of future tasks;
2- Emphasises the use of general principles and theories to foster understanding and learning;
3- Teaches not only rules but also the rules for changing rules;

4- Teaches how to learn to design;

5- Increases the level of interdisciplinary work; and

6- Fully integrates information technology into the curriculum.

Asquith (2007) called for an integrated architectural education approach drawing from architecture, anthropology, sociology and behavioural studies, where innovative methods can be employed and used as tools to aid good housing design for the future (Asquith, 2006: 129). This is a valid point, but architectural education needs to integrate many aspects, including science and technology. It can be argued that during the 20th century, science and technology have taken over architecture and have contributed to its failure. Therefore, a holistic approach is needed where the social, aesthetic and technological aspects of design are integrated. With this integration, issues such as sustainability can be addressed more successfully.

2.8 RIBA and other educational bodies

The development of the Royal Institute of British Architects (RIBA) can be summarised in the following chronology (Table 2.2):

Table 2.2 RIBA role in regulating architecture professional education in the UK

Year	Action
1834	RIBA established
1860	RIBA first definition and introduction of an examination in architecture
1882	Arrival of compulsory qualifying membership examinations
1895	First full-time academic courses start
1904	RIBA Board of Architectural Education to Overseas Countries was founded
1922	RIBA Visiting Board was established

Source: (Cunningham, 2005)

Over one hundred and sixty years ago, in 1847, another type of institution, the Architectural Association (AA) was founded in Britain by the private sector and adopted the aim of reforming architectural education (Balfour, 1995). The AA was founded as a reaction against the architectural establishment, and in 1912

it had become an academy where male students were taught to design cottages and cowsheds (Reilly 1931 cited in Cunningham, 2005). After the end of World War II, the AA was the only surviving independent school which assumed the role its founders had intended as kind of a club where ideas might be freely exchanged. Its educational format is closest to that of the École Beaux Arts, in so far as it was, until recently, staffed by practising architects teaching in the evolved version of ateliers, known as units. It is an intensely urban form of education, relying on a capital city as its primary resource and has helped in focusing international attention on London as an important forum for the discussion of architectural theory and practice.

The Liverpool School provided the first full-time architectural education in 1895 (Crinson and Lubbock, 1994), achieving honours status in 1900, and by 1920 exempting students from all RIBA qualifying examinations (Cunningham, 2005). By devising substitutes for the atelier and pupilage systems, Charles Riley achieved professional and academic acceptance of architecture as an academic subject for the first time. He adapted the Beaux Arts 'Decorative Composition Study' into an exercise called Sketch Design, and was very conscious of the significance for architectural practice of the emergence of full-time education and the role of the schools. He believed that architects must now realise that general movements of opinion and methods of design will increasingly come from the schools. Reilly also founded the position of Chair of Town Planning in order to forge the link between planning and architecture which was historically obtained in practice. The Civic Design course in Liverpool was as significant in its national contribution as the architecture school, each for several decades rivalling their strategically better located rivals in London. The significance of these schools to modern developments lies in the methodological approaches rehearsed during the first half of the 20th century.
In April 1958 the Oxford Conference was held under the administration of RIBA in response to the persuasion of a group of intellectuals and academics such as Sir Leslie Martin and Lord Richard Llewellyn-Davis who was a socialist peer and Professor of Architecture at the Bartlett School, part of University College London, in the 1960s (Fox, 1973). Llewellyn-Davis saw architecture as entirely utilitarian. He wanted architecture to apply science and what was referred to as

'a body of knowledge' for the greatest social good. At that time architectural education took two forms: students graduating via the full-time route adopted by some universities, and those who had worked by articulated pupilage and took the RIBA examination externally. The conference recognized the importance of practical experience to be gained, preferably by training in an office. It also recommended higher minimum entry standards to schools of architecture (Pearce and Toy, 1995). At the Oxford Conference the responsibility for the transmission of knowledge in architectural education was transferred from architectural practice to the Universities and state-funded higher education. Schools could claim that during this period that they had earned the authority to teach without prescription, and because of the demise of public practice, the profession outside academia (with the exception of a few isolated examples of private practice) was not in a position to share much of the responsibility for education. As a consequence of that conference, architecture was taken out of the art schools and into the universities, where it became 'scientific' or 'sociological' with entry requirements for 'A' level mathematics and physics.

Another event that had a significant effect on architectural education was the advent of the Council for National Academic Awards (CNAA) which was founded in the UK by the Royal Charter in 1964, and dissolved in 1993. CNAA added considerable advantages and value to the architectural education of individual students and to the profession financially by bringing in additional state funding. It also contributed to the coherence of the discipline by the added value it brought to the profession's education and its short-lived responsibility for academic standards in the local government polytechnic sector.

In January 1999, RIBA issued a working consultation document to heads of schools, academic institutions, practitioners and students explaining the reasons why a review was taking place and why it had been necessary in the context of considerable change in the construction industry. These changing circumstances, the establishment of the Architects Registration Board and the Quality Assurance Agency, the consequences of the Dearing Report, the Latham and Egan Reports, various European directives and the globalization of architecture, have all contributed to a need for a review of architectural education (RIBA, 1999).

2.9 Architectural education outside the UK since the 17th century

The split between architecture and construction took place in 1670 when the *Academie Royale d'Architecture* was established during Louis XIV's reign (France), initiating the separation of theory and practice. In the USA a professional curriculum for architecture was established in the School of Mathematics of the University of Virginia in 1814. In the 18th century separation, between the academies and the polytechnics took place, denying an integration between art and science in architectural design. The question has become more crucial today, with increasing demands for energy saving, environmental awareness and sustainability. An analysis of the reasons for such a separation has been proposed, and certain interventions suggested, in order to improve the efficiency of a design process that composes architecture by means of architecture (Los, 1998: 171).

In Central Europe, a final player in 19th century architectural education was the university (Schwarzer, 1995). At that time, design was not taught and the study of art history and philosophy had a great impact on design ideology.

The object of the teaching profession is, of course, the development of competent professionals, who will contribute to their society's well-being, as well as educating proficient practitioners. How well the educational systems have served this end needs to be examined (Glasser, 2000).

2.10 RIBA/ARB and the SAPL BA Honours Degree syllabus

RIBA, ARB and the SAPL share similar syllabus[14] schemes in their suggested programmes leading to the Bachelor of Architecture degree. In the following sections, each of the institutions mentioned above will be investigated in terms of their curriculum design themes and ways of obtaining the Bachelor of Architecture degree, and how they tackle sustainable architecture education.

[14] Syllabus: one aspect of the curriculum that includes a list of the learning objectives for each course

2.10.1 RIBA syllabus

RIBA has established an alternative route to its membership through the recognition of courses and examinations considered to have the necessary minimum standard for exemption from the RIBA examination (RIBA, c2003). As a cornerstone of this process, RIBA has for many years published an 'Outline Syllabus' which forms the basis of RIBA's own examination in architecture. The syllabus is normally reviewed and republished every five years.

The outline syllabus is divided into five themes: design, technology and environment, cultural context, communication and management, practice and law.

In 1997, the Architects Registration Board (ARB) was established through the Architects Board to administer and control entry to the Register of Architects. The ARB has the authority to notify courses to the European Union and validates courses inside the UK, while RIBA validates courses outside the UK: both follow the same syllabus validation criteria. Both ARB and RIBA provide syllabus specifications that are taken by schools of architecture that fashion them into a course, which renders the syllabus flexible, as each school may add new dimensions to it.

RIBA considers that educating the architects with the appropriate skills and knowledge to meet the needs of the 21st century requires a five-year educational programme and two years of monitored professional experience, particularly because architecture is a career carrying considerable legal liability.

The training programme normally involves three key stages:

1. ***A five-year degree programme***: on a course that is recognised by both RIBA and ARB. This is usually divided into two parts: A three-year degree, known as *RIBA Part 1* followed by a further two years of advanced undergraduate study known as *RIBA Part 2*.
2. ***A minimum of two years' professional experience*** in an architect's office or equivalent. One year is usually taken after *Part 1* (Stage1 Professional Experience), and the other year after *Part 2* (Stage 2 Professional Experience).

RIBA provides guidelines to the terms used in the Syllabus Outline: Awareness, Knowledge, Understanding and Ability (*see* Table 1 in Appendix 2).

RIBA emphasizes that for an architect, acquiring practical and mental agility takes time, and requires a complex process of design dependent on knowledge, skills and creative activity that leads to competence in designing. RIBA identifies five thematic criteria as requirements of the UK Quality Assurance in Part 1, Part 2, and Part 3. They include Design, Technology and Environment, Cultural Context, Communication and Management, Practice and Law. The following section displays the main guidelines only for Technology and Environment in the three parts, as it covers environmental concepts[15].

RIBA Part 1: Technology and Environment

According to RIBA, in Part 1 undergraduates should be able to demonstrate within coherent architectural designs and an academic portfolio the ability to integrate knowledge of:

1) Human well-being;
2) The welfare of future generations;
3) The natural world;
4) Consideration of a sustainable environment;
5) Use of materials;
6) Process of assembly;
7) Structural principles and
8) The impact on design of legislation, codes of practice and Health and Safety, both during the construction and occupation of a project.

Part 2: Technology and Environment

In Part 2 undergraduates will demonstrate, within coherent architectural designs and an academic portfolio the ability to integrate knowledge of:

1. The principles and theories associated with visual, thermal and acoustic environments;

[15] The whole content is listed without rephrasing for reasons of accuracy.

2. Climatic design and the relationship between climate, built form construction, life style, energy consumption and human well-being;

and *understanding* of:

1) Building technologies, environmental design and construction methods in relation to:

i) Human well-being;
ii) The welfare of future generations;
iii) The natural world;
iv) The consideration of a sustainable environment.
v) The impact on design of legislation, codes of practices and Health and Safety both during the construction and occupation of a project.

In addition, they will have the *ability* to:

2) Devise structural and constructional strategies for a complex building or group of buildings, employing integrative knowledge of:

I. Structural theories;
II. Construction techniques and processes;
III. The physical properties and characteristics of building materials and components and the environmental impact of specification choices and
IV. The provision of building services.

Part 3: students will demonstrate within an academic portfolio:

understanding of: the social and economic context for investment in the built environment.

2.10.2 ARB syllabus

Since its establishment in 1997, the ARB has effectively carried out its obligations to set the practical training experience and qualifications required for getting registered as an architect in the UK. ARB criteria include minimum levels of awareness, knowledge, understanding and ability.

Through its market research in 2001, ARB developed a clear insight into how architectural education ought to more positively prepare students for professional life. Also the criteria included five themes: Design, Technology and Environment, Cultural Context, Management Practice and Law, and Communication, with Design as the only theme that should carry at least half of the assessed weighting in Part 1, and Part 2 (ARB, April 2002). ARB criteria are

flexible, which encourages individuality and diversity within the curricula and course contents of different schools of architecture. The ARB states that:

> Variations in educational practice and innovations in academic programmes must not compromise the delivery of the essential content of these requirements (ibid: 3).

2.10.3 The SAPL syllabus is generated from RIBA syllabus

SAPL offers to its undergraduates a Bachelor of Architecture degree syllabus that leads them to exemption from the RIBA Part 1 examination since it is generated from the RIBA outline. The coming section will not look in detail at the SAPL lectures, but rather at the specifications of each course, as the syllabus forms only one part of the curriculum. It will not look at how successful the lecture courses are, but it will rather assume that the syllabus is a comprehensive description to enable students to understand what they will actually be given. In which case, the research will determine how well the level of environmental teaching found in the lectures is declared in the syllabus.

Through an examination of the SAPL Programme of Studies for the BA in Architecture for 2005/2006, it was found that the professional programme in architecture is designed to include courses that run over no less than seven academic years. The programme is divided into four sections:

1. Bachelor of Arts with Honours in Architectural Studies: this includes three stages that cover three years, and is also called *Part 1*;
2. Certificate in Architectural Practice: stage 4, over one academic year;
3. Bachelor of Architecture with Honours: this includes two stages: 5 and 6 over two academic years, and is also called *Part 2*;
4. Diploma in Professional Practice: stage 7 over one academic year and also called *Part 3*.

The SAPL undergraduates who finish each stage successfully gain exemption from RIBA's Part 1, Part 2, and Part 3 Examinations (APL, 2005/2006).

2.10.3.1 The SAPL Objectives of Part 1

The main objectives listed in the 'Aims of the BA Architectural Studies Programme for Part 1 include eight points related to the student's expected

abilities, which it is expected, he/she will demonstrate through coherent architectural designs and/or academic portfolio. The points include:

- A broad and well-balanced grounding in the disciplines which inform architectural studies: design; technology and environment; cultural context; communication skills and management; practice and law, enriched by input from research and practice.
- The ability to produce coherent, moderately complex architectural designs that demonstrate an integration of structure, building materials and constructional elements, and that demonstrate an understanding of the integrative relationship between the climate, service systems and energy.

The SAPL Intended Learning Outcomes for Part 1 include four main outcomes that the student is expected to achieve. The following table (2.3) includes only the points that are found to be relevant to environmental/ sustainability education, with the total number of each theme's outcomes given in brackets.

Table 2.3 SAPL Part 1 Objectives

Theme	Environmental/ Sustainability education aims
Knowledge and Understanding	1- Demonstrates with coherent architectural designs - up to a moderately complex set of specific requirements - and academic portfolio, knowledge and understanding of the principles of building technologies, environmental design and construction methods in relation to: human well-being - the welfare of future generations - the natural world - consideration of sustainable environment - use of materials - process of assembly - structural principles.
Cognitive- Intellectual Skills	1- Apply and integrate knowledge of the principles of building technologies, environmental design and construction methods within moderately complex architectural designs and academic portfolio in relation to: human well-being - the welfare of future generations - the natural world - consideration of a sustainable environment - use of materials - process of assembly- structural principles. 2- Select and apply appropriate technologies (sketching, modeling, digital and electronic) to appraise performance of the principles of building technologies, environmental design and construction methods. 3- Demonstrate an ability to form considered judgments about the spatial, aesthetic, technical and social qualities of design within the scope and scale of a wider environment.
Professional Subject Specific Skill	1- Demonstrate through a coherent portfolio of work, the ability to create moderately complex architectural designs that show an understanding of the integrative relationship between climate, service systems and energy.
Key- Transferable Skills	None

Source: (APL, 2005/2006).

2.10.3.2 The SAPL Objectives of Part 2

The SAPL Part 2 programme comprises seven objectives that include the following aim for the student:

- To develop a systematic understanding of discipline-specific knowledge, including a critical awareness of current problems relevant to the profession of architecture, while encouraging a questioning and receptive attitude that enables students to construct an informed theoretical and ethical position in relation to architectural design and its appropriate relationship to a wider social, cultural and environmental content.

As in Part 1, Part 2 includes four main themes, each of which is listed in the following with the total aims listed between brackets. The theme concerning the environment is listed in full in Table (2.4):

Table 2.4 SAPL Objectives for Part 2 Architecture Programme

Theme	Environmental/ Sustainability education aims
Knowledge and Understanding	1- Have 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; 2- Demonstrate a knowledge of the principles and theories associated with visual, thermal and acoustic environments; 5^{10}. Demonstrate a knowledge of climatic design and the relationship between climate, built form construction, lifestyle, energy consumption and human well-being; 3- Have an understanding of building technologies, environmental design and construction methods in relation to: human well-being, the welfare of future generations, the natural world and the consideration of a sustainable environment; 4- Understanding the influences on the contemporary built environment of individual buildings, the design of cities, past and present societies and wider global issues; 5- Demonstrate a knowledge of the inter-relationship between people, building and the environment and an understanding of the need to relate buildings and the spaces between them to human needs and scale.
Cognitive- Intellectual Skills	1- A student will be expected to have the ability to devise structural and constructional strategies for a complex building or group of buildings, employing an integrative knowledge of structural theories, construction technologies and processes and the provision of building services within the framework of the knowledge of the physical properties of building materials and components and the environmental impact of specification choices.
Professional Subject Specific Skill	None
Key- Transferable Skills	None

Source: (APL, 2005/2006)

2.10.3.3 Notes on the SAPL objectives of Part 1 and Part 2

By comparing the objectives related to the environment on the BA, Part 1 and Part 2, it was noticed that:

1- Part 2 contains more objectives in the area of *Knowledge and Understanding*, while no environmentally-related objectives were listed in either *Professional and Transferable Skills* or *Key Transferable Skills.* Part 1 includes three *Cognitive-Intellectual Skills* objectives in comparison with Part 2 which included only one.

2- SAPL should place more emphasis on developing the students' ability to achieve environmental goals in their profession in both Part 1 and Part 2 of their programmes, in which case the graduates will follow the correct procedures once they become professional architects.

2.10.4 Environmental concepts in the content of the SAPL syllabus

An analysis of the SAPL *content of courses booklet* was made; all the courses were reviewed to measure the environmental concepts within them. The environmental concepts included in the undergraduate course are expected to cover different areas, for example, macro and micro climates, ecological architecture, sustainability and other issues. See Appendix 3 for the results of the review.

SAPL provides copies of the Bachelor of Architectural Studies booklet to undergraduates to use as a guidebook during their graduate years to help them learn the university's responsibilities towards them and their obligations during their school years.

Appendix 3 includes a table demonstrating that environmental concepts are well represented in the syllabus of the SAPL, covering a wide range of aspects, starting from the micro and macro environment of domestic living space, to different building materials and sustainable building design. However, tutors are advised to review their 'cognitive domain' objectives in a way that will enable them to assess learners' levels accurately. For example;

1- The objective of raising awareness of the richness and complexity of *contemporary domestic environments* is hard to test and measure on a 1-10 scale because it involves emotions acquired rather than skills.

2- For modules related to developing the students' professional background, no aims were listed for preparing them for their future role in achieving sustainable architecture. Tutors should list objectives in modules such as ARC220 Dissertation Studies, that will prepare undergraduates in ways of dealing with their clients.

3- It is understood that fewer sustainability concepts are listed in the first year (Stage 1), increasing gradually in the subsequent Stages 2-5, because undergraduates need to develop their design skills, and in the coming years they will learn more sustainability concepts, when studying building materials, building structures, architectural design, and so on. At the end of all the stages they are expected to have acquired a basic understanding about achieving environmentally appropriate building design and are well equipped with the research skills that will enable them to create sustainable building design in the future with new technologies coming into the field.

4- Aims are not listed in some modules, e.g. ARC807.

5- Teaching and learning methods cover a wide range of schemes, starting from simple blackboard and chalk approaches, to seminars and IT use applying CAD in design.

6- Module assessment varies considerably in accordance with the nature of each module and the year in which the student is studying; starting from oral/ written examinations to writing essays, to preparing and presenting seminars and designing a project and a presentation that is evaluated by internal and external examiners.

7- The contents of the Bachelor of Architecture syllabus booklet identify the criteria, through which undergraduates are evaluated, including their workload and the percentage each examination/ assignment contributes to the total final mark. This helps the students to recognize what they are required to do.

8- Architectural History 1.1: ARC Aims:

1- Environmental/ sustainability concepts are not listed.

2- Some aims listed need to be rephrased because they are hard to measure, for example, *to make students aware of, or to promote, an interest.*

Topics: This course should tackle 'sustainability achieved in historical times through recycling building materials and other concepts to sustainable building designs from the earliest times to the present'.

9- Principles and Theories of Architecture 1.1: ARC 112.

Aims: again here it is hard to assess/measure the outcome of the aim. Perhaps it should be rephrased into measurable action that can be evaluated in examination.

Skills outcomes total: 4: none related to sustainability.

10- Architectural Technology 1.1: ARC 113: In the 'Knowledge and skills outcomes', 'Familiarity' is not a good term to use. Also no skill is listed for the module, although it is related to architectural technology.

11- Architectural Technology 1.1: ARC114: In the 'Knowledge and skills outcomes' section the concepts can be employed to teach students how the systems in the 19th century achieved some aspects of sustainable architecture.

12- Professional Studies 1.1:ARC116: The course aims should include some sustainability concepts.

Perhaps the topics section could include the design of sustainable buildings. The 'Knowledge and skills outcomes' section includes: 1- At the end of the course students must be able to apply some computer-based tools to design projects. This should be improved to *design projects that embody certain themes, e.g. environmental or non-environmental, and so on*

13- Architectural Design 2.2 ARC 202: The topics of 'interest' are not listed. The description of the module is in general terms only.

14- Environmental Design and Building Services: ARC210. In the Assessment section, the assessment criteria are not clear in terms of the percentage allocated for each task and also the meaning of 'one two-hour paper'.

15- Twentieth Century Architecture: ARC211: The module's aims to build the undergraduates' environmental awareness are not translated into the list of knowledge and skills outcomes.

16- History of The Designed Landscape: TCP840: The course also could invest in teaching the students sustainable urban design concepts. In the aims and topics section, sustainability could be discussed in terms of the recycling of the building materials when they are scarce, and other design procedures that aim at improving the building's internal environment and function. The aims could be translated in the topics section to examples of sustainable buildings from the past.

17- Dissertation Studies: ARC220: In the assessment section, although students are free to choose their topics, the topics should be arranged under a general theme, for example, sustainable architecture, green architecture, and natural building materials.

18- Principles and Theories 3.1: ARC315: In the assessment section, this point should also include 'architectural solutions' in terms of attaining sustainable architectural designs.

19- Dissertation Studies: ARC220: In the aims section: sustainable architecture could be added to the aims of this module.

20- Architectural Theory Seminars: ARC521: In the 'knowledge and skills outcomes', the outline syllabus does not indicate the topics which will be covered in the seminars, or at least its general theme, for example, sustainable architectural design, energy consumption, historical architecture, and so on.

21- Architectural Design 6.1: ARC518: In the aims section, the title of the module is different from the title mentioned in the aims content.

22- Sustainability should be included in the Aims of the module Dissertation in Architecture B: ARC519.

23- Special Topics: Linked Research Project ARC502: In the topics section the emphasis could be placed on certain topics, for example, sustainability and energy consumption.

2.11 Sources of the Kuwait architecture curriculum and future alternatives

The previous sections looked at architectural education within and outside the UK and how it developed through time until it came to be transmitted through formal and informal education channels.

Kuwaiti architecture education started where the others left off, benefiting from their experience, in 1997. The Kuwaiti Department of Architecture was founded after pressure was applied by members of the Kuwait Architecture League on the then Dean of Faculty of Engineering and Petroleum, Dr. Alsanad. The new departmental curriculum was set following an exchange of academic consultation with Texas A&M University, MIT University, King Faisal and King Fahad University in KSA, in collaboration with the National American Architecture Body (NAAB).

The existing Kuwaiti curriculum is taken from the American model without modification, therefore, the forthcoming sections 2.12 and 2.13 will examine the NAAB and Texas A&M syllabi, as they are both interrelated and they have directly influenced the Kuwait University syllabus. Section 2.12 includes a general review of the NAAB syllabus in terms of its application in Kuwait University. The review shows marked lack of sustainability and environmental concepts in the American architecture curricula.

Section 2.14 examines other alternative sources of the curriculum that could potentially be employed within Kuwait University. They include the syllabi of the Architects Accreditation Council of Australia (AACA) and the University of Sydney, as possible comparisons with the Kuwaiti syllabus. The Australian model was initially drawn from the European, but it has been modified, acclimatized and adapted to the local Australian environment. The adaptation of a curriculum to meet local needs is the key issue here, as the main criticism of Kuwait University is that American degree models were used without adaptation. This process of adaptation will be useful, hence the inclusion of the Australian Sydney approach in this thesis. The actual curriculum offered at Sydney University emphasises aspects of environment, sustainability and design and technology. The pedagogy evolved in time until digital technologies and design in virtual environments that are reshaping architectural education and practice were introduced in the early 1990s by Mary Lou Maher. The electronic design introduced went beyond using computer-aided design (CAD) as was in the architecture curriculum, to incorporating virtual design practice in studio teaching. This advance led to moving architecture teaching from a traditional studio setting to a point where students no longer needed to gather in the same space and at the same time to solve the same design problem (Salama and Wilkinson, 2007a). The University of Sydney undergraduates are given an excellent environment and design technology background, but if they want to further their sustainable architecture education, they have the option of joining the Masters Degree programme with its in-depth curriculum.

2.11.1 Review of the NAAB syllabus

American professional education is characterized as university-dominated in comparison with European state-dominated systems or the British practice-dominated system (Stevens, 1998). The National Architecture Accreditation Board (NAAB) is the sole body authorized to accredit US Architecture Professional degree programmes, requiring them to contain general studies, professional studies and electives. In August 2003, the NAAB committee agreed on the need to strengthen NAAB criteria to reflect a commitment to the principles of sustainability within architecture curricula. As a result, NAAB changed its curricular requirements for awarding the Bachelor of Architecture degree, stating that architecture schools have until 2015 to comply with the minimum credit requirements.

The new NAAB Thirteen Conditions of Accreditation for Professional Degree Programmes are as follows (with more details provided wherever environmental issues are covered):

1. Programme Response to the NAAB perspectives;

1.1 Architectural Education and the Academic Context;

1.2 Architectural Education and the Students;

1.3 Architectural Education and Registration;

1.4 Architectural Education and the Profession;

1.5 Architectural Education and Society;

> The programme must demonstrate that it equips its students with an informed understanding of **social and environmental problems** and develops their capacity to address these problems with sound architecture and urban design decisions;

2. Programme Self-Assessment Procedures;
3. Public Information;
4. Social Equity;
5. Studio Culture;
6. Human Resources;
7. Human Resources Development;
8. Physical Resources;
9. Information Resources;
10. Financial Resources;

11. Administrative Structure;
12. Professional Degrees and Curriculum;

> The curricular requirements for the accredited Bachelor of Architecture must include professional studies, general studies, and electives. The accredited programme requires a minimum of 168 semester credit hours, or the quarter-hour equivalent, on each academic course in professional studies and electives. Every existing accredited programme must conform to the above minimum credit hour requirements by 1 January 2015.

13. Student Performance Criteria

In 2004 NAAB altered part of their conditions for accreditation; for example, the requirement that **Profession Studies** should take up to 60% of the course distribution and **General Studies**[16] should take up to 40% of the course distribution were replaced by a new regulation:

Each degree must include a minimum of 45 credits of coursework with no architectural content or the quarter hour equivalent, see Table 2.5.

Table 2.5 The minimum credit distribution for General Studies, Professional Studies and Electives

General Studies	Professional Studies
Courses other than Architecture content	Courses with Architecture content
Electives other than Architecture content	Electives with Architecture content
45 Semester Credit hour OR the quarter-hour equivalent	The required courses that satisfy NAAB Student Performance Criteria

According to NAAB, the Student Performance Criteria (SPC) must demonstrate two levels of achievement: *Understanding* and *Ability*. The two levels are intended to help the accredited degree programmes in preparing their learners for their future professions, while encouraging educational practices that are suitable for the individual degree programme. In 2004 NAAB abandoned a third level, Awareness, and reduced the Student Performance Criteria from 37 to 34 to eliminate any repetition and reinforce their aims[17].

[16] General Studies include: (non architecture studies) Arts, Humanities, and Sciences.
[17] For more details see: http://www.naab.org/newsletter1727/newsletter_show.htm?doc_id=281518

The following list displays the Student Performance Criteria for obtaining the Bachelor of Architecture degree covered within the two levels, with elaboration on the areas linked to sustainability:

1. **Speaking and Writing Skills;**
2. **Critical Thinking Skills;**
3. **Graphics Skills;**
4. **Research Skills;**
5. **Formal Ordering Systems;**
6. **Fundamental Design Skills;**
7. **Collaborative Skills.**
8. **Western Traditions** *Understanding* of the Western architecture canons and traditions in architecture, landscape and urban design, as well as the climatic, technological, socioeconomic, and other cultural factors that have shaped and sustained them.
9. **Non-Western Traditions**: *Understanding* of parallel and divergent canons and traditions of architecture and urban design in the non-Western world.
10. **National and Regional Traditions**
11. **Use of Precedents**
12. **Human Behaviour** *Understanding* of the theories and methods of inquiry that seek to clarify the relationship between human behaviour and the physical environment.
13. **Human Diversity**
14. **Accessibility**
15. **Sustainable Design**: *A new criterion added by the NAAB to SPC.* It entails '*Understanding of* the principles of sustainability in making architecture and urban design decisions that conserve natural and built resources, including culturally important buildings and sites, and in the creation of healthful buildings and communities.' [18]
16. **Programme Preparation**
17. **Site Conditions**
18. **Structural Systems**: *Understanding* of principles of structural behaviour in withstanding gravity and lateral forces and the evolution, range, and appropriate application of contemporary structural systems.
19. **Environmental Systems** '*Understanding* of the basic principles and appropriate application and performance of environmental systems, including acoustical, lighting, and climate modification systems and energy use, integrated with the building envelope.
20. **Life Safety**

[18] Source: http://www.naab.org/usr_doc/2004_CONDITIONS.pdf

21. **Building Envelope Systems**: *Understanding* of the basic principles and appropriate application and performance of building envelope materials and assemblies.
22. **Building Service Systems**: *Understanding* of the basic principles and appropriate application and performance of plumbing, electrical, vertical transportation, communication, security, and fire protection systems.
23. **Building Systems Integration**: A*bility* to assess, select, and conceptually integrate structural systems, building envelope systems, environmental systems, life-safety systems, and building service systems into building design.
24. **Building Materials and Assemblies**: *Understanding* of the basic principles and appropriate application and performance of construction materials, products, components, and assemblies, including their environmental impact & reuse'
25. **Construction Cost Control**: *Understanding* of the fundamentals of building cost, life-cycle cost, and construction estimating.
26. **Technical Documentation**

27. **Client Role in Architecture**: *a new criterion added to SPC.*

28. **Comprehensive Design**: *Ability* to produce a comprehensive architectural project based on a building programme and site that includes development of programmed spaces, demonstrating an understanding of structural and environmental systems, building envelope systems, life-safety provisions, wall sections and building assemblies and the principles of sustainability.
29. **Architect's Administrative Roles**

30. **Architectural Practice**

31. **Professional Development**

32. **Leadership**

33. **Legal Responsibilities** *Understanding* of the architect's responsibility as determined by registration law, building codes and regulations, professional service contracts, zoning and subdivision ordinance, environmental regulations, historic preservation laws, and accessibility laws.
34. **Ethics and Professional Judgment**

The NAAB[19] performance criteria displayed above (1-34) demonstrate that it places less emphasis on environmental aspects in general and sustainable architecture in particular. Out of the 34 points listed above only thirteen comply with environmental issues, although the majority are indirectly related to environmental education. Changes made by the NAAB to Student Performance Criteria include adding the following phrases:

1- 'appropriate application and performance' to four of the 34 criteria;

[19] See NAAB homepage: http://www.naab.org (last accessed 18/09/'07)

2- 'trends that affect practice, such as globalisation, outsourcing, project delivery, expanding practice settings, diversity, and others' has been added to the Professional Practice criterion; and
3- 'Issues of growth, development, and aesthetics in their communities' have been added to the Leadership criterion.

Each architecture school must provide NAAB with a matrix cross-referencing the performance criteria with each required course, including evidence of achievement.

By comparing Kuwait University's Bachelor of Architecture syllabus with the NAAB undergraduate requirements (1-34), it is not clear how understanding or employing sustainable design is translated to the Kuwait University syllabus since its main focus is mainly on architectural design and Humanities rather than Sustainable Architecture. Because Kuwait University Department of Architecture took guidance from the University of Texas A&M prior to starting its programme in 1997, a review of the Texas A&M University syllabus is conducted in section 2.11.1 in terms of the sustainability concepts featured, as well as other aspects of the curriculum and the syllabus.

2.11.2 University of Texas A&M College of Architecture, B.Arch.

The University of Texas A&M is ranked at 77 within the Global University ranking scheme (Exclusive, 2006). The Bachelor of Architecture programme entitled *Environmental Design* provides a foundation in general learning, along with knowledge and skills necessary to understand the built and virtual environments. All Environmental Design degree students follow a common two-year curriculum with a lower-level classification (ENDS[20]). Enrolment in junior and senior level courses is limited to those who have been admitted to upper-level studies with ENDS classification. Students who are admitted to upper-level studies select one of the two options offered in the College of Architecture, where admission within each option may be limited by enrolment restrictions.

[20] ENDS: Environmental Design.

Students interested in professional registration are required to attend an NAAB accredited Master of Architecture programme in addition to the four-year undergraduate Bachelor of Environmental Design degree. This criterion is not in fact employed in Kuwait University.

University of Texas A&M Department of Architecture offers two programmes for obtaining a Bachelor's Degree of Architecture:

1- **Environmental Design**: teaches design that envisions, plans and develops built and visual environments and to manage how people interact with their environment; and

2- **Construction Science**: focuses mainly on construction aspects, for example, building construction, or road and bridge construction, to enable the graduates to work for general contractors and developers.

However, there are many unclear issues in the Bachelor of Environmental Design programme. For example, the title of the programme is not reflected in the curriculum content of Environmental Design displayed on the university's homepage[21] (*see* Table 2 in Appendix 4). The difficulty is that the word 'environment' can have many interpretations. Table (2.6) features undergraduate courses that include environmental concepts in the curriculum of BA Architecture Environmental Design:

[21] Source: http://archone.tamu.edu/architecture/undergrad/undergrad.html (last accessed 18/09/'07)

Table 2.6 Environmental concepts within University of Texas A&M Department of Architecture degree

Course Title	Environmental/ Sustainability education Concepts Included
101. (ARCH 1311) Design Process	Fundamentals of design processes including issues and theories relevant to design resolution and creative thinking processes, from formulating new ideas through incubation to final product, and future impact on the physical environment and society.
102. Design Foundations I-- Lecture	Fundamental design processes, issues and theories relevant to design resolution by disciplines in the environmental design professions; the act of designing, its purpose, method and impact on the physical environment and society; creative thought processes from the formation of ideas through incubation to final product; intuition, systems theory and creation of hybrids. Prerequisite: classification in environmental design, construction science or landscape architecture.
103. Design Foundations II-- Lecture	Fundamental design processes, issues and theories relevant to design disciplines in the environmental design professions; critical thinking through systematic processes; physical, human and cultural factors as influences for the arts and environment.
105. (ARCH 1403) Design Foundations I	Visual and functional design principles; development of skills in perception, thought and craft as they apply to the formation of two- and three-dimensional relationships; design attitudes and environmental awareness. Prerequisite: Classification in environmental design, construction science or landscape architecture.
233. Environmental Systems I	Theory and applications of building energy use, envelope design, shading analysis, heating and cooling systems, lighting design and construction materials; design opportunities, calculations, equipment selection and component sizing as they relate to design.
301. Field Studies in Design Innovation	Design innovation in international and domestic environments away from the Texas A&M University campus; emphasis on the cultural, social, economic, geographical, climatic and technological factors influencing design solutions for human needs. May be taken up to two times in the same semester.
310. Site Planning and Design	An introduction to the history, theory and materials of site design that lead to environmentally sound development decisions based on a property's assets and limitations, balancing environmental sustainability with human well-being and the consequences of development; problem solving processes encompassing environmental, engineering, cultural and economic forms of analysis.
421. Energy Conservation in Residential Architecture	Analyze energy use for sustainability in architecture; energy and Leadership in Energy and Environmental Design (LEED) audits, computer simulations of design impact using solar, low-energy and passive energy; include LEED rating analysis. Prepare for LEED rating.

Through a review of the graduate courses offered by the College of Architecture[22] in Texas A&M University it becomes obvious that more environmental courses (modules) are offered at a graduate level, although the

[22] Source: http://archone.tamu.edu/arch/courses/courses.html (last accessed 01/ 2008)

term 'sustainability' was not actually used. Only six courses out of the twenty-seven offered were directly or indirectly related to the environment (see Table 2.6). Much is needed to develop the syllabus of the University of Texas A&M Department of Architecture in the College of Architecture. The course titles may contain the term 'environment', but this does not necessarily mean they contain environmentally related concepts within their learning schemes. For example, the focus of the Environmental Design degree is on design. The course ARCH 642 Data Processing in Environmental Design is actually about using the computer as a mapping device to display graphically spatially-related data, and the course ARCH 657 Professional Practice includes concepts of business and the legal environment, but in fact it does not cover sustainability concepts.

According to Texas A&M's Accreditation Programme Report (2003), the BA Architecture programme's compliance with NAAB conditions for accreditation is demonstrated in eleven criteria with sub-criteria, summarized in Appendix 5. Although the Texas A&M criteria respond to NAAB accreditation conditions, there is no solid evidence that they responds to the international vision of sustainable education since tackling sustainable issues is left to their academics' interests rather than prescription.

2.12 NAAB generated architectural education- KU

Academics in the Department of Architecture in Kuwait University employed NAAB syllabus guidelines when they established their own syllabus. Taking in NAAB's syllabus also involved making some alterations to it to fit the requirements of graduation and of course duration in Kuwait University. The modification of the syllabus is very much expected to affect the teaching outcomes and levels of readiness of the graduates.

The architecture curriculum has been designed to achieve the following Objectives:

1- Certify architects through an architectural programme that emphasises Islamic and local culture, history, and the environment of the region;

2- Develop a curriculum that is not only diverse, but also well balanced in the humanities and scientific fields that relate to architecture, in order to produce architects who serve Kuwaiti society and the region in general and
3- Motivate students and develop communication capabilities to enhance the role of the architect in Kuwaiti society.

2.12.1 Environmental concepts in the KU syllabus

A search for a student handbook on course modules found a 'measure sheet' that is handed to those students admitted to the Department of Architecture in Kuwait University (*see* Table 3 in Appendix 6). All undergraduates of the Faculty of Engineering share the same modules in their first year regardless of their majors, and in their second year they choose their major according to their preferences. Admission to the Department of Architecture is based entirely on the students' choices and high school results rather than interviews conducted with them (an approach that is used in many universities around the world).
The contents of the modules at course levels 200-400 are summarized on the Faculty of Engineering's homepage[23].
The courses were scanned in terms of their environmental concepts, especially sustainability. The results of the review are listed in Appendix 6.

2.12.2 Notes on environmental concepts in the courses content at KU

From Table 3 in Appendix 6 it is clear that teaching methods range from lectures and seminars, to laboratory design and use of IT through CAD training. Also, the environmental concepts taught in KU are taught using technical terms used in the construction environment such as *micro* and *macro-environment*. These terms refer to living conditions created by heat, light and acoustics, rather than to achieving sustainable architectural design and construction. Although the environmental concepts are listed, there is no indication of how sustainability concepts will be taught in the courses. The table does not explain the practical applications of environmental and sustainability concepts within the classroom or the design studio.

[23]See: http://www.eng.kuniv.edu/architecture/ (last accessed on 2nd October 2007).

Besides the general environmental terms used, the courses do not include designing sustainable buildings with efficient energy use, or the use of solar energy, or futuristic sustainable building design to train undergraduates for their future professional roles. Finally, there is no indication of how students may be taught to use technology in creating sustainable building designs and construction.

2.13 A comparison between the syllabi (course content) of the SAPL and KU

The following subsections 2.13.1, 2.13.2, and 2.13.3 include a general comparison of the syllabus content of both universities in terms of the total course credit, the course titles, sequence of the courses, and categories of the courses (i.e. technology, humanities, and design). The comparison is displayed in Table 4 in Appendix 7.

2.13.1Total semester credit hours for both Newcastle and Kuwait Universities

It is hard to make a direct comparison between Kuwait University and SAPL total semester credit hours as the credit weighting values of British system is different from the Kuwaiti credit system weighting and they belong to totally different criteria. The two systems need to be converted into readable and comparable numbers that will enable the comparing process. Therefore the following points a, and b attempt to carry out the process.

a- The SAPL, Newcastle University

1- Total semester credits for the degree of BA Architecture at SAPL = 600 credits

2- Total semester hours for the degree of BA Architecture at SAPL = 6000 hours

3- Students' workload varies from one module to another, for example, ARC116 requires the students to complete 63 assignments, whilst ARC112 require 60 assignments from them and ARC202 demands 92 hours of private study, 16 hours of fieldwork and 3 hours of feedback.

b- KU Department of Architecture

1- Total semester credits for the degree of BA Architecture KU = 166 credits

2- Total number of weeks/semester = 16 weeks

3- Total number of weeks= 16 week x 2 semesters x 5 years = 160 weeks

4- Calculating the total teaching hours for each course does not always depend on the credits allocated for the course, but rather the total number of hours allocated for the course by the department's courses coordinator. Hours/credits depend on the nature of each course and department. For example, the elective course (0690-182 Art and Artists: Introduction to Theory and Practice in Visual Art) is allocated 3 credits and given 7 hours of teaching/week, whilst the compulsory Building Systems which is allocated 3 credits is taught 3 hours/week, and the compulsory general course (0410-101 Calculus) is given 3 hours of teaching and 3 hours of tutorial/week.

3- Total semester hours for the degree of BA Architecture KU = 166 credit x hours/credit X 16 weeks = 5666 distributed as shown in Table (2.7).

Table 2.7 Total teaching hours in Kuwait University

No	Course Type	Total Credits Allocated	Total Teaching Hours
1	Compulsory General Courses	16	352
2	Compulsory Architectural Courses	84	2016
3	Elective Architectural Courses	33	1714
4	Elective Liberal Arts Courses	33	1584
	Total	166	5666

4- The elective architectural courses include Architectural Professional Training that is allocated only 3 credits and it entails 200 hours of training and 10 hours of laboratory work.

5- Tutors expect their students to undertake private study whose duration must at least equal the time spent in the studio.

2.13.2 Professional experience in the SAPL and KU

a. For SAPL, after completing the Bachelor's degree programme, students usually spend a year in practice working as an architectural assistant, either in Britain or abroad, in order to gain the certificate in architectural practice. This

certificate also requires them to attend several short courses at the university and self-study assignments. To obtain a BA with Honours from SAPL, undergraduates are obliged to complete a total of two years' work experience.

b. Kuwait University places little emphasis on undergraduates' professional development, requesting only that they participate in professional practice during the summer course, working for any architectural firm that agrees to collaborate with the Department of Architecture, for a period of six weeks.

2.13.3 General notes on the KU and SAPL syllabi

By examining the syllabus of KU displayed in section 2.12.4, the following points have arisen:

First: total semester credit hours for the Bachelor of Architecture degree = 166 credits, of which:

a) 16 credits of compulsory general courses = 9.638%

b) 84 credits of compulsory architectural courses = 50.602%

c) 33 credits of elective architectural courses = 19.879%

d) 33 credits of elective liberal studies courses = 19.879%

Second: the syllabus places more emphasis on humanities and liberal arts courses than science and technology.

Third: Section 2.13.3 shows that, in comparison with SAPL, the KU syllabus contains more elective courses. Those electives are mostly from Arts and Humanities fields, and while they contribute to the learning process, perhaps replacing half of the credit hours of electives from Art and Humanity with other electives from Science and Technology might be useful in building the undergraduates' professional background. This might enrich the syllabus with concepts relevant to architectural technology design, or sustainable construction methods. This choice of Humanities and Arts could be useful in the students' learning process, in terms of developing their architecture background, but it is not contributing to the development of their sustainability background. This research aims to look at the environmental concepts taught in both universities, and finds that in the SAPL syllabus there is a declared and

compulsory choice of sustainability courses, while this forms a weak point in the Kuwaiti syllabus. The large number of humanities elective courses within the Kuwaiti syllabus, in comparison with science and technology elective courses embedded in the KU syllabus, will lead by and large to students choosing more humanities courses than sustainability courses.

The curriculum of Kuwait University's Department of Architecture is derived from the University of Texas A&M Bachelor's degree programme, as displayed in subsection 2.12. As demonstrated in subsection 2.12, the original US curriculum places little emphasis on sustainable architecture education. Consequently, perhaps investigating other Bachelor of Architecture degree programmes from different universities will help in finding the best alternatives for developing Kuwait University's curriculum.

Section 2.14 will outline architecture education in Australia starting with the Architects Accreditation Council of Australia, AACA. It will be followed by a display of the curriculum of the University of Sydney. This will generate a discussion around the possibility that KU adopts part of the Australian programme when developing its curriculum. The reason behind choosing the Australian educational system is because it enjoys an international reputation for a well-established curriculum focusing on science and technology aspects.

2.14 Review of AACA and University of Sydney syllabi

The previous sections have outlined the syllabi offered in SAPL, Kuwait University, and Texas A&M University, as well as the NAAB and RIBA syllabi. The SAPL syllabus was used because sustainability is well-integrated into its design teaching programme. Sustainability was not considered as a bolt-on extra but very much as a main and integral part of the education of an architectural student. To explore other philosophies of teaching, the curriculum set by the Australian system will be examined, as it is recognised internationally for being well established scientifically and technologically. The purpose of this research is to determine the level of environmental teaching declared in the curriculum, therefore the dislocation of theory and practice is clearly unadvisable.

AACA was established in 1974 as the sole national organisation responsible for establishing, coordinating, and advocating national standards for the registration of architects in Australia and for the recognition of Australian architects overseas by the relevant registration authorities. It coordinates the accreditation of Australian and Overseas Architecture qualifications (*see* the AACA homepage[24]).

The AACA set the performance criteria framework for validating graduate programmes, which consists of three main criteria: *Design Integration*, *Knowledge*, and *Skills*. Each criterion has its own components. The Knowledge criterion includes *History and Theory Studies*, *Design Studies*, *Environmental Studies, User Studies, Technical Studies,* and *Implementation Studies* as a component with the following subcomponents:

i) An ability to inform action through knowledge of natural systems and built environment;
ii) An understanding of issues of ecological sustainability and design for reduction of energy use and environmental impact;
iii) An understanding of the history and practice of urban design and issues of city planning;
iv) An understanding of passive systems for thermal comfort, lighting and acoustics and their relationship to active systems;
v) An awareness of the cultural and spiritual dimension of place;
vi) An awareness of issues of national and regional planning and their relationship to global and local demography and resources;
vii) An awareness of landscape design and management of natural systems.
The *Technical Studies* criterion includes eight subcomponents, of which the following is related to the environment:
v) An understanding of active services systems for thermal comfort, lighting and acoustics and their relationship to natural systems.

2.14.1 University of Sydney- Australia

The University of Sydney is the first university in Australia and was founded in 1850. It enjoys an outstanding teaching reputation and recognition as a centre

[24] AACA home page; http://www.aaca.org.au/index.html (last accessed on January 2008)

of research excellence and was ranked in the top 50 Global universities in 2006.[25] The University's Faculty of Architecture, Design and Planning was founded in 1919 and The Department of Architecture and Design Sciences was established in 1954. The University of Sydney programme of Undergraduate Professional Architecture varies in several respects from the Texas A&M university programme.[26]

2.14.1.1 University of Sydney Bachelor of Architecture degree syllabus

The academic staff introduced courses from related allied disciplines in neural network analysis, accounting, photorealism and loudspeaker design (Stevens, 1998). A content analysis of the 2007 Architecture Handbook for The University of Sydney published online[27] shows that many sustainability concepts are embedded within the courses of the Bachelor of Architecture degree syllabus, including social sustainability (see Table 5 in Appendix 8 for a brief description of the courses).

Graduates wishing to specialize in **Sustainable design** are required to enroll on a postgraduate diploma or Masters Degree as shown in Table 2.8.

Table 2.8 Courses required for a Postgraduate Degree in Sustainable Design at University of Sydney

Sustainable Design Stream		
Unit of Study		Credit points
	Semester 1	
DESC9145	Sustaining the Built Environment	6
DESC9146	Climate, Comfort & Sustainable Design	6
	Option	6
	Option/elective	6
	Semester 2	
DESC9145	Sustainable Building Design Principles	6
DESC9145	Sustainable Building Design Practice	6
	Option	6
	Option/elective	6

[25] See Newsweek International Magazine: http://www.newsweek.com/ (last accessed 18/09/'07)
[26] http://www.arch.usyd.edu.au/about/
[27] www.usyd.edu.au/handbooks

The undergraduate courses of the University of Sydney's Programme for the Bachelor's Degree of Architecture are shown in (Appendix 6) and Table 2.8 presents a course description list for the Postgraduate Degree in Sustainable Design which deals with the importance of teaching sustainability concepts to architectural undergraduates, with emphasis placed on design and technology. The embedded concepts within the courses are a good example of applying integrated sustainable architecture instruction that promotes better understanding and practice among the university's graduates.

2.14.1.2 The exchange programme

Unlike Kuwait University, the University of Sydney offers its undergraduates the opportunity to study part of their degree overseas through the Student Exchange Programme, organised in collaboration with over 150 exchange partners in 28 countries for over 21 years. The exchange programme provides the undergraduates with the opportunity to build their personal skills, their experience with the outer world and their career prospects while learning. Once the students pass special designated units[28] of study successfully, a result 'R' will be recorded in their transcript that signifies 'Satisfied Requirements'. For the Bachelor of Architecture exchange, all students must complete the final semester at the University of Sydney.

The exchange units for the *Bachelor of Design Computing* include the following:

- *Year 2 core units of study include*: Exchange Collaborative Virtual Environments, Exchange Design Programming, Exchange Sound Design and Sonification, and Exchange Generative Design System. Each carries 6 credit points[29].
- *Year 2 elective units of study include*: Design Computing Exchange Elective 2A, 2B, 2C, 2D, 2E and 2F. Each carries 6 credit points.
- *Year 3 core units of study*: Exchange Design Computing Studio (12 credit points).
- *Year 3 elective units of study include:* Design Computing Exchange Elective 3A, 3B and 3C with each carrying 6 credit points.

[28] Unit of study: a term used by The University of Sydney to describe both a course leading to a diploma or Bachelor's degree and a student enrolled on such a course.

[29] Credit point or Units are the value or weighting provided by each course towards completion of the total programme requirements.

Exchange units of *Bachelor of Architecture* include the following:
- For core units of study: Architecture Exchange Studio A & C, and History/ Theory Core Exchange. Each of the units carries 6 credit points.
- For Elective units of study: Architecture Exchange Elective A, B, C and D. Each of the units carries 6 credit points.

Both American and Australian universities share some academic specifications for their Bachelor Degree Programmes that do not exist in the Kuwait University curriculum. Kuwait University should consider advancing its current curriculum to meet at least the minimum international competencies required for gaining the Bachelor's Degree of Architecture.

2.15 Summary and Conclusion

Chapter 2 has displayed the theoretical background of the history of the development of architecture, architectural education and sustainable architecture education and the issues related to them. It has explained the meaning of education and how the curriculum is perceived by the public as the content of textbooks or equivalent to the syllabus rather than its full significance, that is, the sum of teaching tools, books contents, school buildings, the syllabus and other areas related to the education process.

Furthermore, Chapter 2 has shown how architectural knowledge was passed from one generation to another by word of mouth, and then through apprenticeship, and later through pupilage, until it was formalized in educational (Higher Education) institutes as well as transmission through the informal education system, as part of CPD programs. Because environmental architecture gained new scope as a result of global environmental awareness, architectural education took a new turn. Schools of architecture were founded first in Europe, and later in the UK. As an isolated island, the UK was the last European country to incorporate architectural education in its academic system.

Chapter 2 also looked at the architecture curriculum in different systems around the world: NAAB in the US, RIBA in Britain, and AACA in Australia, and the effect of these architecture bodies on the curriculum of the University of Texas

A&M, the University of Newcastle (UK), the University of Sydney and the University of Kuwait.

Kuwait introduced architectural education at the end of the last century, later than other Gulf countries, although the Kuwait Architecture League was founded in the mid-1950s. By examining the curricula of both the SAPL and KU in terms of the sources of the curriculum and the syllabus content it appears that there are major differences between the two systems that echo the outcomes of their curricula in many ways. It is clear that both university systems include environmental concepts in their syllabi. When comparing the total credit hours and professional experience components, it is obvious that Kuwait University's curriculum offers fewer total credit hours, and less professional experience in comparison to those required by the SAPL. Also, the comparison illustrates that the SAPL syllabus contains more science and technology related courses, whilst the KU syllabus contains more arts and humanities courses. Therefore, it is necessary to reinforce the observation of significant weak points in both universities' curricula and especially the KU programme for the Bachelor of Architecture degree. Academics in Kuwait University and their administration should re-examine their existing programme and decide what outcomes they want to derive from the programme to respond to the international sustainable development requirements. To achieve this goal, they should review all aspects of their existing curriculum including the syllabus, text books and teaching methods, and equip the department with the appropriately qualified staff to foster improvements in their teaching methods using information technology. The University of Sydney curriculum is recognized for its well designed curriculum, combining environmental concepts with design technology, rendering it excellent to adopt as a global model.

To conclude this section, it is acknowledged that architecture is changing rapidly, leading to the development of architectural education by governmental bodies, such as validation bodies, which equips graduates with the experience and knowledge that enables them to serve their profession. Different countries around the world follow different architecture pedagogical themes guided by architectural organisations, the political situation, university policy or other parties, depending on their strategies.

Chapter 3

Interview Research Methodology and Results

3.1 Introduction

Chapter 3 aims to discuss the methodology used while conducting the research in terms of its advantages and its limitations. The methods used in the study included surveys, interviews, content analysis, case studies and observation. The use of a mixed methods approach is presented and justified, along with the triangulation approach applied to obtain and analyse the results, with the aim of emphasising the findings' validity and reliability.

Furthermore the chapter includes a brief description of the pilot studies at the preliminary stage of the research and of the data analysis tools applied to the quantitative and qualitative data.

Because of the enormous amount of quantitative and qualitative data collected in the course of the study, these are displayed in Chapter 3 using graphs, tables and charts, to provide a concise description. The data displayed relate to the three main interviewee categories: undergraduates, academics and stake holders – the latter including end users, architects, government officials and experts. Discussion will take place in the next chapter of the data and initial analysis provided in this chapter. The discussion covers all aspects of the findings, and the interrelationships between all the factors of sustainable architecture educational and legislation across the social spectrum.

3.2 General Methodology

The process of collecting and analyzing the information about Kuwait and the UK was systematic and carefully conducted in order to assemble answers for the questions raised at the beginning of the research. Hakim (2000a) recommended that research design should include imaginative, creative, innovative elements that cannot be taught or planned.

The research methodology adopted was designed to accumulate knowledge in an academic way, avoiding dependence on personal experience, which might

lead to generalizations, uncertainties or a disregard for the complexity of factors that operated at the time of observation and thus display bias. Verma and Beard (1981) warned that research in the social sciences is more difficult than natural sciences because of the complexity of human behaviour which makes it hard to predict in comparison with events in the physical sciences.

Usher (1997) defined methodology as the frame through which the researchers design their study, defining a general approach to the topic in which they are interested. According to Cohen *et al.* (2000) by methods, we mean the range of approaches used in educational research to gather data (research material) which are to be used as a basis for inference and interpretation that inform explanation and prediction.

This research methodology employed four ways of using quantitative methods in educational research listed by Muijs (2004). In this research the data is used to determine the levels of sustainability awareness of Kuwaiti undergraduates, academics and end users. The data collected from them can be conceived as the *variables* (ibid: 8). Using survey questionnaires, the variables varied between *Dichotomous variables* that have only two categories (Yes/No) and *Polytomous variables* that can be divided into more than two categories, (for example, strongly favourable, favourable, unfavourable, strongly unfavourable). It was initially considered possible to design the sampling for the quantitative survey component of this research according to a standard concept of sampling that involves taking a portion of the population, making observations on this smaller group and then generalizing the findings to the large population. This would be achieved using a simple random sampling method in which:
1- Each member of the population has an equal chance of being selected in the sample in an unbiased way; and
2- The selection of one subject is independent of the selection of any other because the sample is drawn at random from the population.

Instead of this approach, *population sampling* was selected in this research. It is a technique or a process through which a group of representative individuals is selected from a population to generate data which can be statistically analysed,

the results of which can be used to make generalizations about a larger population. The term population refers to the category of people (or animals or objects) about whom the researcher intends to write their report and from which they plan to draw their sample (Davies, 2007: 55). Population sampling enabled the researcher to decide in advance which types of people are needed for the survey and how many of each type and then set about finding them with a sample size large enough to represent all the characteristics of the larger group (Moore, 2000).

Czaja and Blair (1995) stress the importance of obtaining a large sample size for better results and to reduce possible sources of error and increase accuracy, whilst Muijs (2004) explains how response rates affect the size of the final sample. In this research a simple random sample was taken as part of the methodology. In this method every member of the population had an equal chance of being included and every possible combination of individuals from within the 'population' is equally likely. For the procedure, a list of names of the population is obtained forming the sampling frame. Each name is given a number from 001 to 500. To pick 50 out of the 500 to create the sample population one of two ways is used; either by shuffling pieces of papers with their names and drawing them in a raffle or accessing a set of random numbers from MS Excel and opening a Workbook. Then in the formula bar (fx) at the head of the screen, enter the formula: RANDO ()*200 and you will obtain the names by hitting function key F9 (Davies, 2007: 58-59).

The survey questions were designed to include both types of questions: *closed questions* in which respondents had to choose from a limited number of options in a multiple-choice form. Also they contained two to three *open ended questions* where the respondents had to formulate answers using their own words. The survey questions were custom-built to the specifications of this research with the purpose of obtaining information in a structured format that could be answered without the support of the interviewer. The questionnaire survey designed for both the undergraduates and the end users was piloted in the preliminary stage of the research. Bell (2005) explained the benefits of undertaking a pilot study: to test how long it takes recipients to complete the survey, to check that all the questions and instructions are clear and enable the

removal of any items which do not yield usable data. Converse and Presser (1986) noted that to succeed, the questionnaire must involve successive trials that consider two stages: exploration and pre-testing.

However, questionnaires have their own limitations which include:

1- They require a considerable input of time to design and pre-test before they can be applied;
2- The sample population size should be large enough to deem the results representative and reliable; and
3- The participants might selectively respond to questions if unsupervised by the researcher.

Therefore, it is recommended, for a questionnaire to succeed, to be designed as follows:

1- It should include relatively short questions, so that they be easily understood and completed;

2- After distribution, the questionnaire should be followed up by appeals to participants to fill out and return the questionnaire within a reasonable time period; and

3- Offering incentives for returning the questionnaires is always a good strategy to increase the participation rate, either by a financial reward, prizes or even sometimes promising to send the survey results to participants if they are interested in them.

However, in this research the limitations of quantitative methodology research were looked at and recognized as a potential drawback to the results. Muijs (2004: 46) listed four limitations of the questionnaire research methods as follows:

1- Qualitative research cannot be used in developing a hypothesis or a theory; variables are limited in a quantitative study in comparison with a qualitative in-depth study in which unexpected variables may emerge, while quantitative methods are better at looking at causality; qualitative methods are suited to looking at the meaning of particular events or circumstances;

2- Surveys do not allow the researcher to control the environment and therefore are less suited to answering questions of causality than experimental designs;

3- Surveys are difficult to use for a deeper understanding of the process and contextual differences, in particular, standardized questionnaires that provide limited length responses; and
4- They are not always reliable in terms of monitoring respondents' self-reports.

It is advisable that the researchers collect data on as many variables as possible using longitudinal designs and careful statistical modelling, as well as a combination of survey and qualitative methods to overcome these limitations. Therefore, to overcome the quantitative research methodology deficiencies, there was no alternative other than to take on board qualitative approaches. Hitchcock and Hughes (1995) reported that qualitative research methodology entails starting the research with a general problem or idea and gathering information about it. It places individual actors at its centre as it focuses on context, meaning, culture, history and biography. Hakim (2000b) asserted that unlike quantitative methodology, qualitative methods gather data from small samples and are concerned with the individual's account of their attitudes, motivations and behaviour. Burns (2000) reported that in qualitative research the hypotheses are tested through a deductive approach while the use of quantitative data permits statistical analysis. Qualitative methods provide answers which have a much firmer basis than the lay person's common sense or intuitive opinion.

In this research investigation, the qualitative research methods used include content analysis, case studies, interviews and observation. Content analysis entails searching through one or more communications to answer questions that the investigator brings to the research. Silverman (2004) adds that content analysis is a further method of collecting data from written or printed documents such as files, records, letters, images and books, extending to audio and recordings, photographs, motion-picture films, and video recordings. The words and phrases are analyzed in their frequency, composition and range of meaning. The researcher then classifies the analyzed content into categories that are counted in terms of the number of instances in which they appear.

A *case study* is expected to catch the complexity of a single case. Usually the cases of interest in education and social services are people and programmes, for both their uniqueness and commonality (Stake, 1995). The *case study* is a specific instance that is frequently designed to illustrate a more general principle. It is the study of an instance in action. Case studies can establish cause and effect; indeed one of their strengths is that they observe effects in real contexts, recognizing that context is a powerful determinant of both causes and effects. Case studies investigate and report the complex dynamic and unfolding interactions of events, human relationships and other factors in a unique instance. Case studies are distinguished less by the methodologies that they employ than by the subjects/objects of their enquiry, with a strong resonance between the case and interpretive methodologies (Hitchcock and Hughes, 1995). The real business of the case study is particularization, not generalization, since a particular case is dealt with in a unique way to gain a comprehensive understanding of it, and it is not compared with other cases (Stake, 1995).

Interviews are usually conducted orally by the researcher. There are four popular interviewing strategies: the *loose-question* is used to elicit respondents' interpretation of a very general query: the *tight-question* is designed to discover respondents' preferences among a limited number of options*; the converging-question* (funnel strategy) is used to incorporate the advantages of both loose and tight methods where the interview is started with open-ended questions followed by more sharply pointed questions, and there is, finally, the *response-guided* approach when the interview begins with prepared questions followed by spontaneously created questions on the basis of the answers given (Thomas, 2003). Stake (1995) claims that interviews provide the interviewers with information they cannot otherwise observe. Interviewing many individuals will provide a multiple view of descriptions and interpretations of the case under research; therefore, it is important to ask the right questions in order to get the best results to get the required information (Bainbridge, 1992). It takes skill and imagination to find the right person to ask.

The *advantages of interviewing* include using the information collected by means of interviews based on printed questionnaires. Interviews provide the researcher with greater information that is more flexible than is possible in self-completed questionnaires and the opportunity for the respondent to ask for unclear questions to be explained or even to elaborate on their answers.

In comparison with observation, interviews provide the researcher with more concrete information about people's knowledge, personal backgrounds, and opinions. The *problems of interviewing* stem from the way the interview is recorded as it proceeds. Some interviewees might get cautious during audio/ or audio visual recording although those means of recording are accurate in delivering data whenever the questions touch on matters that interviewees find personally sensitive. For that reason some researchers might switch to taking notes during the interview, but this again might cause irritation in the interviewee. Relying on memory in writing interview notes might yield inaccurate notes as it depends on how much of the information can be retrieved. Interviews require a great deal of time in meeting each interviewee separately, and segments of the conservation may be of no value to the research project (Thomas, 2003). Bainbridge (1992) explains that interview bias can include *contagion bias,* which is the tendency of the data to be infected by the views of the interviewers.

All interviews in this research were semi structured with a brief oral introduction about the nature of the research being undertaken. All bar one interview were recorded. The interviews are summarized in Table (3.1) as follows:

Table 3.1 Key figures interviewed during field work

Status of key figure	No.	Place of work
Recent KU graduate	2	Private sector
KU Academic Teaching Staff	6	Kuwait University, Department of Architecture
Design Professional	8	Kuwait
Agha Khan Architecture Expert	1	USA
Education Expert	1	Kuwait

According to Heyl (1979, cited in Bainbridge, 1992: 4) there are three methods of evaluating the material from one interview in the light of other information:
1- *Internal consistency* is a test of the reliability of information provided by an informant, focusing on whether data obtained at different times agree with each other; that is, if the same event arises in two interviews that were conducted in the past.
2- *External corroboration* is information that is supportive of claims made by the informant, obtained elsewhere than the informant, for example, from other people.
3- *Triangulation* is a method of checking the validity of data by employing different perspectives concerning it. This takes place by comparing the perspectives of a few people, or a few alternative sources of information, about a certain event. Triangulation will be discussed in greater detail later in this section.

Conversation analysis is the study of spoken interaction attempting to describe the structure and the sequential patterns of interaction, for example in schools and other organisations.

Observational study is structured in the same way as a survey study with one difference; it is built on observed rather than elicited data. Thomas (2003) noted that the observational study is variable and flexible, and can easily be generalized to other real-life settings since it was originally performed in natural settings away from any experimental situation. Usually the descriptive observation record will include writing down everything relevant that is happening during the observed session.

The disadvantages of qualitative methods depend on the type of methodology adopted. For example *in-depth interviews* and *focus group* discussion require a relatively small budget, but might entail considerable expense when employed in a longitudinal study, or if the study covers large numbers of respondents, or if the study covers the travel costs of some of the interviewees.
The limitations of documentary analysis lie in the nature of the documents; some of the governmental sets are inaccessible depending on the laws relating

to a single dataset. Access to organisational records in the private sector depends on each institution's confidentiality policy. In the UK, this is subject to the 1990s convention of *controlled access* to certain data sets such as names, addresses and other personal identifiers that the researcher might seek.

One weakness of case studies is that the results might be biased towards the researchers' perspectives and interests. Case studies of social groups are sometimes accused of a lack of objectivity, and can vary in their costs and timetables. Prior to starting the investigation, all the differences between qualitative and quantitative methods were looked at and examined. Lincoln and Guba (1985 cited in Payne, 1997) identified five different underlying assumptions in qualitative research compared to quantitative research, summarised in the following Table 3.2.

Table 3.2 Differences between quantitative and qualitative research

No.	*Quantitative*	*Qualitative*
1.	The nature of reality within the research paradigm is single, tangible, and fragmentable.	The nature of reality within the research paradigm is multiple and socially constructed.
2.	The role of the researcher is clearly defined and independent, with the researcher more powerful than the respondent.	Interactive research.
3.	Aims to make generalizations at a population level which are temporally and contextually free.	Researchers emphasize the contextual nature of their results.
4.	Aims to discover causal mechanisms which are largely conceptualized as linear.	Paradigms emphasize the interactive nature of causality.
5.	The ideal of 'scientific' research is that it is value free and that well planned, careful studies will enable the 'facts' to be discovered.	Research is inherently value bound in its design and execution, but the values of the researcher should be presented to readers so that they may use this information in evaluating the study.

From Table 3.2, the strong differences between quantitative and qualitative methods can be discerned. Whatever the methodologies selected to conduct a study, prior to collecting the data, the researcher needs to consider carefully the

fit between the tested hypothesis, and the techniques employed to gather research materials.

Furthermore, whatever the selected procedure for collecting data is, it should always be examined critically to assess to what extent it is likely to be reliable and valid (Bell, 1999). *Validity* and *reliability* are two concepts that cannot be achieved on a 100% basis in any research. To be valid, the research should be capable of being justified, that is, based on evidence or fact. The question researchers usually face is whether the evidence used reflects the reality under investigation. In other words, whether the results obtained are valid or not (Shipman, 1988). For the qualitative research criterion, *data validity* depends on the honesty, the depth, the richness and scope of the data achieved, the participants approached, the extent of *triangulation* and the disinterestedness or objectivity of the researcher. On the other hand, data validity in quantitative research methods mainly depends on careful sampling, appropriate instrumentation, and appropriate statistical treatment of data. For all that, validity should be seen as a matter of degree rather than as an absolute state (Gronlund, 1988).

Types of validity applied to the research include the following:

1. *Content validity* refers to whether or not the content of the manifest variables, (e.g. each question in the questionnaire) is appropriate for measuring the latent concept (e.g. attitudes, achievements, etc.) that the researcher is trying to measure. A literature review on the concept being measured helps to achieve content validity. Also asking the respondents if the test looks valid to them creates *face validity*.
2. *Criterion validity* is related to theory. When developing a measure, it should at least in theory be related to other measures or predict certain outcomes. Criterion validity includes two main types of validity, *predictive validity* and *concurrent validity*. *Predictive validity* refers to whether or not the instrument being used predicts the outcomes which are in theory expected. *Concurrent validity* makes less stringent assumptions as the test correlates well with a measure that has previously been validated. For example a measure of work

performance might be correlated with job satisfaction as they both were taken at the same time for the same population.

3. *Constructive validity* is related to the internal structure of an instrument and the concept it is measuring. It is related to the theoretical knowledge of the concept a researcher wants to measure.

   Because validity is the touchstone of all types of educational research researchers usually need to locate their discussions of validity within the research paradigm that is being used.

For qualitative and quantitative methods internal validity and external validity are relevant. *Internal validity* seeks to demonstrate that the explanation of a particular research topic can actually be sustained by the data, whilst e*xternal validity* is the extent to which research results can be generalized to populations and/or conditions (Wiersma, 2000). *Internal validity* is a prerequisite to external validity because if the results cannot be interpreted, it is not likely that they can be generalized.

Whenever something is being measured there is an element of error called *measurement error. Reliability* refers to the extent to which test scores are free of measurement error. *Systematic error* is error that is the same from one measurement to the next, for example an error in the calibration of a scale used for measuring weight; while *Random error* fluctuates from one measurement to the next unpredictably.

Reliability in quantitative research is a synonym for consistency and replicability over time, over instruments and over groups of respondents. As some features can be easily measured, such as weight, and other features are hard to measure, for example, musical ability, the tools should be carefully chosen to ensure that should the experiment be carried out at another time or on a comparable group, the results obtained will remain similar to the results found.

Validity in interviews is a persistent problem. One way of validating interview measures is to compare the interview measure with another measure that has

already been shown to be valid. This kind of comparison is called *convergent validity.*

Triangulation is the use of two or more methods of data collection in the study of some aspects of human behaviour where the results are then compared. Stake (1995) identifies *triangulation* as a protocol used to gain more accuracy and strength in qualitative research that may embrace a variety of methods. It is a strategy used to increase the credibility of the interpretation. The comparison of answers gained by different methods and from different questions is a form of *triangulation* (Andrews, 2003). The central aim of triangulation is to examine the research topic focus from a number of different vantage points, though this should not blind the researcher to the differences between sets of data that such different vantage points provide (Birley and Moreland, 1998). Triangulation involves checking multiple sources in order to strengthen the fieldwork, resulting, in the case of interviews, in confirming the information without antagonizing the informants (Wolcott., 2001). Triangular techniques are used in the social sciences to pinpoint a single objective by studying it from more than one standpoint and, in so doing, by making use of both quantitative and qualitative data. The weakness of each of these methods can be strengthened through the use of a combined approach to a given problem (Cohen et al., 2000). Triangulation is considered as a powerful way of demonstrating concurrent validity, particularly in qualitative research. This increases the researcher's confidence in their findings in comparison with other single observation methods which provide a limited view of the complexity of human behaviour. Secondly, the use of triangular techniques helps to overcome the problem of method limitation. *Multiple triangulation* includes multiple studies, multiple sources of data and multiple theoretical perspectives, all simultaneously combined to add more strength and validity to the research methodology and results (Hakim, 2000a)..

The *strategy* followed in this study was to devise a methodology that would gather the data necessary to enable the following research question and terms of reference to be tested for relevance and then answered initially within the conceptual framework of strategy and structure.

Research Question

Does the Kuwaiti curriculum contribute along with Kuwaiti policies and end users to environmental awareness in achieving sustainable architecture in Kuwait?

Term of reference 1

Do the curriculum content and educational tools convey environmental concepts that build up undergraduates' environmental awareness in general and their awareness of sustainable building design in particular?

Term of reference 2

Are academics and policy makers taking the right steps towards fostering sustainable architecture design?

Term of reference 3

Do the community of end-users/ stake holders/ society realise what sustainable building design entails and their role in affecting its direction?

An examination of the raw preliminary data (Interviews/ Surveys 2004/ University documents/ References) resulting from the preparatory phase of the research (data which was generated on the basis of the research questions) began to establish the research process, and to determine the research approaches, strategy, data collection methods and time horizons. The nature of the research questions and the intended framework pointed firmly towards a multi-methodological and multi-level approach. Therefore, the research was executed by means of mixed quantitative and qualitative research strategies to ensure greater validity and reliability. The selection of an appropriate research design depended mainly of the nature of the objectives and questions the study seeks to achieve and answer (Hakim, 2000b). The research design is the logical sequence that connects the empirical data to the study's initial research questions and conclusions (Yen, 1994, 2003: 20). Hakim stated that research design serves as the architectural blueprint of a research project that ensures

the link between the data analysis and the research questions (Hedrick et al., 1993: 38)

Therefore the selection of an appropriate research design and tools used in the investigation has to consider its purpose. The implementation framework comprised surveys and interviews along with selected official documents including interviews, censuses, written articles and official brochures (see Figure 3.1).

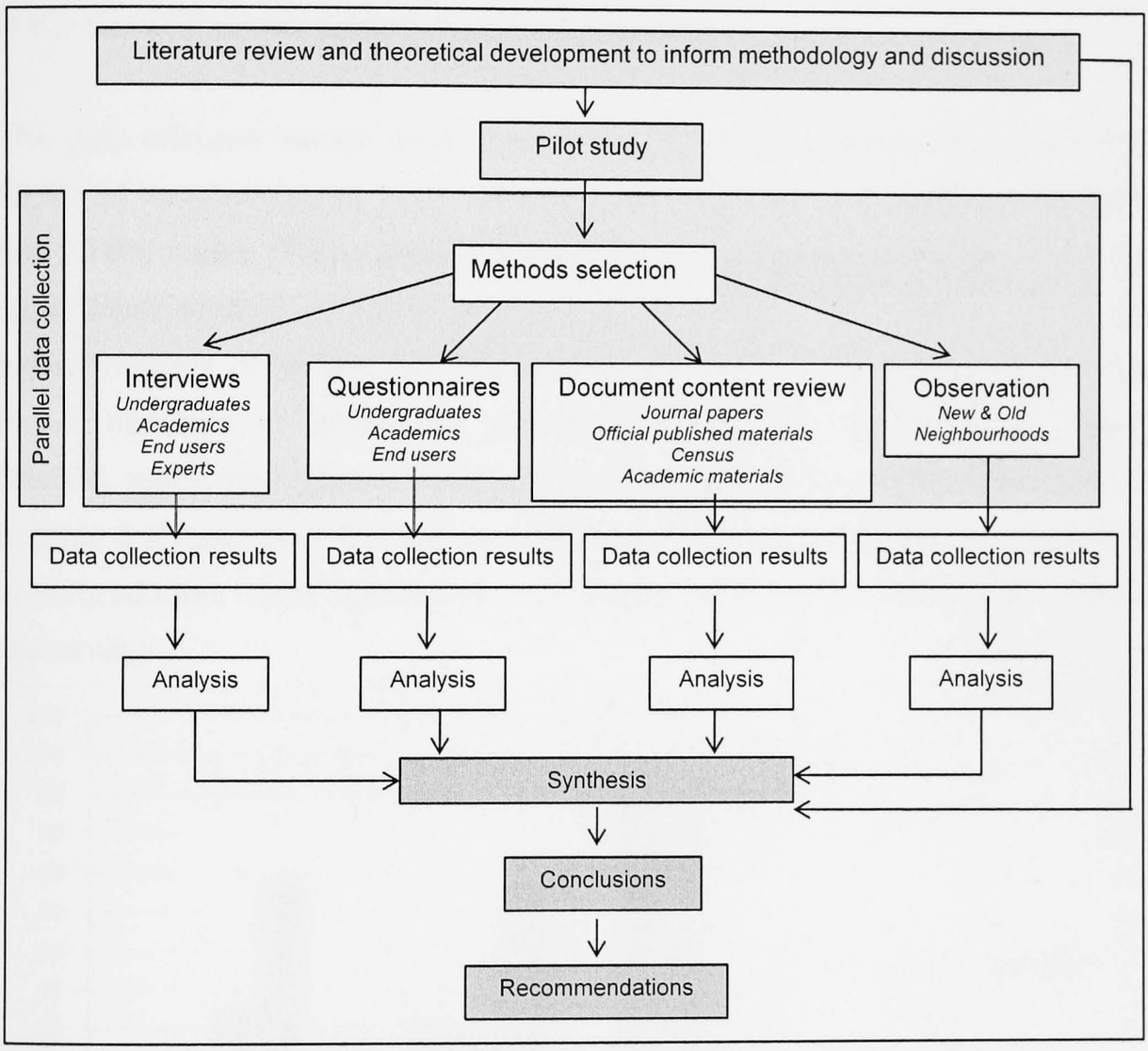


Figure 3.1 The research strategy

3.3 Data results and analysis of KU undergraduates

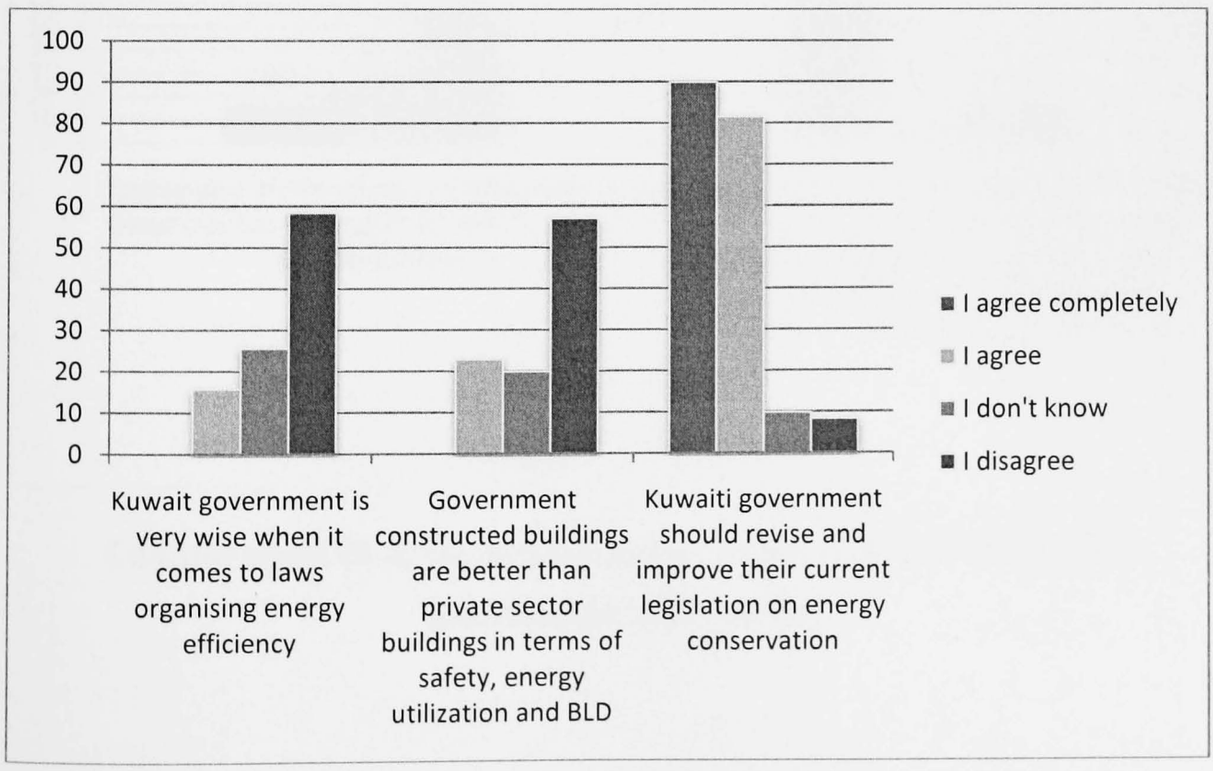
Kuwait University undergraduates were given a questionnaire survey to answer, and whenever possible fresh graduates were interviewed to measure their views of the educational system in the Department of Architecture. The

following sections will present the results of data analysis of both the survey and the interviews.

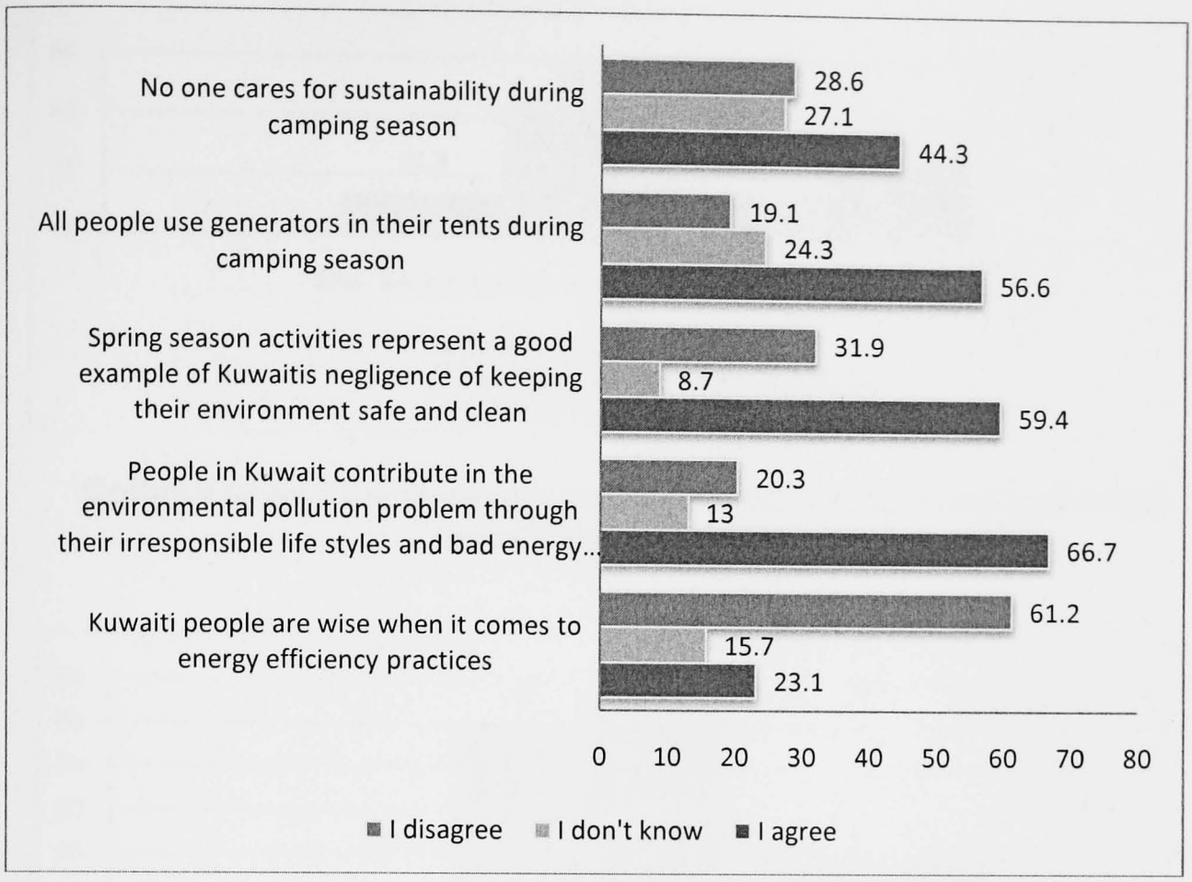
3.3.1 Survey results and initial analysis

74 undergraduates agreed to participate in the survey, out of 86 registered as students in the Department of Architecture of Kuwait University, creating a participation rate of 86%, and whilst they comprise a small number of students, in KU terms, this was deemed to be representative.

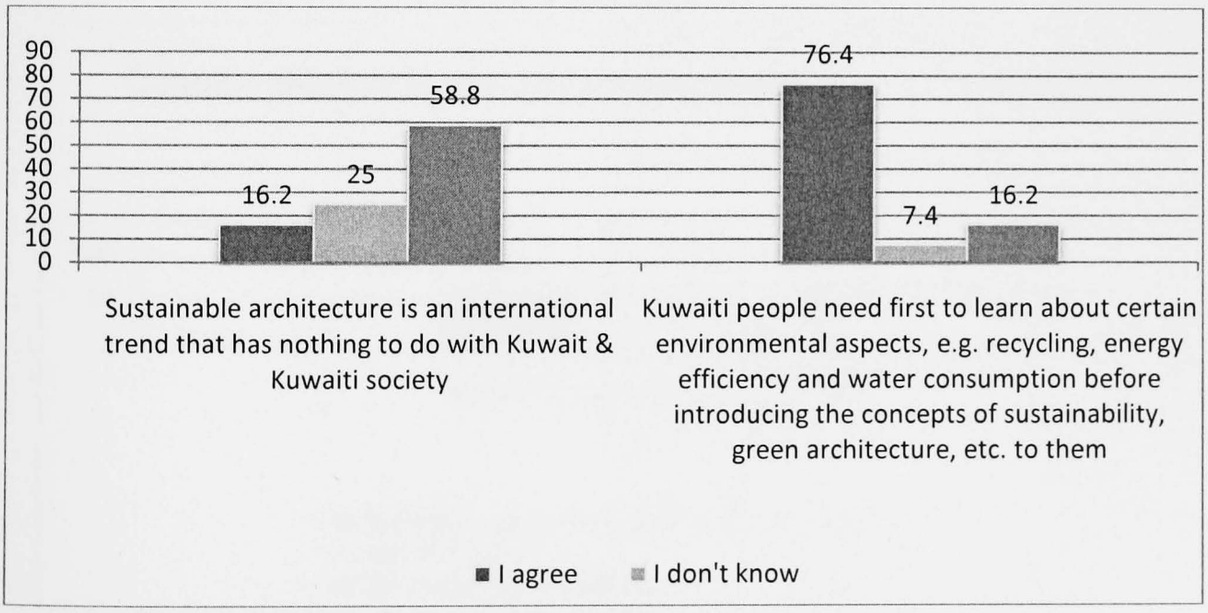
The data analysis results were obtained using SPSS software, and show that 98.6% of the participants were within the age range 18-24 with 70.4% females, and 29.6% males. There were two reasons for the gender difference. First, the department accepts a higher percentage of females than males due to the higher number of female candidates with the right grades required, and the higher numbers of females in general in secondary school (Amer, 2006). Second, many male students drop out during the undergraduate years, leading to triple the number of females to males (see Table 6 in Appendix 9 census of undergraduates and graduates of Department of Architecture, Kuwait University).



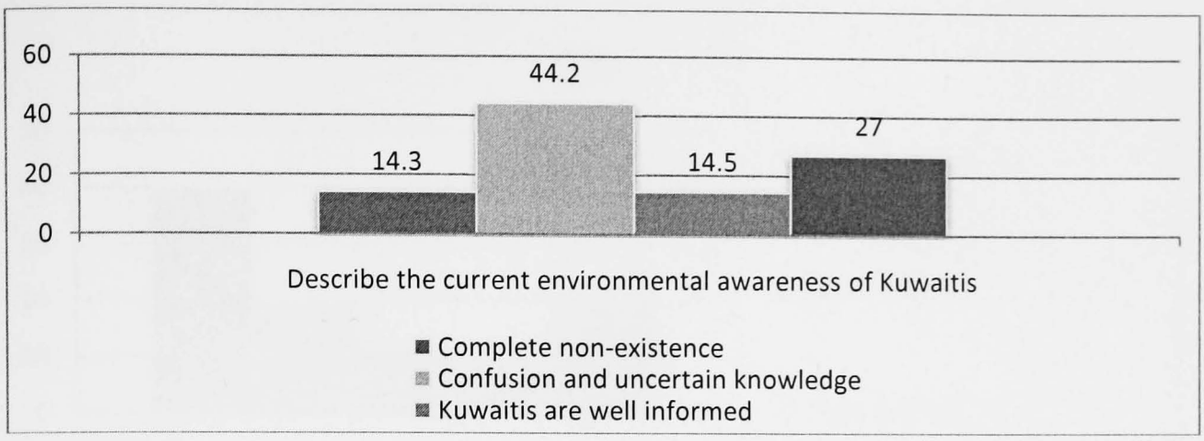
Column chart (3.1) Undergraduates' views: Kuwaiti government



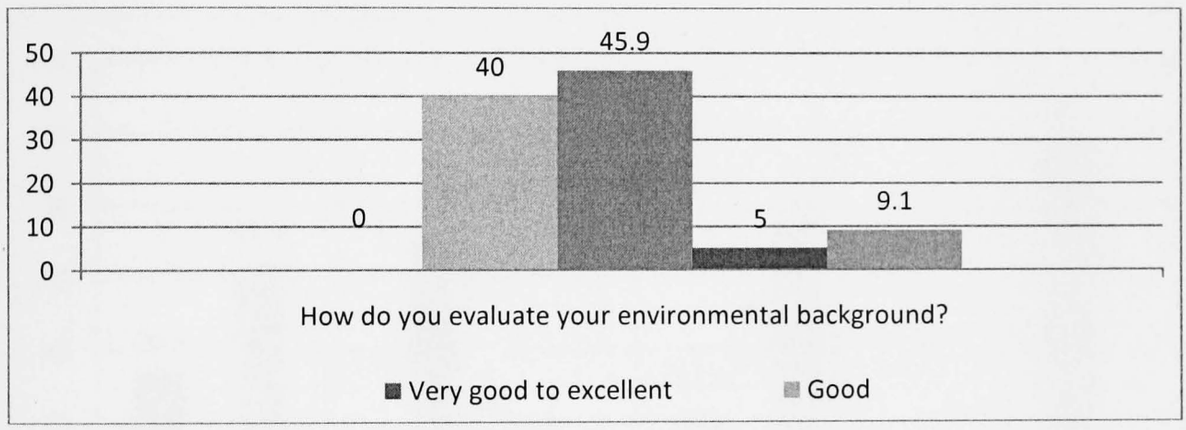
Bar chart (3.2) Undergraduates' views: Environmental awareness of Kuwaitis



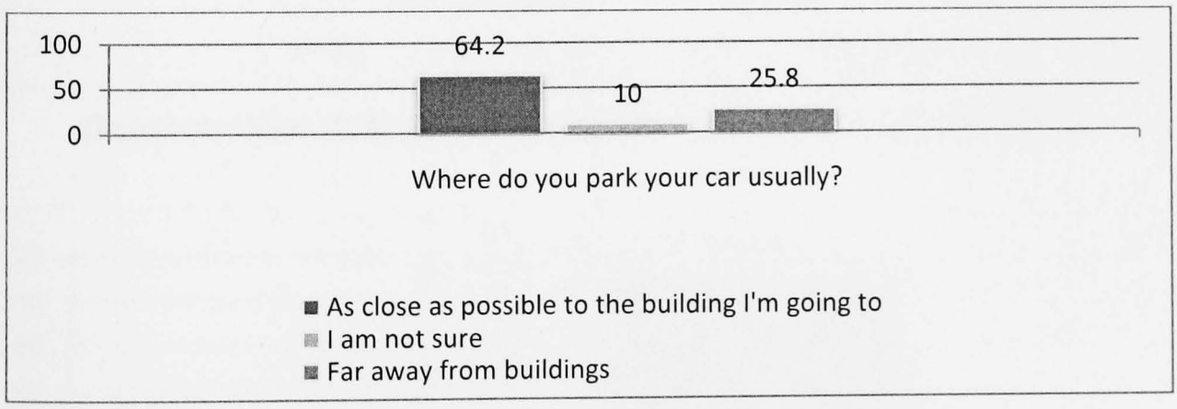
Column chart (3.3) Undergraduates' views: Kuwaiti society and sustainable architecture



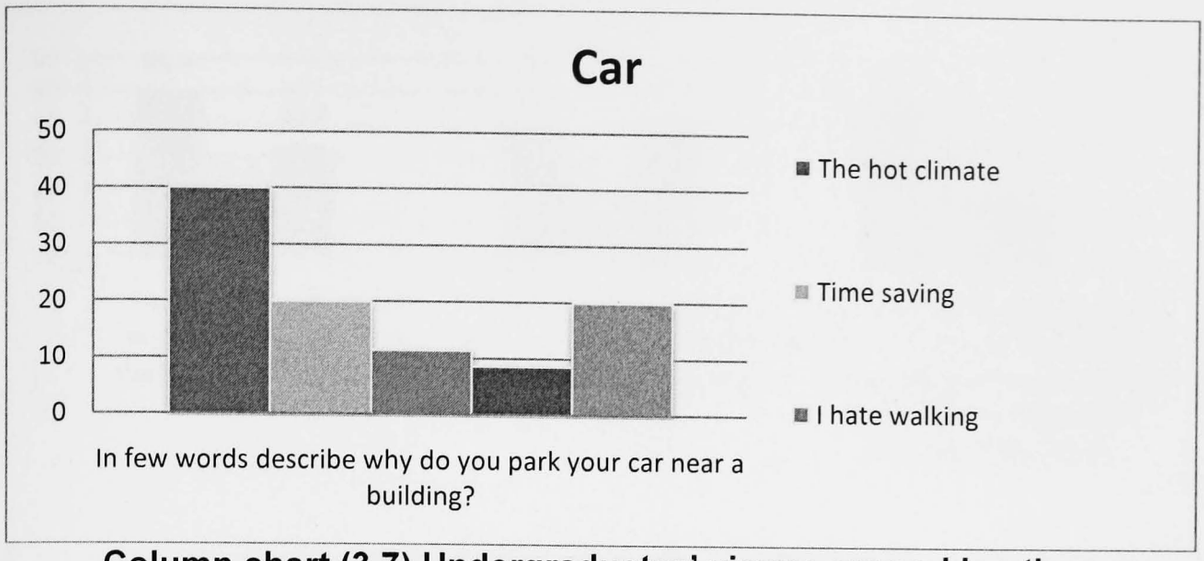
Column chart (3.4) Undergraduates' views: current environmental awareness of Kuwaitis



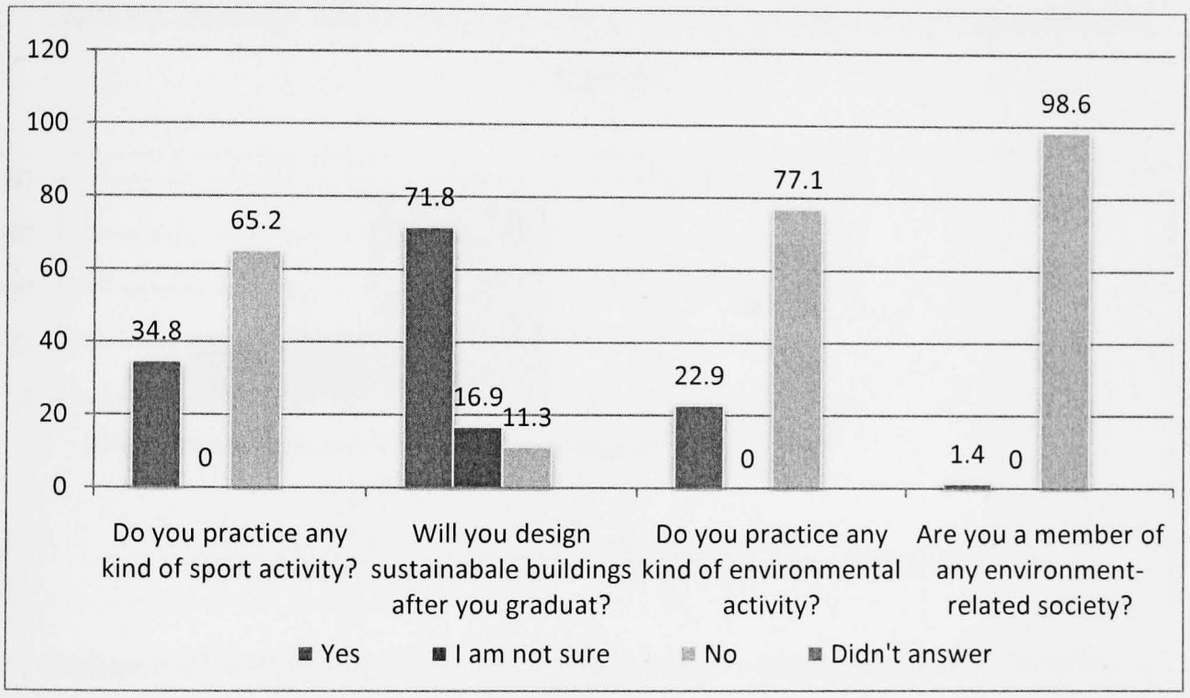
Column chart (3.5) Undergraduate environmental awareness



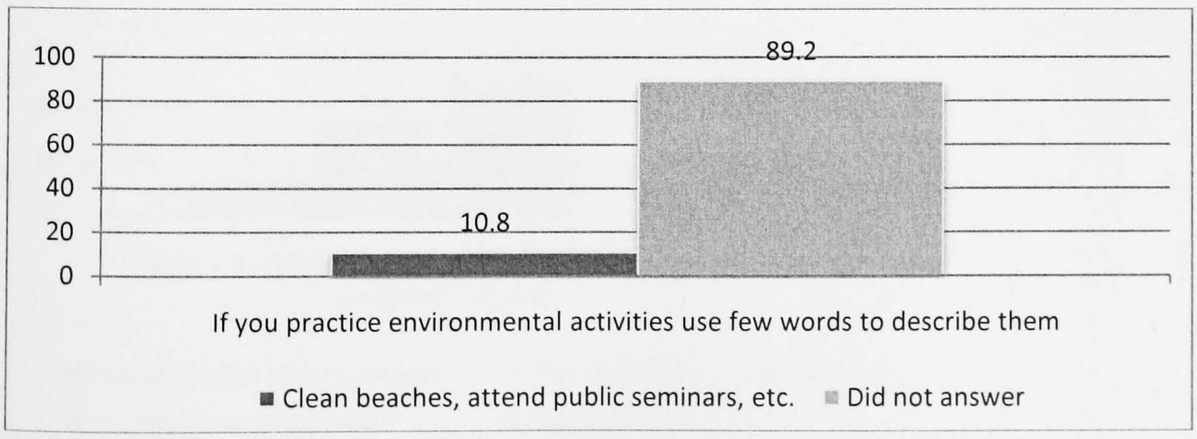
Column chart (3.6) Undergraduates' views: car parking themes



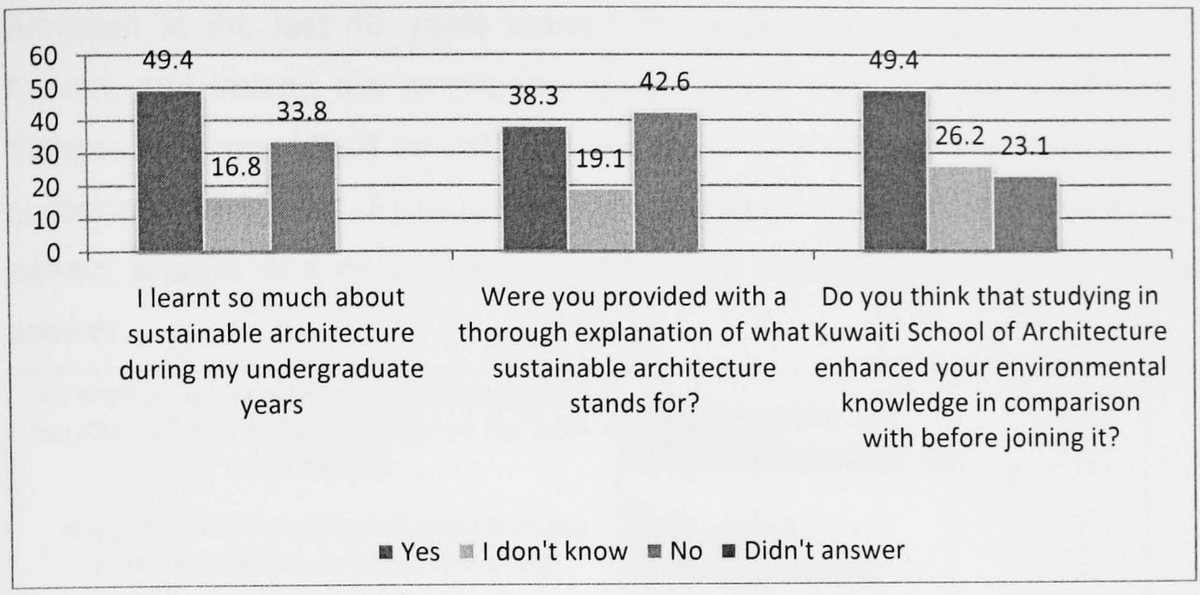
Column chart (3.7) Undergraduates' views: car parking themes



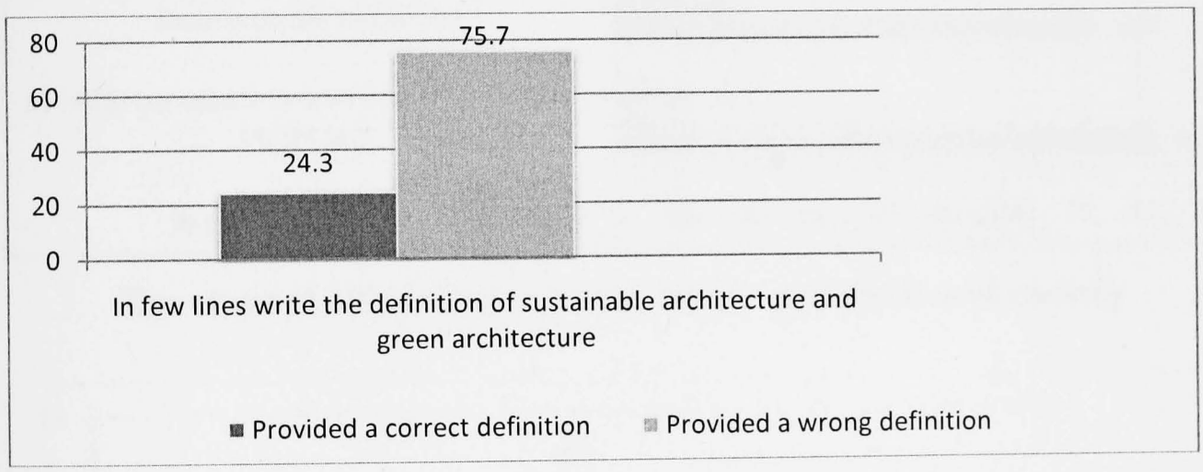
Column chart (3.8) Undergraduates' environmental behaviour



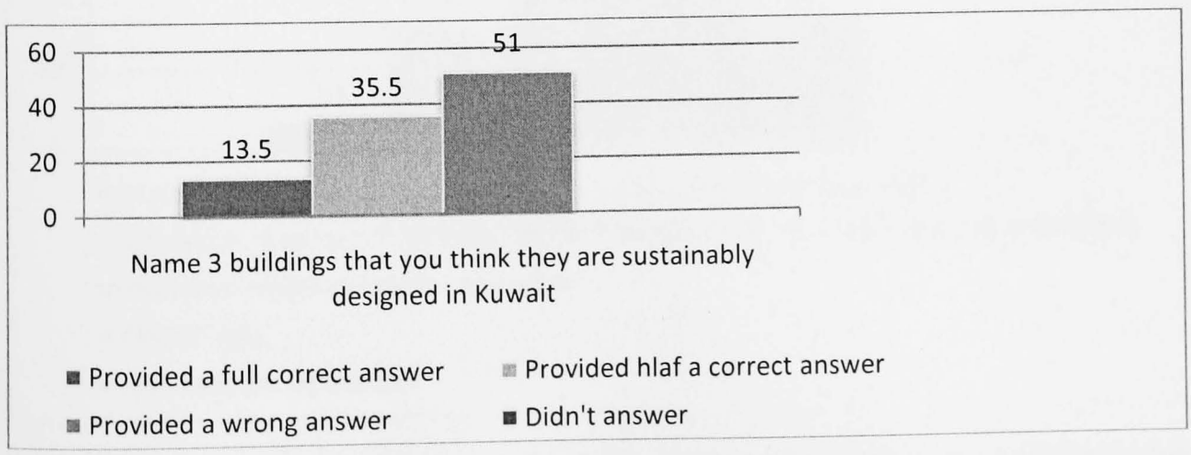
Column **chart (3.9) Undergraduates' views: environmental activities**



Column c**hart (3.10)** Undergraduates' views: **architecture education in Kuwait**

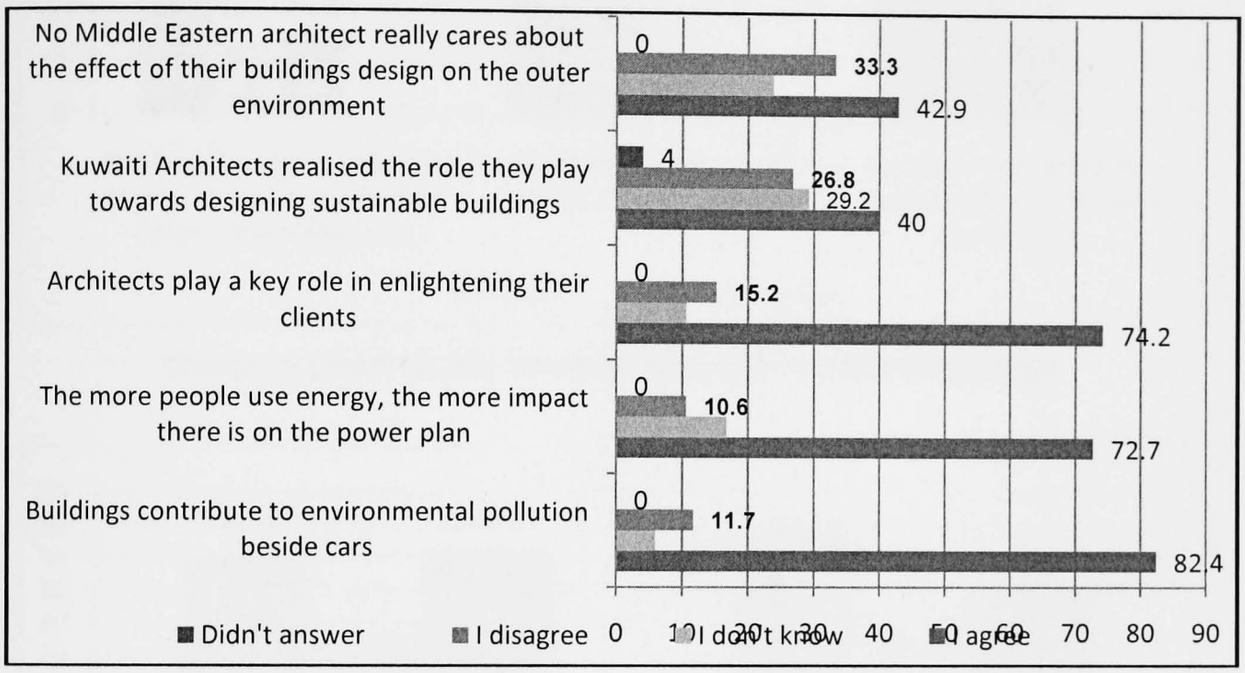


Column chart (3.11) Undergraduates' views: **sustainable architecture competency**

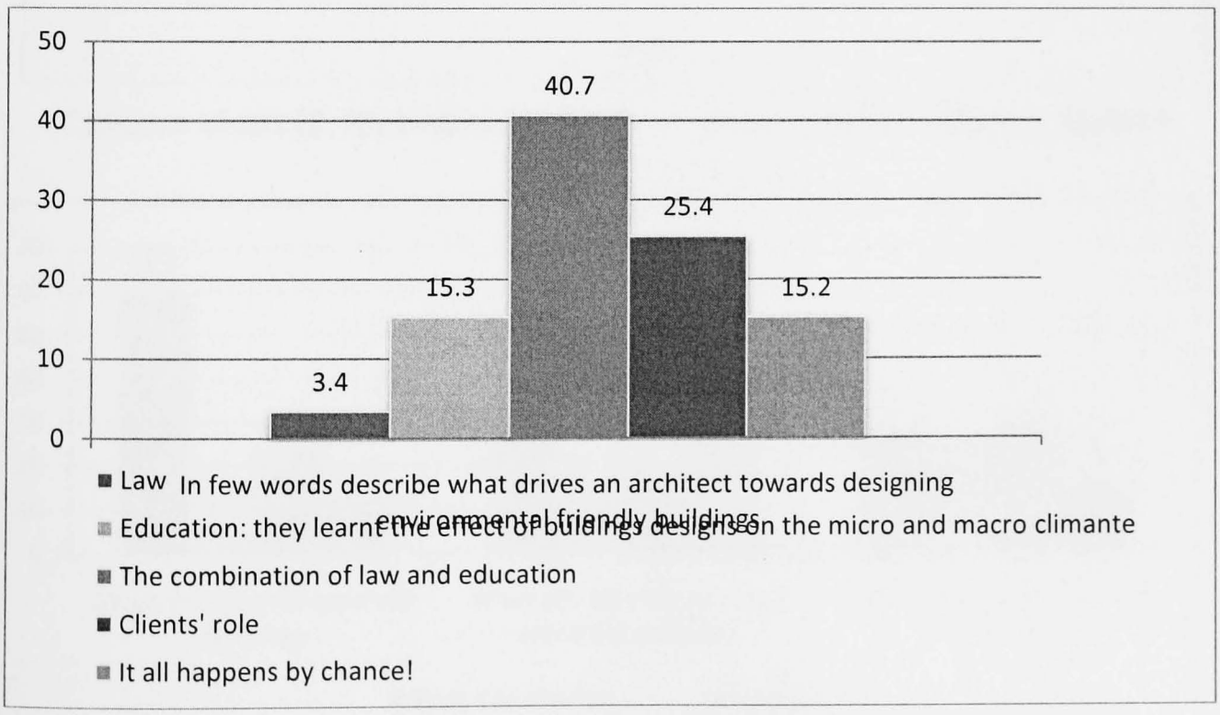


Column chart (3.12) Undergraduates' views: **sustainable building competency**

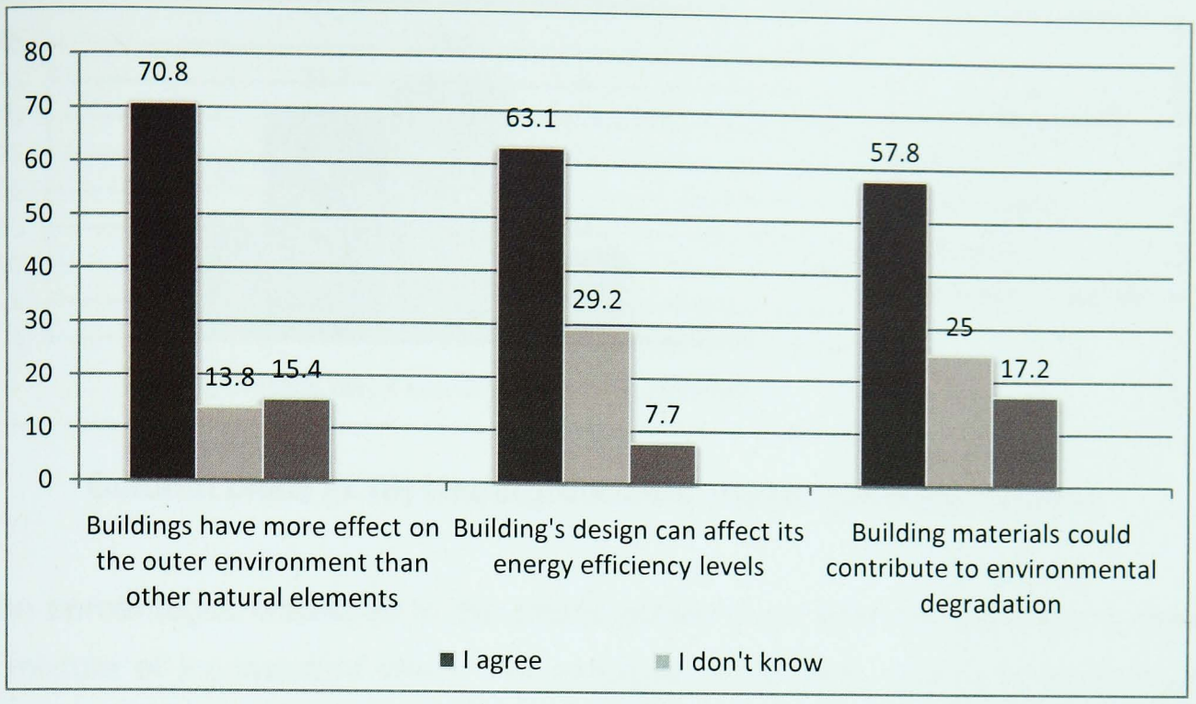
Although in the last 10 years many new sustainable buildings were built in Kuwait, and indeed are mentioned in one of the core courses taught by Dr. Mahgoub, when asked to list the names of 3 buildings they thought were sustainable in Kuwait, 51% provided the wrong answer, 35.3% provided half a correct answer and only 13.5% were able to complete the list with the right answer.



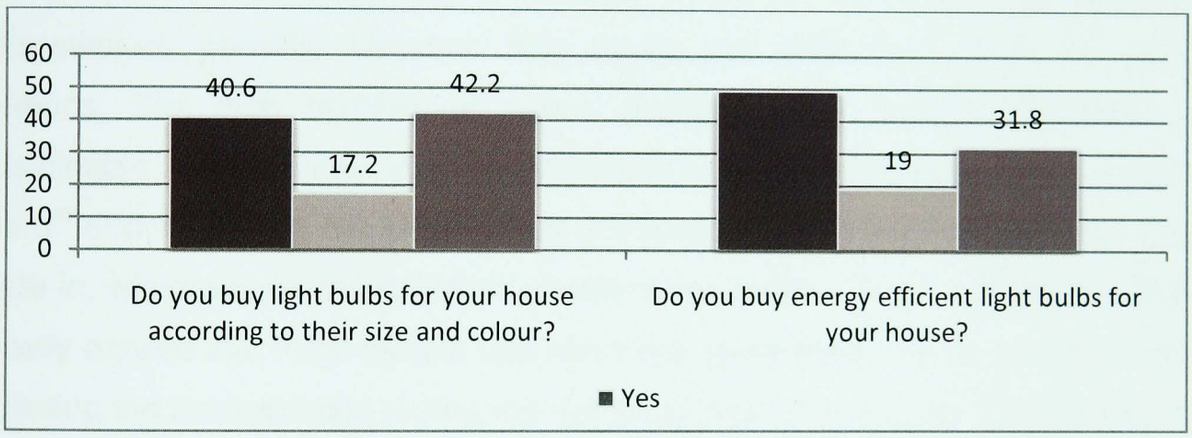
Bar chart (3.13) Undergraduates' views: **architects and society**



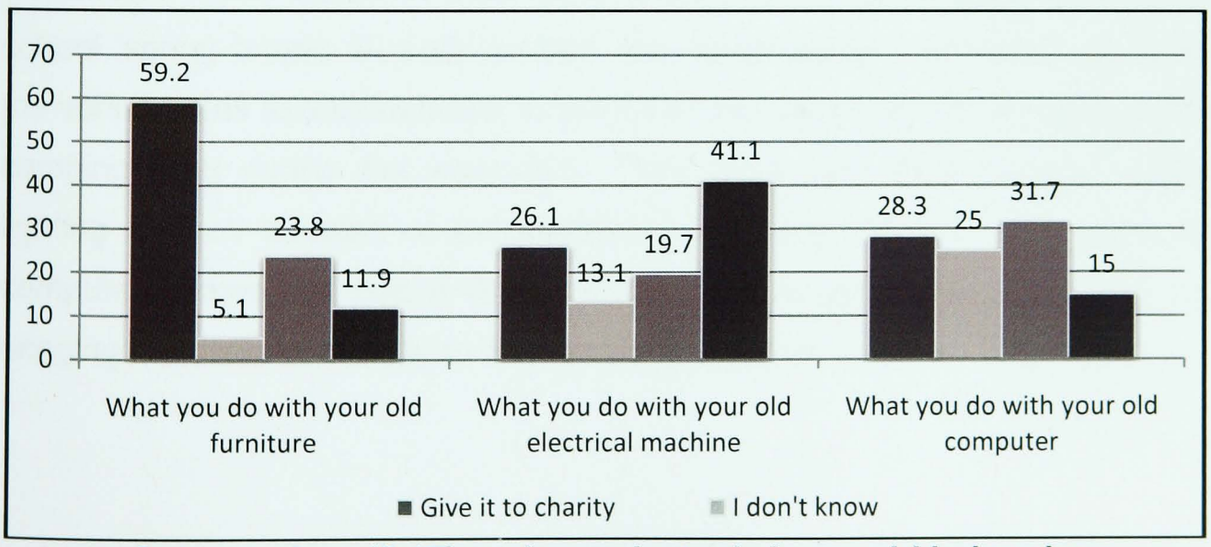
Column chart (3.14) Undergraduates' views: architects as a driving force of environmental design



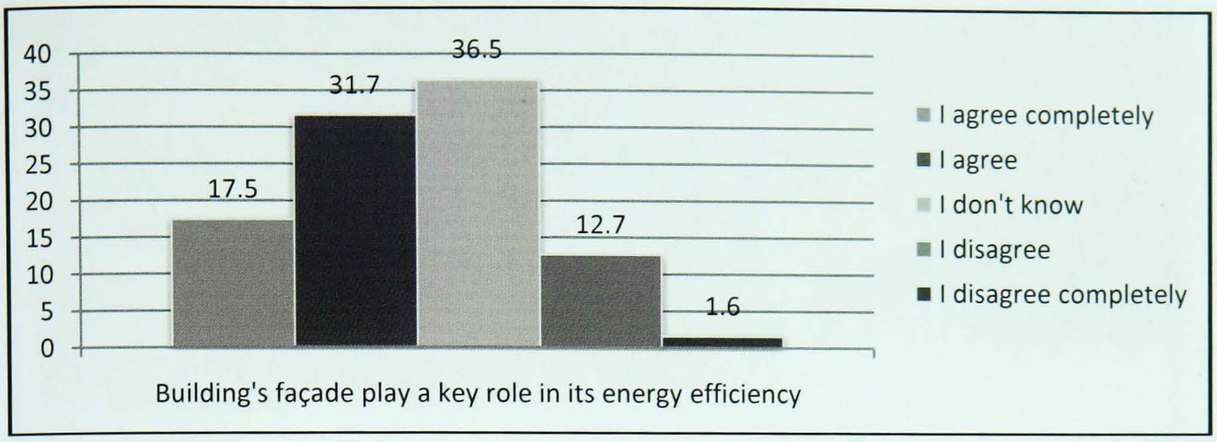
Column chart (3.15) Undergraduates' views: buildings



Column chart (3.16) Undergraduates' views: Indoor lighting system

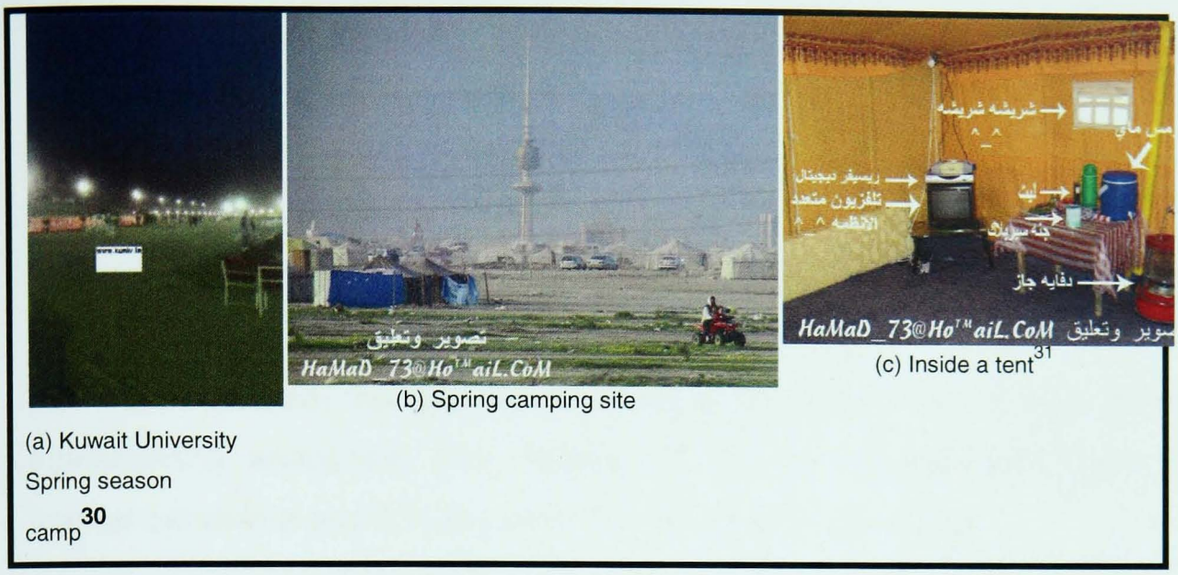


Column chart (3.17) undergraduates' views: old belongings



Column chart (3.18) Undergraduates' views: building façades

The percentages displayed in the charts above show how the participants held a mixture of inconsistent ideas. For example, most were unable to provide an example of three sustainable buildings in Kuwait although they studied them and saw some of them on a fieldtrip! Many of them left the question unanswered, possibly because they could not understand it or for other reasons. The high number of wrong answers given for the definition of sustainable buildings and green architecture when most of them have reached the 3rd and 4th year in the Department of Architecture shows the confusion they were in, which will later affect their performance in their future profession. They mostly agreed that most people use electricity generators (which are known for polluting the environment) during the camping season in Kuwait. The majority of Kuwaitis escape the noisy city by camping in the desert in the south and north of Kuwait (Alajmi, 2007). The camping season in Kuwait always starts with the school 'spring break': Kuwaiti families start assembling their tents long before the spring break to ensure better locations in the desert as well as going to their camping sites during the weekends. They bring with them fridges, outdoor lighting and all sources of entertainment including TV sets and video and computer games. To power these devices diesel generators are used, thus bringing the noise of the city to the desert (see Figure 3.2).



(a) Kuwait University Spring season camp[30]

(b) Spring camping site

(c) Inside a tent[31]

Figure 3.2 Camping season in Kuwait

The questionnaire results demonstrate that the undergraduates of the Department of Architecture recognise the problem of low environmental awareness in Kuwaiti society; however, the results also reflect their own inadequate environmental awareness, which will prevent them from playing any significant role in designing sustainable buildings in the future, unless sustainable building codes are strengthened and enforced (*see* Appendix 10 for the undergraduate questionnaire structure).

3.3.1.1 Total sustainability awareness of the undergraduates

The undergraduates' survey included forty questions with different variables that measure the responses of the sample population to certain environmental behaviour. To measure the undergraduates' total awareness of sustainability (T_aS) the most relevant variables reflecting sustainable behaviour in the survey questionnaire were used as a tool. There are 19 chosen variables included in the questionnaire as follows:

Government buildings and private sector buildings (*Gvntbldngs*) –spring season (*Sprngsn*) – camping season (*cmpnsn*) – after graduation (*aftrgrdn*) – environmental activities participation (*envrmtact*) – environmental society membership (*envrmsct*)– definition of sustainable buildings (*sustdfn*) – sustainability as a trend (*sustnbltrnd*) – people's behaviour (*pplbhve*) – effects of

[30] Source of (Figure 3.2a) (last accessed 14/07/2009)
[31] Source of (Figure 3.2b & c): www.hamaden73.com/kashtah.htm (last accessed 14/07/2009)

buildings and cars (*blndcrs*) – people's energy consumption (*pplconsm*)- effect of buildings on the environment (*bldngefct*) – effects of architects' design on the environment (*archefct*)- effect of building materials on the environment (*bldnmtrl*) – indoor lighting system (*lightblbs*) – buying light bulbs according to their energy efficiency (*lghtblbefncy*)- old furniture (*Of*) – old computers (*Oc*) – old house machines (*Om*) .

For each variable, certain points were given from 1 to 3 expressing the sustainability awareness rate. Number 1 reflects unsustainable behaviour, 2 normal behaviour and 3 is allocated for sustainable behaviour.

To define the awareness of sustainability/ unsustainability of the research area, the 19 variables (indicators) are multiplied by the score that has been given. For the most lack of awareness of sustainability the score would be 19 (19X1=19), for awareness of sustainability the score would be 57 (19X3=57) and the score of 38 would be the normal average awareness (19X2=38).

After that an equation of the sum of the variables was developed as follows:

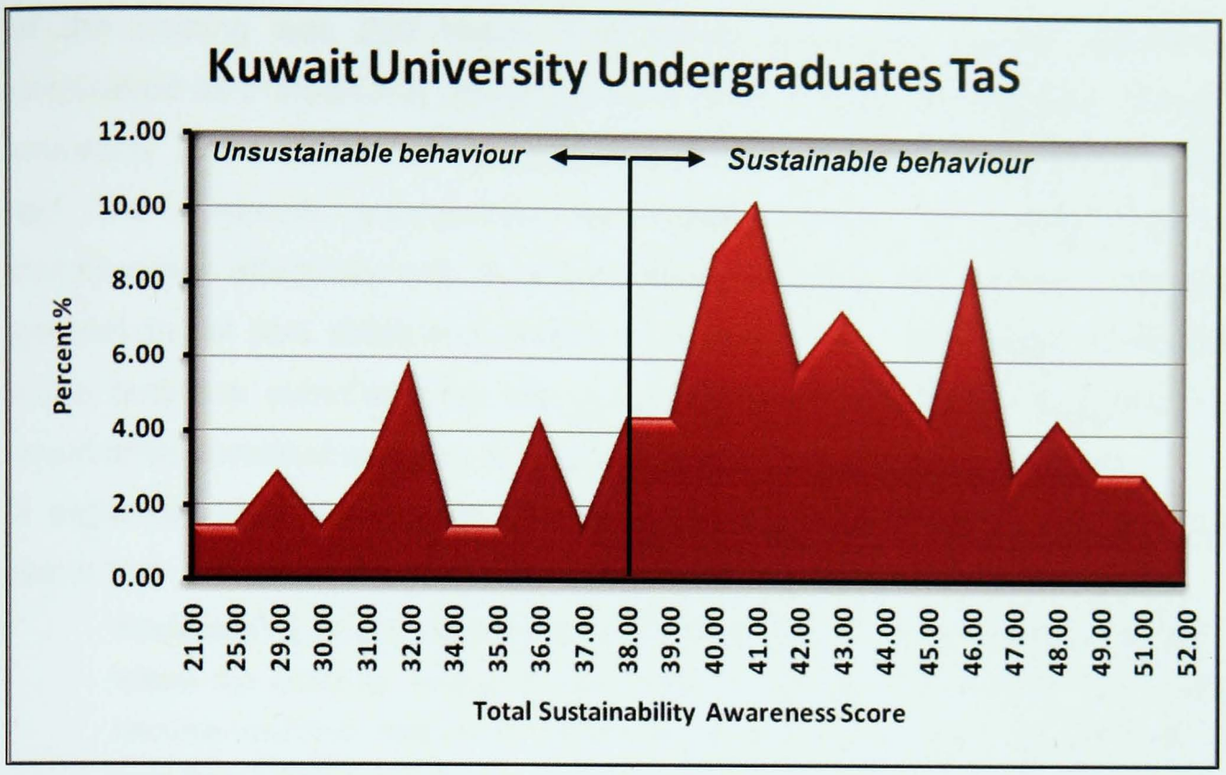
T_aS =

sustnbltrnd+ pplbhve+ blndcrs+ pplconsm+ bldngefct+ lghtblbefncy+ archefct+ bldnmtrl+ Of+ Oc+ Om+ lightblbs

After the calculation was conducted, it was found that some undergraduates did not answer some of the questions, so they were crossed out. The results of the calculation show that:

1- The undergraduates' T_aS score ranges between 21-52 points.

2- The majority of the undergraduates' T_aS score clusters between 41-52, which means that their total awareness of sustainability is above average. 10.29% scored 41 points. (see column area chart 3.19).



Column area (3.19) Majority of Kuwait University undergraduates' total sustainability awareness is above average

3.3.2 Analysis of interviews with fresh graduates

Although the questionnaire replies were thought to be representative, interviews were also carried out with two recent graduates of the department to measure their opinion of the current curriculum of the Department of Architecture. It covered the topics of whether they faced any problems after graduation related to the knowledge they had acquired during their undergraduate years and issues related to sustainability. The reason behind choosing only two graduates was because of Kuwait University's low output: at the time of the study, the total number of female graduates since 2002 was 33 and that of male graduates was 23, many of whom have left Kuwait subsequent to gaining their qualification (*see* Appendix 9: Census of undergraduates and graduates in Department of Architecture and Appendix 11: Key questions asked during semi structured interviews with fresh graduates). In the following sections the female interviewee is referred to as X, and the male interviewee is referred to as Y.

3.3.2.1 Summary of the interview with graduate X

According to X, who graduated in 2004 and worked for a big architecture firm, the practical training of the undergraduates in an architectural office of 6 weeks' duration was an elective course taken during the summer period. The duration

of the training was 200 hours. The school graduation project cannot be considered as professional training since there is a huge gap between what the university tutors require of students and what takes place in reality. Kuwaitis lack the minimum architectural knowledge required to enable them to communicate effectively with architects when designing their houses. People in general do not care about an increase in the cost of their electricity or water bills since both are subsidized by the government; therefore, cost reduction that could drive sustainable action is discounted.

X explained what sustainable architecture entails, according to what she had learnt from her studies at the Department of Architecture:

> **Sustainability in our understanding of Architecture is totally different. We think where the north is, where the sun rises up, will the office inside the building become very hot? How much will it cost me in the long run? I would think of how long this building will live. As an architect, we think that, when I design a building I should design it in a way that 20 years after it's been knocked down, people will regret deciding to knock it down. I want my buildings to be historical and last forever, but when you want to explain this thing to your client, he will answer you back 'No! No! Let it live for 15 years, and after that I will demolish it and build a new one'. All their mentality rotates around money.**

However, her definition of environmental sustainable architecture that reflects a clear understanding is in fact a theoretical point of view because practically speaking she emphasized that under normal conditions her clients do not care about sustainability since they aim for two main things: one, that the design will use the total area of the land and two, that it is important to reduce the total building costs as much as possible. She added that during her school years, they were not trained in how to deal with their clients.

Again she said "They teach us things that are different from what happens in reality." As a result, she said some architecture graduates choose to change their careers from architects to jobs that are not related to their qualification because they feel that their profession does not encourage creativity in them and because of frustration with the laws and restrictions of their profession that they feel put their creativity under constraints. She said that:

> **One of my colleagues became an interior designer, the other one became a kindergarten teacher and a third one became an accessories designer because it**

> **generated very good money and does not involve frustration like the profession of architecture** (Mortazawi, 2006).

X predicted that the impact of Kuwaiti architects on their country's architecture will take as long as 60 years rather than ten years to show, because after they graduate and face reality in their country, they get frustrated and lose interest because of the routine.

X also said that she studied Kuwait Building Codes under the supervision of Dr. M who divided the section into groups and gave them the task of comparing those laws with other countries' laws. She said she realized that the Kuwaiti building codes are unsuccessful because they restrict the buildings to certain shapes and sizes that leave no room for imagination or designing distinctive buildings.

According to X, the Kuwaiti government's future policy concerning the built environment is unclear: "They do not state where our civilization is heading to." She explained how manipulation in building codes takes place through the municipality, making alterations to the Building Systems rather than the Building Codes. The reason behind their carrying out this procedure is that it is easy to modify the Building Systems from time to time from within the ministry in comparison with Building Codes, which require the ratification of the National Assembly for any changes to them, which might take a relatively long time. This results in a greater chance of manipulation of the Building Systems.
X criticised the way the academic staff of the Department of Architecture acted with the undergraduates when they attended as assessors at the students' school projects presentation. X described them as tough enough to cause students to drop out and feel exposed, which is how she felt during the presentation of her school project:

> One of the male students disappeared from school after he presented his project and never came back because the assessor told him that he should place his design in the bin in front of all his colleagues (Mortazawi, 2006)

When asked who was responsible for achieving sustainability she replied that the responsibility falls equally on the shoulders of all parties, including the government, the architects and the end users. She emphasized that if members of the public are well informed, then they will pressurise their government to make improvements in the law. She believes it is useless to use a 'carrot and stick' policy with people because people need to be informed. X believes that some aspects need legislation to make them happen, and other aspects require members of the public to be informed about the reasons underlying government actions.

X suggested that the curricula and syllabi of the Department of Architecture should be changed by the university academics following consultation with recent graduates about the problems they faced in their profession immediately after graduation that are linked to the information (knowledge) they needed, but did not get during their university years, and also the sequence of courses, especially in the case of the pre-requisites, which she felt needed to be rearranged.

She added that the textbooks used in the Department should be up to date and relevant to Kuwait; the tutors should improve their teaching methods and practical training should become compulsory rather than elective. X questioned the reasoning behind taking eleven elective courses from Humanities saying that it is a waste of time unless the students are given valid reasons for taking them. Finally, she expressed her wish for changes in the curriculum to take place in the future and not remain theoretical proposals.

In a previous study; Abdulla (2003) found some deficiencies in the professional practice module of the KU curriculum. These deficiencies are related to topics linked to the business side of architecture, for example, Financial Management, Contract Negotiation, and Project and Construction Management. Graduates and students agreed that the practice courses offered are not doing a good job of exposing the students to topics related to the initiation of contracts. Of her respondents, 75% agreed that Contract Negotiation and Financial Management

are the most neglected topics in their programme. Students also agreed about their lack of effective client communication skills.

3.3.2.2 Summary of the interview with graduate Y

Y graduated a year ago from KU. When asked his opinion of the courses he was taught in KU after graduation, he said that now that he is working he feels that he was not given enough professional training during his undergraduate years. He also needed more Information Technology courses and so he joined classes after graduation because he needs to use particular IT software in his job. Finally, he said that Kuwaiti society pays little attention to the environment and all his environmental background came from his compulsory school years rather than university years.

> **Interviewer: What are the things or topics or courses that you feel that Kuwait University did not teach you and now you think they should have taught them to you?**
>
> **Y: Definitely the fieldwork, because after graduation I found out that I did not have anything that relates my study to the real world. Almost all that I know is theoretical stuff and this is what I really hate. It is like spending more than four years of hard work, only to find out at the end that it was only to get a certificate and it has nothing to do with life. Also we needed more information technology courses, you see we did have common courses with the computer engineers, so you think that I know what is inside a computer, right? But actually I don't have a clue and I did need this knowledge in my current job, so I had to study for a new certificates on my own at my own expense in the private sector institutes.**
>
> **Interviewer: Do you think after graduation you are able to contribute towards achieving Sustainable Development in your country? Are you able to work to protect Kuwait's environment? Are you equipped with the right knowledge to do so? Were you trained in the university properly to do this? Or is it simply that the people and the policy will not help you to contribute positively towards the environment?**
>
> **Y: Well in the current time no, but maybe in the future after I finish the training courses that I'm studying I might be able to contribute to achieving sustainable development. In Kuwait University they did not teach us anything about the environment or how to play any role in protecting your environment in your work. All I know about the environment is from high school and this does not have anything to do with my career. I think here in Kuwait we don't pay enough attention to the environment.**

3.3.2.3 Matching the questionnaire analysis results with fresh graduates' interviews and curriculum analysis results

The survey results, displayed in section 3.3.1, showed that the undergraduates do not actually practice environmentally-related activities. Some of their answers reflected low sustainability awareness such as choosing to buy light bulbs on the basis of their colour and size rather than their energy efficiency. Other answers show that environmental practices stem from their good intentions such as

giving old furniture, computers and household items to charity rather than throwing them away, which can be considered as recycling. It was interesting to learn that they criticize their society's low sustainability awareness, and yet they themselves were not doing any better. They provided poor answers to questions related to their taught courses. The first was the inability to name only three famous buildings that are considered to have sustainable designs. On the other hand, the graduate interviewees might in a way explain the survey results since they both expressed their disappointment in the teaching of the Kuwait University Department of Architecture curriculum for not equipping them with relevant knowledge. In fact, their interview results correspond with the results displayed in Chapter 3 about the necessity of developing undergraduates' professional experience as part of the curriculum.

The undergraduates' low sustainability awareness can be attributed to two factors. First, they do not experience any kind of sustainability behaviour in their society such as sustainable transport or recycling on a daily basis, therefore, they are not equipped with the social incentives to do so. Secondly, the curriculum in the existing educational system does not contribute to effectively raising their environmental awareness. It is apparent that there is a need to develop the curriculum of the Department of Architecture to enable Kuwait University undergraduates to understand the meaning and value of sustainable architecture design and enable them to design culturally and ecologically appropriate built environments.

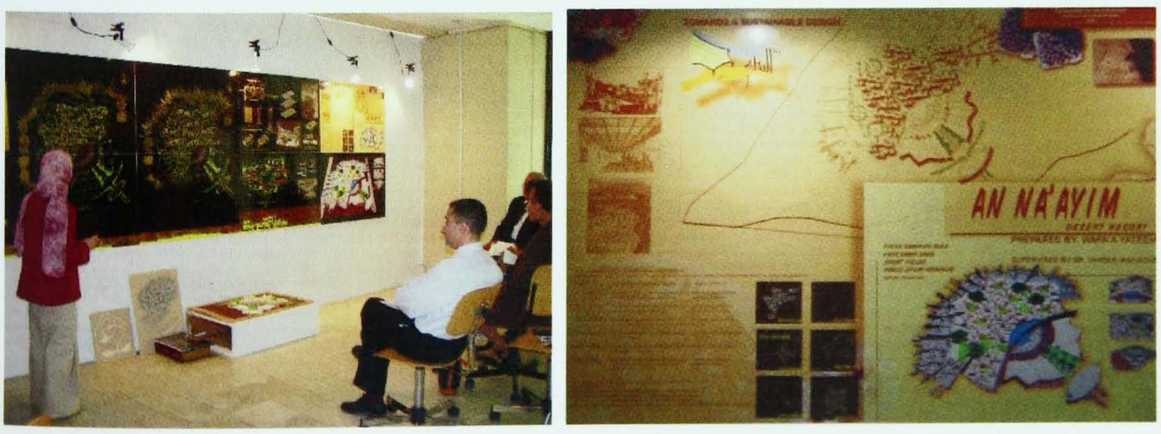


Figure 3.3 Undergraduate explains her sustainable design project 'Na'ayim' to the Jury

3.4 Data analysis and results of KU academics

The academic staff members were given a survey questionnaire to measure their opinion; the total number of staff was nine, of whom only six replied. Because of the low number of the sample population, interviews were conducted with those who participated to gain more validity and reliability for the data analysis results. Interviews with those who replied were conducted to establish their opinion of sustainable education and other issues related to achieving sustainable development. The interviews were semi-structured to leave some space for the interviewees to express their opinions openly whenever possible, as well as to add more information during the course of the interview. To support the argument, the conclusion section will reflect on the results of this section.

3.4.1 Data analysis of KU academics survey

Of the academic staff who replied to the questionnaire three had less than 5 years' experience, two had 5-10 years of professional experience, and one had 10-20 years of work experience at the time of the survey. They all work for the university as their only employer because of the university regulations that prohibit them from working in architecture firms, i.e. having two jobs at the same time. Two of the academic staff obtained their degree from Kuwait University, two from the USA and two from the UK.

All those who replied to the survey agreed that there is a need for sustainable design in Kuwait, that there isn't any non-governmental agency in Kuwait to implement sustainable development in Kuwait, and that Kuwait needs to update its energy efficiency laws. But they were divided on the need for the Department of Architecture to focus more on environmental issues.

All the academic staff agreed on the statement *Kuwaiti people need to be aware of the impact of the built environment on their health*. Furthermore, they all agreed that the Kuwaiti government should renew its policy of achieving sustainability in general, but they were divided about whether Kuwaitis are actually aware of the global environmental agenda; three disagreed and three agreed.

All Kuwait university architecture academics who replied to the survey agreed that no one actually practices energy efficiency because of low electricity bills in Kuwait, but only one of them believes that only a few of architecture firms' clients insist on certain architecture designs regardless of their energy efficiency.

Three of the six Kuwait University academic staff agreed that Kuwaiti architects do not design sustainable buildings because of low public environmental awareness, whilst three disagree. And two of them think that the society should demand sustainable design; architects cannot impose it on them. Four of the academics agree that 50% of global warming is caused by burning fuel in the maintenance of buildings, whilst two disagree. Four agree that Kuwaiti society has a low awareness of sustainability.

Clearly the population size of the survey carried out in the Architecture Department was small; only nine individuals, of which six replied to the survey. To draw quantitative conclusions from such a small group is difficult and could be misleading. To combat this shortcoming, the six individuals who replied to the survey were interviewed; the analysis of these interviews is provided in the next section.

3.4.2 Analysis of interviews conducted with KU academic staff

Interviews conducted with academic staff members in the Department of Architecture in Kuwait University show that most instructors limit their teaching of environmental issues to topics that are directly related to the environment (heat, light, shade and acoustics, etc.) rather than explaining possible ways of implementing sustainability in the profession, in accordance with the content of each course. Perhaps time restrictions have been responsible for their way of covering the curriculum content, i.e., placing more emphasis on topics related to architecture.

My interviews show that the 6 faculty members interviewed only teach environmental issues as a separate part of the curriculum. They do not integrate environmental concerns across topic boundaries. Environmental concerns are therefore addressed more as an afterthought than as an integral part of architectural design. As a result, Kuwaiti students are not as well equipped to

design environmentally friendly buildings as would be those students who have been exposed to a more thoroughly integrated curriculum. This low awareness is likely to result in inferior governmental policy planning as graduates take up government jobs and assume positions of influence in ministerial posts.

The following points are a summary of the main points expressed by the interviewees:

(1) All the interviewees believe that undergraduates learn a great deal from their courses and that their course materials increase the students' environmental awareness, though it was not clear how they achieved that goal. They agreed that all their students had gained an insufficient amount of knowledge about the environment in previous school years; therefore, they had the minimum amount of environmental awareness.

(2) All the members of staff believe that building laws need reviewing thoroughly because they are out of date and do not respond to most environmental issues such as the greenhouse effect and depletion of natural recourses, sustainability, and so on.

(3) All the interviewees agreed that low energy costs (electricity tariffs) lead to high energy consumption by the public. Therefore, architects may design buildings according to aesthetic considerations and neglect energy factors. Some of them suggested that the best way of improving building standards is to build up public awareness using the media; others decided that the best way is to increase electricity bills. This third group thought that the 'carrot and stick' approach is the best policy to deal with the situation. Finally, one suggested applying the American policy of accrediting buildings with the lowest energy consumption.

Two faculty members suggested adding core environmental topics to all courses and one more environmental course to the syllabus, neglecting their role in developing the syllabus.

(4) Members of staff teach many undergraduate courses outside their specialization because of a shortage of instructors with particular specializations in architecture.

(5) Some members of staff believe that weak building laws have resulted from weak environmental awareness at both public and official levels which has been reflected in the poor application of building design codes.

(6) Staff members pointed out the urgent need to add new building codes in relation to building materials and end users.

(7) Two academics who teach urban planning courses for architecture undergraduates stated that it is difficult to train students to approach urban planning at a fundamental level. Students typically respond to planning problems by extending pre-existing functions rather than by altering fundamental design. For example students might respond to the problem of environmental pollution caused by traffic congestion. Rather than re-think traffic flow, they suggest the solution of increasing emission control. This shows their inability to re-think problems at a basic design level. This failure in ability for people generally to understand the significance of their actions in a broader context is said to be the main cause of environmental destruction. The respondent provided three examples of how this is the case.

(8) The coordinator of the NAAB[32] criteria in Kuwait knows that the syllabus of the Department of Architecture in Kuwait will not be recognized by the NAAB committee simply because they do not accredit their curriculum from outside the USA, on the basis of cultural differences and differences in objectives. Yet, in Kuwait they insist on applying all 37 elements that are included in the NAAB matrix, regardless of their importance. The problem with applying such a method is that in Kuwait they omit small details which might affect the learning process. For example, by adding so many elective architecture courses to the curriculum they assume that Kuwaiti students know how to choose the best

[32] NAAB: National Architecture Accrediting Board

courses on the basis of their intended profession, when interviews with students revealed that most of them chose elective architecture courses by following the crowd! As a result, during their graduation project many students get stuck and discover that they lack the ability to form links between their previous experiences.

(9) The same coordinator said that it is more important to apply environmental laws to people, such as exacting fines for dropping litter in the street, rather than paying attention to building laws. He believes that the Department of Architecture plays a limited role in terms of building up students' environmental awareness. This is attributed to the way they learn things in the Architecture Department in relation to their profession, but as citizens, they need to learn about their environment at a different level, away from the Department. He suggested the need for enforcing universal laws that are related to the needs of the disabled, smoking bans in buildings, and stopping emissions of harmful gases etc from buildings. He insisted that environmental specialists are the ones who should follow up environmental law rather than architects, neglecting the fact that environmental law has several branches, each related to a particular field, for example, industry, agriculture, and so on.
By doing so, he was placing a boundary between architectural education and other environmental activities, which means that in his teaching he restricts himself to architectural concepts rather than helping undergraduates to learn how to apply sustainability in real life settings. One surprising element is that he did not consider factories and electricity plants as buildings, but he said that houses are buildings! Also he said that an oil spill has more effect on the environment than a building emitting gases, which cannot be considered an accurate statement. The word building is 'an umbrella' which includes many things. It is not clear why he stated that neither electricity plants nor factories can be considered as buildings, since the definition of a building applies to both.

(10) Another member of staff believed that once students are convinced about the idea of the relationship between building materials and energy consumption through computation, they won't forget to apply their knowledge in positive

building designs. They develop good attitudes only when they have been through the tedious process of gaining knowledge.

(11) When asked about the curriculum in Kuwait and why it includes many elective courses in humanities, he criticized the way the graduates are accredited in Kuwait and how they become architects immediately after graduation, regardless of their real abilities. He suggested that in Kuwait they should follow the American approach in requiring an accreditation examination for those who intend to work as architects. This way all their previous experience and knowledge would be tested regardless of the type of education they have received. In this case if the curriculum places more emphasis on art and humanities rather than on technology, the architect will need to work to improve his technology background to pass the test and be accredited. However, the way current graduates are dealt with in Kuwait ensures that inexperienced architecture graduates will be allowed to work as architects, surely leading to a problematic future for architecture in Kuwait!

(12) The Department of Architecture introduced five more compulsory courses to the syllabus in the academic year 2004/2005, reflecting their concern about their programme.

3.4.3 Analysis of the interview with the Head of KU Department of Architecture

The interview was not recorded following the request of Dr. Amer to turn off the recording machine and I was restricted to hand written notes.

Dr. Amer explained that the Department Of Architecture was opened in 1997 and offers graduates a professional degree in Architecture; the curriculum of Texas A&M University was chosen as a basis for this. The reason for choosing that university is that the duration of study there is five years, after which the undergraduates obtain a 'Professional Architecture' degree.

To obtain professional experience, undergraduates join elective training courses during the summer vacation that are equal to 3 credits out of the 166

credits required in the measure sheet[33]. The training takes place in collaboration with the private sector in architectural practices.

Dr. Amer further alleged that the choice of an American curriculum was due simply to the fact that it responded to the objectives of the Department Of Architecture at the time it was initiated and not out of a prejudicial bias in favour of North Americans. Also, generally speaking, the Faculty of Engineering was started with curricula from the US because the Department of Architecture, which is under the umbrella of the Faculty of Engineering, followed the same sequence of adopting American curricula. He explained that this does not necessarily mean that they do not take UK graduates to work for them. Also, students who transfer from British Schools of Architecture can transfer to Kuwait University by gaining accreditation for courses that match KU courses.

Dr. Amer stated that the future plan of the Department Of Architecture includes:

1- Introducing new courses that will cover any deficiencies in the training, for example, 'the Science of the Building' and 'Working Institutional Drawings';

2- Increasing courses that include Theory of Architecture;

3- Decreasing the number of elective courses in Humanities and introducing more subjects that deal with architectural science, urban planning and communication, so that the architecture programme becomes more fit for the requirements of graduates of Kuwait University;

4- Also the department will initiate a Masters Degree programme, mainly in architecture, and then it will expand to urban design.

5- He said they aim to move to a new building in the future, independent of the Faculty of Engineering, depending on space availability; first they will start with the facilities that are available until they have more space and then they will add two more departments: 'Building Construction' and 'Urban Design and Landscape'.

Dr. Amer said that currently the percentage of female students in the department is 70% and the males make up 30%. This is based on the results of

[33] The term 'Measure Sheet' is equivalent to UK 'requirements of graduation'.

high school graduates' GPA[34] in which females achieve higher grades than males. He added they do not use tests to accept new students, but when they are accepted into the Faculty of Engineering, the undergraduates take two architecture courses in 'Communication' and 'Design Basics' in their first year, so that when they join the Architecture Department they seldom drop out. Application to the course had risen steeply in recent years and now exceeded those of the Medical School, which had previously been the most popular area of study. In 2006 more than 250 students applied to the Department Of Architecture, out of which only 27 were accepted. However the acceptance rate is increasing, with the net result that more Kuwait architects will be available to influence the future of the country.

3.4.4 Correspondence with former Kuwait University lecturer

Professor R. Anderson is a former visiting lecturer for the Department of Architecture in Kuwait University, with whom I have established a personal correspondence via e-mail messages. His reply was as follows:

Architecture and environment at KU: some points to possibly consider

The architecture programme at KU offers a Bachelor of Architecture degree, which is a professional degree. Since it is in Architecture, it is heavily weighted with core courses in design. However, it also includes several core courses in architectural history, structures, materials, solar design, mechanical systems, and professional practice. Students must also take several external electives in the social sciences. Some design courses focus on interior design, urban design, and landscape. Most departmental electives cover areas such as theory and criticism and architecture of the Middle East, as well as foundation courses in several of the fine arts – e.g., ceramics, photography, and painting.

Since architecture is a very full curriculum, there has never been much opportunity to include courses in environmental science other than those that relate to building environmental systems – heating, air conditioning, and so

[34] GPA: Grade Points Average: A standardized measurement within a subject area used to assess students' levels of comprehension, where grades can be assigned letters. For example, A stands for excellent or achieving 100% of the total mark, whilst C stands for 60% of the total mark.

forth. My own thoughts in regard to providing students with environmental courses have centred on the possibility of offering a Master's degree in planning and transportation as these are two areas that have long been neglected in Kuwait and certainly should be addressed. A planning degree could include courses on housing, land use planning, neighbourhood design, site planning, and transportation. In most universities Master's level transportation and planning programmes are located in either architectural or engineering colleges.

Having given two short courses on city planning in Kuwait, I see little benefit in introducing a curriculum on planning policy since there is really no expressed public sector in the State of Kuwait and policy issues are always adjudicated at the highest levels in the ministries of Planning and Public Works. However, the establishment of a curriculum which could provide training for skilled analysts to examine problems in land use, traffic and transportation, solid waste disposal, urban management, and public facility planning could be of great benefit.

In support of this idea I will mention a few examples. The first is the sitting of the port facility in Shuwaik which blocks the paths of currents that previously cleaned the bay of contaminants. This disruption of a vital ecosystem leaves great pools of stagnant water along the beach and often leaves a horrific stench that lasts for days at a time (I learned this from Dr. Al-Awadi, a former Minister of Public Health, when I first lived in Shuwaik.). A second example worth mentioning is the present controversy regarding the location of the Kuwait University campus which now has two master plans in two different parts of the city. Surely an in-house comprehensive land use study could have selected a proper site for such a large facility, giving it an optimum location within the city's general plan and transportation network? A third example, of course would be some of the recent housing developments along the outer ring roads that are now occupied yet have no water or sanitation connections.

While many people have addressed some of the aesthetic issues within the city – for example, the quality of the early 1950s and '60s architecture, the removal of most of the *Sour* Wall and the old *Sougs*, and the many high rise buildings that crowd the coastal areas – there is still much to be focused upon in

improving the city's infrastructure and environment. And, I strongly feel that this should be done at home rather than through the work of consultants who have little vested interest in the city and work in a piecemeal manner from one project to the next. For example, if you look carefully at the plans of the six waterfront development projects by the firms Sasaki Walker & Associates and K.E.O, you can see that many have been significantly changed as they have been executed, indicating that there has been little municipal oversight.

When I left KU, most of the Architecture faculty were interested in establishing a Master's programme in Architecture. However, Dr. H. Dashti and I felt that the pursuit of a Master's degree in Planning would be of much greater benefit since the one-year M. Arch. Degree would not be accredited and there really was no need for it, as the B. Arch degree was already a first professional degree giving graduates the right to practice architecture. Our other reason for supporting the Masters degree in Planning was that several members of the faculty were already trained planners with Masters or Ph.D. degrees in urban planning. However, our pleas fell largely on deaf ears as a one-year M. Arch. degree was already in the planning stage when the architecture programme was established (Anderson, 2005).

3.5 Data analysis for end users

The effect of Kuwaiti end users on achieving more sustainable architecture in their country is induced through their daily behavior in their dwelling. Indeed people who build new houses, refurbish their old houses or buy new houses can redirect the housing market industry towards sustainable or unsustainable architecture. Their daily behaviour patterns (consumption of energy, gas and water) as well as their housing choices reflect their sustainable awareness. At an international level, the public can create a pressure group that plays a key role in changing the policies of their countries, provided they are well informed about the issues they are fighting to achieve. In this case, the research method will examine the possibility of Kuwaitis pressurizing their government to improve sustainability education, and create more environmental friendly policies (as will be further explained in Chapter 4).

Therefore a mixed method of data collection was designed to measure the end users' awareness of sustainability and was implemented along parallel lines. The mixed methodology included a survey questionnaire, direct one to one interviews or published interviews, a document content review as well as observation.

A questionnaire was designed to measure the views of Kuwaiti end users. The questionnaire aimed to answer the question of whether environmental awareness has actually led them to environmentally sound behaviour. The sample population[35] consisted of people intending to buy or build or refurbish a house. For validity and reliability, the questionnaire was distributed among a random sample in which each individual in the population has an equal probability of being selected, i.e. *systematic* or *probabilistic sample* (Creswell 2003: 156). According to the last census conducted in Kuwait in 2005 and 2006, the total population of Kuwait by 30/06/2005 was three million. According to their distribution by nationality and gender status, Kuwaitis make up 33.95% of the total population, of which 496,070 are females and 477,216 are males. Because the nature of Kuwait society makes it difficult to meet Kuwaitis in a public space to distribute the questionnaire[36], the method chosen was to give the questionnaires to Kuwaiti nationals in places that provide services just for Kuwaiti nationals.

The survey went through different stages that are explained in detail in the following section.

When the questionnaire was first administered, it was planned that over a period of 4 weeks a total of 480 questionnaires would be sent out. In the first week only 7 usable replies were received out of 120 copies of the questionnaire sent out to a random sample population in health clinics that provide health services only to Kuwaitis. It was established that the low percentage of

[35] See section (3.2).
[36] the population rate Kuwaiti: non-Kuwaiti is 1: 3.4

respondents could be attributed to three main factors: first, it included a relatively high number of questions - 40 - which sometimes were in compound form or needed further written elaboration (1-3 sentences). Secondly, the questionnaire was written in English which is a second language in Kuwait and this may discourage people. Finally, it included professional terminology used only in the field of architecture which contributed to increasing the difficulty in finding the right answers. As the questionnaires were handed to them and they were left on their own to answer them and leave them with the receptionist to collect later, 12% survey copies were returned with blank answers.

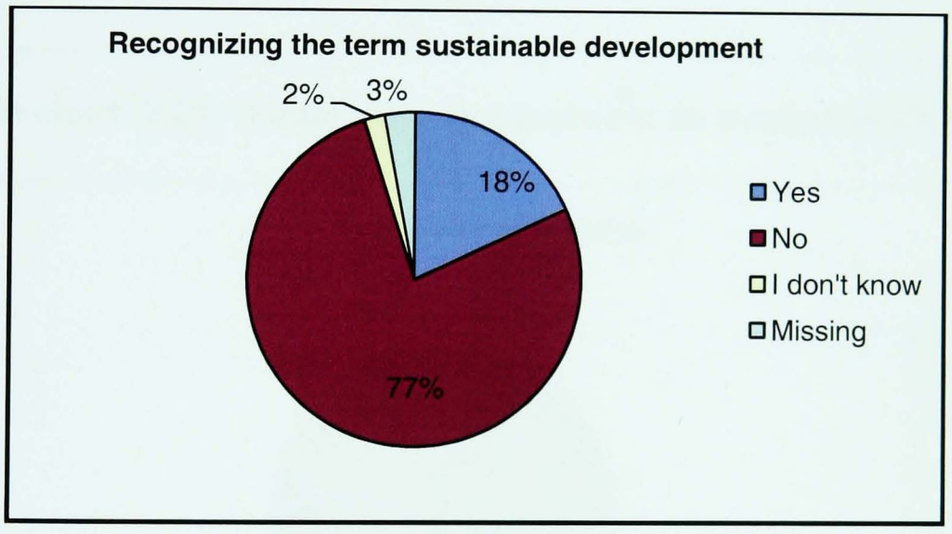
This stage of the survey was not considered as having misfired, but was instead regarded as a *pilot* phase from which a new questionnaire was evolved to override the weak points of the first.

The questions in the second survey were filtered and rephrased to a simpler language that would enable participants with different levels of knowledge and backgrounds to respond more easily; new questions were also added and the language used was Arabic.

The second questionnaire was distributed randomly in different areas of Kuwait where Kuwaitis commonly gather, such as public clinics, governmental service offices, restaurants and places of entertainment. The selection of the places was made by shuffling folded pieces of paper with the names of all the areas in Kuwait on them, then choosing some of them randomly. The time for implementing the survey was also chosen randomly using this system of raffling. After that the questionnaires were carried out in the selected areas within the selected times. The total number of usable replies received from this phase was 117 out of 200 copies sent out (58.5%), and the data were analysed using SPSS statistical software. Because the respondents of questionnaire 2 did not meet the goal of gender equity (33% male and 67% female), the sample was deemed unrepresentative (the gender balance in Kuwait is 50:50) and a new questionnaire was conducted to achieve a more representative sample to gain more accuracy for the results obtained to the final discussion with regard to the question: to what extent could Kuwaitis contribute to sustainable architecture in general and to architectural education in particular?

3.5.1Survey analysis results

The total number of participants in the third survey (Appendix 12[37]) was more representative of the Kuwaiti population. Out of 650 questionnaires 479 responses were obtained (a participation rate of 74%), out of which 54.5% were from male respondents. The questionnaire was analysed using SPSS software; the most significant figures are discussed in the following section. When the sample population was asked if they were familiar with the term 'sustainable development', 76.83% answered *no* (see pie chart 3. 20). The same sample data was further analysed using the one-way ANOVA test to investigate whether there is a difference in the responses of females and males. The data analysis results show that there is a significant difference between the attitudes of females (0.62) and males (0.39) (see Table 3.3) and that the results are significant (0.001) (see Table 3.4).



Pie chart (3.20) Sustainable development

Table 3.3 Results of Descriptive Data Analysis

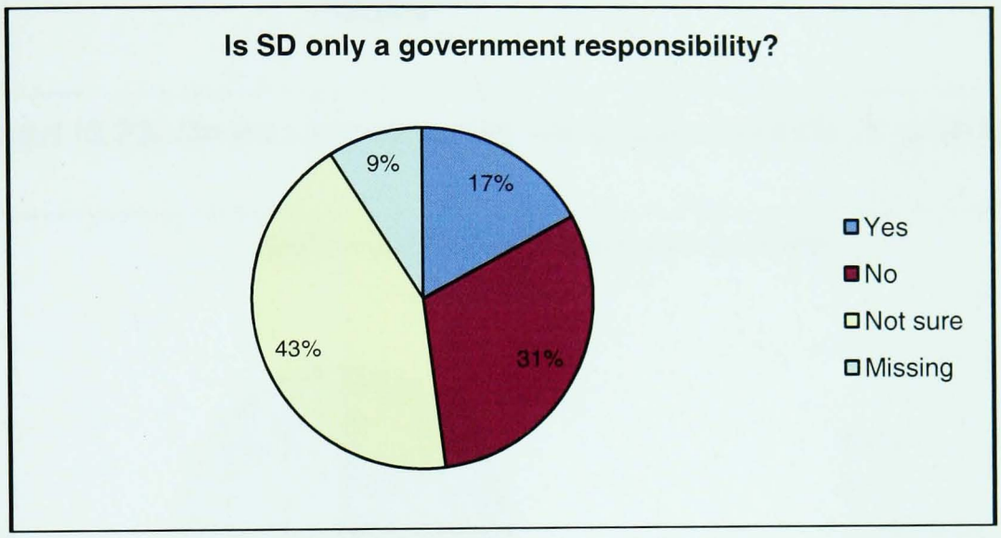
	N	Mean	Std. Deviation	Std. Error	95% Confidence Interval for Mean		Minimum	Maximum
	Lower Bound	Upper Bound	Lower Bound	Upper Bound	Lower Bound	Upper Bound	Lower Bound	Upper Bound
Male	261	.39	1.256	.078	.23	.54	0	9
Female	143	.62	1.846	.154	.31	.92	0	9
Missing	75	1.21	2.622	.303	.61	1.82	0	9
Total	479	.58	1.737	.079	.43	.74	0	9

[37] In questionnaire 3 the questions were translated to Arabic to increase participation rate.

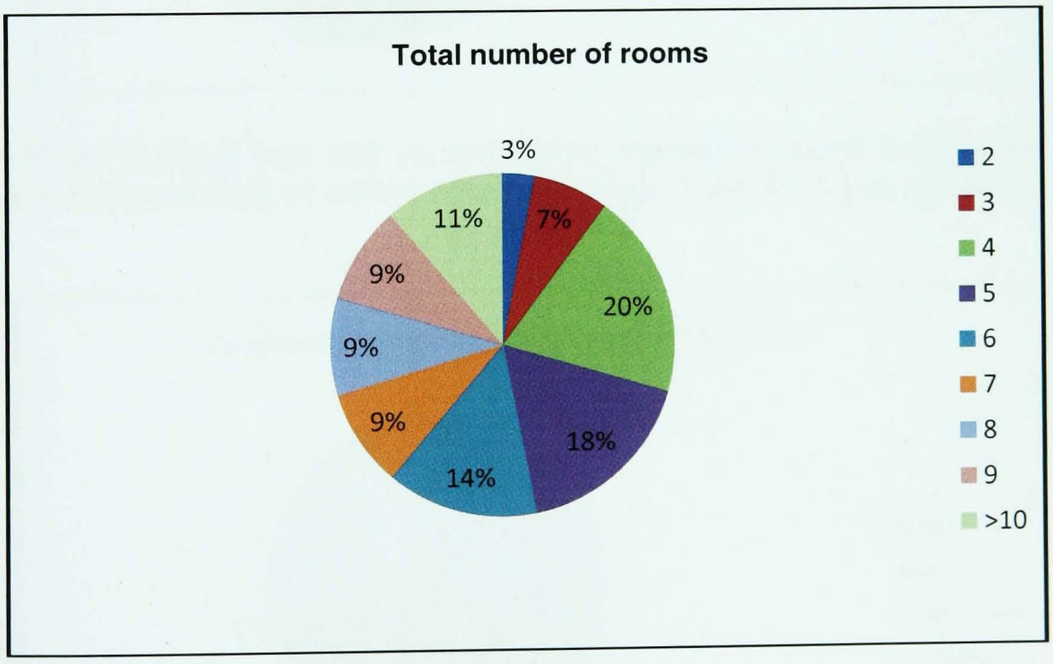
Table 3.4 Results of One Way ANOVA Test

Have you ever heard of SD?

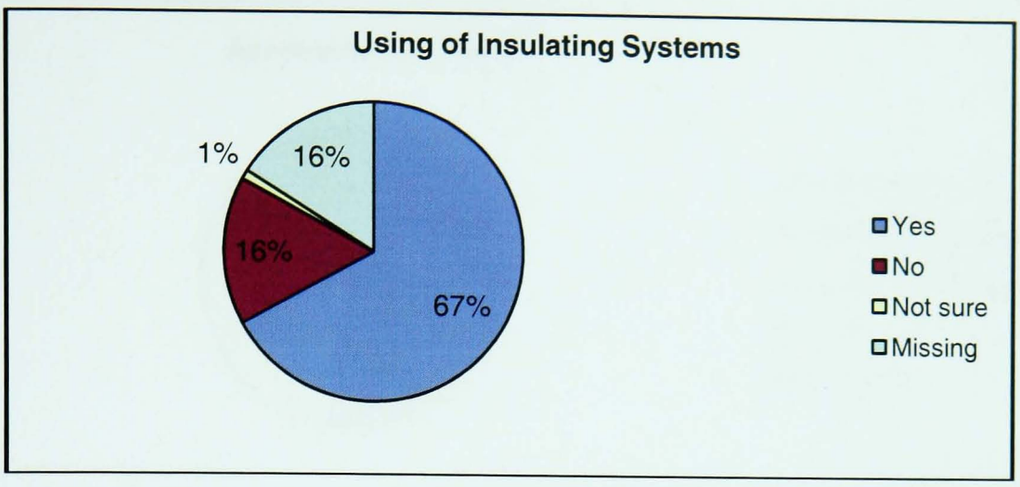
	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	39.977	2	19.989	6.785	.001
Within Groups	1402.349	476	2.946		
Total	1442.326	478			



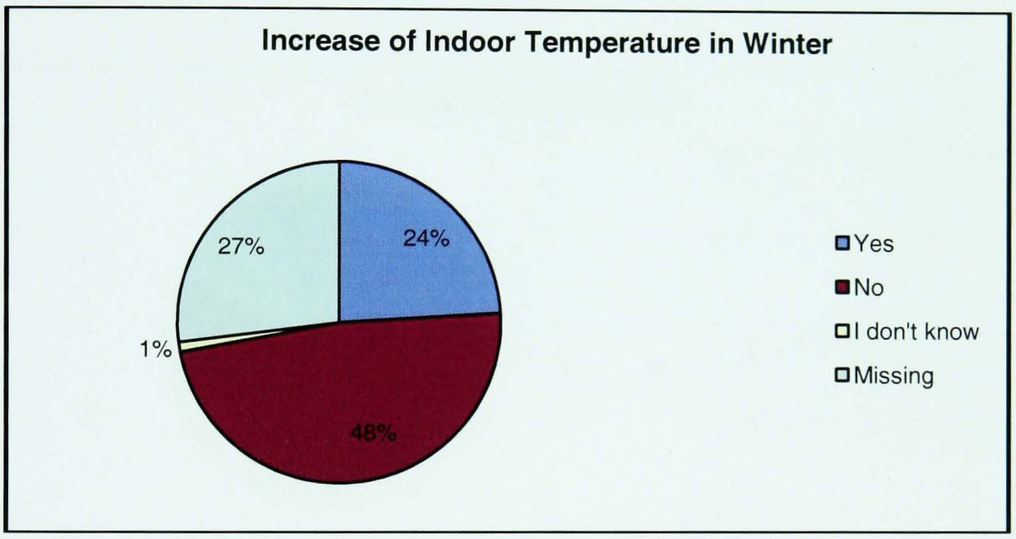
Pie chart (3.21) Sustainable development as a responsibility



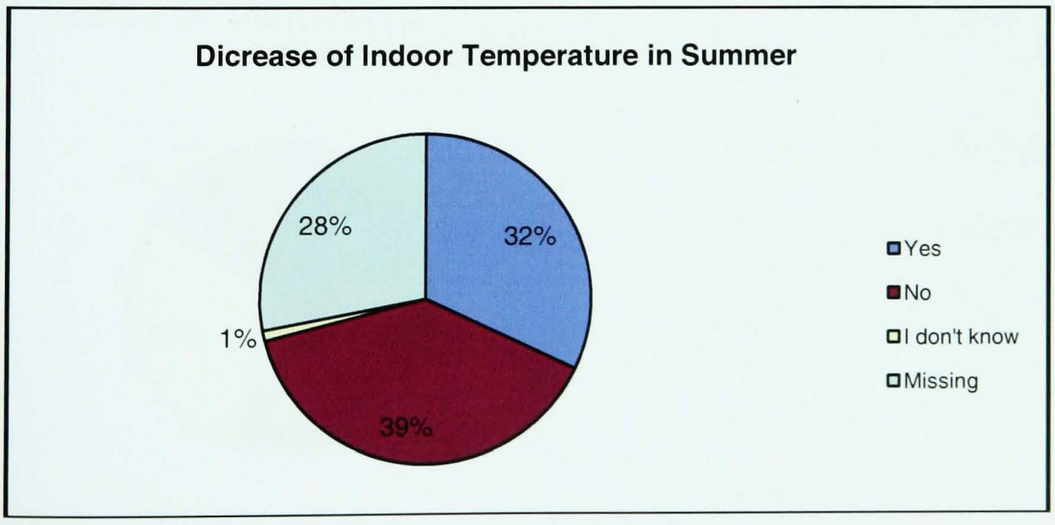
Pie chart (3.22) What is the total number of bedrooms in your house?



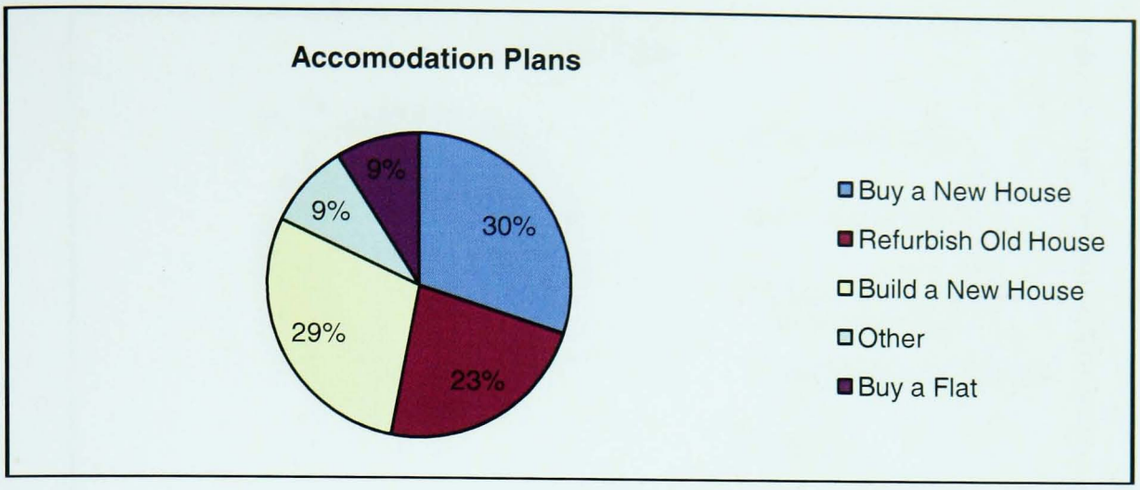
Pie chart (3.23) Do you use different insulating methods in your house?



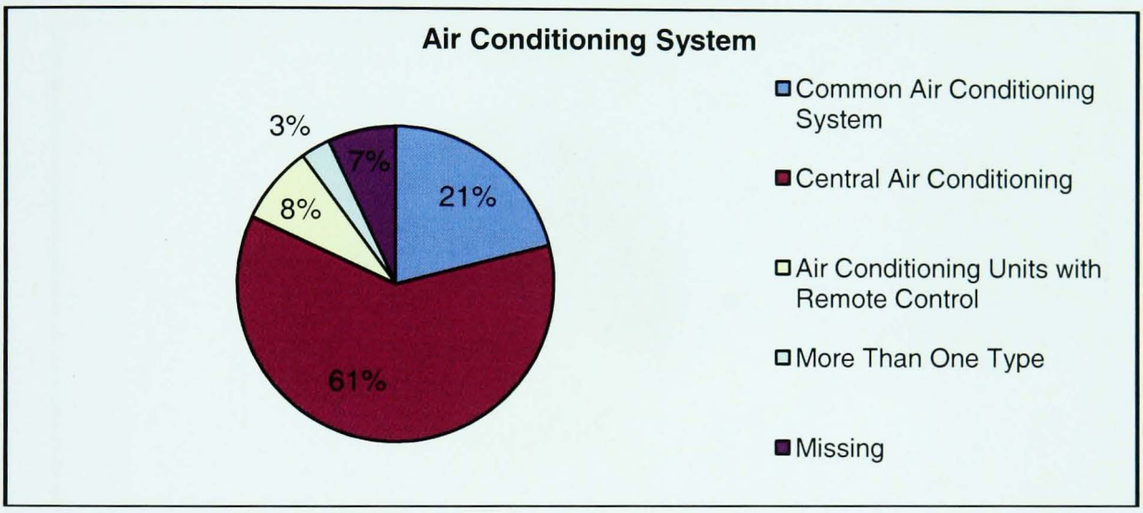
Pie chart (3.24) If you use an insulation system in your house, do you have the problem of rising temperatures in winter as a result of the insulation?



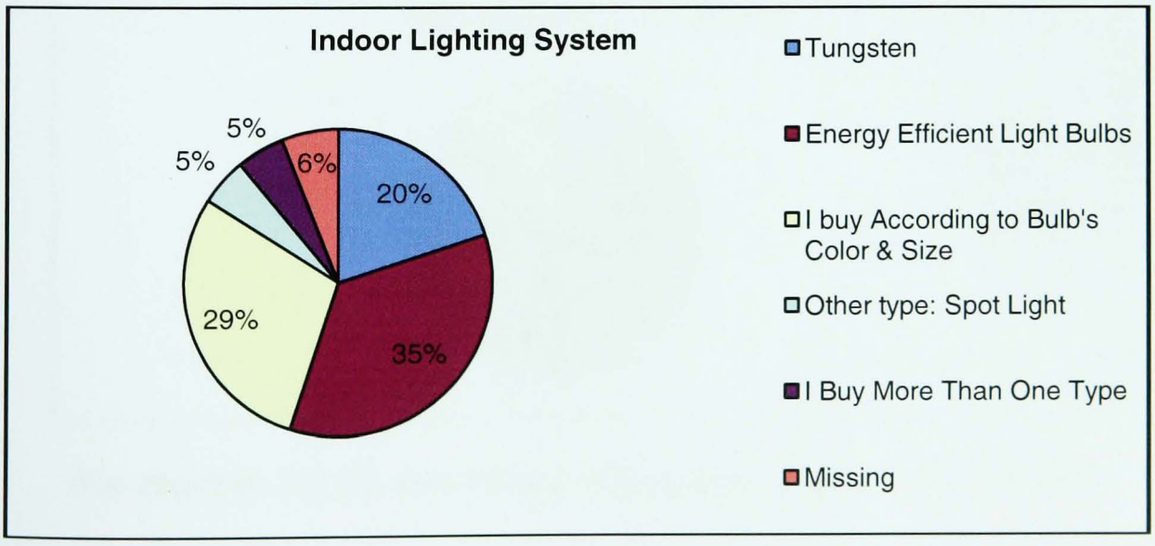
Pie chart (3.25) If you use an insulation system in your house, do you have the problem of decreasing temperatures in summer as a result of the insulation?



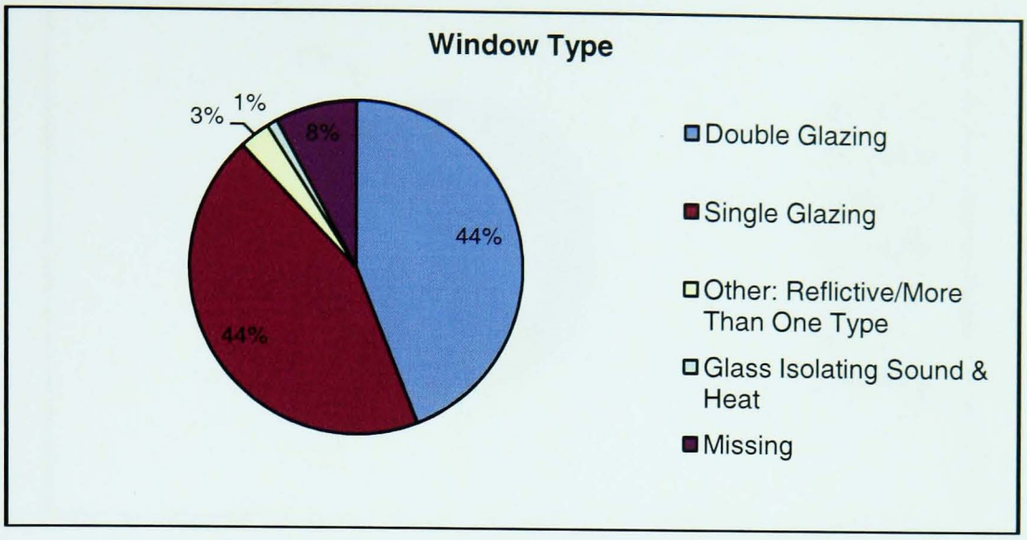
Pie chart (3.26) What do you intend to do regarding your accommodation?



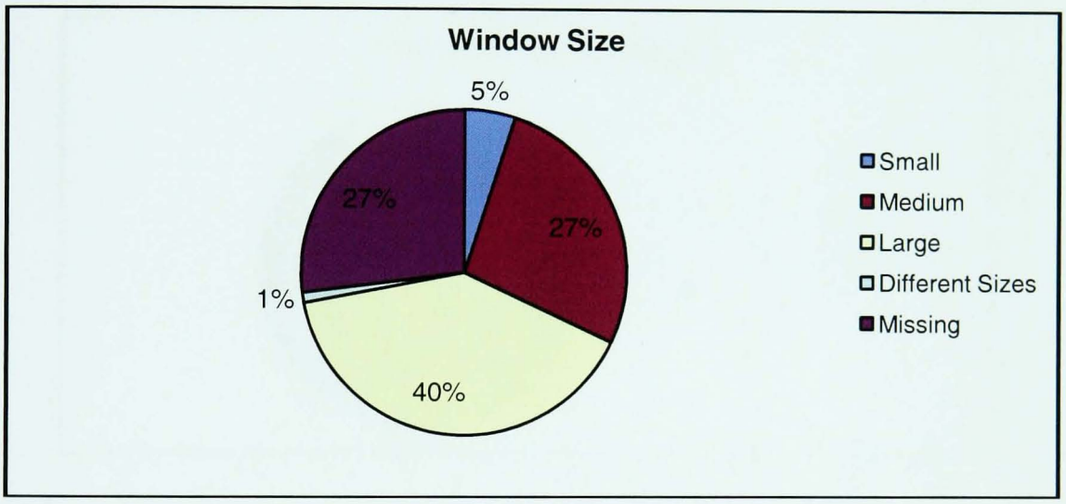
Pie Chart (3.27) What type of cooling system do you use in your house?



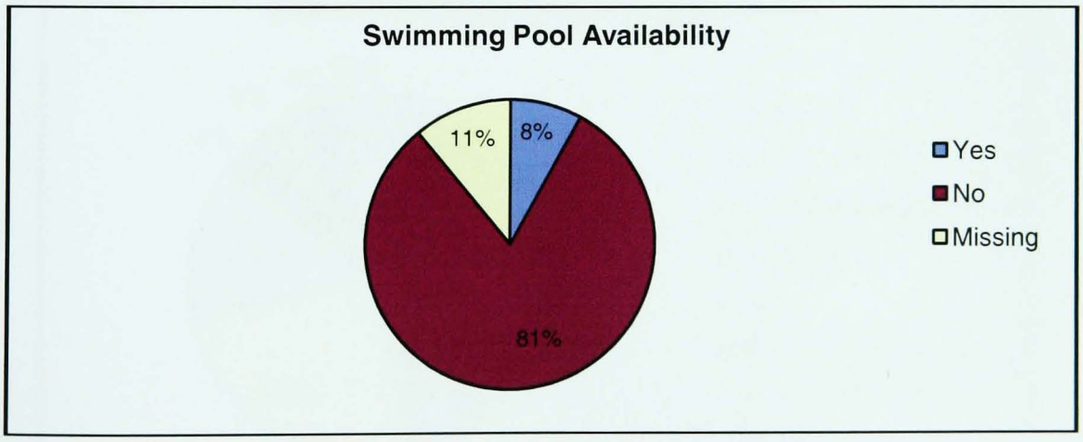
Pie chart (3.28) What type of lighting system do you use in your house?



Pie chart (3.29) What type of window glazing is installed in your house?

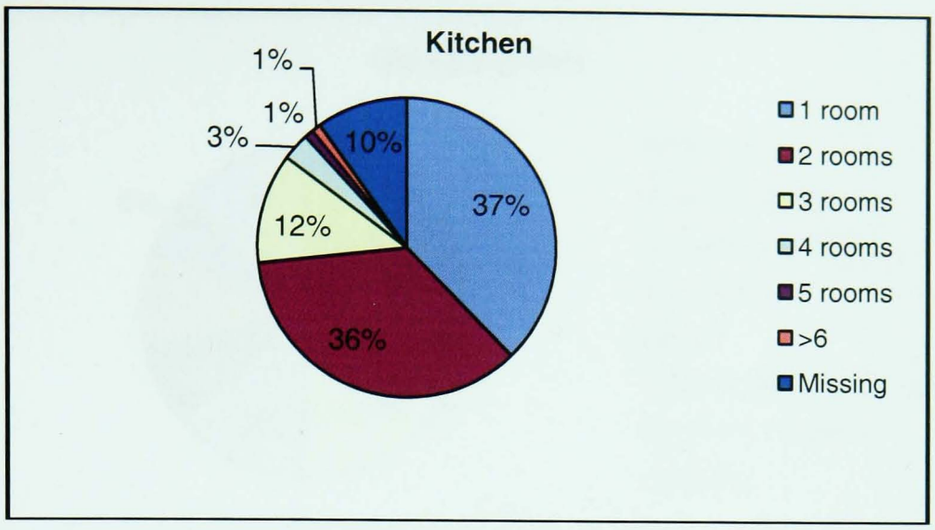


Pie chart (3.30) What are the sizes of the windows installed in your house in meters? [38]

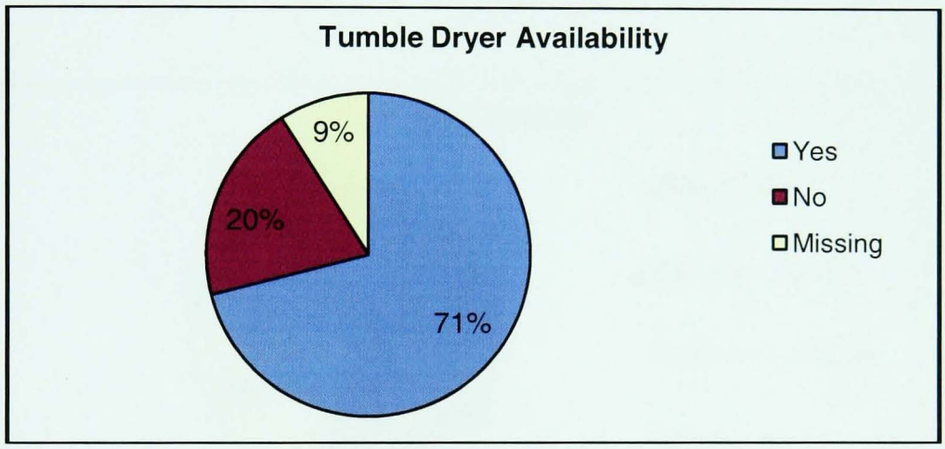


Pie chart (3.31) Do you have a swimming pool in your house?

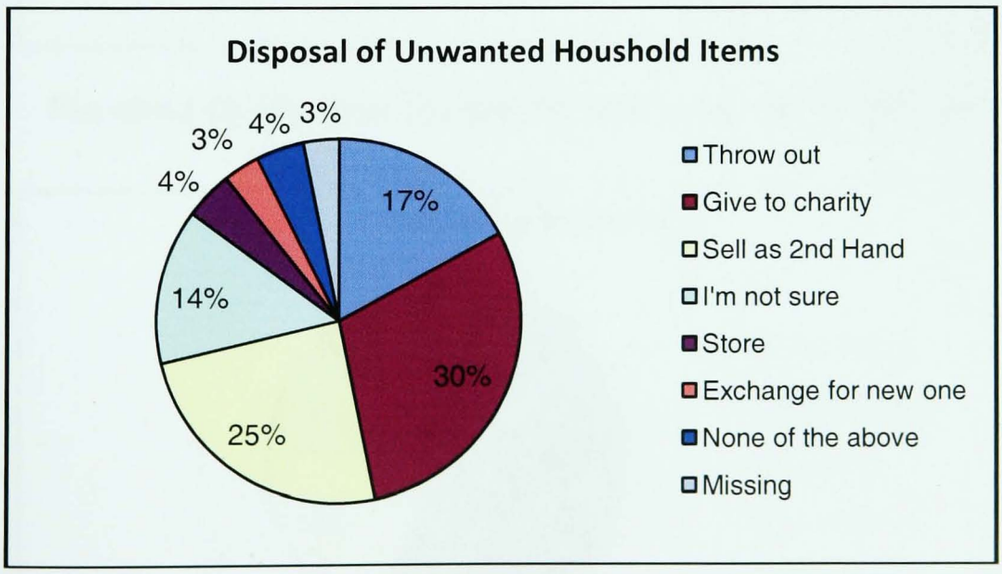
[38] The window sizes were converted from meters to (small.- Medium – Large – Very Large) for statistical reasons.



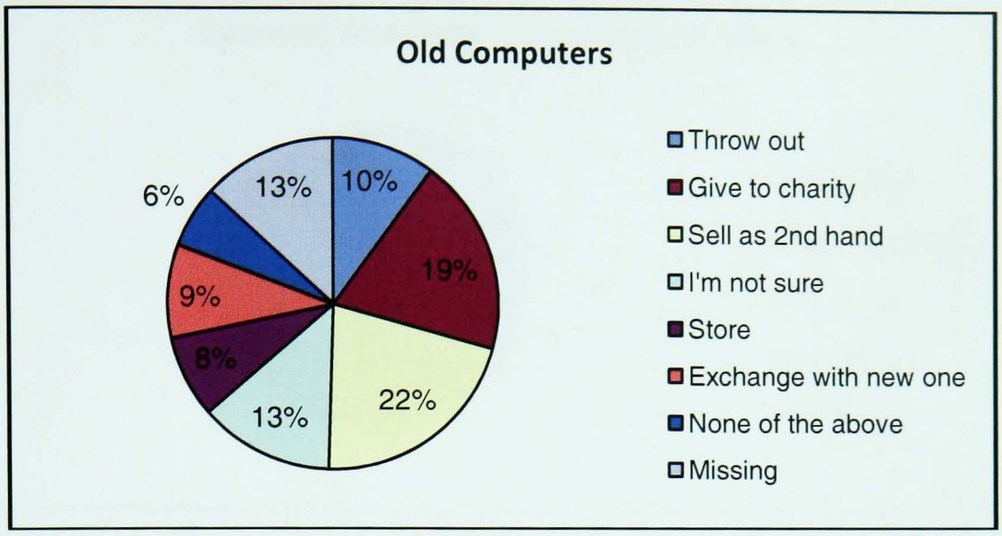
Pie chart (3.32) How many rooms are allocated to the kitchen in your house?



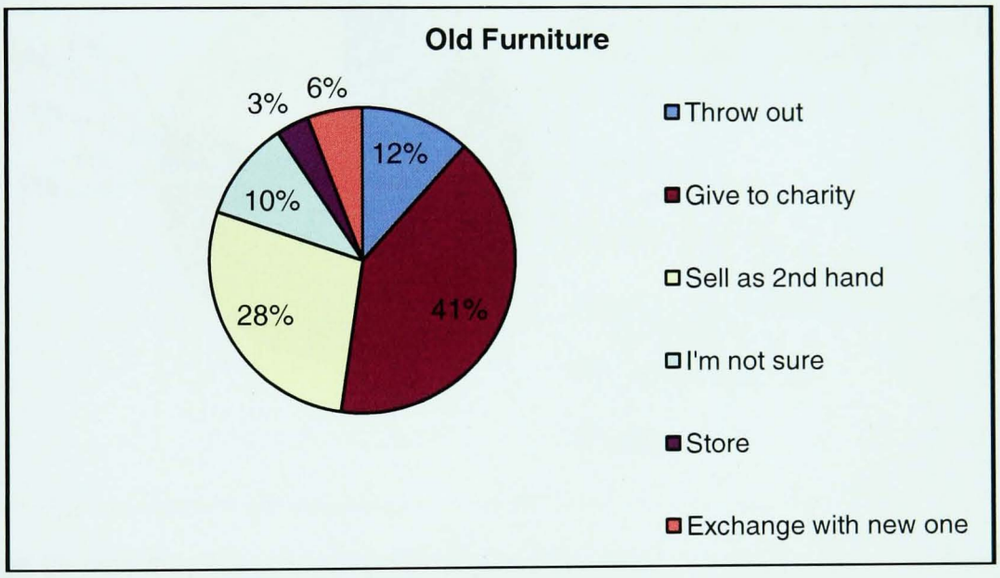
Pie chart (3.33) Do you have an electric tumble dryer in your house?



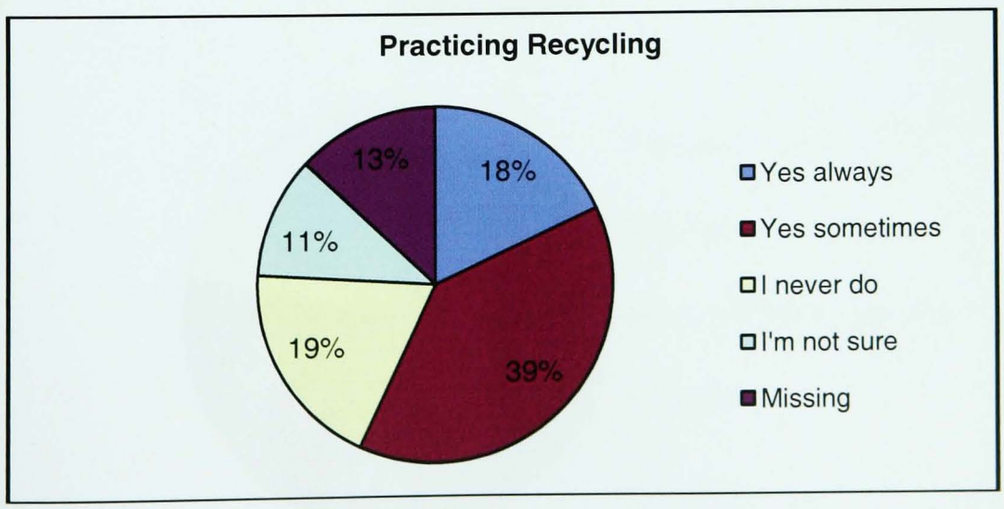
Pie chart (3.34) What do you do with the old machines in your house?



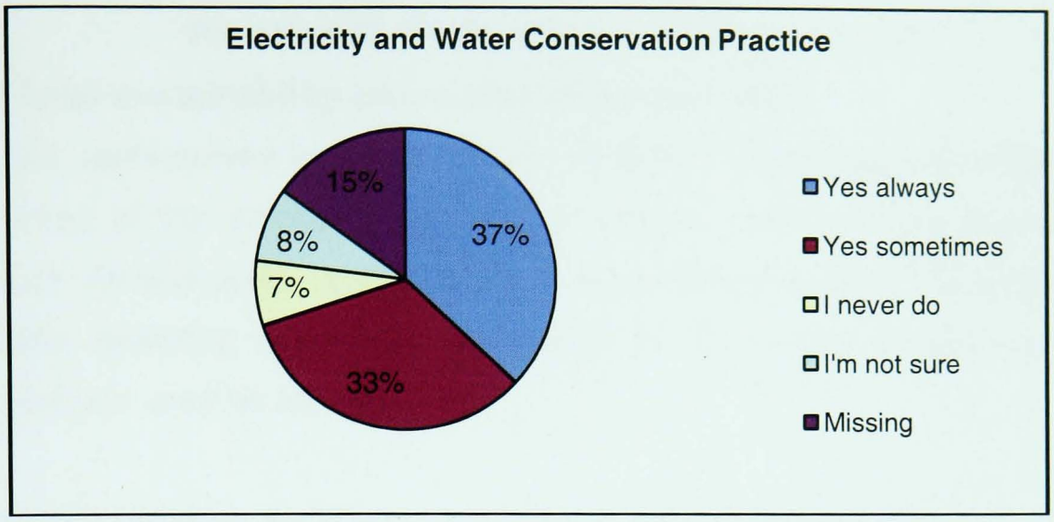
Pie chart (3.35) What do you do with your old computers?



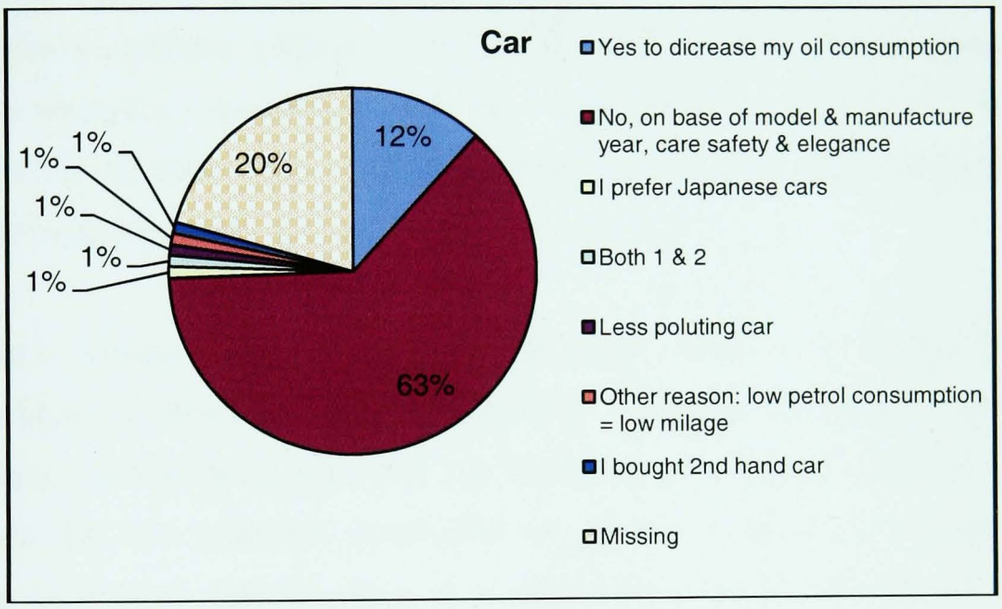
Pie chart (3.36) What do you do with your old furniture?



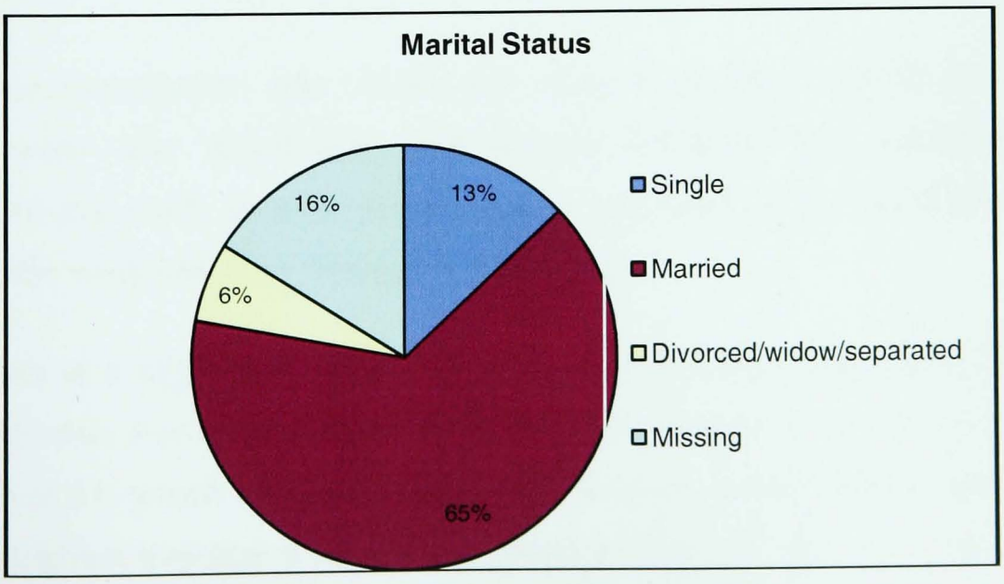
Pie chart (3.37) Do you practice any kind of recycling in your house?



Pie chart (3.38) Do you practice electricity and water conservation at home?



Pie chart (3.39) Did you buy your car according to its petrol consumption per gallon?



Pie chart (3.40) What is your marital status?

3.5.2 Total sustainability awareness of the end users

The end users survey included different variables (indicators) that measure the responses of the sample population to certain environmental behaviour. To measure the end users' total awareness of sustainability (T_aS) the most relevant variables reflecting sustainable behaviour in the survey questionnaire were selected and used as a tool.

Seventeen variables were included in the questionnaire as follows:
Sustainable development (*SD*) -total number of rooms in house (*Trms*) – use of insulation systems (*Insln*) – total number of house members (*Thm*) – air conditioning systems (*ACsys*) – indoor lighting system (*Ilsys*)– glazing (*G*) – window size (*W*) – swimming pool (*S*) – kitchen (*K*) – dryer (*D*) – old furniture (*Of*) – old computers (*Oc*) – old house machines (*Om*) – recycling behaviour (*R*) – conserving electricity and water (*EWc*) – car (*C*).

For each variable certain points were given from 1 to 3, expressing the sustainability awareness rate. The number 1 reflects sustainable behaviour, 2 represents normal behaviour and 3 is allocated for unsustainable behaviour. For example, for the question *what kind of glazing system do you have*, if the answer is double glazing, then it is allocated 1 as it reflects a sustainable behaviour, single glazing is given 3 points as it reflects unsustainable behaviour.

A further investigation was carried out using a *one way ANOVA* test to see if there were any significant relationships between the variables in the questionnaire such as age, marital status, education level or gender with the rest of the variables. The findings suggest that:

1) There is a significant relationship between the age group and sustainable behaviour. For example, the age groups 61-70 and 71-80 have an average T_aS of 31, which demonstrates a high level of sustainability awareness but the highest average is for the age group between 31-40 years old.

a. There is no significant relationship between gender and the average T_aS.

2) There is a significant relationship between different areas in Kuwait and the average T_aS.

To define the sustainable/unsustainable behaviour of the research area, the 17 variables (indicators) are multiplied by the score that has been given. For the most sustainable behaviour the score would be 17 (17X1=17), for unsustainable behaviour the score would be 51 (17X3=51) and the score of 34 would be the normal average behaviour (17X2=34). The score within the average (17-34) will indicate sustainable behaviour, whilst the score between the ranges (34-51) will indicate unsustainable behaviour.

Following this, an equation of the sum of the variables was developed as follows:

$$T_aS = SD + Trms + Insln + Thm + ACsys + Ilsys + G + W + S + K + D + Of + Oc + Om + R + EWc + C$$

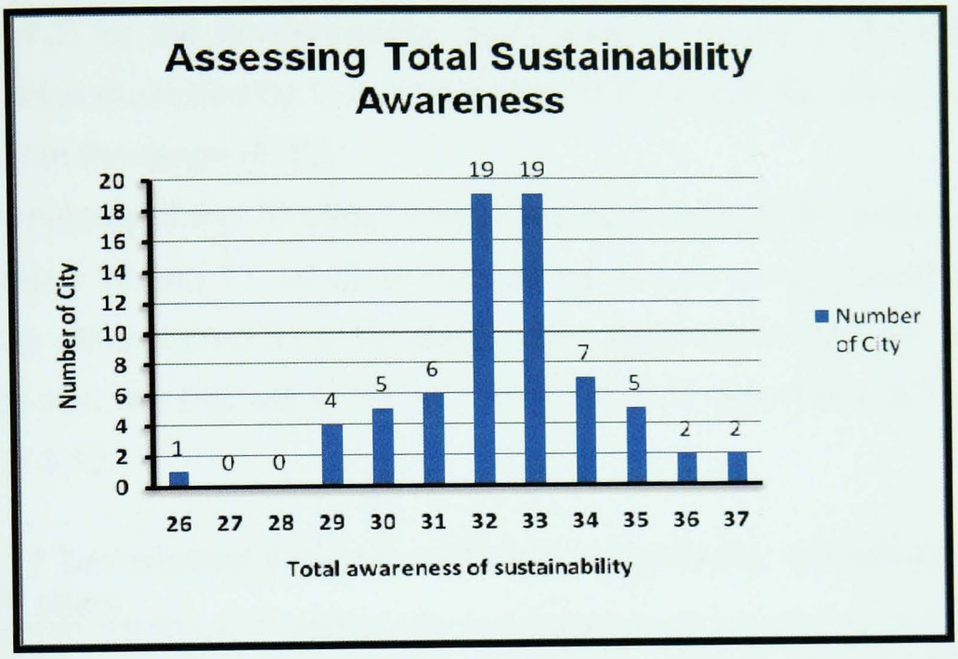
As the respondents of the survey belong to 70 Kuwaiti cities, the data analysis was designed to compare the T_aS between the cities.

The results of the calculation show that the majority of the cities' T_aS score was between 29-37 points, which means that their behaviour is normal rather than sustainable, although city number 26 is considered the most sustainable (see Table 3.5 and Column chart 3.41).

Table 3.5 TaS of 70 Kuwaiti cities

Total Awareness of Sustainability Score	Number of cities	Valid percent	Cumulative Percent
26	1	1.43	1.43
27	0	0.00	1.43
28	0	0.00	1.43
29	4	5.71	7.14
30	5	7.14	14.29
31	6	8.57	22.86
32	19	27.14	50.00
33	19	27.14	77.14
34	7	10.00	87.14

35	5	7.14	94.29
36	2	2.86	97.14
37	2	2.86	100.00



Column chart (3.41) TaS of Kuwaiti end users

The total awareness of sustainability of 70 Kuwaiti cities was assessed and evaluated in terms of the 3 drivers of sustainability which are environmental, economical and social sustainability. Therefore 17 indicators are categorised in these three drivers as shown in Table 3.6 below.

Table 3.6 The 17 indicators within the three sustainability drivers

	Environmental Indicator	Economic Indicator	Social Indicator
1	Sustainable development (*SD*)	Total number of rooms in house (*Trms*)	Total number of house members (*Thm*)
2	Indoor lighting system (*Ilsys*)	Use of insulation systems (*Insln*)	Old furniture (*Of*)
3	Glazing (*G*)	Air conditioning systems (*ACsys*)	Old computers (*Oc*)
4	Window size (*W*)	Kitchen (*K*)	Old house machines (*Om*)
5	Swimming pool (*S*)	Conserving electricity and water (*EWc*)	Recycling behaviour (*R*)
6	Dryer (*D*)	car (*C*)	
Total	6	6	5

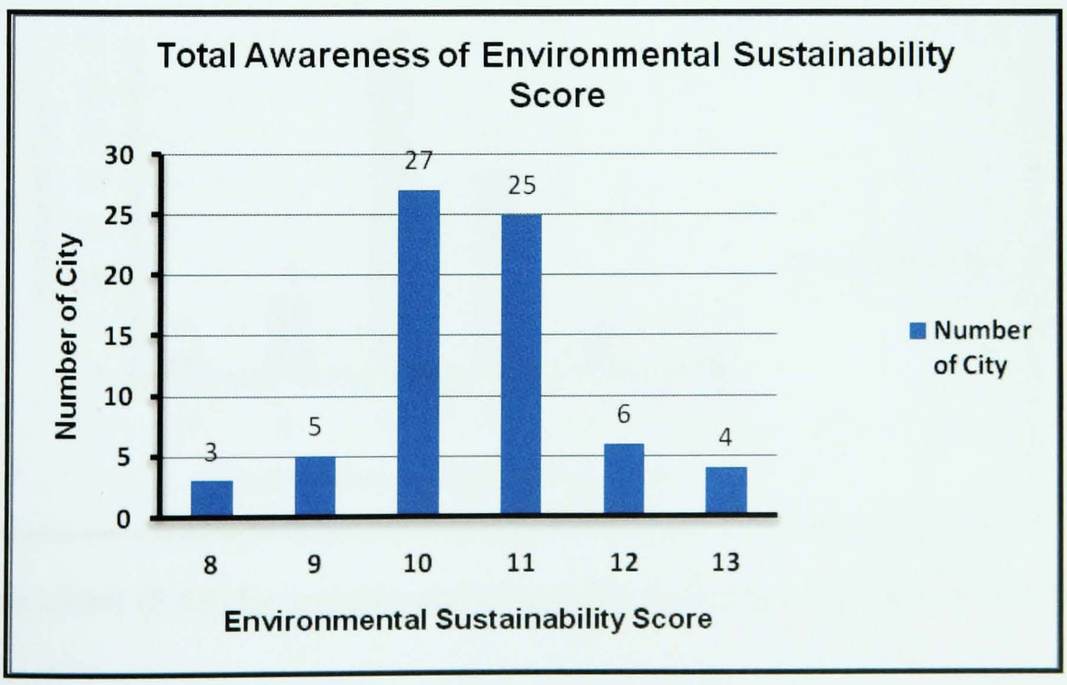
Using the categories in the above table to calculate the T_aS for the 70 cities covered in the survey, it is found that T_aS is 32.3, so it lies within the range (17-34). Therefore, it is near to sustainable, but it is not sustainable.

1- The T_aS for the environmental driver average score is 10.49: there are 6 variables multiplied by 1, 2, 3, resulting in 6, 12 and 18, which means 10.49 is within the range (6-12).

2- The majority of the 70 cities' environmental sustainability awareness score is between 10 and 11, which is considered normal, going toward sustainable. Three cities scored 8 points which is the lowest score (38, 61, 66) and four cities had the highest score of 13 (64, 48, 46) (see Table 3.7 and column chart 3.42.

Table 3.7 Descriptive Analysis of TaS environmental sustainability in 70 Kuwaiti cities

Total Awareness of Environmental Sustainability Score	Number of City	Valid percent	Cumulative Percent
8	3	4.29	4.29
9	5	7.14	11.43
10	27	38.57	50.00
11	25	35.71	85.71
12	6	8.57	94.29
13	4	5.71	100.00



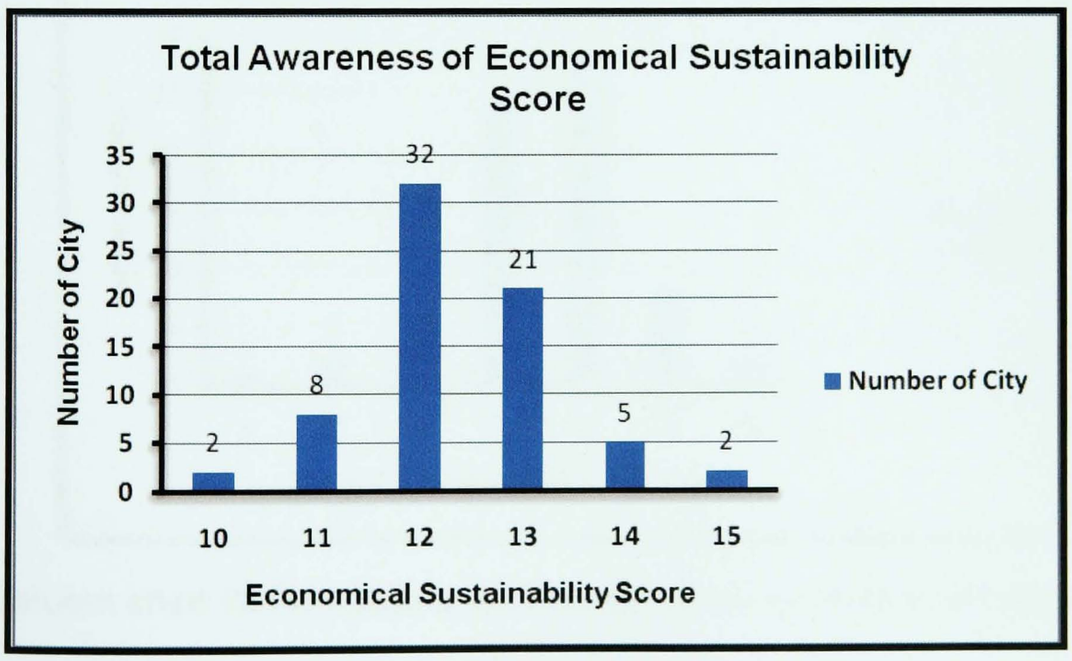
Column chart (3.42) Environmental sustainability behaviour in 70 Kuwaiti cities

3- The T_aS score for the economic driver is between 12.28 and 15, which is in the range between normal and unsustainable. This result means that the government should take measures to bring the average score back within the normal range by introducing new economic sustainable strategies.

For economic sustainability awareness, the majority scored between 12 and 15, so their awareness is normal going towards sustainability (see Table 3.8 and column chart 3.43.

Table 3.8 Descriptive Analysis of TaS economic sustainability in 70 Kuwaiti cities

Total Awareness of Economical Sustainability Score	Number of City	Valid percent	Cumulative Percent
10	2	2.86	2.86
11	8	11.43	14.29
12	32	45.71	60.00
13	21	30.00	90.00
14	5	7.14	97.14
15	2	2.86	100.00



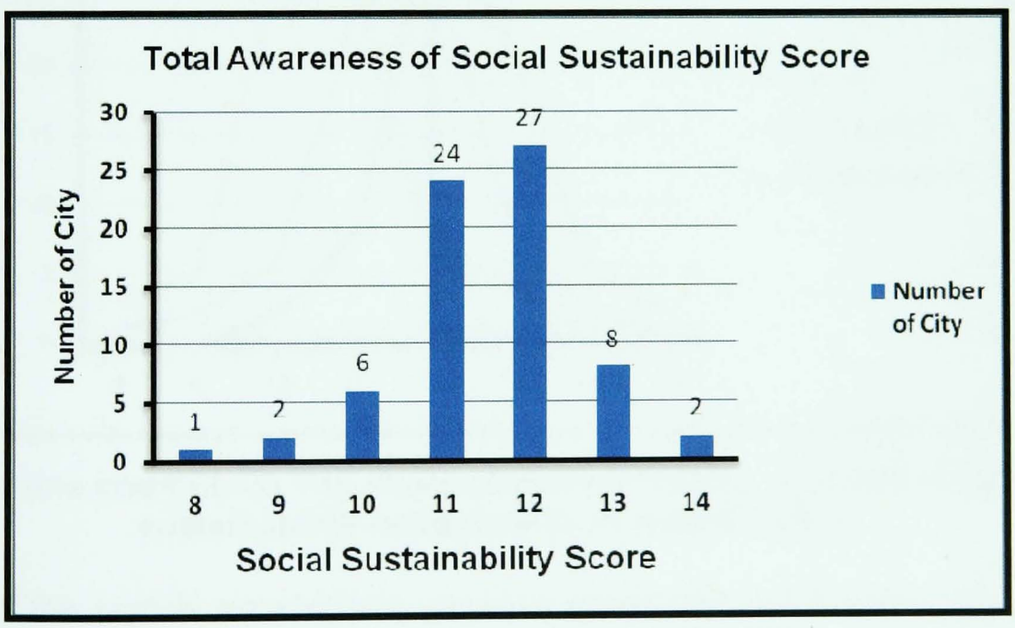
Column chart (3.43) Economic sustainability behaviour in 70 Kuwaiti cities

4- The T_aS for the social driver score is 9.51, which is less than the other two drivers and more sustainable (because it is within the range 5-10. This driver

includes only 5 variables in Table 3.4). By converting the scores of social sustainability which are 5 to 6 to make it equivalent to the other two drivers, it is found that environmental sustainability behaviour is more common among the sample population in comparison with the other two drivers. For the social sustainability driver, the majority scored between 11 and 12. More than 85.7% are below average; see Table (3.9) and column chart (2.44).

Table 3.9 Descriptive Analysis of TaS social sustainability in 70 Kuwaiti cities

Total Awareness of Social Sustainability Score	Number of City	Number of cities	Cumulative Percent
8	1	1.43	1.43
9	2	2.86	4.29
10	6	8.57	12.86
11	24	34.29	47.14
12	27	38.57	85.71
13	8	11.43	97.14
14	2	2.86	100.00



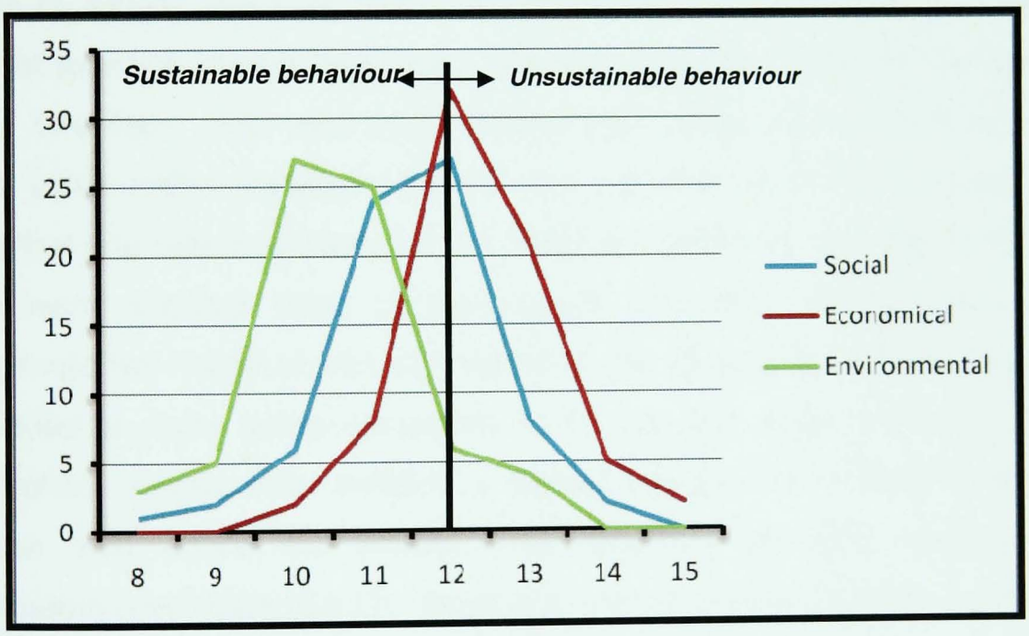
Column chart (3.44) Social sustainability driver in 70 Kuwaiti cities

By comparing the three drivers, it is found that the environmental driver is the most sustainable driver, followed by the social and the last is the economic

driver. The majority of the cities express normal sustainability awareness; see Table (3.10) and stacked line chart (3.45).

Table 3.10 A comparison between the score of TaS of the three drivers of sustainability

Total score	Social	Economic	Environmental
8	1	0.00	3
9	2	0.00	5
10	6	2	27
11	24	8	25
12	27	32	6
13	8	21	4
14	2	5	0.00
15	0	2	0.00



Stacked line chart (3.45) TaS score of environmental, economic and social sustainability behaviour in 70 Kuwaiti cities

52.2% of the sample population's answers expressed unsustainable behaviour as their T_aS is more than 34 points;

37.8% of the sample population expressed sustainable behaviour as their T_aS is less than 34 points, and

10% of the sample population expressed highly sustainable behaviour as their T_aS score is between 18 and 27.

10% of the sample population expressed highly sustainable behaviour as their T_aS score is between 18 and 27.

3.5.3 Analysis of interviews with end users

Another random sample of members of the public in Kuwait was interviewed to measure their sustainability awareness. The reasoning behind this procedure was to establish some grounds for estimating their ability to play a significant role in achieving sustainable development in the future and affecting decision makers' policies of improving education in the field of Architecture in Kuwait.
Two types of interviews were analyzed: those conducted during the course of the research, and interviews published in the media. An analysis of the results is given in the following sections.

3.5.3.1 End user 1, E

The first end user, *E* - interviewed by the researcher, explained her building themes by saying she built two extra flats in her house to rent out, but if she does not manage to rent them then she will keep them until her children grow up and use them. She also said that the final design of her building resulted from a collaboration between herself, the architect, and her husband, which shows that she was well aware of her need to make sure that the details of the house were decided upon in accordance with the family's future needs. Furthermore her husband was well aware of the effect of the environment when he decided to make some alterations to the window sizes during the building construction, making them smaller to reduce the amount of sunlight and heat, and the dust inside the house. This decision will also reduce energy consumption (*see* Appendix 13 - excerpt of interview with end user 1, E).

3.5.3.2 End user 2, G

G explained that he rented a small flat in the Jabriya Area near his family house. When his father passed away he used his share of the inheritance to purchase a new house for his family in the same area. When asked about the house specifications he answered that he bought an eight-bedroom house although he had only one son and two daughters. He described his choice as a 'precaution,' just in case his female relatives and mother visit him and decide to stay overnight. When asked about his environmental specifications he said he had none because he was more concerned with finding the right price within his

3.5.3.3 End user 3, N

End user N was interviewed by an Al-Qabas journalist. She explained how she imitated her childhood house in Lebanon when she designed her house in Kuwait. She added that her house was four storeys high, and was a building whose ground floor was used as a reception area with different corners furnished in different styles (English, Italian and Arabic). The second floor was allocated to her and her husband and the third floor was for her children's use. The top floor included flats built just in case any of her children decides to stay within the family house after getting married (*see* Figure 3.4).

Figure 3.4 Pictures of the house of end user N published in Al-Qabas newspaper

3.5.3.4 End user 4, L

Mrs. Alkhurafi's husband was the head of the Kuwaiti Engineering Society at the time of the interview[39] with the Al-Qabas journalist. According to her, and also as is observable from the pictures in Figure 3.5, the interior of the house was designed to mimic English designs. It has many arrangements and features that express its owner's taste in colours and furniture and her love for creating a series of big spaces. The furniture includes a twenty-chair Italian dining table. The basement includes many guest rooms and a swimming pool. The house has a variety of furniture such as Scandinavian style chairs in the Scandinavian corner, American style chairs and chandeliers of different sizes in the American

[39] The interview was published in Al-Qabas newspaper on12-06-2006.

corner, English style curtains, chairs, chandeliers and spotlights in the English corner and the entrance includes Italian marble floors.

Figure 3.5 Details from the home of end user L who is the wife of the Head of the Kuwait Engineering Society, showing extravagant decor and little interest in sustainable practices

3.6 Observation of new neighbourhoods in the private sector

Observations were made and photos taken of new buildings that were designed and constructed by the private sector in new neighbourhoods in Kuwait. The purpose of the pictures was to compare the levels of awareness of sustainability

exhibited in interviews with end users, and the results of the survey with actual behaviour and to see evidence of how far building codes are enforced in Kuwait. Since housing in the private sector is restricted to Kuwaitis, and only a very small number of non-Kuwaitis build their houses in Kuwait, observation of building designs was used to measure levels of environmental awareness.

Figure 3.6 is a sample of the personal observation survey results:

Source: courtesy of Bushra Abdlrahim

Figure 3.6 Observation of new neighbourhoods in Kuwait. The top row displays random house façade designs and colours, the middle row displays designs that do not consider the hot arid climate resulting in houses with closed shutters most of the day, and the bottom row shows houses which differ from the Arabic style.

3.7 Observation of old neighbourhoods in the government housing sector

Old neighbourhoods that were designed and built by the government as part of its plan to provide citizens with a housing service at subsidised prices were visited and observed. It was found that the majority of the houses had been

demolished and rebuilt into new buildings for various reasons. Each house refurbishment that has taken place long before the end of the building's life cycle speaks of its occupants' dissatisfaction and the easily accessed bank loans (*see* Figure 3.7).

Source: courtesy of Faleh Al-Gatha

Figure 3.7 Photographs of government houses in Kuwait. The top row includes the original building designs; the middle house was altered, adding an extra floor. The bottom row includes government houses after alterations with higher elevations than the rest of the neighbourhood

3.8 Comparing undergraduates' responses to points of view of academics and end users

When examining and comparing the results of the three groups - Kuwait University undergraduates, academics and the end users - three points should be considered. First, the undergraduates belong to different generations from the other two groups, and this affects their way of thinking. Second, the undergraduates could be the offspring of the end users, that is, the ideas or beliefs that the parents hold may be transmitted to their children, resulting in modification of their environmental behaviour, positively or negatively. Third, all three groups share common knowledge that has accumulated from the Kuwaiti education system, especially in the compulsory school years, and also utilise the same Kuwaiti regulations, that is, energy tariffs, construction laws and indirect taxation.

the same Kuwaiti regulations, that is, energy tariffs, construction laws and indirect taxation.

3.9 Interviews with government officials and architectural design experts

The detailed reporting of these interviews is given in appendix 14 and 15 (Tables 7-15). The interviews were conducted by the researcher and two of the interviews, of a government official and an architect, were published in Kuwait media.

The tables include summarized points extracted from the analysis of the interviews conducted with experts from different disciplines on the topic of sustainability. Each one of them tackled the issue of sustainability from a different angle, resulting in a range of opinions that will be investigated in the discussion and conclusion section of Chapter 4.

3.10 Points extracted from the interviews with government experts

The experts interviewed in the previous sections (whether by the researcher or extracted from published interviews in the Kuwait media) hold different points of view of the issues under investigation, but at the same time they presented valid arguments about ways to improve sustainable architectural education, raising the environmental awareness of the public and undergraduates and improving the present environmental policies. The main points they discussed will be exhibited in the following sections: 3.10.1, 3.10.2, and 3.10.3.

3.10.1 Architectural education in Kuwait

Architectural education in Kuwait University can be improved as follows:

1- Developing the human resources should become a priority in the Department of Architecture; for example, it should become a priority in the department to insist that university staff should obtain a Bachelor of Architecture rather than an Engineering degree, in order to improve the quality of teaching and to gain more positive teaching outcomes. Many international universities prefer to employ architectural staff holding a Bachelor's degree and with excellent professional experience rather than those with high academic qualifications, that is, PhDs and post doctoral graduates, because they believe experience contributes to better teaching of architectural design.

2- Prior to initiating an Arab Architects' League that will create a unified curriculum drawn from the curricula of all Arab countries, and appropriate to their culture and environment, all Arab countries should improve their curricula to meet international standards; otherwise, the whole process will be doomed to fail.

3- Teaching of sustainability should be initiated by high-ranking officials to make it a priority at Kuwait University as an integrated subject, including its integration into the syllabus of the Department of Architecture.

4- Employing international academic staff will mean better architectural education that generates a variety of teaching methods and better designed curricula.

5- Dr. H and Dr. Amer have contrasting views. Dr. H criticized the system of enrolling high school graduates into the Department of Architecture on the basis of their high school grades (results) rather than on the basis of their talent (for example, through a drawing exam). The Head of the Department of Architecture, KU Dr. Amer (in section 3.4.3), said that all students accepted in the Faculty of Engineering participate together in the first year, in which they study the Design Basics model, and in their second year in the Faculty they branch out to do their preferred majors. Dr. Amer sees the preparatory year as a practical way for the students to investigate their own abilities and make their choices, whilst Dr. H sees it as a waste of one year of a student's life, which could easily be substituted by an official test to find out what the students are able to do. From these two points of view, it is clear that even though the students do not take any kind of drawing tests to investigate their talent, their first year in the Faculty is thought to be sufficient for them to decide whether to join the Department of Architecture or not.

3.10.2 End users' sustainability awareness

It is interesting to find that most of the expert interviewees agreed that the sustainability awareness of Kuwaiti people is lower than the international norm. The analysis of the results from the end users' interviews in section 3.4.1 and the new building criteria of the Public Authority for Housing Welfare (see Table 7 in Appendix 15 interview with Director of Architects Department in PAHW for

details) concur with the interviewees' views as well as those of Kuwait University academic staff presented in section 3.4.2.

3.10.3 Improving the sustainability awareness of end-users and undergraduates

The experts interviewed expressed different points of view about ways to raise end users' environmental awareness: most agreed on the importance of the educational system in achieving such targets, though felt that starting in the early years is likely to make education more effective. Many of the interviewees agreed that education plays a key role in raising people's environmental awareness and that education from childhood is more likely to achieve results than postponing this kind of education until the learners have reached adulthood when they are likely to have established their own beliefs which will be hard to change. Others suggested the role of the media or NLP (Neuro Linguistic Programming) in building public environmental awareness and a small number placed emphasis on short term measures to be taken by the government, such as raising energy tariffs. Professor Lewcock expressed an optimistic opinion in his prediction that sustainability will find its place in the Gulf Area within ten years from now, in spite of what some might think at the present time (for example, the high energy consumption rates in that region of the world in particular - *see Appendix 16*).

3.11 Summary and conclusions derived from analyzed data

The results outlined above in Chapter 3 make it evident that sustainability awareness is initiated by the educational system, which, if it is appropriately designed, provides learners with basic knowledge, as well as incentives. Subsequently, sustainability awareness is reflected in the daily behaviour of all categories of society at different levels and in different ways, in accordance with each category's role in the whole community. The state exerts its influence through the legal and regulatory systems, but education starts to have an influence from an early age.

In Chapter 3, the experts agreed that knowledge of sustainability should be instilled in infancy, followed by encouragement of a more responsible attitude towards the environment once the young generations become mature and capable of making a contribution to their society. The curricula should include

environmental concepts and information should be prepared by specialist professionals and integrated within all disciplines to achieve the best results.

In the present teaching environment of Kuwait University's Department of Architecture, a growing number of faculty members are joining the staff with PhD level qualifications, who have not had the opportunity to design and erect a building or evaluate the real-world usefulness of cherished intellectual and aesthetic preferences. In many programmes there exists an almost cult-like adherence to theoretical architectural notions on the part of young faculty members.

The earlier sections of Chapter 3 present a variety of factors that contribute to the weak implementation of sustainable architectural design in Kuwait; a situation which undermines any steps taken to achieve sustainable architecture. Based on this finding, it is concluded that, to achieve sustainable architecture, any suggested reforms towards a positive sustainable construction industry in Kuwait should include all parties participating in this process.

3.12 Summary and Conclusion

Chapter 3 presented the methodology used in conducting the research and justified the mixed methodology strategy in establishing the validity and reliability of the data collected and analysed. Further, the chapter aimed to determine the degree of sustainability awareness in Kuwaiti society through interviews with undergraduates, academics and end users.

The results display low awareness of sustainability issues that can be attributed to several factors: first, the weak environmental primary and secondary educational systems, which do not equip the students with knowledge and skills regarding sustaining the environment. Second, Kuwaiti government policy makers do not prioritise sustainable education, resulting in its neglect by education experts and low environmental competencies in those educated. Third, the policies that subsidise gas, water and energy tariffs and even building materials, result in a widespread lack of awareness of their real importance in a country which is dependent on sea water desalination in daily life.

The data results and analysis reveal the required roles of policy makers in setting new strategies for sustainability at a state level, including the Ministry of Energy, Public Housing Welfare, the Ministry of Media, the Ministry of Education and Higher Education, the Ministry of Health and other official departments. As architectural education is new to Kuwait, it is apparent that the country's Higher Education system has not yet developed an internal capacity for independently monitoring the quality, relevance and/or performance of its architectural study programme. It could therefore be effective for the Ministry of Higher Education in Kuwait to take more account of comparable architectural education systems as a point of reference. This could guide the development of an indigenous programme for Kuwait.

Chapter 4

The Attainment of Sustainable Architecture in Kuwait

4.1 Introduction

Chapter 4 aims to provide an examination of the drivers[40] for more sustainable architecture in Kuwait that spring from environmental, economic and social issues. Key environmental thinking emerged in the 18th century in Europe connected with reforestation movements (Palmer et al., 2001). It emphasised the preservation of the Earth's living and non-living resources including raw materials, water, fossil fuels, agriculture and livestock. Concerns about the exploitation of the Earth's resources relating to economic issues emerged later and related to both land and manpower. Economic sustainability is not always embraced by investors because it is subject on all levels to different inputs and outputs. At a state level it is subject to the whole economy on local, national and international level, whilst at investor's level it is subject to viability of an enterprise or a product for marketing. It will be discussed briefly in this chapter. The social driver, society's influential role in sustainable architecture, will be analysed and it will be shown that it operates in two ways; first, through social capital forming networks that aim to change government policy and, second, through end users influencing architects' designs positively or negatively, depending on their levels of environmental awareness. Influencing policy makers affects sustainable architecture through state strategies, legislation, building codes and standards that are both enforced, and taught in schools of architecture. Policies also cover laws that affect the housing sector, public, private, domestic and non-domestic.

Furthermore, Chapter 4 will discuss the interaction between the different factors within social sustainability and their influence upon achieving sustainable architecture. The factors' effects vary widely around the world. Here, the factors discussed will be restricted to the UK and Kuwait. The concluding section of Chapter 4 will reconsider all the factors and includes recommendations for ways to increase public environmental awareness using educational tools.

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[40] Drivers of sustainability in architecture are referred to as pillars of sustainable architecture in many Architecture references and other sources call them simply sustainability factors or goals (Dernbach 2002: 51-52, IUCN 2006: 2).

Because this research concerns the sustainable architecture curriculum in particular, the description of the environmental and economic sustainability drivers will be outlined in subsections 4.3.1 and 4.3.2, while in subsection 4.3.3 more detail will be provided regarding social sustainability as it covers the role of stakeholders, policy makers and education in formulating sustainable architecture.

Figure 4.1 presents the key drivers of sustainable architecture: environmental, economic, and social. In the representation of social sustainability, the arrows represent each factor's effect, with the assumption that factors have equal weight; each factor occupies one third of the inner circle, which represents the state structure. Because there are no rigid boundaries between the three categories, a dotted line is used to separate them.

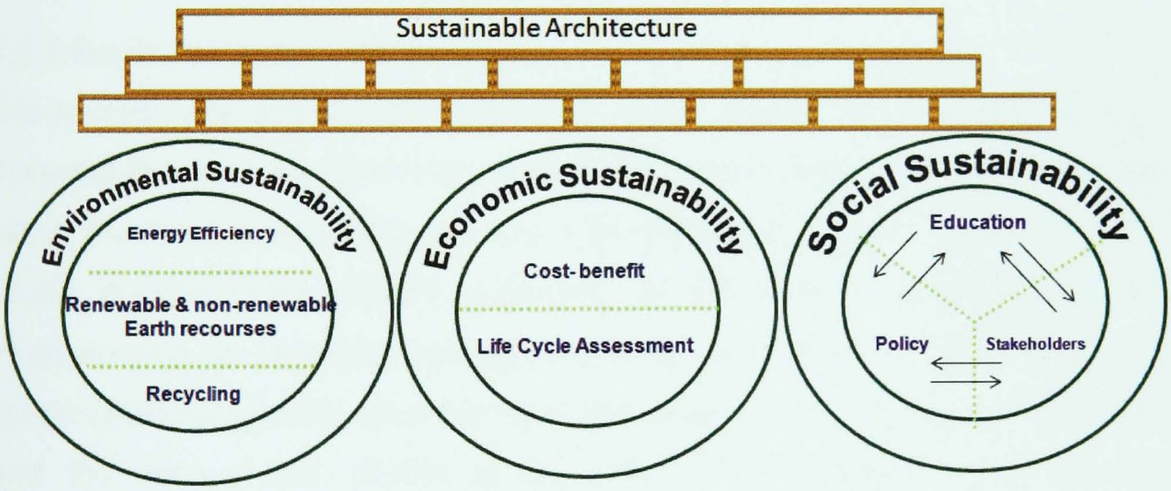

Figure 4.1 Framework of sustainable development

4.2 Sustainable architecture

Although a regard for sustainability has underpinned many practices across human history, it was first explicitly noted in the international agenda after the end of WWII and received global attention from then onwards (McNeill, 2007). Sustainable development aims to provide quality life to all current generations without jeopardising the life quality of future generations, through improving the quality of environmental, economic and social aspects of life (World Commission on Environment and Development, 1987).

4.3. Sustainable architecture drivers

Sustainable development has three aspects: environmental, economic, and social (Wells, 2003). Through its history sustainable architecture may be said to have been affected by the three drivers: environmental, economic and more recently social (Ibid: 73). In subsections 4.3.1, 4.3.2 and 4.3.3 the three drivers of sustainable architecture will be explained with a greater emphasis on social sustainability, as its elements are directly linked to this research's investigation of the architecture curriculum. Social sustainability is relatively the 'newest' of the three drivers of sustainability and has proven difficult to define exactly. It was brought into international attention in the 2000s and was focused on in particular in the Johannesburg Summit in 2004 which brought forward social issues such as providing clean drinking water for millions who don't have it and having social aspects as the core of economy (McHarry et al., 2005) Section 4.3.3 provides a possible definition.

4.3.1 Environmental Sustainability

Environmentally sustainable practices were common in the 18th century as documented in Han Carl Von Carlowitz's book *Sylvicultura Oeconomica* in which the term *sustainable use* was first introduced (Heigel, 2002). In 1980 the World Wildlife Fund (WWF) published its definition of sustainability as the 'maintenance of essential ecological processes and life support systems, the preservation of genetic diversity, and the sustainable utilisation of the species and the ecosystems' (IUCN et al., 1980). This definition emphasised the relationship between social and environmental concerns as it sought to raise the profile of ecosystems ecological environment to sustainability. Allen (1980) considered that the definition includes the requirement to meet the needs of local people, communities and governments while implementing sustainable development strategies that improve quality of life while conserving the environment. Environmental sustainability is discussed in many parts of this thesis, but generally speaking it has gone through many incarnations since it was introduced by the UN Brundtland commission as part of sustainable development, defined as development that meets the needs of the present without compromising the ability of future generations to meet their own needs (World Commission on Environment and Development, 1987) and it is still

developing in the course of world summits (Dresner, 2002; Baker, 2006; Dale and Newman, 2005).

4.3.2 Economic Sustainability

Environmental economics aims to promote sustainable development through market incentives that decrease the gap between economic growth and environmental protection through finding common ground, and eliminating fears that environmental protection will prevent economic growth (Zarsky, October 1998). Economic factors play a key role in shaping sustainability together with the vital roles of the environmental and social drivers. Redclift (1989) proposed that lessons from ecology should be applied to the economic process to encompass a World Conservation Strategy, providing an environmental rationale through which development, which aims to improve human quality of life, can be challenged. The past few decades have seen a growing recognition of the inadequate feedback within the decision-making processes for any project, due to economic concerns. This led the World Commission on Environment and Development (WCED) to bring economic issues into the 1987 UN Conference on Environment and Development and into the 1992 Rio de Janeiro conference, leading to further global and local consideration of economic sustainability (Hodge et al., 1999). The recognition of the economic dimension of sustainability led the UN to modify sustainability programmes to track changes in economic as well as in ecological and human conditions, in order to decrease human vulnerability and increase confidence by means of this wider perspective. The UN Commission on Sustainable Development listed 134 indicators of sustainable economic change on a global scale, while encouraging communities and businesses to apply performance measurement. The main UN scales are identified on base of the components of each sustainable system to use as monitoring tools (Cheng and Durst, 2000). The scales are listed below:

1. Programme, project, facility; employing traditional performance measurement of input, output, outcomes or results;
2. Company size (small, medium, large), industry, sector of the economy;
3. Community;
4. Province, state or nation;
5. Ecosystem-bound unit (landscape unit, river basin, island, etc); and

6. Globe (Hodge et al., 1999: 2).

Many studies were conducted into the relationship between environmental attitudes and environmentally related behaviours. These studies provide little guidance on explaining, predicting and testing hypotheses about environmentally related economic behaviour (Kotchen and Reiling, 2000). Cost is considered a primary element in sustainable building, as most managers in the building industry tend to take no action, if additional costs are involved in sustainable building given the low environmental and social quality awareness the public is perceived to have (Halliday, 2008). Often the financial decisions taken in the construction industry impact on both the environmental and social quality of life and therefore affect sustainable architecture. With little information available to initiators about the impact of building alternatives on net cost, they are powerless to evaluate alternatives, rendering them unresponsive to end users preferences. Recently information about building costs has started to raise questions about their impact on infrastructure, people, running costs, and the quality of the environment (ibid.: 60). Traditional economic systems place more emphasis on financial impact rather than on outcomes, which improve the quality of life and environmental conditions and are sustainable outcomes. Therefore, new policies that include alternative indicators have been introduced internationally in the UN conferences in Kyoto, Rio de Janeiro and Doha, at regional levels, such as the EU's Lisbon sustainability strategy, and at national levels, such as the UK Code for Sustainable Homes implemented in April 2008[41]. These new policies have introduced new trends in the built environment, consumerism and social sustainability through determining the real costs of building decisions.

Halliday (2008) reports that reducing costs may lead to poorly designed and constructed buildings, which may result in *sick building syndrome*, an increase in the crime rate, dissatisfied communities and additional financial costs. While well-designed and constructed buildings produce environments with satisfied inhabitants, lower crime rates and less long-term financial costs for refurbishments. Possible additional costs of constructing sustainable buildings

[41] The codes can be downloaded on line: http://www.communities.gov.uk (last accessed 19/03/2009).

appear to be the market drivers that put pressure on the innovators of sustainable products to reduce their profits, to compete with unsustainable products and practices. Further, she argues that the current lack of innovation and unsustainable building practices are a result of the existing funding mechanisms in the construction industry (p. 61).

In spite of the widespread idea that additional costs are introduced by sustainable designs, a study comparing American libraries designed to fit LEED[42] requirements for Platinum green design found a lack of evidence that there are additional costs resulting from sustainable designs[43]. Sustainable building design has the potential to reduce operation and maintenance costs to zero (Barrington Area Library, 2008).

Regarding *cost-effectiveness*, there is no statistical basis for clients and some policymakers to assume that the higher the building's green rating, the more expensive it becomes (Halliday, 2008: 71). In terms of *added value*, the design adds little to the building's costs in comparison with the cost of operation, finance and employees, which, together, account for up to 99% of the costs (ibid.: 74). Extra construction costs to produce quality buildings are often offset by markedly improved performance and reduced operating costs. For example, air quality and lighting contribute to operational efficiency, leading to a significant improvement of the staff and process performance within the building. The design of efficient lighting leads to significant energy saving and increases workers productivity and satisfaction (ibid.: 74). Halliday (2008) listed the economic benefits of sustainable buildings as follows:

1- *Reducing operating costs* by 30% when attention is given to basic details, passive solutions and avoiding over sizes prior to adding technology;
2- Reduced waste through efficient land use, energy and water conservation, native landscaping, solid waste management and considering *Limits to Growth*[44].

[42] LEED: Leadership in Energy and Environmental Design rating system set by US Green Building Council
[43] See http://www.barringtonarealibrary.org/ref/docs/LEED.pdf (last accessed on 20/March/2009).
[44] The Limits to Growth model is based on ways that the system responds to pressure: population and carrying capacity are of four types: continuous, overshoot, collapse and sigmoid.

3- Reduced liability as legislation has now become a vital consideration and environmental bodies increasingly introduce and use law to prevent poor environmental practices;
4- Enhanced productivity and learning owing to good air quality, personal environmental control, daylight, and bio connections indoor and outdoor; and
5- Social costs and poor built environments are directly related. For example the percentage of adult and childhood asthma patients in the UK that result from poor home environment with dust mite colonies that could be easily removed impact on NHS annual costs. Asthma from this cause leads to a yearly £359m lost to productivity and £60m lost in sickness benefits. Sustainable construction projects with continuous monitoring found a reduced rate of dust mites and improved health conditions within (ibid.: 76-77).

4.3.2.1 Life-cycle assessment (LCA) and Whole-life cost (WLC)

Life-cycle assessment or life-cycle analysis is a method used to measure and evaluate the environmental burdens associated with a productive system or activity through describing the energy and materials used in construction and operation, and released to the environment, through the building's life cycle.
Whole-life cost (WLC) or *life-cycle cost* (LCC) is a method considered to be in the formative stage as a variety of techniques have been introduced to support it. It is a method used to assess all relevant costs and revenues associated with a building over an agreed period including the following:

1- Procurement costs: feasibility, design, construction, purchase/lease, interest and fees;
2- Operating costs: energy, water, sewage, waste disposal, cleaning, security, and management;
3- Recruiting costs: rentals, rates, maintenance, repair, refurbishment and replacement or renewal;
4- End of life costs: decommissioning and dismantling or disposal; and
5- Revenue: sales of recycled materials, rental income, and asset value accrued (ibid.: 79).

Other aspects of economic sustainability include:

a- The *external costs*, that is, the social and financial implications of unsustainable development leading to change through recognition of how unsustainable development leads to the financial remediation of all the damage it causes. Measures may be introduced to protect natural resources that have economic value by internalising costs through taxation, legislation, changes in building standards and positive incentives to encourage sustainable development (ibid.: 80).

b- *Economic measures* (instruments), that is, policies that affect value such as pollution charges, user charges, deposit refunds and tradable pollution permits or resource rights.

c- *Fiscal measures,* which include Enhanced Capital Allowances to give incentives to invest in energy-saving equipment; reduced VAT on some energy-saving products; and the Landlords' Energy Saving Allowance.

An international survey by Drouet (2003) listed the economic measures promoting sustainability in building construction as follows:

1- Preferential credit conditions for sustainable buildings, including improved mortgage conditions and financial assistance for social housing with sustainable features;

2- Reimbursement rebates, refunding and investment aid offered by energy and water utilities and equipment suppliers, and so on such as cash-back schemes for buying water or energy efficient appliances;

3- Privileged insurance conditions for sustainable buildings for example, lower insurance premiums for sustainable buildings' owners or occupants.

4- Providing resources for funding sustainable construction, for example, investments and guarantee funds;

5- Fiscal bonuses for constructing or refurbishing green buildings including tax rebates, or tax credits for specific investments and exemption from or reduction of specific taxes or charges;

6- Disincentives given to unsustainable buildings including tax on water/energy consumption and tax on virgin material extraction;

7- Providing incentives such as grants for training professionals in sustainable building construction practices, and subsidies to building owners to help obtain sustainable construction certification;

8- Developers awarded a density bonus for sustainable buildings;
9- Business rating indices stipulating specific sustainable building management criteria; and
10- CO_2 offset certifications[45].

4.3.2.2 Economic sustainability and sustainable development

Globally speaking, gross domestic product (GDP[46]) is used as an indicator of countries' quality of life and well-being. Although the GDP indicates nations' progress quantitatively, it does not give a financial value for the existing real environmental or social factors such as the pollution rate or crime rate or health rate. Sustainable development, however, should embrace all aspects of the economy, because economic development alone could cause environmental depletion or social un-sustainability. This can only take place through adopting *ethical investment* that supports both environmental and social aspects while achieving sustainable construction(OCG, 2007).

To achieve sustainable investment certain responsibilities, involving judgement about safety measures and the sustainable use of the resources should be considered. Recent sustainability policies monitor businesses' performance in terms of risk assessment and public image.

Through examining the definition of sustainable development introduced by the Brundtland Commission in 1987 from an economic perspective, one can claim that any proposed sustainable development should include the notions of environmental capital, human capital, social capital, manufactured capital and financial capital. The industrial revolution lead to excessive development and considerable damage to the environment has taken place since. So far the exact cost of the environmental elements has not been quantified, although it is recognised that they are in the process of depletion. For example, ozone layer depletion, the melting of glaciers and climate change do not have an exact value within the concept of economic sustainability although there are predictions that a loss of human capital, livestock and many environmental

[45] Online source: http://www.areneidf.org/english/pdf/intervention-ds-tokyo.pdf (Accessed 23/03/2009)
[46] GDP for any country: consumption + cross investment + government spending + (exports – imports).

assets will occur as a result. Starting from mid1980s some policy reports claim to quantify the economic value of environmental elements depletion through using contingent valuation. Contingent valuation is a method of estimating the monetary value that people place on a particular good not traded in regular marketplaces such as natural water reservoirs, forests and wetlands (Ahmed and Gotoh, 2006; Biodone et al., 2002; Al-Kandari, 1994; Hanemann, 1994). This method enables measuring the cost of air/water pollution and sometimes other goods cost such as damage to a wheat field by fire caused by a passing train (Hanemann, 1994: 19)

4.3.3 Social sustainability

Social sustainability is difficult to define because it is not susceptible of measurement, as it cannot be reduced to quantitative indicators. It is subjective, qualitative and political (see figure 4.2). This difficulty led to a difficulty in developing the social sustainability driver and assessing its impact[47]. Social sustainability has a direct relationship with levels of consumerism, especially under capitalist systems, and with technological advances more consumerism is stimulated (Dresner, 2002: 171).

Current and future generations
Socio-economic polarisation
Poverty and disadvantage
Social development
Social justice
Participation
Democracy
Equity
Diversity
Well being
Resources
Opportunity
Living standards
Interconnectedness
Social exclusion/inclusion

Figure 4.2 Elements of social sustainability

[47] See http://www2.napier.ac.uk (last accessed December 2009).

Throughout the ages, philosophers and religious leaders have denounced materialism as the path to human fulfilment, yet societies across the ideological spectrum have persisted in equating quality of life with increased consumption (Dalal-Clayton and Bass, 2002). Polèse and Stren (2000) described socially sustainable development as development that is compatible with the harmonious evolution of civil society, fostering an environment conducive to the compatible cohabitation of culturally and socially diverse groups while at the same time encouraging social integration, with improvements in the quality of life for all segments of the population (p15-16). The levels of sustainability awareness in a society, including stakeholders, end users and consumers, affect the creating of sustainable architecture. Social capital is created when people practice environmental actions rather than embracing them as rhetoric. It requires accepting environmental limits and living within them, recognising that even extravagant benefits from new technologies are not worthwhile if they involve the risk of serious irreversible environmental impacts (Dresner, 2002: 170). The following subsections will demonstrate how people sharing the same ideas, backgrounds and ambitions come together to form pressure groups and create *social capital,* which can play a key role in affecting the state's policy towards achievable sustainability.

4.3.3.1 Social capital and public participation

People tend to band together, sorting the world into 'us' and 'them'. Individuals' membership of a group may have results, which increase or decrease their collective power. When there is a *diffusion of responsibility* (Baumeister, 2005) belonging to a group reduces effectiveness in the case of a crisis, as each may place responsibility onto others (Darley and Latane, 1968). Another drawback of these groups is that their members are often reluctant to disagree with each other (Woolcock, 1998). For them to succeed they must be willing to raise views that clash with what someone else has said, thus avoiding *groupthink*; the term first coined in *Fortune* magazine in 1952 by Whyte, to signify the loss of creativity that results from group work. Groups tend to avoid disagreements and suppress members who question certain issues (Janis, 1982).

As a concept, social capital has been well understood as the advantage created by a person's location in a structure of relationships such as school boards and Internet networks (Portes, 1998). Simply put; it is anything that facilitates individual or collective action, but in the context of sustainable development it allows a connection to be made between individuals' skills and education and the agenda of environmental resource use (Serageldin and Grootaert, 1996). Social capital is generated through four mechanisms: networks of relationships, reciprocity, trust and social norms. It complements human capital and educational achievement (Coleman, 1994). Putnam *et. al.*, see social capital as being more important than physical or human capital (Putnam et al., 1993). Although *political culture* describes how a society, the citizens and leaders make their political decisions, social capital contributes to the creation of a tolerant and democratic political culture (Rotberg, 2001). For policy makers, social capital captures the political zeitgeist[48] through its hard-nosed economic feel. In 1997, the World Bank found that in 192 countries social capital made up only 1/5th of the wealth of most of the countries, and yet most economic policies focus on promoting social capital as a wealth generator (World Bank, 1997; Serageldin and Grootaert, 1996).

Attempts to build social capital can lead to a 'form of empowerment' that engages both the state and private sector: that is, consultation with communities about their requirements, through high levels of social participation in solving collective problems (Goddard, 2005). This strategy encourages different parties to participate in bridging social networks, although it requires well developed skills of critical dialogue among people that can only be achieved through education (Preece, 2005). There are two types of social capital: *bonding capital* supports grassroots development based on community participation and *bridging capital* refers to links between donors, governmental agencies and local communities involving NGOs[49] (Brown and Ashman, 1996). These types of social capital contribute to policy success (Rydin and Holman,

[48] Zeitgeist: Etymology: German, from *Zeit* + *Geist* Spirit: the general intellectual, moral, and cultural climate of an era

[49] NGO: Non-governmental Organisation

2004). Coleman (1988) and Bourdieu (1985) discussed the possible uses of social capital in the acquisition of educational credentials (Portes, 1998).

Public participation is a method through which people achieve a greater socio-environmental impact; there are four reasons for the greater impact. First, it ensures better decision-making where local knowledge is involved with expert knowledge, leading the latter to be publicly examined. Second, it is a democratic process, in terms of reaching the final outcome after consulting all parties involved. Third, it is a process found under democratic governments, and fourth, the process leads to maturing the individuals into responsible democratic citizens through a phenomenon called *social learning* (Webler et al., 1995). Social learning is defined as:

> the process by which changes in social conditions occur - particularly changes in popular awareness of how individuals see their private interests as being linked with the shared interests of their fellow individuals (ibid.: 445).

This is a product of individuals learning how to solve their shared problems in a manner that is responsible for both factual correctness and normative consent (ibid.: 445). Applying this discourse to sustainability, it could be said that humans can learn to change so as to moderate problems related to their environment and health. In the USA, a comparative study examining public participation in governments' decisions for brownfield regeneration with the redevelopment of former military sites in the UK, Germany and Jordan, advocated the necessity of public participation in any sustainable development plans for complex projects, at any geographic scale. This participation is needed regardless of the reasons for the government taking such redevelopment steps. Further, it recommended that citizens should be well informed with regard to sustainable city projects in order to achieve better public participation (Bagaeen, 2006).

4.3.3.2 Social capital and sustainability

Too few urban developments designed by architects seek to engender social capital. Living sustainable lifestyles is thought to be the critical element that shapes sustainable communities, which are the building blocks forming sustainable societies. These sustainable communities are neither geographically nor politically determined; therefore, educators should focus on formal and informal education approaches that facilitate developing sustainable communities (O'Brien, 1998). Postma questioned the legitimacy and adequacy of peoples' shared values and ways of acting in response to current environmental crises (Postma, 2002). Many theorists have established links between social capital and sustainable development because social capital is a source of empowerment (Bourdieu, 1985) and a source of a community's agency to solve its own problems (Goddard, 2005; Healy, 2005). Through social capital people gain the ability to work in groups and organizations (Fukuyama, 1995) which establish strong relationships (de Fillippis, 2001) and the capacity to exercise control over their and others' futures (Bourdieu, 1985). Achieving local sustainability can be realised through high levels mutual trust, a component of social capital, and being enrolled in sustainability strategies and projects, that is, local participation within organisations and communities (Selman, 2001).

Weak levels of sustainability can be attributed to the lack of spontaneous or artificially engendered social or human capital. These kinds of capital are interchangeable within boundaries of resource endowment (Pearce and Atkinson, 1993). Social capital is also considered a shift factor enhancing the benefits of physical and human capital investment and maximising returns to the other factors of production (Putnam et al., 1993). Some theorists argue that social capital is dependent upon context and that there is weak evidence around utilising it as means of securing effective policy delivery (Kearns, 2004; Fine, 2001).

Sustainable development strategic policy and planning is recognised as a learning process in which information about progress towards sustainability, or lack of progress, is used constructively to revise the mechanisms and means of

realising objectives. It consists mostly of building on, and improving existing strategic planning frameworks and their coordination, although it was noted that many existing strategic planning processes have not had a lasting impact in terms of moving countries towards sustainable development. In the past, there has been little civil society or private sector involvement in developing or monitoring such national plans, although increasing evidence of stakeholder participation in these mechanisms in a number of countries such as Thailand, China and Bangladesh has been noticed (Dalal-Clayton and Bass, 2002).

Individuals mistakenly look at environmental issues as being of global or national importance, therefore rather than acting appropriately in their environment they blame their governments should anything go wrong. Also, there is a lack of a social contract between individuals and their government (Banister, 2001a). A sustainable society is one that satisfies its needs without jeopardising the prospects of future generations. Humanity should aim at achieving sustainability otherwise environmental deterioration and economic decline will take place, leading towards social decay and political upheaval. At such a point, reclaiming any hope of a sustainable future might be impossible. Whether Earth Day 2030 turns out to be a day to celebrate lasting achievements or to lament missed opportunities is largely up to each one of us as individuals. Progress towards sustainability thus hinges on a collective dependence on our sense of responsibility to the Earth and our offspring. Without a revaluation of our personal aspirations and motivations, we will never achieve an environmentally sound global community (Braddell, 1949: 147-148).

A movement toward an enduring society cannot occur without a transformation of individual priorities and values. It is noted that individuals are often the initiators of actions, whether in the public or private sector or in civil society. A personal, a community, or a national agenda could drive them, but in any case their motivation contributes effectively to development (Dalal-Clayton and Bass, 2002).

Because of the strain on resources it creates, materialism simply cannot survive the transformation to a sustainable world. Once public understanding of the need to adopt a simpler and less consumerist lifestyle spreads, it will become

unfashionable to own fashionable new cars and clothes and the latest electronic devices. The potential benefits of unleashing human energy now devoted to producing, advertising, buying, consuming, and discarding material goods are enormous. Ideological differences may also fade, as nations adopt sustainability as a common cause, and as they come to recognise that achieving it requires a shared set of values that include democratic principles, freedom to innovate, respect for human rights, and acceptance of diversity.

The task of building a sustainable society is an enormous one that will take decades rather than years and the reward in the year 2030 could be an Earth Day that celebrates the achieving of a society in balance with the resources that support it, instead of one that destroys the underpinning of its future (Pojman, 1994: 500).

4.3.3.3 International sustainability awareness

Van de Kerk and Manuel (2008) developed the Sustainable Society Index (SSI) a tool to be used as indicator of the global sustainability and where each country fits in it. The SSI used a simple instrument for assessing each country's sustainability based on a solid definition. A list of 22 indicators was used (*see* Appendix 17) in a practical tool for defining targets showing whether countries are making their way to sustainability or achieving it, or not, and to compare countries' levels with each other's. The results of the comparison between 150 countries in the study show that the UK is ranked number 37, whilst Kuwait is at 146 in the index.

4.3.3.4 Sustainability awareness in British society

Many studies have been conducted in the UK to measure environmental activities that have been identified as indicators of society's sustainable awareness levels. These studies focus on certain individuals' behaviour towards certain aspects of the environment, such as recycling. A study found a socio-demographic relationship with recycling behaviour in London, where more affluent and better educated people participated in recycling activities more than those enjoying less education (RRF, 2001). Another study of ethnic minorities conducted in Preston and Lancashire found that the third generation of ethnic

minorities participated more in various recycling activities in comparison with the second and first generations. It explains the effect of the culture and religion of each ethnic minority's country of origin on the particular types of recycled material they produce. Therefore it is important to understand this segment of society to ensure better outcomes and to address them using their first language, as the older generation may speak English but not read it (Perry and Williams, 2007). Williams and Kelly's study in the UK claimed that people who recycle are usually car and house owners with better education (Williams and Kelly, 2003). Moreover, a Department of Environment, Food and Rural Affairs study concluded that youngsters with less education and living in rented accommodation do not recycle as much as well-educated individuals (DEFRA, 2002). The above results challenge the conclusions of an earlier study carried out in 1998 claiming that in the UK there is no clear impact of the categories, age, household size or socio-economic status, on recycling behaviour (MacDonald and Ball, 1998).

A study carried out to explore environmental citizenship in the UK found that many barriers stand in the way of achieving better environmental awareness, even if citizens express their wish to act more in favour of their environment. The barriers include the following:

1- Hard to access environmental information;
2- Government leaflets referring readers to specialised agencies (bodies) that may introduce their own language barriers both in terms of difficulties in articulating the request (too technical for the staff) and understanding the answer (too technical for the potential user);
3- The quality of the information that organisations provide to the public could be dependent on the calibre of the staff, that is, the quality of information provided could be too theoretical for a real-life scenario;
4- Nongovernmental organisations who help and advise those wishing to pursue environmental careers rarely create a link between the provision of information about volunteer opportunities and careers advice;
5- The Department for Environment, Food and Rural Affairs does not make available much of the information it obtains;

6- Highly technical environmental information about energy efficiency practices and pollution data accessibility is biased in favour of particular sectors of the society; the Energy Saving Trust (EST) provides good, accessible information, but its primary means of delivery is via the Internet. Those individuals without the means or know how to use the net are denied information;
7- People tend to ask about information of a limited and parochial dimension that are linked to local environmental issues and
8- Most NGOs[50] do not keep records of enquiries, and those who do, appear not to make use of them (Elias 2001: 38).

The study concludes that in the light of the barriers mentioned, it is rather difficult to believe the continued proclamations of HM Government (1990) that '*the role of the public in monitoring improvements where necessary will be one of the most effective stimuli to improving the environment throughout Europe*' (Alabaster and Hawthorne, 1999).

Environmental education literature is a very important source for providing people with the environmental information they need to educate themselves. Motivation plays a key role in driving them towards gathering the information and making use of it in terms of addressing an environmental problem, to which they ultimately contribute (Filho, 1999). It was found that environmental attitudes have an effect on environmentally protective behaviours. Attitude intensity is correlated with self-reported environmental behaviours and political activism in environmental issues. Understanding the effect of attitudes on actual behaviour can help in developing better programmes aimed at increasing *public participation* in environmental policy making (Steel, 1996). The difficulty in changing social attitudes towards sustainable living, in spite of the presence of a unique academic freedom and a diversity of skills that can lead to developing new ideas, lies in the deep cultural shift needed to achieve the required change.

[50] NGO: Non Governmental Organization.

Cultural shift is "the most important leverage point for institutional transformation" (Meadows, 1997).

A case study in the UK examined a series of public consultation workshops that took place in the rural areas and towns and cities in three regions (Wales, England and Scotland). The study was to measure public participation and involvement in decision making over the choice of energy types available through the national energy supply. Groups of participants included citizens' panels that achieved a close match in terms of socio-economic characteristics. The goal of the workshops was to answer the question: which energy-related goals matter most to the citizens, rather than what energy scenarios should the government pursue. The Energy Review carried out the public consultation in the form of meetings, and lasted over the course of a year, during which the DTI published the document: "Energy Policy - Key Issues for Consultation". The groups also used a book (UK Energy in Brief) published by the DTI in 2002 for initial information. The briefings covered a range of topics related to energy use, sources, supply, consumption rates, carbon emissions and current objectives of the government, but no experts were invited to the workshops; therefore, the participants relied on the Internet as another source of information. The results showed a major shift in their attitudes over the course of the workshops. At the end of the workshop they preferred wind and wave powers rather than solar energy after learning the costs of each energy source. Also, diversity was discussed as an option, including the use of nuclear energy to generate power as a way of securing a constant supply. The study proved that using multi-criteria evaluation (MCE) in a series of workshops is useful in enhancing mutual understanding, exploring common goals and the decision-making process of institutions that may update their goals during the workshops (Stagl, 2006).

And finally, it is appropriate here to review the existing British Government Sustainable Development Strategy[51] that includes four criteria that will lead to public environmental behaviour change (see Figure 4.3). The criteria are as follow:

[51] Source: http://www.defra.gov.uk (pdf file published on line: last accessed 07/08/2009)

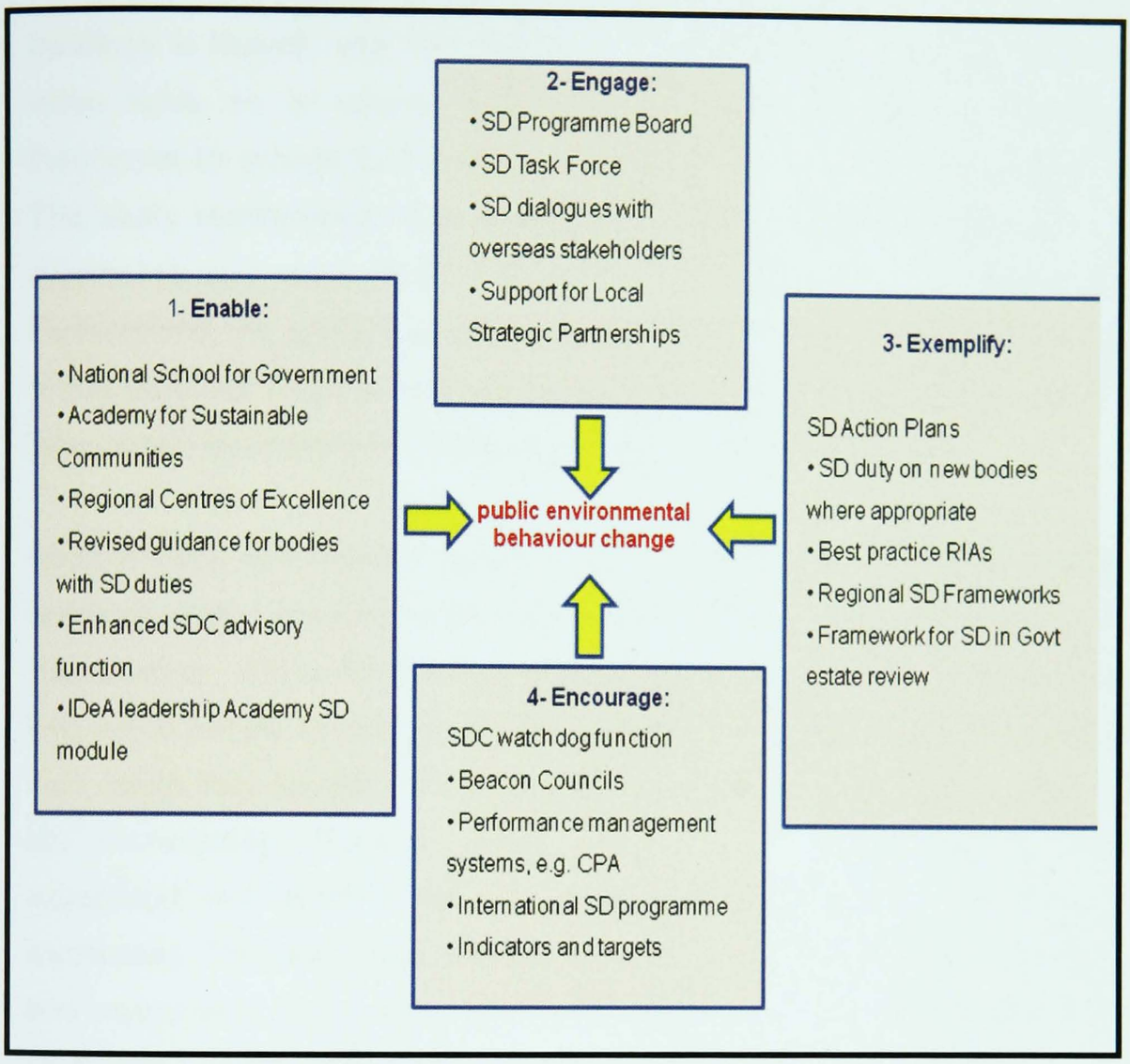

Figure 4.3 British Government 2006 Strategy for public environmental behaviour change

4.3.3.5 Sustainability awareness in Kuwaiti society

Public participation is considered a factor in political feasibility. Even in situations where initial public involvement merely begins with opposition or scepticism, it is still considered an element that enhances political feasibility in many situations. According to the UNDP Human Development Report, a rapid increase in the number of the world's democracies has taken place, but there is still a substantial lag between Arab countries and other regions in terms of participatory governance. The wave of democracy that swept many countries in many regions of the world in recent decades has barely reached the Arab states because of the quality of information about life available through education, the Internet, and other sources (UNDP, 2001).

A study of the annual energy consumption of the occupants in residential buildings in Kuwait, and their lifestyles, found that they have the tendency to leave lights on in vacant rooms and that they set their air conditioning thermostat to around 22°C, which is towards the lower end of comfort levels. The study recommends that energy advertising campaigns should be more informative and more effective than mere exhortations to improve behaviour. Furthermore, the authors suggest that members of the public should be aware of the potential financial savings, in terms of real sums of money, when they take certain environmental measures (Al-Mumin et al., 2002).

Another study conducted in Kuwait on public opinion of solid waste landfills and levels of related environmental awareness, revealed low public awareness (Al-Yaqout et al., 2001). Such levels of awareness are attributed to three reasons: first, since people do not pay for the collection, transportation, and disposal of their waste they are not concerned with the landfill sites and leave it entirely to the municipality. Second, media coverage of environmental problems associated with landfills has not been significant enough to raise public awareness. The study recommended improving the public's general knowledge and awareness of the issues of landfill sites and their environmental impact (Ibid.: 226). Third, other studies found a negative correlation between families' production of solid waste and the level of education of the head of the family (Koushki and Al-Khaleefi, 1998).

Here, it should be stressed that the boom in oil prices in the mid 1970s resulted in the creation and expansion of the public system of education. The educational system was offered completely free of charge to the indigenous population. However, the education offered to the public has been criticised for its quality; it is felt that the imbalance between economic growth and social development has produced a unique educational system that does not correspond to society's needs (Bahgat, 1999). Kuwait, like any other Gulf country, has a curriculum in schools and colleges which continues to be dominated by Islamic and Arabic Studies rather than building in its students a firm scientific background. A large majority of students opt for the less

demanding humanities and social sciences courses (Abir, 1988). With this kind of education in the compulsory school years, there is a tendency towards poor scientific outcomes, and may be the reason for Kuwaitis' low environmental awareness.

Another contributor to Kuwaitis' apparently irresponsible attitude towards maintaining their environment and energy conservation is their high wages and high levels of economic prosperity due to oil revenues (Ridolfo, 2001). Paradoxically, the rise in fortunes was vast after the oil boom, yet the political and social processes froze before they had reached maturity. While the transformation of the physical landscape of the Gulf countries[52] progressed at a remarkable rate, with the building of the industrial infrastructure, hospitals, universities, housing, and utilities, the social and political structures were fixed and immutable (Zanoyan, 1995).

Finally, the structure of the Kuwaiti society according to the 2006 census results is a population of three million, of which only one million are Kuwaitis, and the rest belong to a range of 120 other nationalities who came to Kuwait for short periods of time to earn money and then return to their country of origin and have little interest in Kuwait's Sustainability. This number signifies that no matter how high indigenous Kuwaitis' sustainability awareness may be, its impact could be counteracted by the effect of other nationalities' rates of consumption. The high energy consumption rate is a shared responsibility between Kuwaitis and non-Kuwaitis. In this case, social capital representing non-Kuwaitis, such as labour societies and physicians societies, should contribute to the process of replacing harmful environmental practices with positive ones for all levels of society, including ethnic minorities, both genders and all generations.

Public participation in creating sustainable architecture education in Kuwait and therefore shifting current architecture trends towards more sustainable practices does not lie in the behaviour of particular individuals or institutions but in the properties of local governance systems as a whole. At the same time community participation has the potential to push the governance system towards a more democratic system. The government should provide

[52] Gulf countries include: Bahrain- Kuwait- Oman- Qatar- UAE- KSA

opportunities for the local communities to participate in their local governance and leave people to speak freely about what their needs are for sustainable architecture in general and sustainable architecture education in particular. This step could commence with a small group of people joining and the majority of the public will witness its fruits. This witnessing process would be an educational tool for the rest of the community, from which they may take a new stand for sustainable architecture. The small group would be motivated by their love for their environment and their desire to sustain not demolish Earth's resources and the rest of the society would be pushed by another driver, i.e., seeing how sustainable practices will lead to decreasing energy, water and gas consumption rates and reducing their monthly expenditure. Positive reinforcement is a method used to influence people's behaviour for better environmental and social outcomes (Daniels, 2001).

4.3.3.6 Policies and sustainable architecture

The sources of environmental information and environmental activities available to the general public were mostly derived from voluntary groups in the 1960s, 1970s and the 1980's, governments adopted this role in the 1990s (Halliday, 2008: 63). Turning sustainability plans into action requires administrative capability even if technical solutions, financial resources and strong legislation are available (Cooper and Vargas, 2004). Well-equipped organizations with professional staff and management are a requirement for sustainable development plans to work. UNEP *Global Environmental Outlook* recommended that 'the establishment of strong institutions for environmental governance is a prerequisite for almost all other policies'.[53]

Despite the presence of many technical experts, and experienced practitioners of sustainable development implementation, politics is still recognised as a key factor. A survey found that scientists from 50 countries ranked governance as the fifth most important problem of the environment[54]. The implementation of a sustainable development policy could face a variety of political issues that include: political instability, political will, issues of public participation, the

[53] United Nations Environment Programme, Global Environment Outlook (Oxford: Oxford University Press, 1997:157)
[54] United Nations Development Programme, Human Development Report, 2002

politics of NGOs, intergovernmental politics, and the increasingly important role of the courts in public policy (Cooper and Vargas, 2004). Although Agenda 21 highlighted the urgent necessity for public involvement and participation in the decision making process for the transition to sustainable development, up to the present members of the public around the world are not well informed about sustainable development, including those actually participating in projects related to sustainable practices, such as sustainable agriculture (Elias, 2001: 32-35).

The European Parliament produced a report and resolution on the environment, security and foreign policy that suggests the EU should align its international policy with its trade and development aid policies to deal with many issues including sustainable development and climate change[55].

In spite of international agreements and conferences on sustainable development, little has been written about the politics of sustainable development. It is reported that despite the dominance of environmental law, sustainable development law has had limited development (Cooper and Vargas, 2004; Barker, 1999).

Woolcock (Bebbington et al., 2006; 2000) notes that at a time when social capital influences both policies and programmes, both can, in turn, be either helpful or harmful to social capital depending on their nature, whether technocratic or bureaucratic. In improving the services of different sectors such as sustainable education, environmental policy implementation requires the setting of a combination of a variety of policies, programmes, and practices at all levels: local, regional and national levels. Failure to bring in new policies and better programmes will lead to failure in delivering better services. This can be caused by a failure to recognise the power, pervasiveness and potential of new practices. In which case, social capital together with policy development should play a critical role in bringing new practices into being. Idiosyncratic practices are driven by social capital towards policies and programmes.

[55] Source: European Parliament Resolution on the Environment, Security and Foreign Policy, OJG 128/94 dated 7 May 1999.

> As Europeans and as part of some of the wealthiest societies in the world, we are very conscious of our role and responsibilities. [A]long with other developed countries, we are major contributors to global environmental problems such as green house gas emissions and we consume a major, and some would argue unfair, share of the planet's renewable and non-renewable resources. (CEC 2001:11)[56]

The EU was established first through the Treaty of Rome in 1957 as the European Economic Community (EEC). The treaty[57] did not include specific clauses related to the environment. The first European Community (EC) environmental law was set through the *Single European Act 1986* (SEA). More environmental focused issues were introduced such as Directive 85/337[58], which concerned the environmental impact assessment of certain public and private projects (Kramer, 1998). The Maastricht Treaty changed the title from EEC to the European Community, which was later renamed as the European Union. Amendments were introduced to the EC Treaty relating to environmental protection with the adding of Articles 130r to 130t, which were later changed to 174, 175 and 176. The Amsterdam Treaty of 1997 set sustainable development as an objective through calling for '*balanced and sustainable development of economic activities*'[59].

Article 174 EC set three main objectives:

> To preserve, protect and improve the quality of the environment; to contribute towards protecting human health; to ensure a prudent and rational utilisation of natural resources[60].

[56] Commission of the European Communities (CEC): Communication from the Commission to the Council, the European Parliament, the Economic and Social Committee and the Committee of the Regions on the Sixth Environment Action Programme of the European Community, 'Environment 2010: Our Future, Our Choice': The Sixth Environment Action Programme, COM(2001)31 FINAL, Luxembourg: Office for Official Publications of the European Communities.
[57] Sequence of EU treaties: 1951 Treaty of Paris; 1957 The Treaties of Rome; 1967 Merger Treaty; 1992 Treaty of Maastricht; 1997 Treaty of Amsterdam; 2001 Treaty of Nice.
[58] Directive 85/337 [1985] O.J. L175/40
[59] European Community (2004), Treaty Establishing a Constitution for Europe', *Official Journal*, C310, 16 December
[60] See the European Parliament homepage: http://www.europarl.europa.eu (last accessed 29 June 2009)

Article 6 of the EC Treaty states that:

> Environmental protection requirements must be integrated into the definition and implementation of the community policies and activities referred to in Article 3. (Jans, 2000).

Although environmental issues are said to be taken seriously by the EU[61], environmental cases brought to European Court of Justice have showed the weak impact of the articles when judicially enforced. For example in Article 6 the statement 'environmental protection requirement' remains indistinct, general and vague leading to general obligations to reach integrated and balanced assessment of environmental aspects when implementing environmental policies (Jans, 2000).

Concepts can be found in different documents resulting in changes in their status. This affects both their aims and functions. For example, the principle of environmental integration can be found in Article 6 EC after Amsterdam and in the 1972 EAP[62] before the SEA[63].

The former states:

> Environmental protection requirements must be integrated into the definition and implementation of community policies and activities referred to in Article 3, in particular with a view to promoting sustainable development (Gibson and Morgan, 2003).

While the latter states:

> Effects on the environment should be taken into account at the earliest possible stage in all the technical planning and decision-making processes'[64].

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[61] The Global Assessment of the European Community Programme of Policy and Action, COM (99) 543
[62] Environmental Action Program
[63] Single European Act
[64] Programme of Action of the European Communities on the Environment, OJ 1973 C112/3, at 6

The former statement is an intermediate discourse on law in the sense that it identifies the obligations of the EC, whilst the latter is a political discourse around law in aiming to introduce a new common policy strategy.

Some authors find this lack of clarity in meaning to be a reflection of the complexity of issues invoked when juxtaposing development and environment and dismiss any undermining ideas (Meadowcroft, 1999), while others find it politically advantageous because it allows groups of different conflicting interests to reach some common ground (Baker, 2006). The modification of the Articles happening in the various treaties led to a strong constitutional commitment to sustainable development within the EU, making it a norm of EU politics both domestically and internationally (Baker and McCormick, 2004).

The Aarhus Convention of the UN Economic Commission for Europe (UN-ECE) is an example of the environmental law-makers' activity in regard to the issues of public participation, information and access to justice concerning environmental decision-making to be achieved through cooperation between the governments and NGOs. It provides the EU's individual citizens and public with the tools to participate in environmental decision-making (Brusasco-Mackenzie, 2001: 195).

In the UK, under Section 14 of the Building Act 1984, the Building Regulations Advisory Committee (BRAC) was founded in England; NIBRAC was initiated in Northern Ireland, and the BSAC in Scotland. These committees are recognised as non-departmental public bodies (NDPB) and are also recognised as a scientific committee under the Government's Code of Practice for Scientific Advisory Committees 2001. BRAC provides expert advice for government departments, the British Standards Institution, and the BRE[65]. In a BRAC discussion held on 22nd February 2006, it was argued that the Code for Sustainable Homes Issues/ Constraint 1- Location should include informing homeowners how sustainable the home they are buying is compared to others. It also stated that the code should cover new homes only, but future codes

[65] BRE: Building Research Establishment.

could cover new buildings other than dwellings and also existing buildings (BRAC, 2006).

4.3.3.6.1 Policies promoting sustainable awareness

Sustainable development was first initiated through WCED[66] 1987 policies aimed at people rather than the environment, recognising that the environment exists within a shared sphere of human actions and ambitions (Elliott, 2006). The Stockholm environmental principles state "science, technology, education and research should all be used to promote environmental protection" (McCormick, 1989).

Education can contribute to building the knowledge, skills and psychological growth of people only when it recognises the multifaceted requirements of sustainable development. This can only be achieved with political support that implements policies, together with awareness training, that promotes the unlearning of disempowering practices of the past (Preece, 2005). Even with individuals provided with sufficient accurate information and encouraged to change their patterns of behaviour through intensive learning programmes, there is still a need for a full range of policy measures to ensure the translation of the notion of sustainability into action (Banister, 2001b). Generally speaking, the existing regulations, acts and standards can lead the building industry in the right direction. The environmental policies' approach to sustainable development can serve as a foundation for assessing how well regulations and standards promote sustainable building and construction (Strand and Fossdal, 2003).

For example, in the Western world, regulatory frameworks on pollution are a mix of legal and fiscal incentives. They create financial incentives or disincentives for developers, producers or citizens to reduce and recycle, whether in the form of taxes on environmentally harmful products, charges, or fees for waste disposal (Pitts, 2003; Birkeland, 2002b; Birkeland, 2002a; Birkland, 2002). By making pollution and waste more expensive, it is assumed

[66] WCED: the World Commission on Environment and Development

that industry will find ways to reduce these costs, which will contribute to the overall effectiveness of strategies (Birkeland, 2002a: 70). Standards or performance-based regulations specify a standard or a criterion that may act as a driver to develop more efficient technologies in order to save costs and thus compete more effectively. The standards may be enforced through a licensing scheme, with a system of monitoring, and penalties, such as fines or loss of licence (Birkeland, 2002a).

Socially responsible behaviour needs to prosper on a 'level playing field' through governments creating and enforcing appropriate legislation that will allow it to thrive. It has been noted that industrialised countries initiate their own 'self-regulation' that involves development of management systems and safety committees, whilst developing countries find this approach hard to implement (Wells, 2003: 72-75). Governments in the developed world develop an environmental policy through setting objectives and measurable targets, implementing objectives and targets, monitoring the performance and taking remedial action as necessary, and reviewing the policy on a systematic basis.

The EMAS[67] auditing system is the preferred model in the EU. Both LCA[68] and EMAS share a common basis but under EMAS, environmental performance must be publicly reported, as well as externally audited (Edwards and Hyett, 2001).

The International Organization for Standardization (ISO) Committee on Sustainability in Building Construction has initiated standardisation activity that includes building and constructed assets sustainability indicators. It claims that the aim of such standards is to define a framework with respect to sustainability indicators for buildings and groups of buildings. Such standards will naturally include the economic, environmental and social aspects of sustainability, but it was found that no defined indicators for environmental and social costs exist in the current version of standards (Strand and Fossdal, 2003). Indicators should

[67] Eco-Management and Audit Scheme
[68] Life Cycle Assessment

be developed to enable programmes' contribution to sustainable development to be measured in terms of output and outcomes (SEPA, 2003).
The UK government has set up 120 indicators for sustainable development making it one of the most successful strategies that is closer to sustainability concepts than other systems and that focuses on growth and living standards. Its indicator system includes social aspects such as poverty and social exclusion, and education and economic aspects such as GDP, and social and economic aspects (Strand and Fossdal, 2003).

4.3.3.6.2 Policies organising public educational programmes

Environmental management and quality design can only be achieved if local communities and the general public begin to understand the implications of unsustainable practices (Pitts, 2003). Lack of knowledge about the fundamental nature of some of the thinking required to achieve sustainable development requires the provision of opportunities for training and learning about technical and communication skills, which are not available at the moment. Institutions of research and education must take the lead in educating planners into their responsibilities and the required innovation involving all stages in education and learning through schools, universities and continuing professional development (Banister, 2001a). The information package should include learning about the risks and costs of pursuing alternative development paths, with all parties involved in the whole debate, and building the public's support for political action.

Creating government programmes may represent a relatively slow, costly and inefficient form of pollution control as well as environmental education and social change (Birkeland, 2002b). Direct actions are distinguished from incentive-based approaches that are calculated to bring about behaviour change in consumers or industry. Direct action is taken by government authorities to bring about immediate outcomes in energy, materials, public health or other resource savings, whilst indirect actions, for example incentive programmes that encourage others to conserve resources have been a standard approach with regard to environmental policy. Economic instruments such as subsidies or taxes and regulatory controls are considered as indirect

actions although they generate direct responses from consumers and industry (Birkeland, 2002a).

4.4 The attainment of sustainable architecture in Kuwait

The previous sections (4.3.1), (4.3.2) and (4.3.3) have reviewed the three drivers of sustainability; Environment, Economic and Social with the first two examined briefly whilst the latter was examined in more depth. These three drivers are the forces, which are pushing towards increasing sustainability and in particular increasing the development of sustainable architecture. However, when these three drivers are applied to Kuwait the magnitude of the problem becomes manifest.

Taking the results of Van de Kerk and Manuel (2008) sustainable indexing of 150 countries in the world over twenty two separate criteria, Kuwait was 146th, not quite at the bottom of the sustainable index but very close.

The 2006 data, (the latest publicly available source) published by the Carbon Dioxide Information Centre for carbon dioxide production per capita, places Kuwait second, at 9.35 metric tons of carbon per person. In the lead in another oil based economy, that of Qatar at 13.46 metric tons of carbon per person. For comparison the UK is 38th with a production of 2.56 tons of carbon per person, less than a third of Kuwait's production.

In this thesis the attitudes and knowledge of sustainability was determined for three groups of Kuwaiti's, undergraduate architecture students, academics teaching these undergraduate students and end users of buildings in Kuwait, sections 3.3, 3.4 and 3.5, revealed low sustainability awareness. Interviews with building professionals, reviews of published documents and observation confirmed the low status of sustainability or sustainable practices.

This absence of awareness of the environmental, economic and social sustainability drivers in Kuwait has many factors but the main contributor is oil production and the effect that wealth from selling this oil has on the driving forces behind these three drivers. Figure 4.4 shows the price of oil nominally

and in real terms (2008) for the past 150 years. Prior to the early 1970's, the 20th century saw stable prices, after the actions of OPEC the price and the income for selling oil has increased dramatically. Kuwait has benefited from this explosion of wealth and the country has transformed since it gained independence from the UK in the 1960's.

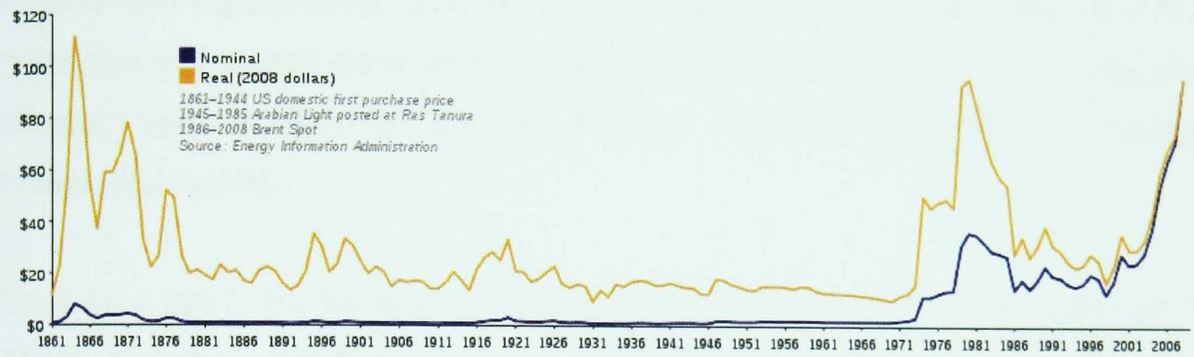

Figure 4.4 The oil prices in the past 150 years

This wealth has dislocated the drivers of sustainability with economic drivers being the main influence. Kuwait can build large glass boxes in a hot arid climate, it can afford the latest in glass technology, and it can afford to generate electricity to cool these buildings. Cold water tanks, placed on the roofs of buildings are left un-insulated and need refrigeration to cool the water. The practice of government agencies building accommodation that was then demolished by the occupiers and rebuilt to meet the needs of the occupants continued for many years, a waste of energy, time and materials. During the camping season, when the Kuwaitis escape the cities for the desert, they take all the paraphernalia of their city dwelling to the desert, and run noisy, inefficient diesel generators to power their lights and other equipment adding to pollution and carbon dioxide production.

The education of Kuwaitis prior to entry into university does not focus on environmental issues; there are few other social institutions that can drive sustainability (Green Line Society, Kuwait Environment Protection Society and Equilibrium[69]). Therefore, when high school graduates join Kuwait University Department of Architecture, their knowledge and awareness of sustainability is

[69] http://www.eqcco.com/ (last accessed December 2009)

low. No matter how good the curriculum of the Department of Architecture at present there does not seem to be the motivation or the knowledge to promote sustainable architecture during the course and on graduation to encourage the design of more sustainable buildings.

The Kuwaiti government is party too and signs international environmental treaties and agreements, but there is no driving force to implement them from governmental or non governmental bodies. Energy campaigns are started then stopped without allowing sufficient time for them to take effect and without meaningful review.

On 9 May 2007, the Minister of Electricity and Water, Engineer Mohammad Al-Alaim, launched the National Campaign entitled *Tarsheed,*[70] that lasted until September same year. The campaign included many public presentations aimed at raising public awareness on the best ways of reducing electricity and water consumption. He stated later that the campaign would reflect positively on both individuals and society and that the high attendance of Ministry of Education teachers proved that there was a collective wish for a shared national effort (Kamal, 2007). The campaign used all means of communication: TV, radio and newspapers – but there was a constant increase in the consumption rate rather than a decrease as a result of increased awareness.

Perhaps the fastest route to decreasing excessive energy consumption in Kuwait would be through increasing the energy tariff. Realising that the current water desalination and energy consumption are outstripping the production capacities of the power plants, the Ministry initiated a major campaign to raise public awareness in that regard (*see* Figure 4.5).

[70] Tarsheed – ترشيد in Arabic means wise consumption.

Figure 4.5 Electricity saving campaign in Kuwait that lasted for a short time and ended in September 2007. a- A poster in Arabic[71] reads: To make it last...Solution: save, b- The same poster translated to address Indians in Kuwait[72], c- The campaign poster in 7 languages.[73] and d- the campaign logo

Strangely enough, the campaign stopped at the end of September 2007 before realising the fruits of its success. These kinds of campaigns should last until good results are obtained, rather than starting and ending abruptly, regardless of the results. One consumer expressed her surprise saying:

> The Campaign was at its peak in the summer when the majority of the population were abroad, but that when the people came back the campaign stopped. The campaign duration should be linked to its outcomes rather than setting start and end dates, regardless of the results[74].

Sustainable development should be at the core of the Ministry of Energy's agenda, especially because Kuwait is obliged to pay a carbon tax to the international community. Therefore, a new role of the Ministry of Energy could be to involve new stakeholders in safe renewable energy production projects. Studying the effectiveness of employing wind energy is a possibility, but a better possibility is using solar energy. Solar energy technology was first spoken of on

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[71] Source: http://www.kse.org.kw/kose/index.cfm (15/09/2007)
[72] Source: http://diwania.alazraq.com/showthread.php?t=163664 (last accessed 15/09/2007)
[73] Source: http://diwania.alazraq.com/showthread.php?t=163664 (last accessed 15/09/'07
[74] Source: جريدة القبس- عدد 15236

a commercial basis in the 1970s, and yet oil rich Arab countries prefer oil. Perhaps it is the right time for Kuwait to start producing sustainable energy in cooperation with national and international companies. Becoming a pioneer country in this field should be the state's priority and goal.

As for water consumption, the Ministry of Energy should promote public water conservation through a variety of means, discouraging water intensive gardens, promoting showers over baths, water metering and the introduction of new water tap designs that help decrease water over-consumption (entrainment). Light-sensitive designs and designs that infuse air into the water, increasing the body volume of the flow, although it actually is less in quantity, are two examples of such procedures (*see* Figure 4.6).

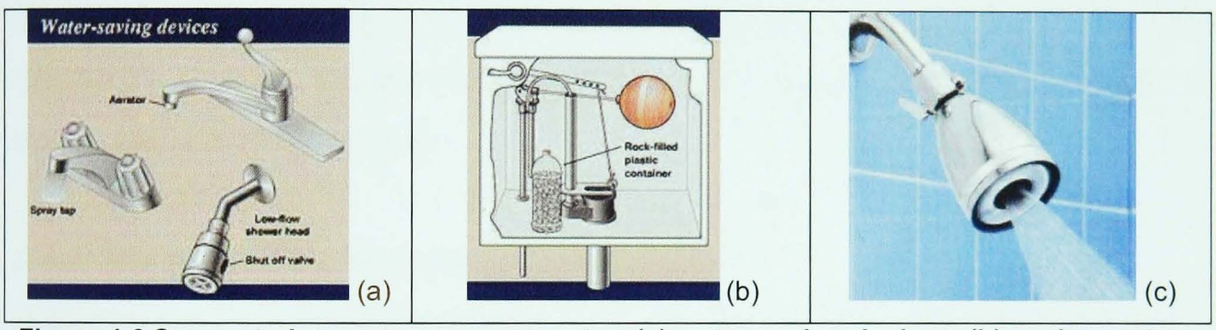

Figure 4.6 Suggested ways to conserve water: (a) water saving devices, (b) saving water in old flush toilets[75], and (c) shower heads producing water bubbles[76]

4.4.1 The role of Kuwait Municipality

Kuwait Municipality should work towards enforcing laws that contribute to achieving sustainable development. An important measure would be finding the best way to deal with solid waste rather than dumping it randomly in landfills in Kuwait, as this forms a potential health hazard, such as in the Al-Qurain Area. The rising number of cases of asthma in that area reflects the ill conceived procedures of the Municipality (Kwarteng and Al-Enezi, 2005). Also, the Municipality should work to increase members of the public's awareness of the best ways of recycling their solid waste, and use Municipality expertise to design the best mechanical and chemical ways to deal with this issue. Kuwait Municipality should ensure all kinds of recycling through placing recycling bins

[75] Source: http://www.thisland.uiuc.edu/57ways/57ways_57.html (last accessed 17/09/'07)
[76] Source: http://www.tomw.net.au/blog/2007/03/bubble-shower-saves-water.html (last accessed 17/09/'07)

in every neighbourhood. Prior to introducing these procedures, the public should be encouraged to learn about ways to separate their refuse and categorise it, then the recycling laws should be enforced, and people refusing to comply should face disincentives such as fines.

4.4.2 The role of the Public Authority for Housing Welfare - Kuwait

All the building specifications set by the Public Authority for Housing Welfare should be enforced in both the private sector and the public sector. Additionally, the housing authority should monitor closely all building alterations, which take place in the public sector, to ensure that they meet the reduction in energy consumption target. Enforcing the laws should also be supported by a thorough investigation of the laws' environmental role and revising them on a regular basis. Housing Welfare should engage architects and academics from Kuwait University and the Kuwait Architects League in their studies and projects and make use of their expertise.

4.4.3 The role of the Ministry of Information

Both Kuwait TV[77]and Kuwait radio[78] are governmental owned and a means of public communication. Therefore, it should be an obligation of the Ministry of Information to use the five official TV channels and all AM and FM radio channels to raise the public's awareness of sustainability issues. However, it is clear that there is a great deal of competition for the official channels, with international broadcasting channels available in every house nowadays and a greater preference for purely entertainment channels; in such a context, it is harder to promote serious topics and channels have to work hard to attract as large an audience as possible.

Perhaps designing television quiz programmes based on testing the audience's knowledge of sustainability and providing attractive rewards for the winners would be a start. People would have an incentive watch to the end of the show, which would provide them with information about sustainability. Another way of raising people's environmental awareness is through broadcasting short

[77] KTV started in 1957
[78] Kuwait radio started in 1951

messages to the viewers during peak hours. Minute long messages, though short, can contain important information that may lead viewers to monitor and decrease their consumption of water and electricity.

4.4.5 The role of the Ministry of Health

The Ministry of Health should launch public campaigns that inform people about the best health practices and the hazards of throwing all kinds of waste on the seashore, and other places. Public lecturers should reach all sectors of society, either by presenting their announcements in conjunction with the Ministry of Education or with the Ministry of Electricity and Water.

4.4.6 Encouraging positive public practices

The government has a moral obligation to encourage public environmental awareness practices, such as encouraging recycling projects to reduce the percentage of solid waste discarded into the environment. Another possible way is to give incentives to private TV channels to start environmental channels.

Increasing female participation in sustainable development can be achieved by enrolling women in environmental education programmes and employing them later in campaigns targeting members of the public. This move will ensure gender equity and make better use of half the society.

As non-Kuwaitis make up just over two thirds of the total population, they also should be targeted by encouraging them to recycle their waste. This can be achieved through providing proper recycling bins in all areas of Kuwait and raising the public awareness of ways of recycling waste materials, especially of plastic which takes longer to degrade. Summer time campaigns at the beaches and in shopping malls can be generated in cooperation with the private sector and transmitted through all means of communication.

To achieve sustainable architecture and a sustainable society the role of education is vital; therefore Chapter 5 will suggest a holistic approach to improving aspects of sustainability in Kuwait. This will include sustainable architecture education for undergraduates, policy makers and end users. It will emphasise the importance of the three drivers of sustainability in providing sustainable architecture in Kuwait. All levels of society, both Kuwaiti and non-

Kuwaiti need to contribute to the attainment of sustainable architecture in Kuwait, without this involvement the development of the University's Department of Architecture curriculum will be doomed to failure.

4.4.7 International building codes and architectural education in Kuwait University

The Kuwaiti government does not interfere with education specifications, but leaves the responsibility to specialists to improve education. The University of Kuwait also follows this approach, creating its own independent board that periodically revises the curriculum to make alterations or include developments. In the USA, each state has a separate and distinct building code adoption process. Many states have adopted one of the three previous model codes, but some states have their own building codes (Ching and Winkel, 2003). Since Kuwait University's Department of Architecture has adopted the NAAB's syllabus, it is to be expected that teaching on building codes will be heavily influenced by the American system, especially because Kuwait's building codes need extensive revision, having been set in the mid 1970s and left unchanged since.

4.4.8 International environmental agreements and education in Kuwait

Although Kuwait representatives have attended many international conservation meetings, which have set recommendations for improving environmental conditions, such as the Kuwait Regional Meeting held in 1999 (Kimbal, 2001), none of the recommendations have actually been introduced into the educational system.

4.4.9 GCC countries and environmental education in Kuwait

Kuwait is one of the group of Gulf Co-operation Council countries (GCC) which follow a unified approach in fields including Health, Education, Policy and Sports. Bahgat (1999) warned that in spite of the rapid expansion of education in the GCC countries, the quality of education does not meet these societies' actual needs. He further noted that there is a mismatch between traditional and modern learning in these countries (Bahgat, 1999).

The objectives stated in the document 'General Objectives of Education during Standard School Years and the Aims of School Stages' published in 2006 by the Arab Bureau of Education for the Gulf States[79], show clearly the level of emphasis GCC countries place on sustainability education.

The general objectives of education are listed in Chapter 2 of that document. They are listed in the following table 4.1, with more detail given on the objectives relevant to this study:

Table 4.1 GCC countries general education objectives

First: general objectives derived from the Islamic Faith (10 objectives);
Second: general objectives derived from belonging to the Arabian nation; (9 objectives)
Third: general objectives derived from the nature of Arabian Gulf society and requirements for its development (14 objectives);
Fourth: general objectives derived from requirements of Arabian Gulf individuals and their requirements for growth (15 objectives);
Fifth: general objectives derived from the nature of the century and of future directives (6 objectives):

1- Enabling individuals through self-learning and continuous learning, and equipping them to make use of this learning during their lives;
2- Enabling individuals to use technology effectively and interact with it positively in all aspects of their lives;
3- Building the individuals' ability to predict/ view future horizons, preparing them in the light of latest events, and to anticipate their outcomes;
4- Placing emphasis on individuals' understanding of international measures and positive adjustments in them, in order to maintain their society's identity and Islamic principles;
5- Developing the individual's ability to distinguish between useful and harmful information produced by the media, and the principles and directions it aims at, and
6- Developing the individual's ability to interact positively with other cultures, live with others and improving the general cultural level of Gulf society.

From the points presented above, it is obvious that GCC countries' objectives place no special emphasis on environmental concepts in education in the

[79] The original document title in Arabic: وثيقة الأهداف العامة للمواد الدراسية بمراحل التعليم العام في الدول الأعضاء بمكتب التربية العربي لدول الخليج ، إعداد المركز العربي للبحوث التربوية لدول الخليج ، 1427هـ - 2006م

compulsory school years. In light of this, the low sustainability awareness of Kuwait University undergraduates is not surprising.

4.4.10 Kuwait University accreditation policy

The *Office of the Vice President of Academic Affairs* of Kuwait University is in charge of institutional academic programmes. It includes two departments:

1. The *Department Of Cultural Relations* and
2. The *Department Of Faculty Members Affairs.*

It also includes three centres:

1. The *Language Teaching Centre;*
2. The *Decision Support Centre;* and
3. The *Centre For Teaching Excellence.*

The Office of Academic Approval is also part of the Office of the Vice President of Academic Affairs.

It is notable that, Kuwait University seeks accreditation of all its bachelor degree programmes from accreditation bodies that are outside the Gulf region. In its 2006 yearbook of Academic Accreditation, the Office of Vice President for Academic Affairs gives accreditation information on Kuwait University. Table 4.2 provides some examples of the accreditation sources.

Table 4.2 Kuwait University departments' sources of accreditation

1- College of Engineering and Petroleum obtained its 'Substantial Equivalency' in 1990, 1996 and 2002 from the Accreditation Board for Engineering and Technology (ABET) based in the USA; 2- Chemistry Department of the College of Science obtained Full Accreditation from the Canadian Society of Chemistry (CSC) in July 2005; 3- Physics Department took its Full Accreditation from the Australian Institute of Physics (AIP); College of Education obtained theirs from the National Council for Accreditation for Teacher Education, NCATE based in the USA

Source:(Department of Academic Accreditation, 2006).

It should be emphasised that the main reason for not seeking recognition from any regional body is that no such regional accreditation body exists (Alhassan and Dudek, 2008b). Therefore, in principle, Kuwait University has to seek

accreditation for its course from international bodies to gain international recognition. However, would be advisable for them to take further steps towards initiating a regional body.

4.5 Summary and Conclusion

Chapter 4 provided an analytical account of the drivers of sustainable architecture, examining issues relating to the drivers promoting the achievement of more sustainable architecture that include environmental sustainability, economic sustainability and more recently social sustainability. The attainment of more sustainable architecture globally, and in Kuwait in particular, results from the interaction between the drivers behind the components of sustainability. Because the main focus of this research is the sustainable architecture curriculum in Kuwait University, the chapter placed an emphasis on examining social sustainability, and in particular political sustainability, educational sustainability and stakeholders in society.

The chapter discussed the role of social capital in influencing policy making in each state and how education can affect the choices and outcomes for society as a whole, including policy makers and end users. Section 4.3.3.5 of Chapter 4 explored briefly how environmental policies and the process of sustainable development might need to tackle a variety of political issues including political instability and how international agreements have not included a consideration of the politics of sustainable development, which has led to some confusion and inefficacy. Moreover it has been shown that relevant cases brought to the EU Court of Justice demonstrated the weakness in the judicial enforcement of the articles dealing with sustainability.

Chapter 4 included a short discussion of the roles of policy, sustainable education and NGOs in Kuwait. It showed that sustainable construction in Kuwait does not meet international goals for sustainable development, and needs revision and renewal.

The next Chapter will discuss more holistic approaches to developing architectural education in Kuwait on the basis of the data analysed in Chapter 3 and the examination of the drivers of more sustainable architecture discussed in Chapter 4.

Chapter 5

Education Delivery Recommendations

5.1 Introduction

This chapter aims to construct an argument for a new teaching environment for sustainable architecture in Kuwait. It provides an analysis and recommendations for preferable teaching methods while referring to the theories examined in Chapter 2. Furthermore, it provides a framework for a sustainable curriculum for Kuwait University, including teaching tools, learning and assessment methods. Although the chapter provides recommendations for sustainable architecture education in Kuwait, it places emphasis on the fact that there is no set recipe for sustainable architecture. Sections 5.3, 5.4 and 5.8 include suggested steps for developing architectural education, policy and end users' awareness in Kuwait.

This chapter recommends ways to add more dimensions to the existing curriculum of Kuwait University. In Chapter 3 the analysis showed that the current programme for the Bachelor of Architecture degree in the Department of Architecture at Kuwait University needed more development to meet the international goals for sustainable architecture education. The deficiencies relate to undergraduates, academic staff, the curriculum and other graduation requirements.

Therefore, Chapter 5 provides several suggestions for enhancing the current programme at Kuwait University. It concludes with a suggested framework for developing the existing curriculum of the Bachelor of Architecture degree in KU's Department of Architecture by adding new dimensions that better serve Kuwait's environmental requirements and respond to its future needs, besides providing its graduates with more desirable outcomes.

5.2 Architecture education taking a step forward

The research findings displayed in Chapter 3 and 4 indicate that the KU Department of Architecture curriculum is theory-based with little emphasis on teaching sustainable architecture for the Kuwait environment. Improving

architectural education in Kuwait University must start out by improving the many factors that shape its outcomes, such as academic staff and the syllabus. Therefore, the undergraduates should participate in finding solutions to their society's problems in relation to their disciplines. The curriculum should change from its current state of rigidity and its routine path of development and become more flexible, to encourage students' participation and creativity through research-based projects that relate to their country's needs.

The results of this research, displayed in Chapter 3, show that the Kuwait University Department of Architecture curriculum is more 'humanities' oriented rather than focusing on teaching 'science and technology' in architecture. Furthermore, the academic staff teach sustainable architecture only out of personal interest as the curriculum does not place any special emphasis on this topic. This situation occurs because unlike RIBA and NAAB, the Kuwaiti Architects League never interferes or monitors the curriculum or the teaching methods of architecture education in Kuwait University. As Kuwait is a democratic country, the Kuwaiti government does not interfere in an attempt to achieve more sustainable architecture education in Kuwait University. Given that there is no actual monitoring system for architecture education and that data analysis results point to the need for the academics to place more emphasis on teaching sustainable architecture within the league programme. This leads to shortcomings in achieving sustainable architecture in Kuwait.
To advance the Kuwait University architecture curriculum, the undergraduates' projects should be oriented towards meeting the actual needs of Kuwait society by creating sustainable architecture designs that respond to Kuwait's harsh desert climate. In addition, KU academic teaching staff of the Department of Architecture should be allowed to work for the private sector while teaching, to learn about the actual needs of the building industry and modify their teaching methods to that direction. At the moment Kuwait University has a curriculum that is similar, but not identical to that of NAAB with few alterations to its content, course duration, and other core issues, resulting in totally different outcomes from the original curriculum. Allowing the academics to work in architectural practices/firms offers them the opportunity to gain greater access to current architectural technologies and therefore their tuition will not be solely

theoretically based. The Department of Architecture should do its best to meet international standards prior to seeking recognition, or even suggest initiating an Arabian Accreditation Board.

5.3 Decision makers taking a step forward

Architectural education is not isolated from society's needs, aspirations and current practices. Fresh graduate architects employ the knowledge they acquired at university in designing buildings for end users that comply with guidelines for construction regulations. For this reason, high ranking decision makers[80] should review and improve current laws and educational guidelines to make education outcomes more environmentally effective.

The data analysis results of Chapter 3 point to the need to set up an association of architects that combines environmental and cultural issues with architectural ones, as well as directing (educating) the end users about sustainable architecture. The state's political system should put aside wishful thinking and start to take action by providing people with incentives and disincentives to encourage sustainable activities. The State of Kuwait government greatly respects the Higher Education self-sufficient policy in setting its own curriculum and education policy, even in the state owned University of Kuwait. However, since Kuwait has signed international agreements on environmental protection, it has the obligation to comply with such treaties through its official channels. Kuwaiti government should ensure that its educational system follows environmental themes.

The recent move of Kuwait's Public Authority for Housing Welfare to hand over buildings to end users in skeleton form so that they can finish them themselves, is a wise step that nevertheless came too late, considering that public housing actually began in 1954. The demolition of government-provided houses partially or totally during the last few decades by the tenants wasted considerable quantities of building materials and reflects the government's lack of awareness of the average family size and real public needs and preferences. However, taking this step to allow end user input is better than never taking it at all (*see*

[80] Successful decision makers adopt Decision Support System (DSS) to effectively support Multiple Participant- Multiple Criteria (MPMC) decision making,

Figure 5.1 and Figure 5.2). The government should consult the Kuwaiti Architects League regarding strategic issues, similar to the way in which RIBA and NAAB are consulted, gaining benefit from existing architects.

Figure 5.1 Different facades for suggested spacious flats to encourage citizens to move from horizontal to vertical housing

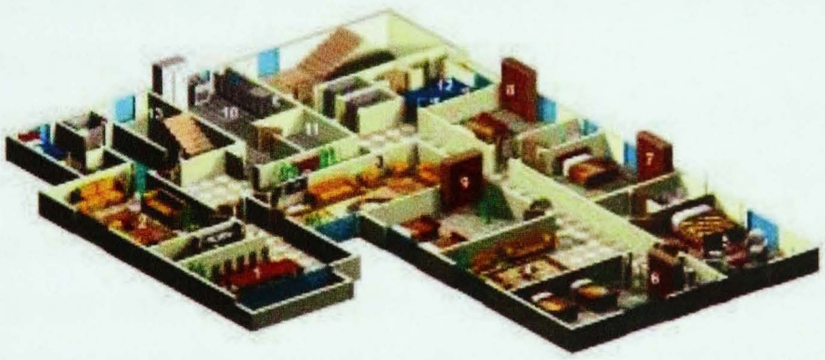

Figure 5.2 Details of the dream flat designed by the Housing Welfare Architects

5.4 Sustainability awareness of undergraduates and end users: taking a step forward

Increasing the awareness levels of sustainability of Kuwaiti undergraduates and end users is one step towards more sustainable architecture in their country and can be achieved by changing their daily behaviour and lifestyle. Some researchers believe that policy makers can achieve better results if people learn more about the effects of their actions on the environment; they will understand better the risks they are taking and as a result, their policies and actions will become less harmful to the environment. In this case, information bridges the

gap between policies and action (Worcester, 1997; Eden, 1996). However, changing behaviour by replacing negative attitudes towards the environment with positive attitudes through education has proved a challenge for many governments. The British Government noted in its Sustainable Development Strategy, which aims to change the throw-away society of over-consumption,, that information alone does not lead to behaviour change as attitude and behaviour change is a complex subject (Department of the Environment, 2005: 25). Such strategies should include two elements; first there continues a conventional definition of environmental action which is focused around specific activities, such as recycling, saving energy or conserving water. In reality, it is unlikely that individuals conform to these highly compartmentalised behavioural patterns, but that the benefits of specific actions will have a positive impact on a range of environmental problems. Second, in proposing new policies to effect behavioural changes, there is an impact assumption that messages to engage the population need to be based around information and awareness. Yet this takes little account of the ways in which different lifestyle groups utilise this information or indeed how their perspective on environmental action varies (Barr and Gilg, 2006: 906-907; Owens, 2000).

The UK government took the step of obliging people to divide their rubbish into different categories; each city council provided people with the tools (bins) to help them to abide by the new regulations (laws). It provided people with alternatives to car use; well-equipped and accessible buses, metro and train systems and more recently, the talk is about people participating in a *car pool* scheme to decrease traffic congestion. The British government policy involvement in Britons' daily practices achieves two targets; meeting the international environment target in saving the Earth's resources by involving people in the process, and building the member's of public sustainable awareness by the means of the media and the government's official homepage in informing them about their policies, etc. Similar steps should be taken by the Kuwaiti government where people should be provided with better alternatives in their daily practice. The high consumption rates can be replaced by more sustainable daily behaviour. These more sustainable lifestyles can only be achieved by increasing their sustainability awareness, which will inevitably lead them to better choices and in its turn leading them to positive actions that reflect

a greater awareness and understanding of the need to lead a more sustainable lifestyle. When people are provided with adequate knowledge about what sustainability is, their required role in achieving it and how their actions might reflect positively or negatively on the environment, their behaviour will switch to being more responsible, resulting in a change in their life styles. By realizing the real effect of their environmental footprint, people will take action voluntarily rather than being forced to do so by the Kuwaiti government. Under the current circumstances, people in Kuwait learn about their environment after experiencing an environmental catastrophe. Older people of Kuwait witnessed the loss of Kuwaiti desert flora and fauna to desertification as a result of human actions. In 2003 the problem of Red Tide phenomenon in the Gulf which resulted in the killing of hundreds of tons of mullets[81] caused people to realize the effect of their actions. More recently the 2009 catastrophe of Mishref Area sewage problem (which Kuwait Municipality has been struggling to resolve since 24 August 2009) opened the eyes of the public to the role of the public and the government in saving the environment[82].

To avoid this, strategy makers who aim to improve sustainability awareness must examine direct and indirect factors that hinder the final desired outcomes, in addition to the laws and the educational system.

Kuwaitis are provided with one option for transportation; public buses (section 1.8) in a highly condensed daily traffic routine. Introducing efficient public service systems to members of the public will encourage them to change their inappropriate daily routines. For example, if they were provided with an efficient bus and metro service at a convenient price and located within a reasonable distance to their houses, people would automatically switch from using cars in order to avoid traffic jams, and this would be considered a positive sustainable action.

At present Shaikha Amthal, sister of the president of Kuwait represents a role model as she participates in many environmental activities, but people from

[81] Mullet fish: *Liza Klunzingeri*

[82] See: http://www.kuwaittimes.net/read_news.php?newsid=NDY1NTM0Nzcw (accessed on November 2009)

different spectrums of society should participate in these voluntary activities so that they become more fruitful.

Sustainable education should start from infancy in order to have an effect when children grow up and begin to have a greater influence on their environment. Education is more important in raising awareness than the media, since education in its essence embraces the media and also because education is a continuous process that runs from childhood into adulthood and later life. For educational programs targeting adults and undergraduates for the first time, the use of seminars and direct media might have limited effect on them because they have already developed their ideas and they lack the free time to derive any benefit from them, or because sometimes, in spite of being well informed, they choose not to take positive action for their environment. Dr. Hasan Eidi suggests using incentive and disincentive criteria and using NLP[83] as an additional alternative (*see* Table 15 in Appendix 14). Using a carrot and stick policy with people may not always be an efficient approach because people also need to be well-informed. Some actions need to be implemented by law, but others can simply be changed by disseminating the relevant information
Undoubtedly the data results analysis and observations indicate a need to raise the current sustainable awareness of all parties involved in Kuwait, as seen in proposition one and two below.

5.5 Proposition 1

Why did the end-users display low sustainability awareness and unsustainable daily behaviour, whilst the undergraduates' sustainability awareness appeared average in the answers they gave?

By comparing the total sustainability awareness of the undergraduates and the end users (T_aS), it is found that the undergraduates scored average T_aS value, which shows a low level of sustainability awareness (see column area 3.19). The end users T_aS score was investigated within the three drivers of sustainability; environmental, economic and social. The comparison found that the environmental driver scored more sustainable environmental awareness

[83] NLP: Neuro Linguistic Programming

(T_aS) amongst the others followed by the social driver and the last is the economic driver (see stacked line chart 3.45). The age range also played a significant role in determining levels of sustainability for the end users within the age groups; within the age ranges 61-70 and 71-80 higher levels of sustainability awareness were found, whilst the group range within 31-40 scored *average* T_aS (section 3.5.2). This could come as a result of the end users having certain experiences after building their houses and dealing with construction materials whilst the undergraduates' experiences still need developing. The results obtained could be interpreted in light of the following points:

(1) The undergraduates' average T_aS originates from their environmental competencies that have accumulated during their school years. Kuwaiti compulsory schools teach Science, Mathematics and Arabic subjects; a 'unified curricula' as part of GCC countries' criteria that does not place special emphasis on environmental concepts (see Table 41.). Additionally, Kuwait University Department of Architecture does not place emphasis on building the undergraduates' awareness of sustainable architecture. Therefore, it is not surprising to see the average T_aS score of Kuwait University undergraduates.

(2) Although the undergraduates scored *average* in their total sustainability awareness, they were able to predict their society's sustainability awareness levels on the basis of their personal observations of Kuwaitis' daily life practices (see section 3.3.1). This means that they have good judgment abilities and with a sustainable education programme, their environmental competencies could be developed further.

(3) At the moment, architecture undergraduates are taught in classrooms or design studios in isolation from real life. The only time they practise real-world design is in their final course design project, which lasts for a relatively short period of time. The learning process includes little or no collaboration between the Department of Architecture and other related trades in the building industry such as engineers, surveyors, and so on, so that graduates find it harder to interlink their theoretical knowledge and real-world practice. The Architecture Department academics should identify this problem in the

structure of the syllabus and work towards resolving it by integrating sustainable architecture education within the curricula of all courses.

(4) From their personal experience, university academics have witnessed how the majority of students avoided making use of the available natural elements when producing their building designs. In section 3.4.2 one academic said 'one student out of 25 in a building design final exam made use of the presence of five kinds of trees in the location where he was asked to design a building'. His statement reflects undergraduates' poor sustainability competencies, either because they were never taught the importance of the natural world i.e., it is a syllabus content problem or simply because they know the concept, but they cannot recognise how important it is for them to use it.

(5) People, as end users, know that their dwellings are unsustainable and do not function in response to the harsh Gulf weather. They identify the ways in which their building designs are environmentally unfriendly, and yet they do not take any measures to remedy this undesirable situation because they are not equipped with the knowledge of who to contact to remedy it. Also, they do not consider what will happen when cheap energy supplies are exhausted and their houses constitute an unfriendly environment.

Recommendations

Since together the three groups (undergraduates, end users and educators) make up society as recipients of, and contributors to, the educational system, they should go through a full process of reform to review its inputs and outcomes: one of the elements that should be evaluated is environmental education and sustainability awareness, bearing in mind that changing behaviour might take a long time. The Ministry of Education should consider urgent reforms in the content of the high school syllabus to include environmental content and university staff should carry out reforms of the university syllabus content and the structure of architecture programmes. The reforms should ensure the integration of at least the minimum sustainability competencies within the curricula of all compulsory school years and higher education to ensure better educational outcomes.

Education is a tool in the hands of the Kuwaiti government that should be used to achieve behaviour changes in order to deliver sustainable architecture, along with other tools such as enforced laws. By engaging people from all ages and levels of education in the reform process and making them witness its positive impact on them, better environmental behaviour is produced. The government should consider that time is running out fast and once the damage is done, it is irreversible. They should also consider that prevention is better than cure in the case of conserving non renewable resources such as energy and water. The Kuwaiti government rarely interferes with education in Kuwait, but sometimes certain situations call for certain procedures. For example, after the 9/11 attacks, all GCC countries recommended integrating Citizenship into the curricula of all school subjects in order to foster the students' feeling of belonging to their countries, thus encouraging them to protect their country rather than attack it. This step was achieved in collaboration with the Ministries of Education in each country that set the right criteria without government interference. The same step is needed in the situation of building awareness of sustainable architecture in both undergraduates and end users.

5.6 Proposition 2

The undergraduates agreed that society practises unsustainable behaviour and yet their own behaviour did not indicate a high awareness of sustainability practice.

The survey showed that 67.2% of the undergraduates believe their society is not practising energy conservation activities, 57.1% of them thought that government buildings are not sustainably managed. Another 66.7% agreed that Kuwaitis contribute towards environmental pollution problems because they lead irresponsible lifestyles with poor energy use in their dwellings, and 59.4% agreed that people are environmentally negligent during the camping season, for example by using generators in their tents in a careless way.

The percentages displayed above show that the undergraduates are able to point out good/poor environmental behaviour, yet with their ability to distinguish between sustainable practices and non sustainable practices in their own society, one might expect that their own behaviour would indicate more sustainable practices, but on the contrary, the answers to questions about their

behaviour revealed their weak perception of sustainability practice. For example, 71.8% of the undergraduates said they would design sustainable buildings after graduation, but when asked to define what sustainable architecture was, 75.7% of the sample population could not provide an accurate definition. Furthermore, when asked whether they took part in any kind of environmentally activities, 77.1% said they did not, and 98.6% of them said they were not members of any kind of environmental society.

Regardless of whether the curriculum is poor or excellent, the indication given by these students is a low level of their personal level of awareness and low interest in raising their own awareness.

Recommendations:

Environmental activities are sometimes used as indicators of awareness levels of a society as a whole, and in this case, it is clear that they need to learn the importance of being environmentally active. For undergraduates, their ability to distinguish between the positive and negative environmental actions of their society should reflect how they respond to them. When KU Department of Architecture curriculum shifts from being equipped with theoretical standard concepts to being more practical and sustainable concepts-oriented, the undergraduates will be furnished with the knowledge that will help them in their sustainable architecture designs. The Kuwaiti architects will definitely play a productive role in their society in achieving more sustainable architecture and the construction industry will witness a new era.

5.7 Architecture education in Kuwait

The architectural education in Kuwait University can be improved in relation to sustainability issues as follows:

1- Developing the human resources of the Department of Architecture should include an insistence that the academic staff obtain an architecture design qualification, as it forms the basis of Architecture teaching. They should have a Bachelor of Architecture rather than Architecture Engineering[84] degree, and at the same time priority should be given to staff holding significant professional

[84] Architecture engineering degree includes application of engineering principles and technology to building design and construction.

experience rather than having high academic qualifications (PhDs and post-doctoral qualifications), as their professional experience will contribute better to their teaching of architectural design. At the moment Kuwait University recruit only PhD holders in academic staff positions, although well established universities around the world follow different employment schemes.

2- The establishment of an Arab Architects' League is also required that will create a unified curriculum based on the curricula of all Arab countries, and which works for their culture and environment. All Arab countries should improve their curricula in order to meet international standards.

3- A sustainability component to education should be initiated by high ranking government officials to make it a priority in Kuwait University as an integrated subject and also for the Department of Architecture to integrate it into its syllabus. The Kuwaiti government does not interfere with Higher Education strategies, but as sustainability is part of the state policy, the government should influence the university education in that direction.

4- Employing some international academic staff could help to improve architectural education by generating a variety of teaching methods and better designed curricula. In 2009, the department had 11 faculty members out of which only two had achieved part of their degrees in the UK, one from Italy and the rest had obtained their degree from the USA. This will definitely lead them to be pro- American in their teaching preferences, which has little emphasis on sustainable architecture.

5.8 End users' sustainability awareness

It is interesting to find that most of the interviewed experts agreed that the sustainability awareness of Kuwaiti people is below the aspired global level of sustainability awareness. The analysis of the results of the interviews with the end users laid out in Chapter 3 and the new building criteria adopted by the Public Authority for Housing Welfare explained in section 5.3 concurs with the interviewees' points of view as well as with those of the Kuwait University academic staff presented in section 3.4.2.

5.8.1 Improving end-users' and undergraduates' sustainability awareness

The experts interviewed expressed different points of view when they were asked about ways to raise end users' environmental awareness: most of them agreed on the importance of the educational system in achieving these kinds of targets, provided that it starts from the early years in order to be more effective. Many of the interviewees agreed that education plays a key role in raising people's environmental awareness from an early age. They agreed that education from childhood guarantees better results than postponing this kind of education until the learners are adults, because by then they will have already established their own beliefs that will be difficult to change. Others suggested a role for the media or NLP approaches in building public environmental awareness and a smaller number of them placed emphasis on short term measures taken by the government such as raising energy tariffs. Professor Lewcock expressed an optimistic opinion in his prediction that sustainability will find its place in the Gulf Area within ten years in spite of some of the more pessimistic views prevailing at the present time (due to, for example, high energy consumption rates in that region of the world in particular) (*see section* 3.10.3 and Appendix 16).

5.9 Summary and conclusions derived from data analysis

The data analysis results in sections (3.3 - 3.11) prove that sustainability awareness is in the first place initiated by the educational system, which provides learners with basic knowledge as well as incentives, when appropriately designed. Subsequently, sustainability awareness is reflected in the daily behaviour of all categories of society at different levels and in different ways, in accordance with each category's role in the community, but it is also regulated by the state's laws and regulations, since education is part of the state's strategy and policy.

In Chapter 3, experts were in agreement that such knowledge should be instilled from infancy, and succeeded by responsible actions towards the environment once the young generations reach maturity and the capacity to serve their society. The curricula should convey a range of environmental

concepts and information should be prepared by different professionals and integrated in all disciplines to achieve best results.

In the present teaching environment of Kuwait University's Department of Architecture, a growing number of faculty members are entering the ranks with PhD degrees, without having had the opportunity to design and erect a building. In many programmes there exists an almost cult-like adherence to architectural notions on the part of young faculty members (see Chapter 3 sections 3.3 and 3.4). This lack of 'real world' awareness limits the development of education curricula.

The previous sections of Chapter 3 have revealed many factors that contribute to the weak implementation of sustainable architectural design in Kuwait (that include the education, policy implementation and end users' sustainability awareness), and this therefore hinders any steps taken to achieve sustainable development in the country. In this case, any suggested reforms aiming to foster a positive, sustainable construction industry in Kuwait should very much include all parties participating in this process, in order to facilitate the desired outcomes. Sections 5.9.1 and 5.10 include suggested steps for developing architectural education and Chapter 6 includes possible directions of sustainable architecture education reform in order to achieve more sustainable development, referring to the drivers of change in relation to sustainable architecture education.

5.9.1 Architectural education: taking a step forward

The Department of Architecture's tutors should direct their students towards producing realistic designs, and the curriculum should not be isolated from the wider community's needs and aspirations. By allowing academics the right to work in architecture practices/firms they will gain more access to current technologies in their field and therefore their tuition will not be purely theoretical. The Department of Architecture should do its best to meet international standards prior to seeking recognition, or should even suggest initiating an Arabian Board of Accreditation.

Section 5.10 will give details of all the suggested aspects of developing the Kuwait University curriculum that are summarised in Figure 5.3 below.

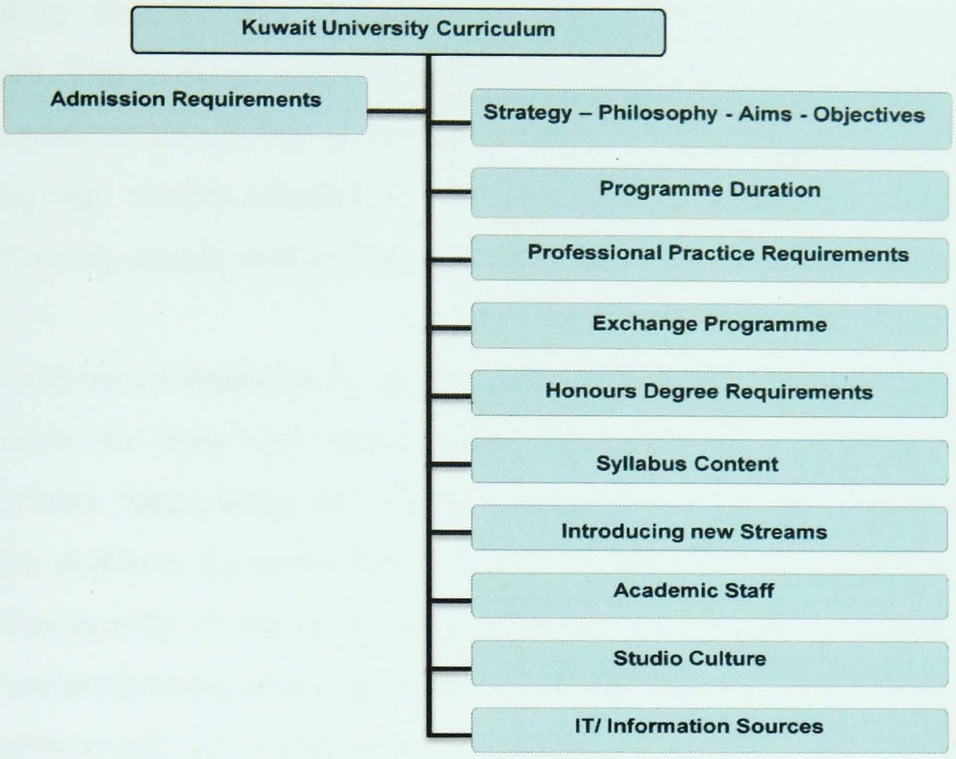

Figure 5.3 Aspects of developing KU Curriculum for the Bachelor Degree of Architecture

5.10 Advancing the curriculum of KU Department of Architecture

Developing the KU curriculum should entail developing every aspect of the curriculum including its philosophy, aims, objectives, the syllabus, and other issues related to syllabus implementation such as emphasising professional development and introducing exchange student programmes. Another way to add new dimensions to the curriculum is to add more electives to the syllabus to broaden the students' choice of streams.

The syllabus developed at KU should be concerned with understanding and practising sustainable design in the built environment by providing a broad architectural design education across all aspects of the built environment and providing at least a basic minimum in areas related to the built environment within certain intended streams. Adopting **sustainability** should not be marginal; rather, it should be integrated in all aspects of the curriculum to ensure better outcomes by understanding different ways of employing it.

Prior to suggesting any changes to the Department of Architecture syllabus, it is relevant to present the departmental **strategy** which guides the teaching outcomes. The strategy includes the department's vision, mission and goals.

The departmental **vision** is to become a leading department in the region, providing high quality education and professionals capable of creating a better world, offering unique and effective architectural ideas and solutions.

The department's **mission** is: to educate individuals in the art and science of architecture so they can assume leading roles as architects and building professionals responding to Kuwaiti society's needs; to instil a commitment within the students as to the health, safety and welfare of building users and to enrich the quality of life of Kuwaiti citizens and society at large; to foster a critical understanding and exploration of the forces that have an impact on the built environment, for example, art, culture, technology and ideology; and to provide students with the knowledge that will enable them to take an active intellectual participation in architecture discourse.

The department has two main **goals**: to establish an Academic Centre that provides architectural consultation to professional practices at private and governmental levels; and to present channels for architectural communication locally, regionally, and internationally[85].

The strategy displayed above needs to be translated into a curriculum that translates all its dimensions into reality, for two reasons. Firstly, the projected Academic Consulting Centre has still not been established. Secondly, there are still a number of targets missing from the department's strategy. Because of this, the following subsections include suggested modifications to the current curriculum for the KU Department of Architecture. The strategy will align the curriculum of KU Architecture Department with the needs of practice.

5.10.1 Developing the existing KU B. Arch curriculum

The development of the syllabus for KU's Department of Architecture should be carried out in accordance with three measures: first, retaining the core courses

[85] *Source*: KU Dep. of Architecture home page http://www.kuniv.edu.kw/?q=kuNode/335&Lang=en

of the Bachelor's Degree programme such as communication and building materials, and replacing or adding new courses that will add extra dimensions to the current syllabus, such as adding more technological or environmentally related courses; secondly, developing the theoretical and practical elements of the syllabus and, thirdly, introducing disciplinary and interdisciplinary sustainability concepts with the aim of achieving integrated learning.[86] More details will be discussed in the coming subsections.

5.10.1.1 Developing the philosophy of B. Arch

A reflective bachelor's programme should focus on developing the present philosophy to become better equipped to face future challenges. The philosophy of the programme should focus on *Knowledge-based design*, *Collaborative practice*, *Progressive use of knowledge*, *Achieving minimum competencies*, *Teaching to promote innovation* and *Achieving objectives*. The following subsections exhibit the philosophical aspects in more detail.

5.10.1.1.1 Knowledge-based design

There are three types of knowledge:

1- *Conceptual knowledge*: facts, principles, concepts learnt theoretically;

2- *Precedent knowledge*: learning how conceptual knowledge has been used in designed objects;

3- *Procedural knowledge*: building skills by doing actual projects.

The programme should place emphasis on design theory, research and practice; educational theory and areas relevant to design using a problem-solving approach to develop learners' abilities. Learning design should focus on it as a *process* since it is a compound, iterative and integrative process that holds a great deal of potential for innovation and creativity. Also learning design is a *situated activity* since it can only be achieved within a certain context. To achieve a successful functional design requires the use of knowledge related to the design problem.

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[86] Integrated Learning: the process of acquiring learning empowered by the mastery of intellectual and practical skills informed by knowledge from various disciplines and responsible for their actions and those of the society (Huber, M. T. and Hutchings, P. (2003) *Integrative Learning: mapping the terrain.* California: Carnegie Foundation for the Advancement of Teaching

It is imperative for the programme to focus on *reflective practice* as a central component of the learning process. Learning and practising design should reflect on many areas related to design such as physical forms, the process of design, and communication. Learners' accumulation of *knowledge-based design* should be based on design problem solving.

Learners should reconceptualise various disciplines of knowledge that are design-relevant. Suggested areas of knowledge include: *Inhabiting the Built Environment,* which consists of natural systems, interaction with people within the physiological boundaries of the built environment, social context, ergonomic and space requirements; *Designing the Built Environment* which includes knowledge of the history of design methodology, critique, procedures and systems, aesthetics, design principles, philosophical, global cultural and political movements in art; and *Constructing the Built* Environment which focuses on many things including construction and building materials, building codes, regulations and standards, urban design, safety, and other issues. Finally, undergraduates need to be provided with sufficient knowledge about creating sustainable architecture, including an awareness of the limited amounts of fossil fuels and other non-renewable natural resources, and the need to use fewer resources and recycle more.

5.10.1.1.2 Collaborative practice

Because Architecture is a collaborative practice, the learning process in KU's Department of Architecture should be focused on training undergraduates to achieve it. The curriculum should embrace other relevant subject matters in order to reach this goal. Architectural education should ensure relevance to existing architecture practices, and to do this perhaps the best way is to collaborate with other parties such as planners, developers, political activists, artists, researchers, fabricators, builders and so on, who will represent a centre of excellence in KU for teaching and research. The learning should be based on collaborative team work developed under the supervision of academic staff, as well as experts. Students will learn collaboratively in the learning and assessment processes through peer review.

5.10.1.1.3 Progressive use of knowledge

Progressive use of knowledge is a scheme of learning in which tutors plan learning activities that integrate the progressive development of learners' knowledge towards achieving complex designs. The learning process integrates previous knowledge, abilities and skills with new knowledge and concepts subsequently acquired. Learning skills should develop progressively, integrating different kinds of skills with the accumulation of new concepts learnt in different courses.

5.10.1.1.4 Minimum level competencies

The Bachelor of Architecture programme should be directed towards developing learners' knowledge, skills, awareness and abilities in a range of situations that require a basic to strong background. Learners should demonstrate minimum competencies[87] while carrying out design activities for core modules, although they should be furnished with the means to achieve the full range of competencies from awareness to excellence. Curriculum setting should include minimum required design competencies for achieving excellence, for example, the ability to apply knowledge and work in different types of environments.

5.10.1.1.5 Teaching to promote innovation

The instruction method should go beyond traditional ways of teaching by developing and promoting a climate of innovation in the existing curriculum, improving students' learning by embarking on creative futuristic school projects, and connecting the learning process with international aspirations.

5.10.1.1.6 Achieving objectives of B. Arch.

The philosophy of the Bachelor of Architecture should aspire to achieve the objectives of the curriculum, that is, produce highly competent graduates who are capable of producing high quality designs as professionals and research as academics (*see* section 5.10.1.2).

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[87] Competency: plural competencies are skills acquired through work experience, life experience, training, or studying.

5.10.1.2 Developing the objectives of the B. Arch.

The Bachelor of Architecture programme should place more emphasis on the professional development of students. The programme syllabus should enable students to:

1- Gain the knowledge and skills required to become a reflective architect, bearing in mind the growing complexity of the profession;

2- Gain a range of attitudes and philosophies relating to architecture;

3- Acquire a range of knowledge and skills that will enable them to provide their community with the best possible services and high quality architecture based on reasoning around sustainable building designs by obtaining:

a. An understanding of, and experience in, architectural design;

b. A knowledge of the history of architectural design in different cultures and civilizations;

c. A knowledge of architecture theory;

d. A knowledge of building materials, and different construction practices and production methods;

e. An ability to translate society's needs and future aspirations for good quality environments into reflective architectural design;

f. An ability to understand the legal requirements of the built environment and how to operate it in real life settings;

j. An ability to understand the technical sides of architectural design and their applications;

h. An ability to communicate with all parties related to the built environment (employees, employers, and end users) effectively using all means of communication (oral, written, graphic, etc.) and

i. The ability to generate research that contributes to Higher Education outcomes.

5.10.1.3 Developing the aims of the B. Arch. degree

The following aims are recommended in order to better achieve the objectives of the Bachelor Degree of Architecture at KU.

At the end of the programme students are expected to be able to accomplish the following:

1- To gain a general understanding of Architectural Design, Architectural Technology and Environment, History of Architecture, Communication Skills, Creating Sustainable Designs, and Architecture Management and Law.

2- Obtain a minimum level of professional experience and knowledge that will enable them to take logical decisions in their graduate practice.

3- Develop an understanding of the interrelations between disciplines that contribute to architecture practice and which build towards their creativity.

4- Develop the ability to produce architectural designs that facilitate functionalism, integration of structure, building materials, sustainable energy systems and at the same time economic sustainability.

5- Develop an ability to demonstrate a variety of skilful means of communication with clients and end users that are both effective and collaborative.

6- An ability to build students' personal qualities such as ethics, critical thinking, graphics, individual and collaborative team work, computer and information technology skills, effective research, and numeracy.

7- An ability to build on all the skills and knowledge obtained during the undergraduate years by pinpointing their own educational needs and selecting the best continuous education programmes that contribute to their future ongoing professional education.

5.10.1.4 Developing the admission requirements

In addition to high school grades, the admission to KU's Department of Architecture should include personality tests, drawing ability, and exams which test the fresh undergraduates' creative design skills. These kinds of tests should be compulsory to help undergraduates assess their own abilities, leading to a decrease in the number of future undergraduates dropping out from a major that takes a longer time to finish in comparison with many other undergraduate majors.

5.10.1.5 Developing BA. Arch programme duration

The administrators of KU's Department of Architecture are required to review the length of its Bachelor degree programme in the light of any relevant

development that arises. They ought to ensure that the programme duration will allow the achievement of the new targets, including any new courses, as well as being long enough to ensure the professional development of the undergraduates.

This could involve dividing the undergraduate years of study into three parts. After finishing Part 1, the undergraduate takes part in professional development practice, Part 2, to fulfil the graduation requirements. On finishing the professional development component, graduates enter Part 3. The academic years could be organised by the KU Department of Architecture on the basis of this division. Or they may simply replace some existing courses with others that produce better academic outcomes.

5.10.1.6 Developing BA. Arch professional practice requirements

Although KU's Department of Architecture requires 166 credits for graduation, similar to US universities, the programme does not offer an appropriate professional practice component. As with many Arab Universities, Kuwait University education is theory-based for most majors. Students seeking vocational study are supposed to join the courses offered by the Public Authority for Applied Education and Training[88]

Developing the curriculum should entail a focus on developing undergraduates' professional practice. Meeting this target can be achieved by dividing the syllabus into two parts in which students work for an architectural practice for one year after finishing the first part of their degree in order to gain professional practice experience, as shown in Figure 5.4. Even in the UK, it was reported that students' professional development takes place outside schools of architecture, which produces discourse about architecture (Stevens, 1998).

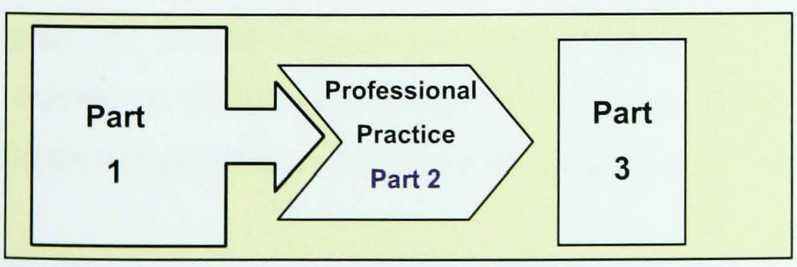

Figure 5.4 A suggested timeline for the Bachelor of Architecture programme in Kuwait University introducing a professional experience development component

[88] See the homepage of the Public Authority for Applied Education and Training : http://www.paaet.edu.kw/

5.10.1.7 Introducing an exchange programme to KU

To develop its learning outcomes, Kuwait University's Department of Architecture should initiate an *International Students Exchange Programme* for qualified students that follows certain guidelines. The department should employ a coordinator for the exchange programme who will set its guidelines, the programme's duration and the semesters in which students can qualify to join the programme.

5.10.1.8 Developing existing honours degree themes

For the Bachelor's Degree in Architectural Design, Kuwait University's Department of Architecture should develop the existing regulations with new ones that encourage students to participate in the department's research activities. A possible way of developing the Honours requirement is to state that obtaining an Honours degree requires an extra year of full-time research studies under the supervision of a member of the academic staff, which can also be fulfilled by, for example, registering on extra courses such as the *Advanced Study Report*. In this case the Honours degree will contribute to the research outcomes of the department and develop students' research abilities in terms of formulating a problem, investigating its factors (variables) and writing a reasoned research report. Also, such an Honours degree will carry more value for graduates aspiring to work in academic institutions or in prestigious architectural firms; or it could be counted as a prerequisite for applying for a PhD programme without the need to register on and complete a Masters Degree programme.

Students could also be encouraged to join Honours programmes by being accepted for scholarships once their programme is complete. Only students who achieve a Weighted Average Mark[89] of at least 70% for the pass degree should be considered on the Honours programme.

[89] Weighted Average Mark is the calculation commonly used by universities to assess the students' average performance and to compare students' levels with each other.

5.10.1.9 Developing the syllabus content

Since the current curriculum includes many courses that are considered globally as core courses for architectural education, and it includes other courses that are either technology or humanities oriented, perhaps the best way to develop the syllabus is as follows:

First: retaining the core courses that are regarded internationally as the basics of Bachelor of Architecture programmes;

Second: Adding a sustainability dimension to the syllabus by introducing new modules/courses focused on sustainability concepts, and by integrating some sustainability concepts within the content of the existing courses; and

Third: Adding more dimensions to certain existing courses in the programme to meet international objectives, for example a Professional Practice course should be reviewed as suggested previously in section 5.10.1.6.

The following Table 5.1 displays both current and suggested courses/concepts.

Table 5.1 Developing the syllabus courses

Courses that should be retained	Courses/ Concepts that should be introduced[90]
1- Architectural Design 2- Computer Applications in Architecture 3- History of Architecture 4- Indigenous Architecture 5- Architectural Criticism 6- Architects and Architecture 7- Structural Analysis 8- Materials and Methods of Building Construction.	1- **International Sustainable Construction**: aims at developing the learners' sustainable construction concepts, training them in ways of achieving sustainable construction. Incorporating sustainable construction principles into a vocational curriculum should focus on internationally-based examples. Learners will research barriers to Sustainable Development in the construction industry, find solutions and test them across the world. 2- **Issues in Sustainability**: builds the learners' background about the meaning of Sustainable Development from different viewpoints including: *Environmental Sustainability*, ecosystem integrity, carrying capacity & Biodiversity; *Social Sustainability* cultural identity - Empowerment, Accessibility, Stability & Equity; and *Economic Sustainability* Growth, Development, Productivity & Trickle-down. *Climate Change*, Resources, Internal & External environment, Building stock value, Transport and utilities, Construction material, & infrastructures. All the issues are defined & analysed within the architectural design framework and objectives. 3- **Construction Ecology**: taught concepts include the meaning of construction ecology & its relation to green & sustainable architecture, sustainable building materials & ecology, materials' life cycles, recycling materials, materials & the environment, engineering insights in ecological construction, materials valuation, materials flow & land resources, minimising waste emissions from the built environment, managing buildings ecosystems, requirements for construction ecology, ecological analogy, implementing construction ecology, examples for construction ecology & intelligent architectural design for ecological construction. 4- **Principles of Sustainable Construction**: in-depth concepts of issues pertinent to sustainable architectural design & construction, including sustainable building materials, buildings' life cycles, choosing building materials with low embodied energy[91]. 5- **Detailing Connections for Sustainable Architecture**: concepts including using materials, for example, recycled plastic lumber in detailing will prevent soil contact & rot and will minimize use of pressure-treated lumber; using proper detailing will minimize use of old-growth timber; for example, when using an opaque stain or paint, no need for clear narrow-grained cedar or redwood siding as long as proper detailing is used to avoid rot.

[90] All the concepts listed above can be integrated with the practical side of the programme of Bachelor Degree of Architecture through applying them in the Design Studio whenever applicable.

[91] (By weight: Lumber= 1Brick = 2 Cement = 2 Glass = 3 Fibreglass = 7 Steel = 8 Plastic = 30 Aluminium = 30).

Cont. **Table 5.1** Developing the syllabus courses

Courses that should be retained	Courses/ Concepts that should be introduced
9- Introduction to Landscape Architecture	6- **European Approach to Sustainable Design**: sustainable design, employing sustainable construction methods and materials and incorporating water and energy efficiency equipment.
10- Introduction to Urban Design	7- **Seminars in Sustainable Design**: receiving key note architects if possible in seminars which discuss a selection of the most pioneering buildings in terms of sustainable construction practices, representing the most innovative building designs worldwide.
11- Solar Energy in Buildings	8- **Natural Hazards, Designing, Planning and Building**: learners study designing and construction for extreme climatic conditions.
12- Architectural Professional Training	9- **Natural Hazards in the Built Environment**: concepts including primary replacements of CFCs & HFCs which have been phased out of construction, such as using local building materials - another method of reducing air pollution and energy consumption since they do not require transportation; using recycled building materials[93] to reduce solid waste problems and cut energy consumption in manufacturing; using salvaged materials[94] to reduce landfill pressure and save natural resources; avoiding building materials that release formaldehyde and volatile organic compounds (VOCs) that give off gas pollutants[95]; avoiding over- packaged products to minimize packaging waste, such as plastic-wrapped plumbing fixtures and PR fasteners that are not available in bulk.
13- Architectural Theory	
14- Architectural Design (6) - CAAD[92]	10- **Green Building Delivery Systems**: the green building challenge in an international collaborative initiative which aims to develop an internationally accepted environmental assessment tool for buildings, using case studies.
	11- **Material for Sustainable Interior Design**: concepts include furniture design, surface reflection, avoiding ozone-depleting chemicals in insulation & mechanical equipment, using durable products and materials or at least products that last longer and require less maintenance.

[92] Software other than CAAD can be employed.

[93] e.g. cellulose insulation, Homosote, Termon-ply, and recycled plastic lumber

[94] e.g. lumber, millwork, certain plumbing fixtures, and hardware

[95] e.g. solvent-based finishes, adhesives, carpeting, particleboards, etc.

Cont. **Table 5.1** Developing the syllabus courses

Courses that should be retained	Courses/ Concepts that should be introduced
15- Architecture in the Middle East	12- **Environmental Technology** concepts including contemporary environmental issues with emphasis on the way environments function and on compatible tools, alternative contemporary technologies and policies for sustainable environmental management; appreciating that successful projects depend partly on belonging to a network of experts aiming to advance personal and collective environmental goals. CAD and Autodesk VIZ applications, learning about materials technology, systems and services technology, control technology and environmental technology. Learning about architecture and the built environment will be based on scientific & engineering principles.
16- Design of the Luminous Environment	
17- Design of the Sonic Environment	13- **Environmental Planning and Design**: orienting buildings to enhance the use of passive solar heating, day lighting & natural cooling; locating buildings close to public transport, bicycle paths and walking access to basic services; clustering buildings to preserve nearby wildlife habitats and minimize environmental impact; locating buildings near trees/vegetation will reduce cooling loads in winter and channel cool summer breezes into the building.
18- Building Systems	
19- Advanced Environmental Systems	14- **Architecture, Energy, Resources and Ecology**: concepts include energy and resources in connection with the construction and operation of buildings at a local and international base; energy consumption in heating houses, industrial and commercial buildings and the use of Earth's mineral materials for building construction, infrastructure & building roads, with emphasis on creating sustainable architecture with an awareness of the escalating depletion of fossil fuels and the need for recycling.
20- Architectural Graduation Project	
	15- **Sustainable Practices**: the relation between architectural expression and appropriate materials
	16- **Sustainable Technology, equity and ethics**
	17- **Climate and construction**: an interdisciplinary introduction to the perceptual and technological aspects of architecture, crossing to the spatially perceptual, the material & the built, and physical and architectural construction.
	18- **Free- Hand Drawing**: Students practise fundamental free-hand drawing disciplines and perceptions through ½ day a week workshops which are supplemented by homework exercises. The course can be taken over two years of study in which students make use of consultant training.

5.10.1.10 Introducing new streams

The KU Bachelor of Architecture syllabus should be structured around a set of core units of study (compulsory courses) with a choice of streams. Students then choose the most appropriate stream on the basis of their intended future profession or pursue particular interests while participating in the core of the programme with its focus on design for the built environment. The following streams are suggested:

- *Bachelor of Design in Architecture (A pure non-stream programme)*

Although this non-stream programme will focus on the basic concepts and skills of architecture, it should tackle Islamic architecture as part of the culture of that region of the world. It should include sustainability concepts in its core courses.

- *Bachelor of Design in Architecture (Allied Arts in Architecture)*

This stream is focused on various techniques and levels of producing a fine art print through knowledge of technique, theory and practice, and demonstrating an understanding of printmaking theory and practice, imaginative thinking and critical judgement. Traditional and contemporary art methods are covered, for example, photography, photocopy art, collage, the fundamentals of plate making, etching press, traditional disciplines of drawing, and so on. Students are provided with the knowledge and skills of drawing based on observing the physical world and studying the history and theory of art.

- *Bachelor of Design in Architectural Technology (Digital Architecture)*

As technology has become an essential part of our daily life, digital technology has replaced the blue paper technique in contemporary architectural practice. Because of this, it is more practical to teach undergraduates how to create sustainable designs using information technology. Students explore past, present and future technologies of architectural design and construction and their impact on the economy, society, and the environment. In this stream, emphasis is placed on design skills development and the realisation process, the application of knowledge by acting creatively and confidently, conceptual awareness, and the ability to evaluate technological activities constructively. Also this stream places emphasis on practical learning activity. Technological

aspects should include: environmental technology, CAD and other software where possible, service technology, building materials technology and systems technology. The learning process should include environmental issues such as sustainable architecture, the conservation of natural resources, environmental and ecological issues, the disposal of domestic waste, and the selection and use of building materials. All architectural concepts should be taught within an environmental technological framework.

- *Bachelor of Design in Architecture (Sustainable Design)*

Students joining this stream will learn more about aspects of sustainable design, including understanding environmental systems, sustainable building materials, sustainable building design and construction, climate and design principles, safe waste treatment, sustaining building materials' life cycle, energy and building envelope systems, understanding principles and functions of construction materials, Health and Safety, international environmental treaties, environmental laws, building designs and environmental ethics.

- *Bachelor of Design in Architecture (Urban Design and Planning)*

An integrative approach to education and research in planning the physical environment should comprise a double strategy. Undergraduates will understand the problems of cities by planning their own designs in the studio. They will discuss their strengths and weaknesses, and learn new techniques, considering the social, historical and sustainable aspects of urban design and planning. They will also learn how to deal with individual clients or social groups, human settlements and multicultural interests while undertaking urban planning.

- *Bachelor of Design in Architecture (Heritage Conservation)*

This stream aims to increase undergraduates' knowledge of Kuwaiti built heritage and ways to conserve it. Because Kuwait borders Iraq to the north, Saudi Arabia to the south, and Iran is also across the border, this stream should tackle many conservation issues in relation to the architecture of the surrounding countries. Examples taught from neighbouring countries will have

future benefits to the graduates. They will also be close to the relevant geographic areas with easy access to them.

To join a certain specialised stream, students will have to register on a specific set of elective courses in their third year as prerequisites for entry to that programme and to complete the Architectural Experience Requirements (18 weeks of approved work experience or equivalent). Joining different streams will enable graduates to work in diverse private and governmental arenas and in specialised areas of architectural design within architectural practice or within the Urban Design and Planning stream.

5.10.1.11 Developing the competencies of academic staff

Curriculum reform should place the academic staff at its centre, because they are not only an important part of the process but are essential partners in curriculum development work (Cave, 1971: 11). There are many possible ways to develop existing academic staff's knowledge, teaching skills and outcomes. To start with, the staff should be employed on the basis of their practical experience, besides fulfilling the academic requirements, because of the vocational nature of architecture teaching. Many schools of architecture around the world employ experienced architects in their institutions without the need for them to obtain a PhD qualification.

Another important issue is to achieve gender equality whenever possible by employing more female instructors, especially when the percentage of female undergraduates is double that of male undergraduates in Kuwait University's Department of Architecture (*see* Appendix 9).

Kuwait University should employ teaching staff on the basis of their published research and their contribution to science rather on the basis of the current criteria; employment conditions should also include the achievement of a PhD. Degree, or, as a minimum, the achievement of a B grade in the Bachelor's degree. Paying the teaching staff a generous salary should attract some of the best academics around the world to join the KU Department of Architecture.

The academic staff should join workshops to expand their theoretical and teaching abilities. Obtaining a Higher Education Teaching certificate must become a basic requirement for all Kuwait University faculty in order to develop academics' teaching knowledge and skills. Achieving minimum teaching competencies will be one route towards quality assurance.

Panels should be set up to support diversification in the academy. The academy should work to develop a culture of cooperation among its staff. Their competitive and collaborative attitude should be reflected in their practice and help to maintain better teaching levels. CPD[96] should become a common practice within the faculty. Emphasis should be placed on organising teaching activities.

The introduction of a Sustainable Design course to the curriculum will not be fruitful unless tutors believe in their mission, providing undergraduates with knowledge, incentives and imagination, after which graduates will continue the mission themselves, from generation to generation (Boake, 2006). To achieve this, academics should go through training programmes to build both their knowledge competencies and teaching skills.

5.10.1.12 Developing the studio culture

Simply put, studio culture reflects the learning environment that has been created between undergraduates and the teaching staff inside the design studio. It should be built on mutual respect and trust, encouraging innovation and productivity to train the students for their future roles. Developing students' positive values and principles is a necessity in a profession that links all threads of the environment to individuals within consumer societies. Academics should employ new ways of addressing sustainability and diversity as they pertain to design issues in the design studio and developing a comprehensive design practice. Studio practice should be positive, planning ahead what students do in a typical day, and which structures and practices help them to thrive. Teaching activities should be organised; decisions should be made about undergraduate

[96] CPD: Continuous Professional Development.

learning goals, how students interact in the classroom, what information is directed at them, what information is gained from teaching/visual images and what information is obtained from students' learning experiences.

5.10.1.13 Developing IT and information resources

The university library should be enriched with the latest literature about sustainable architectural practices and other information resources, for example, audio and visual resource collections including DVDs, fast and efficient Internet access, and access to other architectural collections when possible, to support the curriculum. The library should be well equipped with the latest IT[97] equipment to promote research skills and critical thinking for professional practice and lifelong learning.

5.10.1.14 The potential of employing the Australian architectural syllabus model

At this stage, it is possible that the KU Department of Architecture should retain the positive aspects of the curriculum, rather than discard it as a whole. Finding the best-fitting international curriculum for the Arab region to learn from will be the second stage; after this, further curriculum development should take place. Progressing from a point which others have reached is better than starting from zero, and so the university's academics should look at other curricula from different parts of the world. Although Scandinavian universities as well as German universities have both proven high teaching quality in the area of sustainability, the effect of their climate clearly has a significant impact on the actual taught curricula. Therefore, choosing other well established universities that include strong technology and science contents within their curricula, and universities based in arid climates zones such as Australia, might prove a good alternative (Alhassan and Dudek, 2008a: 379). The Australian University of Sydney provides a good example of a sustainable architecture curriculum (see section 2.12.1) that is deep-rooted both academically and technologically. A cutting-edge curriculum design that employs technology to achieve sustainable architecture might be a good start for Kuwait University.

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[97] IT: Information Technology

5.11 Summary and Conclusion

Chapter 5 has provided suggestions for ways to develop the existing KU Programme for the Bachelor's Degree of Architecture by supplementing it with new academic dimensions. The suggested curriculum revisions cover many aspects of the syllabus, from the academic staff to the provision of and training in information technology, and so on. Furthermore, Chapter 5 recommends incorporating examples from Australian universities' curricula in particular, because they are well established in teaching science and technology, as well as supporting sustainability concepts, and they share a similar arid climate with the Arabian region, reflected in the buildings' environmental design and therefore in the system of architectural education.

However, it should be made clear that any attempt to create sustainable architectural education in Kuwait University will be ineffective if Kuwait is not ready to embrace the outcomes. Graduates equipped with positive sustainable architecture awareness must be met with better prepared policy makers and public opinion, rather than finding neglect and negligence. The creation of a sustainable building heritage in Kuwait needs a joint effort from policy makers, the educational system and wider society, as discussed previously in Chapter 5. This refers back to the findings presented in Chapter 3, where the data analysis indicated that environmental awareness in Kuwaiti society does not meet international sustainable development standards (see section 1.8 and 4.3.3.3), and that although environmental laws have been passed, they are not regularly enforced. The process of sustainable architecture development should follow international criteria to achieve the desired outcomes. The curriculum development process follows three steps, as follows: first, evaluating the existing curriculum (as displayed in section 2.11), second, keeping the relevant content and replacing the irrelevant concepts with better alternatives (as displayed in Table 5.1) and third, by following the process outcomes after a certain length of time. For curriculum development, the evaluation process is called *assessing* (explained in section 2.3). Monitoring the success will be through surveys, questionnaires and interviews that assess sustainable architecture competencies. Chapter 6 will address ways to improve the sustainability awareness of both policy makers and of wider society.

Chapter 6

Conclusions

6.1 Introduction

Chapter 6 aims to expand upon the ideas presented in the previous chapters, presenting final recommendations and conclusions about the research topic of developing a sustainable architecture curriculum in Kuwait University. Chapter 1 provided a holistic review of sustainable architecture in the past and present time, as well as theoretical and practical approaches to architecture education and the history of education and consumption patterns in Kuwait.

Chapter 2 presented a background of what education is and how it developed over time to the present day formal and informal education channels, and also showed the nature of the curriculum. Furthermore it explained architectural education development, architectural education theory and sustainable architecture. Other issues covered by the chapter included environmental education in the UK as a political situation; sustainability concepts cannot be prescribed, but rather a holistic teaching approach is needed which creates environments within which scholarship, research, learning and teaching are effectively integrated in order to equip students with adequate skills and knowledge for understanding sustainability and to enable them to incorporate it into their design projects. It also presented the different architecture curricula set by different architectural bodies and universities, including the RIBA in Britain, the NAAB and the University of Texas A&M in the US, the Australian AACA and University of Sydney and University of Kuwait, showing that there are no universally specific criteria for setting the architecture curriculum.

Chapter 3 included a brief explanation of the methodology used to conduct the research and the main and secondary data sources used, and it offered a data analysis of the results. Chapter 4 examined the three drivers of change in architecture toward more sustainable architecture and the importance of developing them, especially the roles of the key players in social sustainability and the linkages that will achieve more sustainable architecture education in

Kuwait. It emphasised the need for greater sustainability may act as a driver for change in architectural education and within that social drivers (the desire for a society to create architecture that will remain for future generations) or economic drivers (it becomes cheaper to use materials that last longer or do not take so much expensive energy to make) or environmental drivers (the use of certain designs and materials that reduce the building impact on the environment). Together these three drivers create a force of change in architectural education towards more proactive sustainable solutions. Chapter 5 covered aspects of developing a curriculum on sustainable architectural education for Kuwait University that emerged from the analysis of the data presented in Chapter 3. The recommendations presented in the chapter covered all aspects of the curriculum including its objectives, philosophy, aims, syllabus, reference books, minimum competencies for undergraduates and staff requirements, teaching staff, course duration, admission requirements, introduction of exchange programs, development of the studio culture, introduction of new streams to the undergraduate program, development of undergraduate job placements and other aspects.

Chapter 6 argues for possible directions of sustainable architecture education reform in order to achieve more sustainable development, referring to the drivers of change in relation to sustainable architecture education. The chapter discusses the role of society, especially of social capital, in engendering better educational policies. As mentioned previously in Chapter 5, policy makers and society have enjoyed an interactive relationship that develops over time under the influence of many factors including education; therefore, the discussion will be interconnected between the two topics. It provides major and minor findings and recommendations for ways of achieving better awareness in society of sustainable architecture education by improving the environmental policies of government institutions.

Perhaps it is worth mentioning here that the argument in Chapter 6 can be applied to other countries around the world that share similar cultural, regional or educational backgrounds with either Kuwait or the UK. This chapter provides

them with suggested future strategies that can be employed to a more achievable sustainable architecture and sustainable development.

6.2 Conclusions

The following subsections will cover the main conclusions of the research findings in relation to drivers pushing sustainable architecture education. The drivers of change for a more sustainable architecture education stem from the drivers of sustainability (environmental, economic and social). Together, these drivers can frame the direction of architecture education in every country, including Kuwait. As the economic factor is very much linked to building industry controllers (contractors, developers and investors), it could move the building industry down unsustainable paths in order to achieve maximum profit and minimum loss. In this case, the social driver should push it back towards more sustainable practice in which sustainably aware people and government work for positive environmental outcomes. The environment driver (conserving non renewable natural materials for future generations) will also move sustainable architecture to counteract the negative impact of the economic driver.

6.2.1 Government educational reforms as part of sustainable development

The discussion of educational reforms covered in Chapter 5 cannot be realized independently from the actions of policy makers, since all educational institutions are government directed. The government is the sole body that can initiate and legitimise any reforms that attempt to achieve the state's aims, such as sustainable education as part of sustainable development plans. Sustainability efforts have a greater chance of success when they enjoy executive-level leadership and are codified in official policy (Keniry, 1995). Therefore, the Kuwait government strategy should aim at setting a short-term and a long-term national environmental plan, consulting national and international expertise in all fields of governing including education, as will be explained in the coming sections.

6.2.2 Initiating new sustainable educational strategies for the compulsory school years

Politicians and policy makers recognize the crucial role of education in realizing social change because students are the citizens of the future. UNCED 1992 A21 recommended 'using educational policies to realize environmental and ethical awareness, values and attitudes, and skills and behaviour consistent with sustainable awareness'[98]. Changing the curriculum means changing the attitudes of the society (Cave, 1971: 14) and curriculum reform has its roots in economic, ecological and technological changes in society itself. The Kuwaiti government's educational aims and objectives should be clarified and stated as accurately as possible. This will enable the government to monitor the educational system of compulsory school years and equip high school graduates with minimum sustainable architecture competencies prior to joining Higher Education institutes. The best methods and media to achieve these aims should be selected, and then by constant evaluation and feedback, the curriculum reform process should be improved and the degree of success tested. This action entails listing the existing environmental concepts within the curriculum into their original branches such as conservation, pollution and recycling, including their scope and sequence. The concepts then are measured in terms of their weight within the entire curriculum, leading to a final conclusion regarding what improvement and reforms need to be carried out during the school years.

In the UK, curriculum planners and teachers have been criticized for being patently xenophobic, pseudoscientific and simply "going with the flow" in what they select from a set of ecological values rooted in British culture (Schoon, 1992 and Lowe, 1983 cited in Agyeman, 1997). Therefore, educationalists are now exploring new educational methods for teaching sustainability, although the content of education for sustainability is still under debate (Agyeman, 1997). Whilst in Kuwait, perhaps the best way to start is by establishing an

[98] United Nations Conference on the Environment and Development (1992) *Agenda* 21, Rio de Janeiro: UNCED

Environmental Education Centre with a main objective of developing the environmental knowledge of both the teachers and students who form the foundation of society.

6.2.3 Enforcing sustainability policies

Passing strong environmental/sustainable policies/laws will be ineffective, no matter how much they are advanced in accordance with international guidelines, if people are ignorant of them and they are not properly enforced and implemented through different state channels. In the case of the Kuwaiti government, this study's interviews with officials and photographs of newly built neighbourhoods in the private sector and refurbishment of old government houses, as displayed in Chapter 3, indicate the need for law enforcement. The Kuwaiti government has the obligation to evaluate current environmental practices in terms of the rates of consumption of available resources, environmental pollution, recycling and conservation. Laws that are linked to those channels should be enforced immediately, although it may be difficult as the responsibility for the laws is divided between different government sectors. Al-Mezaini recommended beginning with the enforcement of current environmental laws, and subsequently, adapting those laws in accordance with international themes, adding that sustainable development is unattainable unless it involves commitment from all sectors of society (Farahat, 2007). Sustainability law enforcement should go together with educating all sectors of society (students, architects and end users) about the importance of implementing building codes for better energy consumption, safety and security levels that will lead to more sustainable buildings and more sustainable development.

Education is a necessary tool for sustainable policy implementation, but it may be insufficient to promote sustainable development and an holistic approach is needed to achieve sustainability.

6.3 Raising the environmental awareness of society

The data results analysis of the end users given in section 3.5, which included questionnaires, interviews, observation and census, indicated low sustainable architecture awareness in Kuwaiti society. Therefore, the Kuwaiti government must consider using incentives and disincentives as ways to raise their population's sustainability awareness, as they were proved effective at international level. For the first time, making people pay energy taxes has been suggested as a way of achieving this goal in a short period of time by the president of Kuwait, Shaikh Sabah Al-Sabah, in an interview which took place in September 2007. He stated that the government realizes that petrol will be depleted one day; therefore, new measures should be taken soon that involve both citizens and non-citizens in Kuwait, such as introducing energy taxes[99].

Environmental concerns are both time and space specific and governed by a specific modelling of the natural world to which technology and sustainable architecture should respond. The adoption of a social perspective in this regard has critical implications for architectural education, practice and research (Guy and Farmer, 2001).

An important contribution of social construction analysis may lie in its ability to demonstrate how the power relations among competing development interests frame technological decision making and subsequent design strategies. An analysis of the changing power relationships structuring this process suggests an important future direction in research. Such research might help to identify those societal actors with the most influence over decision making and enable practitioners and students to recognize their own position and role in the provision of more sustainable lifestyles. However, this may only be possible if, according to Hajer:[100]

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[99] Source: http://www.news.gov.kw/a/46882 (accessed 2007).
[100] Martin Hajer, The Politics of Environmental Discourse, 1995, p. 294.

> ecological politics can shed its prevailing techno-corporatist format and create open structures to determine what sort of nature and society we really want. In recognizing the socially contested nature of environmental design, we might begin to engage in a very different dialogue about sustainable architecture (Cited by Guy and Farmer, 2001).

Changing society's awareness of a sustainable future should include a vision for the long term transformation of education at all levels (Cortese, 2003). The school curriculum from K1 to K12 (*see* sections 3.5, 4.4.8 and 4.4.9) should be reviewed and improved in terms of its role in creating the sustainability awareness of learners, so that once high school graduates start at university, they are well informed about sustainability concepts and only need to learn new concepts at an undergraduate level. Undergraduates of KU's Department of Architecture will need to learn the skill of designing sustainable buildings rather than new environmental terminology.

In the UK, the Department of Culture, Media and Sport has provided a suggested curriculum for teaching the Built Environment. The Built Environment includes buildings of all ages and types, the spaces between them, and their relationships with the natural environment and the local community. This kind of curriculum builds bridges between the school and the outer community and builds the students' knowledge through creative learning tasks. This kind of education can be integrated with other disciplines such as Mathematics, Design and Technology and Dance, and provides students with the opportunity of exploring the fabric of the community, and other environmental aspects (Neuburger, 2006).

The need is for a society that is trained and equipped to understand the new agenda, as well as architects, engineers and builders who can create useful social products (buildings) using the minimum of resources, so resources remain for the use future generations. Members of society need to learn that bioclimatic architecture could make a significant contribution towards lowering the energy

deficit, which has significant consequences for the environment, the economy, health, and consumption levels, as well as reducing emissions (Alabaster and Hawthorne, 1999; Gallo, 1998). Agenda 21 states that "States shall facilitate and encourage public awareness and participation by making information widely available" (UNCED, 1992). Once people understand what they are dealing with when thinking, writing about, and undertaking local and regional development, they will adopt critical approaches and will consider closely what they are learning and thinking (Pike et al., 2006). The Brundtland Commission recommended linking social development with economic and environmental development because sustainable development is a social science concept (Cooper and Vargas, 2004).

Governmental institutions that have a direct relation with the public should play a critical role in raising public environmental awareness in order to achieve sustainable development. The Kuwait Environment Public Authority (KEPA) is a governmental institution that does not include any suggestion of raising public environmental awareness in its *Environmental Policy Statement* [101]. For this reason, KEPA should review its current policy at once and introduce an urgent strategy and plan for raising the public's environmental awareness. The plan should target all levels of society.

As mentioned in Chapter 4, social capital influences and is affected by the state's policy. Where interest groups are well informed, they will take positive steps towards ensuring their rights, and vice versa. From the mid 19th century onward, the UK, the USA and much of the Western world faced a change in civil culture due to an intensification of immigration. The government and other bodies felt that these groups of immigrants were detached from their new communities and governments, both culturally and literally. As their democracies were maturing, working-class movements were generating social and cultural capital, which encouraged people to participate fully and meaningfully in the public affairs of the

[101] See their homepage: http://www.epa.org.kw/main.php?pg=policies , last accessed 08/09/2007

state. Since then, both political commitments and campaigners shared in enabling mass literacy (Attick, 1957, cited in Silverstone 2007). Workers' educational movements engaged a mature, and increasingly universal, primary and secondary education system. The effect of this literacy was to bring in informed, reflective citizenry (ibid: 178). These kinds of movements are still taking place in the Western world.

On the other side lies Kuwait and the Gulf region. In Kuwait, the non-Kuwaiti majority have various degrees of education gained from countries other than Kuwait, which they bring with them as they arrive as adults to work in Kuwait. Educational reforms, and especially literacy, may have passed them by. Kuwait enjoys the social capital provided by a range of strong groups, such as the Kuwait Teachers Society,[102] which contributes so much to the educational process in Kuwait, yet has never contributed to campaigns to raise students' environmental awareness in Kuwait. Their main goals include the following points:

- Encouraging social and educational research and transferring information to increase efficiency.
- Simplifying the transfer of educational, social and cultural information between the association and the Arabian and international union[103].

The Kuwait Teachers Society's goals do not indicate even a slight interest in raising the students' or the public's environmental awareness. Therefore, they should review their goals and aim at working towards Sustainable Development in Kuwait through better educational projects that involve both teachers and students.

[102] Founded in 24/10/1963

[103] See their homepage, last accessed 08/09/2007: http://www.moalem.org/default_en.aspx

The Gulf Teachers Association,[104] which covers GCC countries, shares similar goals to the Kuwait Teachers Society and shows a similar failure to raise public environmental awareness.

The Kuwait Environment Society is a public organization (KEPS)[105]. Their main objectives include the following points:

- Seeking to achieve active participation and citizens' awareness, by raising the scientific and cultural profile of environmental pollution, soil pollution and the preservation of the natural resources of the country, by mutual cooperation with the relevant authorities[106].

The society has organized many activities aimed at raising the public's environmental awareness at a national and regional level: though environmental scientific exhibitions; by initiating The Pupils Environmental Post Project, which is an environmental education project designed to raise the awareness of students from Kindergarten to Year 12 (Age range 6 -17 years); by organizing a project entitled The Track, which aimed at raising the students' awareness about the lasting effect of their actions on the environment by tracking them; it has organized a campaign to collect used batteries, and used the project to measure levels of public environmental awareness, and organized eight exhibitions about the fauna and flora of Kuwait.

KEPS activities are positive in terms of raising future citizens' environmental awareness, and yet for those activities to be fruitful they should be complemented by a holistic governmental strategy on sustainable development. The EPA[107] published perspectives must be realized, replacing the word *environmental* with *sustainable* activity (*see* Appendix 18).

Perhaps the best way to address society is through the means of the mass media. According to Silverstone (2007), the media includes every kind of audio,

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[104] Founded in 20/03/2006. see their homepage, last accessed 08/09/2007: http://www.gulf-ta.org/

[105] KEPS was founded in March 1974 after the first Stockholm environment conference by virtue of Ministerial decree No. (7) for 1974 which was issued by the Ministry of Social Affairs and Labour - Kuwait.

[106] Source: http://www.keps.org.kw/main.html , last accessed 08/09/2007.

[107] EPA: Environmental Public Authority. *See* http://www.epa.org.kw/epa/ (last accessed 10/07/2009)

audio-visual and printed communication that can be received at different levels: global, regional, national, local, or personal. It is hard to direct the media to follow the government's plans or strategies, since in many countries the media has become very independent from the government through privatization or new private channels. In the UK, for example, liberalization of mainstream media and telecommunications in the last two decades of the last century, and the status of the press and the internet that exist outside the formal regulatory frame has led to a moral panic. As a result, the Broadcasting Standards Council was founded to monitor the public media (Silverstone, 2007).

Up until now Kuwait Television and Radio are still governmental institutions, but at the same time other private TV channels operate in Kuwait, such as *Alrai* TV (started in 2005) and *Alwatan* TV (started in 2007). With the presence of digital channels, the majority of the population in Kuwait watch international and regional TV channels according to their preferences, but still the stricter families switch to official Kuwait TV channels because they are well monitored morally. They believe in their positive effect on their children, and most of the day they view programmes on one of the five Kuwait TV channels. Therefore, the Ministry of Information should use this opportunity to reshape the positive environmental concepts of the younger generation to raise their awareness of sustainable development. All Kuwaiti newspapers belong to the private sector and present a colourful range of ideas and perspectives. At present, all means of mass media concentrate on news reporting or entertainment programmes which ignore international views on achieving sustainable development. To avoid this, the Kuwaiti government should plan an integrated campaign using mass media to increase public sustainability awareness.

Raising the public's sustainability awareness should also involve the private sector by foregoing an economy centred on business strategy for one which is society-focused to achieve Corporate Social Responsibility (CSR)[108].

In Kuwait the Second Conference on CSR was held on 28 April 2007, and many recommendations were put forward, such as applying philanthropy and good business practices in a win-win situation where the corporate world benefits both economically and environmentally. The conference provided the first Arabic-written CSR guide for the Middle East and Kuwait, including its definition, CSR strategies, programmes, models, statistics, and society-focused strategies. At this conference David Murphy, a senior associate with Italian-based UN System Staff College, suggested that both large and small Kuwaiti and Gulf companies should be committed to achieving sustainability by establishing well managed and future-oriented investment. Furthermore, he recommended that businesses operate by "thinking about environmental practices that will contribute to improving life in Kuwait". One way of achieving this goal is through partnership with the government, civil society and the UN. In addition, they can invest in existing health and education programmes on achievable sustainability.

Large companies such as KOC[109] and MTC[110] which involve stakeholders and shareholders must, at this stage, start thinking seriously about incorporating CSR into their business model. Raising the awareness of the role of these companies in society and the environment is one step towards sustainable development (Nacheva, 2007).

Another possible way to improve sustainability awareness is by encouraging the private sector to participate in environmental projects; for example, Kuwait is a car-oriented state, although different bus companies provide good services. The Kuwait government should encourage the building of trains and metro stations

[108] CSR: Companies that are socially, environmentally & economically responsible to their society, environment and economic culture

[109] KOC: Kuwait Oil Company; partially private

[110] MTC: Mobile Telecommunications Co

that link the main cities with each other and with key services, for example Kuwait Airport. This kind of project would decrease fuel use, air pollution and rush hour traffic congestion.

6.4 Sustainable behaviour of individuals

Steel (1996) reports that much research has been conducted on the relationship between individuals' attitudes and their behaviour, yet the debate about the correlation between attitude and the ability to predict behaviour still exists (Steel, 1996). He further adds that, while the majority of environmental behaviour studies focus on household recycling behaviour, there is no literature that covers environmental behaviour which addresses lifestyles such as the use of public transport. Generally speaking, however, psychologists have underlined the influence of situational factors over attitudes and behaviour (Sherman and Fazio, 1983); therefore, scientists should develop the right measurement tools in order to properly assess attitude and behaviour (Weigel and Newman, 1976). Steel (1996) alleged that individuals' attitude intensity is directly correlated with self-reported environmental behaviour and political activism in environmental issues. In the USA, citizens participating in environmental activities said that they think globally and act locally. Measuring these kinds of attitude-related behaviours may help environmental policy makers to design public participation programmes in order to achieve sustainability.

6.5 Sustainable society

Prior to achieving sustainable society in Kuwait, officials should study the structure of society in order to set up proper long term and short term policies. According to the last census which took place in 2006, the total population of Kuwait is estimated to be 3 to 3.5 million, of which approximately 900,000 are Kuwaiti citizens. More than half (57%) of the population is Arab, with the other main ethnic minorities being Persian, Egyptian, Philippino, Indian, Bangladeshi, and Pakistani. Civil ID cards have no racial/ethnic/faith identification; neither does the census include these items. Generally speaking, the majority of the

population practises Islam, followed by Christianity and Hinduism. Kuwaitis, on the other hand, are also divided by social group into *Hadar*[111] and *Badou*; the latter, the Bedouins, still adopt the tribal system with a head of tribe called the Shaikh.

Addressing such a small population with such a diverse ethnicity and fostering in them environmentally responsible behaviours must start with preparing strategic plans and setting timetables to meet intended targets. It may be that a focus on building the environmental awareness of the head of the tribe will encourage the formation of social capital within the tribe that integrates sustainable living approaches. As for ethnic minorities, the Kuwaiti media is already multi-lingual, and correspondingly, environmental programmes or campaigns should be in Arabic, English, Persian, Tagalong, Urdu and Hindi to guarantee that they reach the maximum number in the target population.

It is important to remember that raising the environmental awareness of Kuwaitis alone will be insufficient, simply because they make up less than one third of the total population. Because of this, the Kuwaiti government should make efforts to link its minority population to any possible future environmental campaigns. In this case, focusing the budget on raising the environmental awareness of ethnic minorities would not be considered a waste of money, but rather an economic investment in better environmental practices in Kuwait and therefore a step towards achieving Sustainable Development.

Addressing the majority Muslim population can prove useful, as Islam is imbued with a number of environmental philosophies that can be channelled to students in and outside schools (Al-Nakin, 2004).The Holy Quran contains concepts such as wise consumption rather than waste: 'Eat & Drink, but don't waste', 'Wasters are brothers of the devil'! and 'Pollution appeared in land and in sea by the deed of people's hands[112]', etc. Therefore, using the holy verses of the Quran to show

[111] *Hadar* حضر literally mean civilized and *Badou* بدو means nomad.
[112] Source in Quran: Surat Al-Araf; verse:31, Surat Al-Esra; verse 27 and Surat Al-Rome; verse 41

people that they are not practising their religion when they engage in environmentally irresponsible behaviours, might help to convince them to change their behavioural patterns.

6.6 Summary of the research methodology and data analysis results

Following a review of the different qualitative and quantitative research methods in terms of their advantages and limitations, a mixed research methodology was designed to achieve maximum validity and credibility. Triangulation of the data analysis results between the different data sets was conducted wherever possible. The data collected included questionnaires, interviews, journal articles, census data, observation of newly built neighbourhoods, online news and content analysis of official publications and curricula. The results of the investigation into Kuwait University's curriculum, of the views of undergraduates and the academic staff, showed that sustainability awareness levels are falling well below the aspired global levels of sustainability awareness.

Data analysis results show a generally challenging situation in Kuwait at all levels. On the one hand, the education system and curriculum do not promote students' sustainability awareness during their school years or in Higher Education. On the other hand, environmental laws and legislation are not properly enforced at state level and energy consumption rates are outstripping energy provided, to such a degree that in 2007 the country was facing an energy crisis that reached its peak during the summer and prior to the beginning of the school year, when most people returned from their summer vacation.

For the UK, the data presented a more organised strategy, followed by Newcastle University School of Architecture, which seeks guidance from RIBA. RIBA is well connected to the UK government and EU Laws, and updates its accreditation requirements in accordance with sustainable architecture laws and EU energy plans. The UK government complies with the EU's energy use proposals and the global community's Sustainable Development strategies.

Although the UK may not fully succeed in its plans, they more effectively connect global informed opinion, policy makers and end users in comparison with the strategies in Kuwait.

6.7 Recommendations

The data collection and analysis phase produced many findings and recommendations that are directly related to the topic under investigation and others that are indirectly related to it, and yet essential to better sustainable architectural education in Kuwait. In the forthcoming section, the study's recommendations will be divided into major and minor recommendations followed by a general commentary on both at the end.

6.7.1 Major recommendations

According to the data analysis results, building sustainability awareness in Kuwait should take place at three levels: education; policy making and society.

6.7.1.1 Educational system

Perhaps the highest burden on the educational system is the need to build public awareness right from an early age and certainly long before adulthood. Developing sustainability awareness should take place from kindergarten level up to high school level. Learning the minimum environmental competencies during the compulsory school years[113] will ensure that individuals branching out into different disciplines, whether vocational or theoretical, will still maintain some environmental knowledge that will enable them to make better consumer choices.

At the Higher Education level, it is the obligation of institutions to pursue a policy of integrated science education, with environmental concepts taught in courses where relevant. Undergraduates should learn practical ways to employ sustainable concepts in their future careers, rather than solely focusing on

[113] The Compulsory School years, according to UNESCO are from year 1 to year 9.

theoretical knowledge. Developing their sustainability skills will ensure better Sustainable Development practices in Kuwait in the future.

6.7.1.2 Policy and policy makers

For policy and policy makers, it is imperative, as the first step, to enforce current environmental laws and legislation in Kuwait. The current energy crisis in Kuwait arose as a result of a deficiency in environmental law implementation at state level. A second step may be to review the law and update it in accordance with international Sustainable Development treaty requirements. Being an oil producing country does not mean that Kuwait can fill its responsibilities simply by paying carbon dioxide taxes, because other steps need to be taken to save the Earth's resources. Kuwait should adopt sustainable procedures at the state level, whether by building to green specifications, reducing pollution and energy consumption or conserving the Earth's renewable and non-renewable resources, etc.

A third step that policy makers should take is setting a state strategy that will ensure a reduction in the energy consumption rate. In the short term, they should review energy and water tariffs and raise them gradually to decrease rates of consumption. This will antagonise public opinion, particularly in its early stages, and so major campaigns should accompany this procedure to educate people about the reasons behind this government action.

In the long run, the government should employ all its institutions to raise public awareness about the importance of implementing Sustainable Development in Kuwait. Joint efforts from government institutions such as the Ministry of Education, the Ministry of Information, the Ministry of Energy and the Kuwait Municipality, should focus on one end result, that is, building public sustainability awareness over the long term.

The fourth step that the government should take is setting incentives and disincentives to encourage public cooperation. Including the private sector in this project will mean that all parts of society are involved in building sustainability awareness in Kuwait.

Of course, setting laws and implementing them will not be effective without the right tools; in this case, a considered approach regarding their impact in terms of people's needs, for example withdrawing tungsten light bulbs from the supermarkets should correspond with the wide availability of energy efficient light bulbs.

6.7.1.3 Kuwait society

At all levels of Kuwait society, many measures can be implemented to improve public environmental awareness. As mentioned in sections 6.7.1.1 and 6.7.1.2, both the educational system and policy makers should plan future strategies for building public sustainability awareness and ensuring better Sustainable Development in Kuwait. Society itself can have an effect on the state's environmental policy through the operation of social capital. Once social capital has been generated, it may have a positive impact on the implementation of government policy. The Kuwait Architects League and the Kuwait Environment Society are two potential sources of effective social capital, and yet they are not well aware of their powers. Perhaps if they review their plans and objectives, they may have a better view of sustainable development in Kuwait. Also, because of the nature of the Kuwaiti population, where citizens form less than one third of the total population, it is imperative to focus on building non-Kuwaitis' sustainability awareness, since their energy consumption is double that of Kuwaiti citizens. Addressing non-Kuwaitis in governmental campaigns might prove fruitful for the state's future sustainable development. In fact government strategy and all working NGOs should set strategies specifically addressed at these ethnic groups, especially because they are not part of the educational system and therefore, will not be enlightened about their environmental

responsibilities through the educational channels. In this case social capital will play a more effective role in addressing this group.

6.7.2 Minor recommendations

The data analysis results sometimes raised issues that are not directly related to the Kuwait educational system, to policy making or to the wider society, and yet they were found to be relevant in terms of their impact on Kuwait. The following sections will display these findings.

6.7.2.1 Initiating an Architectural Accreditation Body for the Arab region

By examining the Bachelor's Degree Programme for Kuwait University's Department of Architecture, it was established that the programme is not subjected to any kind of accreditation regulations. Furthermore, investigation showed that there is no regulatory body for the Arab region in general, and Kuwait in particular. Because of this, it is not surprising to see that Kuwait University does not comply with any environmental education laws or regulations, resulting in their graduates' low sustainability awareness.

Academic experts from all Arab countries should join together in a committee/body whose mission is to build a new curriculum that responds to different climatic conditions in the Middle East as well as responding to the need for the inclusion of cultural and heritage qualities in buildings. Once guidelines are in place, the committee can hold regular meetings to follow up their target mission (Al-Hassan and Dudek, 2006).

6.7.2.2 Initiating the Arab Environmental Organisation

Up until the present time, Arab countries have not had their own *Environmental Organisation* that can set environmental strategies for all sectors of society and all countries. In fact, the Fourth Arabic European Environmental Conference held in 2007 recommended initiating such an organisation, supported by the expertise of international agencies. The organisation will contribute to many educational and environmental activities with a Middle Eastern base (Farahat, 2007). The low

sustainability awareness of Kuwaiti society may have resulted from the lack of a joint effort by Arab countries to raise their communities' environmental awareness and achievement of Sustainable Development in the region. For that reason, Arab states should think seriously of founding an Arab Environmental Organisation.

6.7.2.3 Developing the criteria of curriculum assessment

Kuwait University is part of the Ministry of Higher Education in Kuwait, but it has been asserted that the Ministry's regulation of the university is very limited and perhaps limited to the administrative level. Therefore, all majors taught in Kuwait are not accredited by any Higher Education body in Kuwait. As architectural education is fairly new in Kuwait (beginning in 1997), the Ministry of Higher Education has not yet developed an internal capacity to validate the Architectural Education System at Kuwait University. This step should be taken in collaboration with both KU academic staff and members of the Kuwaiti Architects League.

Figure 6.1 displays the interrelationship between the different parties in Kuwait and their roles in the short and long term achievement of Sustainable Development. The diagram is divided into two parts: long & short term effects. The left-hand side includes education during school years, and Higher Education. Higher Education is divided into Architecture and Other Disciplines. The right-hand side of the diagram includes two arrows: the top one indicates environmentally-aware architects working under the authority of building codes. The bottom arrow includes environmentally aware end-users who utilise energy within the state's regulating policies. The Earth's position is almost in the middle of the two sections, receiving the influence of both architects and people, thus leading to achievable Sustainable Development.

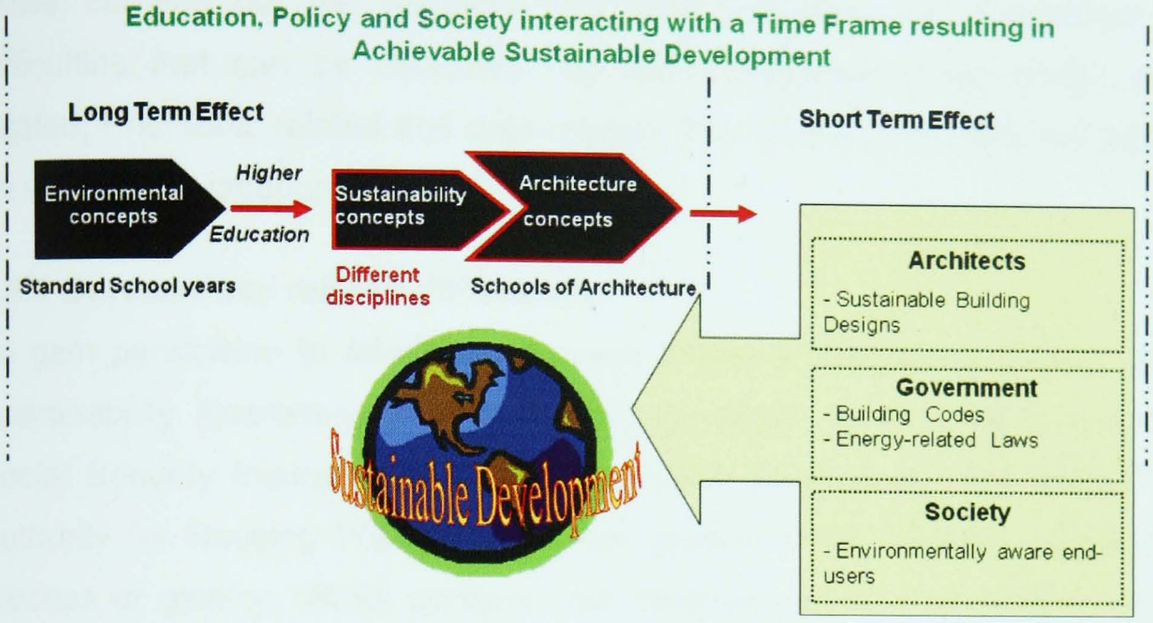

Figure 6.1 The interrelationship between the different parties in Kuwait and their effect in the short and long terms

This section demonstrates major and minor recommendations for improving sustainable architectural education in Kuwait, in order to achieve sustainable development. Because of the nature of the factors interacting with each other, resulting in the sustainability awareness of building undergraduates, policy makers and society, it is hard to separate or subtract the factors from each other. The following Figure 6.2 illustrates the nature of these relationships.

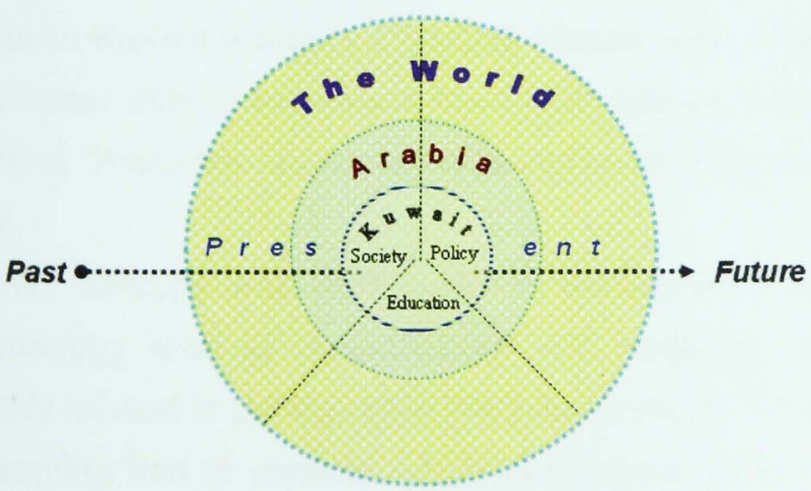

Figure 6.2 The interrelation between the Global context, the Arabian region and the country of Kuwait at a social, political and educational level in the past, present and future

6.8 Difficulties facing the research method

While carrying out the research and data collection, the researcher faced difficulties that can be classified into four categories: bureaucratic, society-related, PhD topic related and data-related. The following sections will elaborate on each of the categories.

6.8.1 Bureaucracy related difficulties

To gain permission to administer surveys aimed at measuring Kuwaiti citizens' sustainability awareness, letters requesting official consent were sent to the Social Security Insurance Building, the Kuwait Municipality, the Kuwait Public Authority for Housing Welfare and other governmental institutes. Although the process of gaining official consent was time-consuming and delayed the data collection phase, it insured the data collection had official approval.

6.8.2 Difficulties related to the nature of the society

While carrying out the questionnaire, and at different stages of the research, difficulties were faced that are related to the nature of Kuwaiti society, which is bilingual and literate. The first survey was written in the English language using technical terminology. As a result, many declined to read it because they claimed it was too time consuming. Another difficulty was trying to make the total number of female participants equal to the total number of male participants, and because Kuwaiti women outnumber Kuwaiti men in governmental institutions, it was rather difficult to achieve the 50/50 balance that reflects Kuwaiti society in general. Therefore the survey was repeated once more to achieve the desired goal.

A third difficulty was individuals' embarrassment on encountering unfamiliar terminology such as 'sustainability' and 'recycling', as a result of which they quickly refused to participate in the questionnaire. To overcome this problem, the researcher had to conduct one-to-one interviews to gain a higher participation rate, which was time consuming. The one-to-one interviews revealed that many people made assumptions about the meaning of the new terms they came across, rather than asking to check their meaning. For example, many answered

'yes' when they were asked if they recycled in their homes. But when asked to elaborate, they said that 'they move the house furniture around every now and then'! Some participants assumed the reason behind the questionnaires, including many energy-related questions, was that the government was monitoring public opinion prior to setting new energy regulations. As a result, a group of people declined to participate, and others decided to skip certain questions.

6.8.3 Difficulty related to the nature of the PhD research topic

Upon commencing the research, the researcher assumed that investigating Sustainable Architecture Education would involve examining the current curriculum taught in the Kuwait University Department of Architecture. Following the literature review undertaken for this study, it became clear that the curriculum was a broad, all-encompassing term used to describe many aspects of teaching. The word curriculum includes book content, the syllabus, the student, the classroom, the teaching staff and more. For this reason the researcher realized that all the factors contributing to the curriculum should be examined. Furthermore, the researcher found that the curriculum cannot be developed in isolation from policy makers and society, not to mention the regional and international community. This kind of difficulty emerges from the development process of the research stages, rather than necessarily being due to any limitations or shortcomings in the investigation methodology.

6.8.4 Difficulty related to the nature of the data

Another difficulty faced during the research was related to the nature of the data collected. Finding government institutions that could provide access to certain census data or official documents was a challenge facing the researcher. Some long documents were not used because they needed to be translated from Arabic to English and authentication of the translated document was required. Therefore, the researcher looked for alternatives that could further the research methodology without affecting the validity of the results.

6.9 Suggested future research

Because of the nature of the research, i.e., investigating existing sustainable architectural education in Kuwait and comparing it to that carried out at the School of Architecture in Newcastle University, a number of issues were raised with regard to Sustainable Architecture Education. It is recommended that future research should investigate ways to increase the end users' sustainability awareness in order to improve energy efficient consumption. The role of academic staff in developing the university curriculum needs further investigation in order to identify obstacles that might inhibit them from being more productive and positive, including routine and bureaucracy. Students should be prompted to be more active in their in Higher Education and developing their research abilities to contribute to their country's development process, and to act as positive members of the international community.

6.10 Summary and Conclusion

Chapter 6 covered all aspects suggested for achieving sustainable architecture by improving the drivers of sustainability, including the roles of both policy makers and society (social driver). From the portrayal in all the previous sections, it becomes clear that developing sustainable architecture education in Kuwait in order to achieve more sustainable development is a shared responsibility of all sectors of the society, including the private sector. All segments of the state's institutions share responsibility for realizing sustainability. The responsibilities vary in dimension, from the simple, such as practising recycling activities, to the more complex, such as building recycling factories, and the large scale, such as establishing solar power stations. Kuwait University Department of Architecture faces a big challenge in terms of developing its existing architecture curriculum. Their efforts to create sustainable architecture education in Kuwait should be greeted with enthusiasm by the full spectrum of society in order to create more sustainable architecture in the future Kuwait.

But even with all these initiatives, the onus ultimately lies with the individual: unless everyone works his/her best, sustainable development will not be achievable in Kuwait.

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Appendices

List of Appendices

Appendix 1

A Historical Review of the Development of Architectural Education

1. Architectural education up to the middle ages

From the time of the Pyramids up to the end of the Middle Ages, architectural education did not follow any institutional academic path, such as later existed through schools of architecture. The architect simply lived on the building site and rarely exercised the autonomy of an independent individual (Tschumi 1995).

2. Greeks and Romans

There is evidence that architectural matters were discussed in Plato's Academy. As Plato put it, the most pleasurable and beautiful house is that in which the owner can find pleasant retreat at all seasons of the year, and can also protect his possessions. But there is no clear evidence that formal courses took place at that time. Greeks learnt architecture 'on the job'. Coulton (1977, cited in Broadbent 1995) suggested that they would not have needed drawings. Once the architectural orders had been established they would know exactly what to do. The Romans were very much the same as the Greeks in their architectural practice, except that they had drawn geometrically correct curves, using compasses (ibid: 11).

3. Vitruvius

Vitruvius, who lived in the first century AD, described the syllabus that architects learned in ancient Rome at the beginning of his work "Ten Books on Architecture" (theory is the ability to demonstrate and explain the principles of proportion, while practice is the continuous and regular exercise of employment, where manual work is carried out according to a drawing design). According to Vitruvius, an architect's education in Greece and Rome had two aspects: theoretical, which included elements such as proportion, and training in the actual technicalities of building. Even today, architectural schools still follow these two aspects. In his advice on house design, he explained that the climate should determine the style of the house, whether in Egypt, or in Spain, or even in different places in Rome (WIlliamson, Radford *et al.* 2003).

4. Medieval

During medieval times, architects performed both design and construction. At that time design was carried out on the building site by carpenters, masons and other trades. The

formal associations of Masons taught their 'secrets' in their lodges, away from the general public and even from ordinary builders. Architects learned their profession through a long series of practical experiences and through the linked experience of mentorship and promotion. Thus the journeyman became a master craftsman through making mistakes, experimentation and effort. Artists used to have a 'wander year' in which they went to various building sites and performed different crafts to learn a well-rounded way of seeing a building, which resulted in the acquisition of affirmative experience (Carpenter, Hoffman *et al.* 1997).

5. Renaissance

The apprenticeship approach became a very important way of transmitting learning during the Renaissance, whereby architects practised sculpture, drawing, and painting instead of designing buildings (Carpenter, Hoffman *et al.* 1997). During the Renaissance no theory lay behind the preferred forms of arches and domes, just practical geometry. In the mid-1470s Leon Batista Alberti set up his own private school, the *Academia Platonica,* in a garden which he owned at the Piazza San Marc in Florence, appointing Bertolodo di Giovanni as his director. The school's purpose was to counter what Lorenzo and Alberti saw as the baleful influence of the craft guilds, which still survived from the middle ages. Students, who were especially selected by the director, ate and slept in the buildings within the garden, including a loggia where they used unwanted sculptures from the Medici collection as raw materials. Graduates from the Academia included Leonardo Da Vinci, Michelangelo, and Antonio Dangallo.

6. Architectural education in France: before and after the revolution

Italian Renaissance and post Renaissance models inspired Mazarin to set up the *Academie Royale of Painting and Sculpture* in France. In 1671, Jean-Baptiste Colbert founded *the Academic Royal d'Architecture* during the rule of King Louis XIV. This event marked the *first split between architecture and construction*, and also created a higher education establishment outside the mainstream framework of the university, where recruitment was based on written and oral exams. It was founded to formulate theory and to regulate the standard of training of architects, where educational facilities consisted of two lectures a week (Crinson and Lubbock 1994). By 1717 the subjects were taught in a two or three year course. The academy offered only lectures: there were no design studies in the school, and students learned drawing and design in the studios of their masters. It was in the studios of individual masters that specialized training of architects in the skills and principles of design took place as well as their attendance in their apprenticeships. Jean-Nicolas-Louis Durand

(1760-1834) is known for teaching in both L'*Academie d'Architecture* and the *Ecole National des Ponts et Chaussees*[1] (ENPC founded in 1747), adopting scientific instruction (Middleton 1982: 19).

It is alleged that the first school of architecture was created for political reasons in opposition to the Guilds; the aim being to divide and conquer through creating a split between theory and practice, where architects no longer learned their trade on the construction site (Tschumi 1995). From 1720 onwards the academy offered regular design competitions for students, known as *Grands prix*.

The full-time course was not launched until 1743 when Jack François Blondel started his private school in which architectural training took place. Blondels' *French Academy* resembled the Italian academies in their manner of supplementing the work that students did in their masters' workshops. He later stated his purpose in "Mercure de France" page 3: "To train skilled architects, it is indispensable to unite the study of all the relevant arts" (which included painting, sculpture, garden design, masonry, joinery, carpentry and locksmithery) (Cunningham 2005). As an academy director, he regarded beauty as the faithful companion of logic and truth (Ballon 1997: 223). He gave public lectures twice a week until 1762 when he became one of the academy's professors. The school also taught arithmetic, geometry, mechanics, military architecture, fortifications, perspective and stone cutting. Twice a week in April and May Blondel visited significant buildings with his students, which were subsequently criticised and exercises set in which students would 'correct' faults. The educational methods he devised became the basis upon which the 19th century *Ecole des Beaux Arts* was modelled.

The Academies were dissolved in 1793 during the French Revolution, when reaction against monarchical institutions was at its height, but, paradoxically, under the influence of Boullé, who was largely instrumental in their demise, they were re-established in a form which was to flourish for 150 years and which has been a major influence upon architectural education. A parallel development having repercussions on architectural education was the formation in 1794 of the *Ecole Polytechnique,* devoted to scientific education, which eventually included engineering; this early separation of science-based techniques from formal composition studies perhaps generating the difficulties encountered by the first modernists in combining technical advances with the conception of form (Cunningham 2005). In the *Ecole des Beaux Arts*, attendance of lectures was optional and non-attendance was attributable to fatigue from completing a design project or to the necessities of making a

[1] ENPC: National school of Bridges and Roads, one of the world's oldest civil engineering schools active up to the present day.

living. Also entry was restricted by no academic pre-requisites, age limits or exclusion by nationality restricted, nor were any time limits set for completion of studies. Charles Garnier (1852-98) trained at the *Ecole des Beaux Arts*, Paris and at the French Academy in Rome, 1842-54 (Conway and Roenisch 2005: 248).

In 1811, the French Minister of the Interior criticized the instruction of architecture for being directed towards the art of drawing rather than giving consideration to the visual impact of the building on its surroundings. In April 1819, the *Ecole d'Architecture* was transformed into the *Ecole des Batiments Civils* under a proposal made by Alexandre de Laborde who aimed at administrative and educational reforms. However, on 4th August 1819, his proposal was rejected in favour of the establishment of the *Ecole Royale des Beaux-Arts*. The school's regulations were finalized in 1823 (Dolgner 1975: 485-500, cited in Middleton 1982: 37).
In the first third of the 19th century, architecture and planning were state-dominated through *Batiments Civils*. This procedure aimed at reaching a midpoint between the original model, the engineering corps of the *Ponts et Chaussees*, and the practices of a liberal architecture profession; and with the establishment of *Ecole des Beaux Arts*, those practices were soon codified as part of its system (Middleton 1982: 37). The *Ecole des Beaux Arts* was established and formally named as such by Louis XVIII with two kinds of teaching: theory in the classroom and design in the ateliers. The *Ecole de Beaux-Arts* provided academic architectural training from 1816 and was open to students of any nationality. It promoted a form of rational classicism which attracted many architects from the US in the 19th and early 20th century (Conway and Roenisch 2005: 246). The name '*Ecole des Beaux-Arts*' became synonymous with architectural education in France, to some extent in England, and eventually in America, and the Ecole continued to operate in this location until 1968 (Moffett, Fazio *et al.* 2003).

7. Arts and Crafts Movement-UK

Beside the French 'Ecole des Beaux-Arts', the British formative influence on architectural education was the *Arts and Crafts Movement,* which had its roots in mid-nineteenth century romanticism in England. The educational culmination of this movement was launched in Weimar in 1919 when the Bauhaus was formed. Short-lived though it was, the educational method and its implicit dependence upon the antithesis of 'standardisation' versus 'individuality' also influenced the teaching of art and architecture throughout the world (Cunningham 2005).

9. Bauhaus

In Munich in 1907 the *Deutsche Werkbund* declared its common goal: reform of environmental design through the productive work of craftsmen, industrialists and architects. As a member of the Deutsche Werkbund, Walter Gropius gave his own notion of typification at the Werkbund congress. Unlike other architects who obtained formal education in architecture, Gropius and Mies Van Der Rohe did not join any architecture schools, yet they became educators at the Bauhaus. In 1919 Gropius, who assumed the directorship of Bauhaus, combined two kinds of teaching, introducing a new approach to education and training (Conway and Roenisch 2005: 249). The course itself included studies of natural objects and materials, contrasting their forms and textures, as well as the analysis of old master paintings, to abstract from them principles of contrast in colour and tone value, rhythm and composition, and life drawing. After the six-month basic course, students spent much of the next three years in theoretical work including studies of nature, fabrics, geometry, colour and composition, construction and presentation, materials and tools. The educational climate was anti-academic, anti-history, and mistrustful of theory; rather, it was based on practical experiments and conscious of social need.

The Bauhaus course lasted for three years. The foundation course, *Vorkurs*, devised and conducted initially by Johannes Itten, which ran for the first six months was the most innovative and controversial (*see* Figure). Itten, who was formerly trained by Friedrich Froebel as an elementary school teacher, initiated the Bauhaus foundation course with its emphasis on unusual uses of common materials. Students were presented with discarded materials (wire mesh, cardboard, newspapers, matchboxes, phonograph needles and razor blades) and instructed to *basteln*; to improvise something.

Other assignments involved the study of materials. Wood, feathers, mosses, and hides had to be looked at, touched and drawn until they were known by heart and could be drawn from memory. The idea was to transcend realistic reproduction and to achieve an interpretative design instead of a mere imitation. It is said that this method was influenced by Friedrich Froebel's pedagogy of "education through play". Itten represented the central figure of the early Bauhaus years. He influenced its first era. The foundation course established by him came to be decisive for the teaching programme of the school (*see* Figure 1). In 1921 Bauhaus was criticized for its lack of architectural classes and for promoting ideas of architecture's pre-eminence (Whitford 1984). In March 1923, Itten left the Bauhaus because Gropius no longer approved of his teaching methods, in particular of the preparatory meditation exercises and the Far-Eastern mysticism which this presupposed. Itten's departure was the first symptom of a general re-orientation of the school. The 'romantic', or

as others have called it, the universalistic era came to an end. Walter Gropius formulated a curriculum which was divided into two parts; the *Fromlehre*, the study of form including the study of nature and materials, and *Werklehere*, instruction on craft-working in stone, metals, clay, wood, and glass (Carpenter, Hoffman *et al.* 1997).

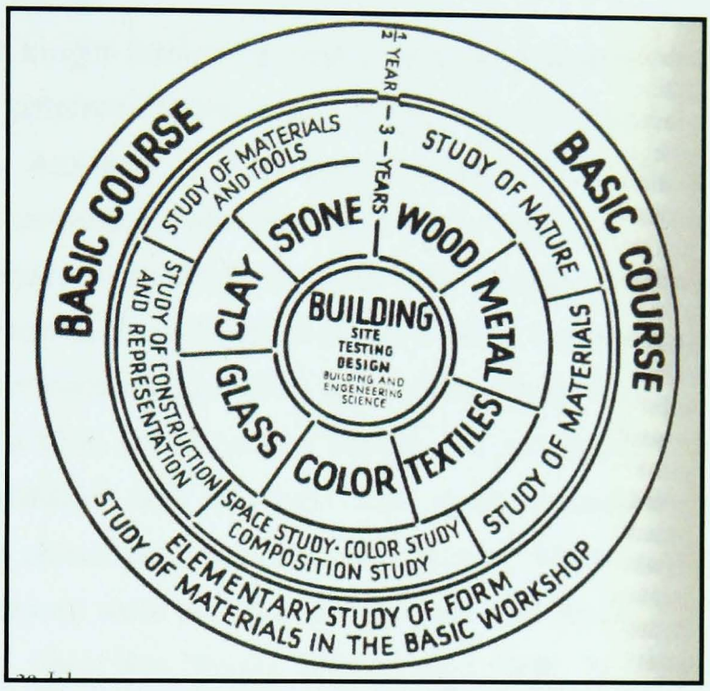

Figure Johannes Itten 1920s Bauhaus Curriculum
Source: Lubbock and Crinson (1994: 92)

10. Vkhutemas

In Moscow, in 1920, the Vkhutemas was formed from the merging of the Stroganov School of Industrial Design and the Moscow School of Painting, Sculpture and Architecture: it was to be a new school incorporating the teaching of an architecture for post-revolutionary Russia. The introductory design course, which paralleled the intentions of that at the Bauhaus, was shared by all departments. Although the Vkhutemas was not as influential upon architectural education internationally as the Bauhaus became, it demonstrated the power of a dynamic, ideologically motivated educational programme to enter into the cultural mainstream, energised by the participation of prominent practitioners.

11. The Islamic world

The first mosque in Islam, *Qobaa,* was built in the 12th Rabi Al-Awwal/ 622[2] MD in Al-madina in Saudi Arabia. It was designed by the Muslim prophet Mohammed bin Abdullah (Pbh), and through it, he changed a ritual that demanded 16 months of praying towards the direction of Al-Aqsa mosque in Israel to praying towards the direction of the Kaba in Mecca. The total area of the original design was 1060m^2 (35mx30m) with a height equal to 2m, which was

[2] Prophet Mohammad was born in 571AC.

partially exposed, and partially covered with palm tree trunks (60m). It had three main entrances on the South side, West side and East side. After an interval of 400 years the '*meth-ana*' was added to the mosque by Caliph Omar Ben Abdul Aziz. Muslims followed their prophet in certain architectural designs that were passed afterwards from generation to generation by word of mouth.

Architecture was first taught through a highly structured system of *apprenticeship* in the Islamic world across different Islamic eras. In the *Ottoman Empire*, architecture was first taught in the *Military Academy of Engineering* in the 1600s. Mimar Vedad, the son of Abdulhamitt II's chief secretary, was the first Turkish Architect who acquired his 'degree' from the *Ecole des Beaux Arts*, Paris. Later in 1882, architecture was taught through the School of Art in countries such as Egypt. Barrada reports that the first Egyptian engineering school that covered architectural education was established in Cairo in 1820 under the name of '*Mohandeskhana*'. In1836 the School of Works was established, with other engineering schools becoming affiliated with it which had curricula similar to that of the Paris *Polytechnique*, but the school was closed for two periods: 1854-1858 and 1861-1866. Other departments of architecture were set up in conjunction with faculties of engineering in Egypt as follows: Alexandria 1941, Ain Shams 1950, Assiut 1957, Al-Azhar 1964, Shubra 1975, and Mataria 1980 (Barrada 1986: 181-185).

On a global scale, the Islamic world was the first to establish higher education (Tibawi 1972), when Al-Azhar University was started in 975AD in Egypt, more than a 1000 years ago making it the oldest and longest continuously functioning university in the world. There is no clear cut evidence that architectural education took place in that institution. The Architecture Department within the Faculty of Engineering of Al-Azhar was started in 1965. Figure 2.6 shows the modern side of Al-Azhar, supplied by T. Ahmed who says he is proud to be an Azharian.

Source: consent of Tamer Ahmed (05/November/ 2007)

Figure 1: Two recent pictures of Al-Azhar University, one of the earliest higher education institutes worldwide.

The University of Cairo was established in 1880, with both Ottoman and Egyptian education highly influenced by Germanic technology-oriented approaches (Ozkan 1986: 104-105). The exogenous factors of the academic world have always dominated the schools of architecture in the Islamic world. Endogenous factors, through which solutions were sought to the particular problems of indigenous society, have seldom been included in the academic promotion process that has had a dominant influence on the realm of academic research (ibid: 108). The endogenous and exogenous nature of the sources of education has been the most crucial aspect of the teaching of architecture. Exogeneity, or seeking to meet the standards of the Western World, has been inevitable and to claim the opposite would be futile. In Egypt there are consultancy units that provide their government projects with designs, as well as providing advice for big firms if asked to do so.

In Iraq, architectural education as an academic activity began in the early 1960s. Previously, Iraqis used to travel abroad to study architecture, and in 1955 there were fifteen Iraqi architects (Chadirji 1986). Iraq experienced wars and invasions for 600 years, resulting in catastrophe in Baghdad, which did not recover until World War I, with all building activities being carried out by local craftsmen, stonemasons, carpenters, and bricklayers, who perpetuated the traditions and aesthetic values of their individual craft in their broader role as master builders (ibid: 114).

In the Kingdom of Saudi Arabia (KSA), the Department of Architecture was established in 1967 within the College of Engineering at Riyadh University (presently King Saud University). Four other schools of architecture were established in 1975 and 1976, and in 1983 a programme of Islamic Architecture was initiated at Umm Al-Qura University in Macca (Akbar 1986: 123).

In Pakistan, architectural education was dominated first by the colonial effect of the British Empire (Ahmad 1986: 152). In Bangladesh, architecture was first taught in 1961 in the Department of Architecture of Bangladesh University of Engineering and Technology, with one foreign teacher and six students(Ali 1986: 179-180).

In the Islamic World, the clients who determine the setting and structure of education are mostly governmental, and necessarily have a vested interest in developing educational

systems according to international standards; therefore, the curricula of architecture in the Islamic World have been developed with world-wide standards in mind (Ozkan 1986).

In Iran, architectural education started in the Department of Architecture within the Faculty of Fine Arts of Tehran University in the 1930s. It was influenced by the Beaux-Arts system from Paris up until 1979, when the Islamic revolution resulted in creating the Committee of Architecture of the Cultural Revolution which recommended a new programme. This was essentially based on Islamic prescription and looks to international trends in architectural teaching. Later, other Faculties of Architecture and Urbanism were established in Beheshti University in 1960, and in the University of Sciences and Technology in 1965 (Diba 1986).

In Syria, the first faculty of engineering was founded in Aleppo in 1946, where students chose to branch either into engineering or to architecture in their second year. In 1984, the faculty was divided in two, resulting in the Faculty of Engineering, and the Faculty of Architecture. In 1967 an architecture section was founded in the University of Damascus which was modified into a faculty in 1982. Other faculties that were created in Syria include Homs in 1980 and Latakiya in 1984. In Syria a common unified programme was worked out for architectural education. Architecture and ancillary subjects (architectural details, construction, theory, descriptive geometry, design, sculpture and model-making) make up approximately 60% of the curriculum. Syrian universities encourage building academics' and undergraduates' experience through establishing building consulting units (offices) in the university (Lolah 1986: 190).

Appendix 2

RIBA Terms and Definitions[3]

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, processes 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.

[3] Source: RIBA, 2003: 14

Table (1)

Appendix 3

Table of the environmental concepts content of SAPL syllabus

Course	Aims	Topics	Knowledge and Skills Outcomes	Teaching and Learning Outcomes	Assessment
Stage 1					
Architecture Design 1.1: ARC101	Total : 3 1- It fosters the framing of a personal ethical basis for design decisions, with an emphasis on client/user needs and concern for the natural/built environment.	A series of related design projects gradually develop basic architectural thinking, skill and knowledge	Total: 5 1- By the end of the module students will demonstrate the ability to make design decisions which satisfy clearly defined criteria in a range of contexts and reconcile a limited but fundamental range of diverse issues in their own work.	Teaching methods include lectures, library based research, a one day workshop, group seminars, individual tutorials, field visits, group work and formal presentation.	Total: 2 Each project is evaluated against a set of criteria outlined in the project description. The assessment criteria for each project require an understanding of and an ability to apply: 1- A particular body of knowledge(related to the project) 2- A particular range of skills and techniques (introduced in the project). Following each project assessment, students receive a set of written comments in relation to the declared criteria, together with a provisional grade which is handed out at Project Reviews/feedback meetings, when summative feedback is given by project leader.
Architectural Design 1.2: ARC 102	Total: 6 By the end of the module and stage 1, the student will be able to demonstrate, through the exploration of ideas, and coherent architectural designs a broad and well-balanced introductory grounding in the disciplines which inform architectural design: design-technology and environment-cultural context, histories, principles and theories of architecture, professional studies and communication skills.	Total: 6 A series of related design projects gradually develop basic architectural thinking, skill and knowledge. In particular Architectural design 1.2 offers project opportunities for students to develop individual design frameworks and architectural skill in more depth in designing a small building which satisfies clearly defined criteria reconciling a limited but fundamental range of diverse issues in their own work.	Total: 13 By the end of the module students will be able to demonstrate: 1. An awareness, and preliminary knowledge and understanding of the disciplines which inform architectural design: design- technology and environment- cultural context, histories, principles and theories of architecture, communication skills, and professional studies; 2. A preliminary ability to integrate knowledge of social and aesthetic requirements, building technologies, environmental design and construction methods, appropriate to modest domestic scale building within coherent architectural designs and academic portfolio.	Teaching methods include lectures, library based research, one day workshops, group seminars, individual tutorials, field visits, group work and formal presentations.	Total: 2 Projects are previously marked as individual performance is discussed as the semester progresses. Each project is evaluated against a set of criteria outlined in project descriptions. The assessment criteria for each project commonly require an understanding of and an ability to apply: 1- A particular body of knowledge (related to the project) 2- A particular range of skills and techniques (introduced in the project). Following each project assessment student receives a set of written comments in relation to the declined criteria, together with a provisional grade which is handed out at Project Reviews/feedback meeting, when the summative feedback is given by the project leader.
An Introduction to Architectural History 1.1: ARC 111	Total: 4 None	Total: 5 Western Architectural History: Ancient, Medieval, Renaissance and Baroque	Total: 6	Weekly lectures which introduce material and establish the framework for learning. Students are expected to augment this knowledge by reading, finding out from other sources of information, e.g. visiting noteworthy buildings.	The examination for the subject consists of a three-hour unseen paper taken after Easter. It will test for general knowledge in the area of the syllabus, using multiple choice answers.

Table (1)

Principles and Theories of Architecture 1.1: ARC 112	Total: 3 1- To introduce students to the consideration of issues of sustainability, human well-being, participatory design and vernacular architecture.	The course comprises selected topics in the principles and theories of architecture from classical times to the present day. The syllabus and therefore the subject and scope of the essay consist of material covered in the lectures supplemented by directed and personal reading. Selection of topics: sustainability, participatory design, vernacular architecture. Elements of architecture: experiential factors of architecture; architectural space; settlement pattern, city form and urban design; proportion; architectural composition; tectonics and materiality.	Total: 3 By the end of the module students should have gained: 1. An awareness of issues of sustainability, human well-being, participatory design and vernacular architectures. Skills outcomes total: 4 None	Teaching and Learning is by means of 14 one-hour weekly lectures with related study and research.	A 1500 word illustrated essay submitted after Easter. (100%)
Architectural Technology 1.1: ARC 113	Total:3 1- To be able to describe and explain the properties of common building materials and the structural implications of using these materials; 2- To be able to use simple techniques (manual and computer aided) in order to estimate those aspects of structural, environmental and constructional performance which will play a critical part in architectural decisions.	Total: 11 1- Timber properties and implications; 2- Fundamental structural principles; 3- Estimating loads and beam design; 4- Glass properties and uses; 5- Concrete properties and wall design; 6- Masonry properties and wall design 7- History of steel structures; 8- Steel properties and implications; 9- Structural performance of steel.	Total 2 1- Familiarity with basic structural, environmental and constructional performance of small scale, domestic architecture; 2- Understanding of significant aspects of ways in which common building materials behave. Skills: none	Lectures, coursework and private study.	Examination 80%, coursework 20% (essay on sustainability)
Architectural Technology 1.1: ARC114	Total: 3 1- To be able to describe and explain the properties of common building materials and the structural, environmental and constructional implications of using these materials; 2- To be able to use simple techniques (manual and computer aided) in order to estimate those aspects of structural, environmental and constructional performance which will play a critical part in architectural decisions.	Total: 13 1- Daylight and sunlight; 2- Natural lighting design; 3- Thermal environment; 4- Ventilation; 5- 19th Century domestic construction; 6- Environmental design coursework; 7- Masonry walls and openings; 8- Acoustics 1; 9- Timber construction; 10- Timber flat roofs; 11- Timber pitched roofs; 12- Steel frame construction; 13- Concrete floors.	Total: 2 1- Familiarity with basic structural, environmental and constructional performance of small scale, domestic architecture. 2- Understanding of significant aspects of ways in which common building materials behave.	Lectures, practical and private study.	Examination 80% Practical 20% (essay on sustainability)

Table (1)

Course	Aims	Topics	Knowledge and Skills Outcomes	Teaching and Learning Outcomes	Assessment
		Stage 2			
Professional Studies 1.1:ARC116	Total: 5 This stage 1 course concentrates upon skills used in the essential processes in Communications and Design and in addition usually draws upon the use of computers for their effectiveness in communications at various stages in a student's professional development.	Total: 4 Study skills, Communication skills, Evaluation skills, and Workplace skills. 1- Apply some computer-based tools to design projects. None	Total: 5 1- At the end of the course students must be able to apply some computer-based tools to design projects.	Lectures, presentations, demonstrations, workshops, exercises and assignments with supporting sessions-clinics for essays.	Oral and graphic presentation skills: assessed drawing and presentation for Architectural Design 1.2; Word Processing : Principles and Theory 20%; 2D CAD assignments 20% hand in Semester 1 3D CAD assignments 20% hand in Semester 2

Table (1)

Architectural Design 2.1: ARC 201	Total: 2 By the end of the module students will: 1- Have the architectural design skills to critically manipulate space, form and light up to the scale of a domestic building with an evolving social, environmental and tectonic understanding; 2- Be able to demonstrate a developing personal ethical framework for decision-making within a sustainable natural and built environment. In this module place-making focuses on dwelling in the city in projects that realize an individual dwelling design within the context of an evolving urban master plan. A major study tour with related practice of architecture relevant to the above level of design complexity with a related understanding of legislative frameworks.	Total: 6 At the end of the module students demonstrate knowledge of: 1- The principles of building technologies, environmental design and construction methods, in relation to: human well-being, the welfare of future generations, the natural world, considerations of a 'sustainable environment use of materials, process of assembly, structural principles, the impact on design of legislations, codes of practice and health and safety both during the construction and occupation of a project.	The syllabus comprises a series of related design projects of increasing complexity and scale that sequentially develop intermediate architectural thinking, skill and knowledge. The projects entail both group and individual tasks. Each project is pedagogically inflected to develop research, creative and thinking skills within the setting of growing complexity. The sequence is iterative and cumulative presenting the student with design issues that are stretching yet within the scope of his/her developing skills. Related to these projects are lectures and briefings, seminars and workshops, individual reviews and feedback sessions. The module also includes a 7 day overseas study tour linked to the project work. The design studio is the critical forum for much of this integrated activity. Detailed hand-outs for each project describe the content, aims and learning outcomes of that project.	Total: 6 1- At the end of the module students demonstrate knowledge of environmental design and construction methods, in relation to: human well-being, the welfare of future generations, the natural world, consideration of a sustainable environment, use of materials, process of assemble, structural principles, the impact on design of legislation, codes of practice and health and safety both during the construction and occupation of a project. 2- At the end of the module students will demonstrate the ability to form considered judgments about the spatial, aesthetic, technical and social qualities of a design of domestic scale within the scope and scale of a considered wider environment; Reflect upon, and relate their ideas to a design and to the work of others in precedent and with the group.	Assessment is by means of examination of the whole Design Portfolio at the end of semester two. Individual and group projects must be presented orally and graphically presented at appropriate stages and interim-provisional marks are given. The assessment criteria are based on the objectives and learning outcomes for that particular project. For a design project this will entail the demonstration of imaginative design responses within a natural and/or built context, and the ability to shape space and form with experiential and tectonic understanding. Clear communication of process and ideas is expected and the demonstration of group and/or individual work skills.

Table (1)

Architectural Design 2.2 ARC 202	Total: 5 By the end of the module and stage 2, students will be able to demonstrate: 1- A maturing awareness, knowledge and understanding of the disciplines which inform architectural design: design-technology and environment-cultural context- histories and theories of architecture-professional and subject specific skills- communication skills; 2- The ability to produce coherent architectural designs up to the level of a median-scale public buildings, with a growing ability to integrate knowledge of social and aesthetic requirements, building technologies, environmental design and construction methods.	The syllabus comprises a series of related design projects of increasing complexity and scale that sequentially develop intermediate and small-scale architectural thinking, skill and knowledge.	Total: 7 By the end of the module and stage 2, students should demonstrate: 1- A maturing ability to integrate knowledge of social and aesthetic requirements, building technologies, environmental design and construction methods in coherent architectural design up to the complexity of a median-scale public building;	Teaching and learning is focused on studio based project work supported by briefings, lectures, workshops, group and individual critical reviews, and field work visits.	Assessment is by means of examination of the whole Design Portfolio at the end of the Session. Throughout the module individual and group projects must be orally and graphically presented at appropriate stages and interim- provisional- marks are given. The assessment criteria will entail the demonstration of imaginative design responses within a personal ethical frame work that exhibits an appropriate response to user needs within a natural and/pr built context, and the ability to shape space and form with experiential and tectonic understanding. Clear communication of process and ideas is expected and the demonstration of group and/or individual work skills.
The Place of Houses: ARC213	Total: 3 1- To raise awareness of the richness and complexity of contemporary domestic environments.	This course is structured around the key forms of production and varying roles of designer, client and user. Emphasis is given to the relationship between the user and the home environment. Case studies from different parts of the world are included, in some cases drawing on current research projects in the School. The syllabus includes the following topics: Homes and houses for individual clients, the psychological dimensions	Total: 7 At the end of the semester students will be expected to have: 1- An increased understanding of how domestic environments are produced and consumed; 2- Developed a critical awareness of the role of professionals in producing housing environments; 3- An appreciation of domestic environments produced by non-professionals; 4- Gained an insight into social sciences approaches to study.	Teaching is by a series of illustrated weekly lectures. Students are encouraged to read widely: reading lists accompany weekly handouts.	A written essay of 2000 words submitted at the end of the semester, that demonstrates knowledge and understanding of the topics, critical skills in responding to the specific and exploratory contexts of the questions, ability to construct coherent arguments and present their work appropriately.

Table (1)

Environmental Design and Building Services: ARC210	Total: 3 The module introduces the principles of techniques and technology associated with environmental design of small to medium scale buildings. It examines the essential function of buildings to provide healthy and comfortable conditions for people set within a context environmental awareness and the need to work towards sustainable development. The lecture course builds on the teaching delivered in stage 1 as part of ARC114. The course aims are: 1- To develop an introductory knowledge of the techniques and technologies used for providing an appropriate environment within buildings; 2- To acquire a basic understanding of the interactive relationship between buildings and their immediate environment; 3- To increase awareness of the wider environmental impacts associated with the use of buildings.	Total: 10 1- Sustainability; 2- Human well-being; 3- Bioclimatic and low energy design; 4- Energy and renewable energies; 5- Water use and conservation; 6- Mechanical ventilation and air conditioning; 7- Natural Ventilation techniques; 8- Passive design strategies; 9- Artificial Lighting: its history, current use and the future; 10- Acoustic design of spaces- a guide.	Total: 6 The module provides opportunities for students to gain knowledge and understanding of: 1- The theory and practice involved in the provision of an appropriate environment within buildings; 2- The different techniques and technologies used for servicing a building; 3- The principles for climatic moderation and the interactive relationship between buildings and the environment; 4- Environmental issues and sustainable development as applied to building design and servicing; The module should enable you to: 5- Recognize the roles and responsibilities of other professionals involved in the process of building design; 6- Apply simple environmental concepts and a concern for sustainability to the design of small medium scale buildings.	Teaching and learning is by a combination lectures and directed reading, related studio tutorials through the use of web-based materials. The lectures are designed to have imparted knowledge which has direct relevance to the studio projects and this knowledge should help inform the process of design. This process is supported by studio tutorials, by recommended reading and through the provision of on-line resources.	Assessment is by means of one two hour paper to be taken at the end of semester 1. This allows students to demonstrate: 1- Their knowledge and understanding of the range of topics covered through the course; 2- Their critical skills in responding to the specific and exploratory context of the examination.
Twentieth Century Architecture: ARC211	The course aims is to make students aware of the social, economic, environmental, technological, historical and ideological factors which influence the design of buildings and their surroundings. This will: enrich understanding of the achievements of the past; position twenty-first century architecture in a historical context; help the student to approach historical and contemporary design issues critically.	The course selected topics in western architecture from the mid 20th and 21st centuries.	Total: 4 None	Teaching is by means of a one-hour lecture a week spread over the second semester (10 lectures), public lectures on architecture history and theory, visits to local examples of modern architecture.	Assessment is by means of a two-hour written examination to be taken at the end of the second semester. This allows the students to demonstrate: Their knowledge and understanding of the range of topics covered; Their critical skills in responding to the specific and exploratory contexts of the examination.

Table (1)

History of The Designed Landscape: TCP840	This module introduces students to history of designed landscape from the ancient civilizations until the present day. It relates developments in landscape design to the social and economic conditions which prevailed during various periods, and also to cultural and scientific developments. It also seeks to explore the linkages between landscape architecture and related discipline.	Total: 10 All topics listed do not include sustainable urban design.	An awareness of the major movements and the significant designs in the development of landscape design to the present time. An understanding of the relationships between development of society in different periods of history under varying natural conditions and how these influenced the landscapes that have been created. Students will be able to discuss historical developments in landscape architecture and relate them to contemporary issues.	Weekly lectures, backed up with website notes and directions for heading in each student's private study are seen as the most efficient way to convey this information-dense subject.	Landscape design history is an information-dense subject. The 60-minute multiple choice examination is used to test the assimilation of this material.
Architectural Technology: Arch209	Total: 5 The module builds on the foundations established in Stage1 and seeks to directly complement the on-going Stage2 Studio projects' main aims: 1- To demonstrate the relevance and impact of building technologies and constructional methods in relation to both the natural and the man-made environment and to encourage each student to adopt an appropriate personal response; 2- To emphasize the importance of junctions and the process of assembly- the bringing of elements and materials together will be examined in a constructional sense while focusing on tectonic intent.	Total: 7 These include: 1- Ecological Functionalism- Possible environmental responses related to construction and materials. Includes examination of various environmental assessment methodologies; 2- Constructional Systems and Material Choice – external and controlled factors affecting the choice of a particular technology or material.	Total: 5 The module provides opportunities for students to: 1- Develop a critical awareness and make considered and informed judgments relating to the appropriate choice of building technologies, materials, structures and constructional systems- particularly in relation to their environmental and human impact.	Teaching is primarily by means of lectures, although these are complemented by studio tutorials, workshops and feedback sessions. In addition, students are encouraged to undertake personal research associated with studio projects.	Assessment is by means of two assessed coursework assignments. The first focuses on structures and detailed design (60%), whilst the second relates to the application of construction legislation (40%).

Table (1)

Dissertation Studies: ARC220	The aim is to gain proficiency in a range of research skills, research methodologies and critical appraisal skills, and to assimilate information and draw conclusions from these processes. Each student is required to write a 5000 word dissertation about the subject chosen, which is of a personal interest to them and which generates enthusiasm. The basis of the academic method is as follows: Academically the dissertation will be excellent if it addresses an issue of general concern, examines architectural theories in practice, design approaches, design and construction techniques, aspects of architectural history, the historical development of buildings, philosophical movements in art and architecture or research & applications in a specific context.	Total: 4 The structure of the syllabus allows students to develop research and technical skills, critical and evaluative abilities and a capacity for clear and succinct expression in writing by: 1- introducing the students to the nature of research and research methods in architecture; 2- Equipping students with the ability to devise their own research strategies for their dissertation; 3- Providing an overview for developing a research hypothesis, selecting appropriate research methods and preparing a dissertation research proposal; 4- Giving an opportunity to present a major piece of work involving a range of professionally-orientated, transferable skills.	Total: 8 The module provides opportunities for students to: 1- Identify or develop a research topic; 2- Conduct a literature survey; 3- Produce a structured study or topic; 4- Appreciate, evaluate, discuss and present significant material from disparate sources; 5- Structure an argument to support a case; 6- Use and acknowledge expert opinion; 7- Draw conclusions and suggest future research paths; 8- Present a document suitable for a specific domain readership.	Teaching is through lectures, tutorials-group and individual – and tasks, involving the examination of current dissertations and the use of public databases; also seminars/tutorials with individually allocated tutors/supervisors.	Total: 4 Assessment is carried out by main readers and other staff as appropriate who evaluate the work as a demonstration of the students': 1- Knowledge and understanding of a topic; 2- Critical skills in surveying existing work; 3- Ability to research and develop an argument; 4- Capacity to present findings in an appropriate manner.

Table (1)

stages 1and 2. By the end of Stage 3 students will be expected to be able to handle the design of a moderately complex building with both confidence and competence. To achieve this, the module consists of 3 design projects organized across the first semester..... The projects are developed to encourage an attitude of critical and reflective thinking at all stages of the design process, from initial concepts through to material and tectonic directions. At key points throughout the year the student is expected to declare both process and outcomes and an emphasis will be placed on effective communication. 1- To encourage the selection of appropriate technological solutions in an environmentally responsible manner; 2- To enhance understanding and to engage with theoretical debates about sustainability in architecture, in terms of technology, society and landscape; 3- To develop the skills required to design a moderately complex public building informed by an appropriate level of environmental, tectonic and technical understanding.	*competition with timber as a primary construction material;* 2- Conveying Quality: a short project which encourages the use of, and develops skills in utilizing simple and effective graphic techniques for conveying architectonic form and composition. Use a particular graphic methodology to interpret and communicate the qualities of a building of their choice. Emphasis will be placed on the ability to distil the core concepts of a building and to convey them simply and clearly. Objectives: 1- To develop an ability to distil the core architectural ideas of others and to convey them clearly using particular graphic conventions; 2- To introduce and develop simple and effective graphic skills aimed at enhancing drawn presentations. 3- Culture, Landscape and Identity: At the centre of contemporary debates about sustainability are key philosophical questions about how we perceive, interpret, understand, value and thereby intervene in nature, explore some of these questions and challenges students to develop environmentally responsive solutions that are sensitive to a particular ecological and landscape context. The location provides a dramatic natural landscape as part of a cultural landscape. The project involves the design of a Retreat Centre for a special social group with possibilities to make the brief by the student. The area provides different options for the location of the centre. The public building will be used mainly for leisure for educational purposes and will include accommodation, festive room, workshop, classroom, offices, kitchen and dining room or a public café. Sustainability is a core aim of the design & the appropriate choice of technology is central to the project. Students are encouraged to critically justify the use of particular materials and technologies whether they are locally sourced, renewable and recyclable, ecologically benign or at the cutting edge of technology. Objectives: Total: 4 1- To develop an ability to read, interpret and respond to a particular landscape context in a manner that is ethically responsible; 2- To encourage the selection of appropriate technological solutions in an environmentally responsible manner; 3- To enhance understanding and to engage with theoretical debates about sustainability in architecture;	*demonstrate.* The development and expansion of the key skills gained during Stage1 and 2; to enable the design of moderately Complex public buildings in a particular landscape context, informed by an appropriate level of understanding of environmental and technical issues, and by relevant regulatory frameworks. The module allows the students to demonstrate: 1- The regulatory frameworks, and health and safety considerations that guide design and building construction; 2- Architectural histories and theories of physical, artistic and cultural contexts, and their use in informing the design process- particularly those principles and theories relating to sustainability in a landscape context; 3- The principles of building technologies, environmental design and construction methods in relation to human well-being, the welfare of future generations, the natural world, sustainable environment, materials, processes of human assembly, and structural principles. 4- Influence on current built environment of individual buildings, cities and landscapes in both past and present cities. Intended skills outcomes: Total: 6 None The module equip the students with the ability to:	*personal research and enquiry.* Tutorials, Seminars and presentations are the main forum for both structured and informal teaching and learning. The participation in a lively and vibrant studio culture that fosters a culture of debate and develops both oral and graphic confidence is a key part of the student learning experience.

ral Design: ARC301

Table (1)

Course	Aims	Topics	Knowledge and Skills Outcomes	Teaching and Learning Outcomes	Assessment
Architectural Design: ARC302	Total: 6 The module builds upon the foundation of architectural knowledge established in Stages 1 and 2 and in Architectural Design. 3.1: in particular, the module objectives are that the student will be able to demonstrate in architectural designs by the end of the module and Stage 3: 1- An awareness, knowledge and understanding of the disciplines which inform architectural design: design principles- technology and environment- cultural context- histories and theories of architecture- professional practice and management- communication skills, appropriate to the resolution of moderately complex coherent architectural designs; 2- The ability to produce coherent architectural designs up to the level of a moderately complex public building, with the ability to integrate knowledge and understanding of social and aesthetic requirements, building technologies, environmental design and construction methods.	Total 3 The module is founded on a single design project as a culmination to the BA and Stage 3 as a whole. A key focus of the module is an exploration of varied contexts and an understanding of the social and cultural setting for the building. Project titles: Extended Engagements The final project of the session provided students with a choice of three options and allows an exploration of issues that particularly interest the individual student. Objectives:	Total: 5 Intended knowledge outcomes: 1- An ability to integrate knowledge of social and aesthetic requirements, building technologies, environmental design and construction methods in moderately coherent architectural designs, in a specific context.	Tutorials, seminars and presentations are the main forum for both structured and informal teaching and learning. Each of the projects will entail a variety of group and individual tasks. The participation in a lively and vibrant studio culture that fosters a culture of debate and develops both oral and graphic confidence is a key part of the student learning experience. The module provides students with a choice of projects of similar complexity; the chosen project allows the students to explore areas of particular interest, in demonstrating their ability to produce a coherent architectural design of moderate complexity.	Total: 5 The portfolio examination and associated interview with an external examiner holistically assesses all the varied projects completed by the student in Architectural Design 3.1 (ARC301) and Architectural Design 3.2 (ARC302).... The crits and final portfolio examination allow the student to demonstrate: 1- Evidence of their architectural skills in resolving and declaring an appropriate response to designing a complex public building that is informed by environmental, tectonic and technical understanding; 2- A theoretical and ethical framework for design decision making and how this has informed design development and appropriate responses to particular physical, social and cultural contexts.
Building Construction and Materials: ARC313	Total:3 The module aims to: 1- Enable students to appreciate building technology as part of the iterative process of design, and within a sustainable framework.	Total: 8 1- Environmental Strategies;	Total: 7 At the end of the module students will demonstrate a knowledge of: 1- The principles of building technologies, environmental design and construction methods, in relation to: human well-being, the welfare of future generations, the natural world, consideration of sustainable environment, use of materials, process of assembly, structural principles, the impact on design of legislation, codes of practice and health and safety both during the construction and occupation of a project.	Teaching and learning is by means of a one hour lecture each week.	Total: 2 1- Assessment is through coursework and requires an annotated 1:20 scale section with larger scale details, relating to the design project work, and to be submitted at the end of the semester; 2- The coursework allows students to demonstrate an understanding of the topics covered in the module through their integration into design project work.

Table (1)

Principles and Theories 3.1: ARC315	Total: 3 None related to sustainability/ environmental design	The syllabus compromises student selected critical studies of notable buildings, demonstrably relevant to current architectural debate. The criteria of selection are quality of design and execution; there are no restrictions on size, type, location or age. Buildings studied for dissertations are not eligible, and normally a student will be expected to have visited the building during their architecturally conscious life.	Total: 5 Knowledge outcomes: 1- The ability to analyze and debate the relative success of architectural solutions to particular challenges, on a comparative basis. Teaching and Learning methods: None related to sustainability/ environmental design	This module is structured so as to engage students in activities that will impact directly on the development of their design and critical abilities. To highlight this symbiotic relationship between design and theory/ criticism the module is linked to an analytical project component of ARC318. Each student is expected to write a written critique of a building of their choice, that they have visited and hold as an example of good quality in architecture. A selected number of candidates will be given the opportunity to make an oral/visual presentation of their building to the rest of the class.	Total: 5 Individual student performance is assessed by means of a 1500 word essay. The criteria for assessment are each student's: 1- Ability to analyse the relative success of the architectural solution in terms of the cultural and technological factors that influenced the project.
Dissertation Studies: ARC220_3	Total:2 The aim is, through research into a topic of architectural significance, for students to gain proficiency in a range of research skills, research methodologies, and critical appraisal skills, and to assimilate information and draw conclusions from these processes. Each student is required to write a 5000-word dissertation about the subject chosen, which is of personal interest to him/her and which generates enthusiasm. The dissertation will normally be illustrated. The basis of the academic method is as follows: Academically the dissertation will be excellent if it addresses an issue of general concern within the architectural community. Typically, topics chosen examine architectural theories in practice, design approaches, design and construction techniques, aspects of architectural history, the historical development of buildings, philosophical movements in art and architecture, of research and applications in a specific context.	Total: 4 The structure of the syllabus allows students to develop research and technical skills, critical and evaluative abilities and capacity for clear and succinct expression in writing by introducing students to research, research methods, research strategies, research hypotheses, and giving them an opportunity to present a major piece of work involving a range of professionally-oriented, transferable skills. The dissertations spans: Stage2: Semester 2, and stage 3: Semester 1	Total: 8 The module provides opportunities for students to: All related to identifying a research topic and what it entails.	Teaching is through lectures, tutorials-group and individual – and tasks, involving the examination of current dissertation and the use of public databases; also seminars/tutorials with individually allocated tutors/ supervisors.	Total: 4 Assessment is carried out by main readers and other staff as appropriate who evaluate the work as a demonstration of the student's 1- Knowledge and understanding of a topic; 2- Critical skills in surveying existing work 3- Ability to research and develop an argument; 4- Capacity to present findings in an appropriate manner.

Table (1)

Structures III: CIV338	Total: 6 This structure III module builds on concepts of structural mechanics and design established in the first two years of the BA (Hons) in Architecture Studies. It concentrates on fundamental principles and application of analysis and design, and conceptualization. To enable students to conceptualize structural form and to establish outline feasibility. In particular to introduce: Structure and structural form, structural materials, loads on structures, equilibrium, structural elements and element behaviour, and structural types	The course compromises selected topics in the principles and theories of structural analysis and design.	Total: 9 All related to structural forms, loads, forces and reactions, and structural elements and solutions. The skills acquired include communication skills, evaluative skills, and workplace skills.	Teaching is by means of 12 one-hour weekly lectures over the first semester.	90 minute examination (January) 100%

Stage 5

Course	Aims	Topics	Knowledge and Skills Outcomes	Teaching and Learning Outcomes	Assessment
Architectural Design: ARC511	Total:6 Design involves integrating different types of knowledge. Dexterity in design derives from an iterative process of problem solving, achieved through the regular practice of the skill of designing through architectural projects. The design projects in Stage 5 (ARC511 and ARC512) offer a range of challenges that aim to expand on the core skills acquired during Part 1 of the course: The aims of ARC511 are to: 1- Provide students with opportunities for shared multidisciplinary learning in association with Urban programme & to engage related built environment professions; 2- To develop knowledge, skills and judgment to enable them to contribute responsibly to the quality of the built environment; 3- To develop their critical awareness of current problems relevant to the profession of architecture & urban design & to encourage questions & a receptive attitude which enables them to construct an informed theoretical & ethical position in relation to urban design and its appropriate relationship to wider social, cultural & environmental context.	Projects total: 2 Project (1) The Way We Live Now Project (2) Urban Design: Social Mapping/Master Planning ARC511 is concerned with urban design and is team based.	Total: 11 By the end of the module students should have gained: 1- Enhanced knowledge of the process of urban design through the development and declaration of an urban design proposal; 2- A basic knowledge of the wider social, political, economic and professional context that guides the construction of the built environment; 3- An understanding of how to develop and critically appraise development briefs to ensure that the design response is appropriate for the community and to site and context, including for reasons such as sustainability and budget; 4- An awareness of related built environment professions and the role of urban design and town planning in urban development.	Teaching and learning is through a combination of lectures, seminars, group and individual tutorials on regular student-centred learning.... The design studio is the basis for the development of both knowledge and skills and students are expected to integrate knowledge gained in other modules into the practice of design. Learning is supported by the use of 'blackboard' web-based tools.	The project must be presented for assessment at the appointed time. Non submission must be accompanied by a written explanation to the Module Leader. Projects are provisionally marked following an oral and visual presentation at the end of Semester 1. The oral and visual presentation gives students the opportunity to articulate their design approach and to demonstrate how it meets the assessment criteria of the module. Feedback is given to each student and they have the opportunity to further develop their design in Semester 2. Each student will submit a completed portfolio of work for Stage 5 (compromising projects from ARC511 and ARC512) to be examined at the end of Semester 2 during a Portfolio Examination.

Table (1)

Architectural Design: ARC512	Total: 5 1- To develop knowledge, skills and judgment to enable students to contribute responsibility to the quality of the built environment. 2- To develop a critical awareness of current problems relevant to the profession of architecture and to encourage a questioning and receptive attitude which enables students to construct an informed theoretical and ethical position in relation to architectural design and its appropriate relationship to a wider social, economic, cultural and environmental context.	Projects: Total: 2 (1) Architecture, Technology and Environment; (2) Small Building, Big Idea The final project of the year is a self-set project for a small building. Through the design of this building you are expected to demonstrate how your architectural ideas are developing and to outline your approach and method. It is seen as a preliminary to the design thesis in Stage 6.	Total: 12 By the end of the module, students should have gained: 1- An understanding of design 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; 2- An awareness of the regulatory requirements, including the needs of the disabled, health and safety legislation, building regulations and statutory development controls that guide building construction; 3- A knowledge of climatic design and the relationship between climate, built form construction, life style, energy consumption and human well-being; 4- An understanding of building technologies, environmental design and construction methods in relation to; generations, the natural world and the consideration of a sustainable environment. Skills: By the end of the module students should be able to: 1- Devise structural, environmental and construction strategies for a complex building, employing an integrative knowledge of structural theories, construction techniques and processes and the provision of building services within a framework of the knowledge of the physical properties of building materials and components and the environmental impact of specification choices.	Teaching and learning is through a combination of lectures, seminars, group and individual tutorials on regular studio days supported by directed reading and student-centered learning. Learning is supported by the use of black board.	Each project must be presented for assessment at the appointed time. Projects are marked following an oral and visual presentation towards the end of Semester 2. The oral and visual presentation gives students the opportunity to articulate their design approach and to demonstrate how it meets the assessment criteria of the module. Feedback is given to each student and they have the opportunity to further develop their design before the whole completed portfolio of work (ARC511 and ARC512) is examined at the end of Semester 2 at a portfolio examination. Each project is evaluated against a set of criteria outlined in project descriptions. The assessment criteria for each project commonly require an understanding of and an ability to apply: 1- A particular body of knowledge (related to the project); 2- A particular range of skills and techniques (introduced in the project). Following each project assessment, students receive a set of written comments in relation to the declared criteria, together with a provisional grade which is handed out at Project Reviews/feedback meetings, when summative feedback is given by the project leader.

Table (1)

Researching Building Technology: ARC501	Total: 4 *The aim of the module are:* 1- To gain knowledge of climate design and the relationship between climate, built form construction, life style, energy consumption and human well-being. 2- To gain advanced knowledge of the inter-relationship between people, buildings, and the environment, and an understanding of how innovative technologies can be used to generate architectural form and enhance the performance of buildings.	Total: 3 1- Research in Building Technology; 2- Advanced Building Technologies; 3- Building technologies and architectural design.	Total: 9 Knowledge Outcomes The module provides opportunities for students to gain knowledge and understanding of: 1- Building technologies, environmental design, and construction methods in relation to human well-being, the welfare of future generations, the natural world, and the consideration of a sustainable environment. Skills Outcomes The module should enable you to: 1- Critically appraise and form considered judgments about the technical qualities of a design within the scope and scale of a wider environment.	Teaching and learning is by way of combination lectures, directed reading, and student presentations. Lectures will introduce various concepts related to building technology and design, and provide guidance for student's independent learning. Seminars will be used to discuss theoretical concepts within the context of architectural design. Group projects will allow students to demonstrate their understanding and application of theoretical concepts, and will encourage practice of key skills.	Group presentations will be used to assess key skills (team working, oral and visual presentation); individual submissions will be used to assess students; knowledge, understanding and application of theoretical concepts of building technology to architectural design. The second part of the assessment will be integrated with a building design project in either Semester 1 or Semester 2 as appropriate. Individual submissions will also be used to assess key skills in written communication.
Architectural Theory Seminars: ARC521	If we are to design well, then we need to understand how our buildings are appreciated and understood by the groups of people who make use of them. This module involves the study of texts about architecture, from various points of view. The general aims of the course are to appreciate a range of these views, and to develop critical and analytical skills in the consideration of them.	Each week a small group of students will lead a seminar, introducing a text, which everyone will have read. The set text generates the field for exploration each week. In addition to sharing in the presentation of one seminar, you should participate in discussion at all the seminars. You are required to keep a seminar diary, which could take the form of notes taken at the seminars themselves, supplemented with observations and reflections prompted by thinking about the subject-matter under discussion. These notes can be supplemented with illustrations (sketches, photocopies, whatever) as appropriate. The idea of the diary is that it not envisaged that will be a highly produced formal document and high production-values will not automatically bring high marks. This diary is to be submitted for marking at the end of the series of seminars.	Total: 3 None.	Teaching is by means of weekly lectures which introduce material, and establish the framework for learning. Students are expected to augment the knowledge by reading and finding out from other sources of information, including visits to noteworthy buildings.	Seminar presentation 50% Seminar Diary 50%

Table (1)

Course	Aims	Topics	Knowledge and Skills Outcomes	Teaching and Learning Outcomes	Assessment
	Stage 6				
Understanding Buildings: Competing Conceptions of Design: ARC807	This course examines how people confer meaning to the built environment through experience, individual and collective imagination, and memory. Going beyond a study of the formal characteristics of buildings as individual objects, it provides an integrated approach to the evaluation of the landscape as a whole. The readings are drawn from an interdisciplinary body of literature (such as philosophy geography, history, anthropology, political science and sociology) in that form or examine the production of space, The syllabus is organized thematically and the broad geographical coverage is intended to elicit an awareness of the increasingly complex and inextricable relationships between the different regions of the world.	Total: 3 The foremost educational goals of this course are 1- To introduce students to different analytic tools for interpreting the built environment. Themes to be explored include, among others, space and social sorting (race, class and gender); building and nature; the biography of buildings; memory and the built environment; space and power.	Total: 4 1- Learn different techniques for analyzing space, including those used other disciplines.	The course will be taught through ten one hour lectures. Each lecture will introduce a theme of critical relevance to contemporary architectural practice and relate it to debates within the social sciences.	Total: 3 Assessment is by means of a multipart take home examination. The exam will call for students to demonstrate: 1- Their knowledge and understanding of the range of topics covered; 2- Their critical skills in analysing the built environment; 3- Their ability to communicate complex ideas.

Table (1)

Architectural Design 6.1: ARC518

The Design Thesis is an opportunity for students to develop their design skills to an advanced level by addressing the solutions for complex building projects. It addresses both the development of core skills expected of an architecture student at this stage while providing the opportunity for them to explore & research in greater depth those particular aspects of architecture which are of special interest to them.	Total: 4 This course involves the generation, research and realization of a Design Thesis. It is the responsibility of the individual student to programme their time appropriately within the framework of the course, which is broadly subdivided as follows; 1- Research into brief, site and precedent; 2- Initial design response and concept; 3- Detailed design and technical submission; 4- Final design work and presentation.	Knowledge outcomes Total: 5 The Design Thesis provides an opportunity for students to develop and demonstrate their knowledge and understanding of: 1- Architectural briefs and how to develop and critically appraise them to ensure that the design response is appropriate to site and context, and for reasons such as sustainability and budget; 2- Building technologies, environmental design and construction methods in relation to; human well-being, the welfare of future generations, the natural world and the consideration of a sustainable environment; 3- The inter-relationship between people, buildings and the environment and an understanding of the need to relate buildings and the spaces between them to human needs and scale. Skills Outcomes Total: 9 The module provides the opportunity for students to develop and demonstrate their ability to: 1- Devise structural and constructional strategies for a complex building or group of buildings, employing an integrative knowledge of structural theories, construction techniques and processes and the provision of building services within a framework of the knowledge of the physical properties of building materials impact of specification choices.	Teaching is mainly through individual studio design tutorials with an allocated tutor or a visiting specialist or through group tutorials & seminar sessions. There will be nine design review sessions given by the Module Leader, Visiting Professor and your allocated Design Tutor. These will be organized in groups of 3-4 students.... The majority of the review sessions will be informal round table discussions. However, there will be a formal mid-session presentation in January.	Through the year the progress of each student's work will be discussed at design reviews and feedback sessions. These are primarily teaching sessions and do not contribute towards the final assessment of the work. The design work is assessed by means of two examinations: One at the end of the year to a panel of internal examiners consisting of the Module Leader, the Visiting Professor of Design, the Design Tutor and the Degree Programme Director & subsequently to an external examiner. The Module leader may, also be their Design Tutor. There is 1.5 week between the internal and external examinations and students are allowed to respond to comments made in their internal exam by amending their presentations. The examinations consist of the student mounting an exhibition of their years work & each student has the opportunity to explain & answer questions concerning their presented work. Each session will last approximately 25 min. The work will be assessed using the ARB Criteria for RIBA Part II Design. This includes: Total: 1- The demonstration of an understanding of the social, cultural & physical aspects of site and ability to generate appropriate and contextual design responses which are founded on an understanding of the inter-relationship between people, buildings and the environment. 2- The demonstration of well-considered, reflective & critical judgments about the spatial, aesthetic, technical & social qualities of a design within the scale and scope of a wider environment and an ability to apply skill & dexterity in generating appropriate design solutions that are both complex and highly resolved.

Table (1)

	Total: 4 None	The syllabus- and therefore the subject and scope of the examination- comprise student-selected critical studies of aspects of architecture related to the development of their independently chosen design theses.	Total: 4 None	This module runs parallel to student's design thesis development for ARC518 and is intended to interact continuously and dynamically with it in order to develop a reflective approach to architectural design practice. Each student is expected to develop a theoretical premise for his/her design thesis concurrently with the development of the design scheme. This will take the form of directed self-study assignments with discrete written/oral presentations to internal and external critics. Teaching is conducted through two X 2-day seminars held during Semester One, at which individual students, in small groups, present their initial design ideas in context, thus providing a basis of discussion and critical comment. The purpose of these seminars is to help focus the students' design conceptualization, to explore with them alternative approaches to particular design challenges from a theoretical perspective and to guide them on how best to present their ideas in illustrated written format. The format and inflection of the two essays are designed to encourage analysis and reflection upon action in a sequential and interactive way.	The module is assessed in two stages. Following the individual non-assessed oral presentations at the seminars each student will submit: Part One: An illustrated, type written theory essay on an agreed topic (1500 words maximum) Part Two: An illustrated theoretical substantiation of the Design Thesis (1500 words maximum plus diagrams) Part 1 carries 40% of the mark; Part 2(correlation with design thesis factored in) 60%
Architectural Design Theory: ARC504					
Architecture and Construction: Process and Management: ARC505	This course examines the economic, commercial, and legal framework within which architecture; property development and construction take place. The module aims by exploring changing models of practice to convey the evolving status and role of the architect as a player in the rapidly changing UK property and construction markets. Central to this is an examination of the architect's role in translating demand driven building needs to the construction practice. Building costs, construction contracts, procurement and property development will be explored and examined.	Total: 5 None	Total: 5 None	Teaching is by means of one two-hour lecture per week spread over the first semester (10 lectures).	Total: 2 Assessment is by means of: 1- A two-hour examination to be taken at the end of the first semester. 2- A 2000 word essay on a topic from the first half of the lecture course. Titles to be given at the mid-point of the lecture course; essay to be submitted on the final day of the first semester.

Table (1)

Dissertation in Architecture B: ARC519	Total: 4 None	The syllabus and therefore the subject and scope of examination comprise student selected research topics in architecture and related subject areas.	Total: 2 None	Students who have opted for this module during Semester two, Stage V are introduced to the basic research methodologies in the field by the module leader. He also advises on the selection of individual research topics, and allocated a personal tutor to each candidate. Each student, in consultation with his/her tutor develops a personal research project towards final submission at the end of Semester One, Stage VI. The workload weighting allocated between Stages V and VI is 20:20.	Total: 5 All dissertations are marked by the module leader, plus another internal reader appointed by the module leader, with the personal tutor acting as a third reader in case of significant variance in marks. The final marks are agreed by all readers together at a separate B. Arch Dissertation Meeting, and tabled at the Departmental Examination Board. Assessment Criteria: 1- Evidence of systematic independent research; 2- A focused analysis/description of the subject matter; 3- A proper substantiation of arguments, including the competent usage of academic writing conventions; 4- The ability to communicate ideas effectively in clear, concise English; 5- High quality visual presentation.
Special Topics: Linked Research Project: ARC502	Total: 1 To enable students to engage in research activity that is already established in the school, in the areas of architecture, planning and landscape by working with academic staff who are actively engaged in researching the selected topic.	Not specified A range of topics will be offered by individuals engaged in research within the school. The particular range will vary from one year to another, depending on the availability of suitable research topics. If fewer than six students elect a particular option then it will not be able to run. With some types of project there will be an upper limit on the number that can be accepted.	Total: 2 None	There are two components to this module. The first is a taught course, which runs during semester 2. It equips students with the specialized skills necessary to tackle the second part, which runs in semester 1 of the following year, and in that part the student engages in research. It is possible to take the taught part of the course by itself, without going on to do the research. Time allocation will vary from one project to another, but most of the time will be divided between project work and private study. Some students have included overseas field visits, but they would have to be undertaken in the student's own time, during the summer vacation.	Total: 2 All project work is marked by the project leader, plus another internal reader appointed by the module leader. A third reader will be appointed in case of serious disagreement over the assessment. Final marks are agreed by all readers together, and tabled at the Departmental Examination Board. Assessment Criteria: 1- These will vary so as to be appropriate to the project, but there must be evidence of systematic research- a question must be posed and answered; 2- Clarity and precision of written and oral presentation will be valued.
Special Topics: Erasmus Exchange: ARC520	Introduction: The ERASMUS student exchange programme has been negotiated to enable Stage 5 BA. Arch students at four partner schools of architecture in Europe. The other schools involved in this agreement are: Belgium, France, Germany, and Spain. Schedule of Modules: While at the host institution, students will select a design project/design projects and associated lecture modules from the programme of study on offer at the particular host institution. In total this programme must add up to a full-time student workload for one semester and should be equivalent to 60 University of Newcastle credits (30 ECTS). The weighted average of the marks, translated from the marking scheme of the host institution into the University of Newcastle scheme, will be used in returning marks for the University of Newcastle work that it replaces. The work that is replaced is: 1- ARC521: Architectural Theory Seminars; (10 credits, 5 ECTS) 2- ARC807: Understanding Buildings: Competing Conceptions of Design; (10 credits, 5 ECTS) 3- ARC512: Architectural Design 5.2 (20 credits, 10 ECTS) 4- Special Topics (20 credits, 10 ECTS).				

Table (2)

Appendix 4

College of Architecture: Texas A&M University

CURRICULUM for ENVIRONMENTAL DESIGN[4]

Freshman Year

FALL SEMESTER		Cr
ENDS 102 Design Found. I Lecture	(1-0)	1
ENDS 105 Design Found. I	(1-4)	3
ENDS 170 Computer Techniques	(2-3)	3
ENDS 149 Arch. History I	(3-0)	3
ENGL 104 Comp. & Rhetoric	(3-0)	3
MATH Mathematics Elective [1]		3
KINE 198 Health & Fitness Activity [2]	(0-2)	1
		17

SPRING SEMESTER		Cr
ENDS 103 Design Found. II Lecture	(1-0)	1
ENDS 106 Design Found. II	(1-4)	3
ENDS 115 Design Comm. Found.	(2-4)	3
ENDS 150 Arch. History II	(3-0)	3
Communications Elective [2]		3
MATH Mathematics Elective [1]		3
KINE 199 Fitness Activity [2]	(0-2)	1
		17

Sophomore Year

FALL SEMESTER		Cr
ENDS 205 Environmental Design I	(2-6)	4
PHYS 201 College Physics	(3-3)	4
COSC 253 Const. Matls. & Meth. I	(3-0)	3
Social & Behavioral Science Elective [2]		3
ENDS 260 Comp. Theory Built and Virtual Environ.	(3-0)	3
		17

SPRING SEMESTER		Cr
ENDS 211 Design Detailing	(2-6)	4
ENDS 250 History of Modern Arch.	(3-0)	3
ENDS 233 Environ. Systems I	(3-0)	3
ENDS 231 Arch. Structures I	(3-0)	3
COSC 254 Const. Matls. & Meth. II	(3-0)	3
CARC 481 Sem. Away Seminar	(1-0)	1
		17

Junior Year

FALL SEMESTER		Cr
ARCH 305 Arch. Design I	(3-9)	6
Directed Elective I (Site & Context) [1]		3
ARCH 334 Environ. Systems II	(3-0)	3
ARCH 431 Arch. Structures II	(3-0)	3
Natural Science Elective [2]		4
		19

SPRING SEMESTER		Cr
CARC 301 Field Studies		6
or		
ENDS 494 Internship		
Arch/Art History Elective [1, 3]		3
Free Elective		3
		12

Semester away - alternates between fall and spring semesters.

Senior Year

FALL SEMESTER		Cr
ARCH 405 Arch. Design II	(3-9)	6
ARCH 457 Ethics & Pro. Practice [3]	(3-0)	3
Directed Elective II (Tectonic Studies) [1]		3
U.S. History Elective [2]		3
POLS 206 American Natl. Govt.	(3-0)	3
		18

SPRING SEMESTER		Cr
ARCH 406 Interdis. Design III	(3-9)	6
Directed Elective III (Interdis. Studies) [1]		3
POLS 207 State & Local Govt.	(3-0)	3
U.S. History Elective [2]		3
Free Elective		3
		18
		67
		135 CR

[1] Electives to be selected from an approved list available in the undergraduate advising office Langford A102.

[2] To be selected from the Core University Curriculum.

[3] ARCH 457 may alternate with ARCH/ART History Elective and may be taken during the semester away semester.

[4] Source: http://archone.tamu.edu/College/ (Jan. 2008)

Appendix 5

NAAB Conditions for Accreditation for BA Architecture Programme

C-1.0 Programme Response to NAAB Perspectives
The programme responds to five NAAB constituencies as follows:
1- Architectural Education and the academic context
The university offers a variety of high quality learning resources including IT equipments and wireless network in four areas: Architecture, Culture, Research and different Publication.
2- Architectural Education and the students
The programme supports and encourages the undergraduates to assume leadership roles both during their school years and after joining the profession in response to the 2001 VTR[5] concern.
3- Architectural Education and registration
The programme provides the students with sound preparation for licensure and internship through a well prepared curriculum placing emphasis on professional practice, and enjoying a good relationship with the State Board (TBAE) and students are referred to a website for licensure requirements.
4- Architectural Education and the profession
The programme demonstrates that it prepares undergraduates to practice and assume their new roles within a climate of increasing cultural diversity and constantly developing client demands. The curriculum reflects a commitment to developing undergraduates' architecture-related knowledge to become effective producers and consumers gaining work experience, through exemplifying lifetime learning, collaborating with associate disciplines and creating collaborative work in the design studio to achieve cultural diversity.
5- Architectural Education and society
The programme informs learners about environmental and social problems and ways to address them. The curriculum builds the students' environmental awareness and dedication to Hanover principles.
C-2.1 Description of the Programme's Self-Assessment Process
C-2.2 Mission Initiatives and Progress
C-2.3 Assessment of the 2002-2003 Strategic Plan
C-2.4 College Strengths and Future Directions
C-2.5 College Objectives Ranked by Priority
C-2.6 Institutional Self-Assessment
C-2.7 College of Architecture Meetings and Reviews
C-3.0 Public information
C-3.1 NAAB Publications
C-3.2 Programme Description as it appears in the University Catalogue
C-3.3 Course Descriptions as it appears in the Texas Tech University Catalogue 2003 – 2004, p. 241.
C-4.0 Social equity
C-4.1 General Statement
C-4.2 Criteria and Procedures for Achieving Equity and Diversity in the

[5] VTR: NAAB's Visiting Team Report

Faculty
C-4.3 Criteria and Procedures for Achieving Equity and Diversity in the Student Body
C-4.4 Faculty, Staff and Student Involvement with Policy, Curriculum, and Programme Development
C-5.0 Human resources
C-5.1 Student Resources
C-5.2 Faculty Resources
C-5.3 Administration Resources
C-5.4 Staff
C-6.0 Human resources development
C-6.1 Faculty Development
C-6.2 Staff Development
C-6.3 Student Development
C-7.0 Physical resources
C-7.1 General Description
C-7.2 Building Plans
C-7.3 Changes Current and Anticipated
C-7.4 Future Opportunities
C-7.5 Furniture and Equipment
C-8.0 Information resources
C-8.1 General Description
C-8.2 Library Statistics Report
C-9.0 Financial resources
C-9.1 Programme Budget
C-9.2 Endowments, Scholarships and Programme Advancement C-9.3 Comparative Data
C-10.0 Administrative structure
C-10.1 Statement of Institutional Accreditation
C-10.2 Programme Administrative Structure
C-10.3 Autonomy
C-10.4 Other Programmes
C-11.0 Professional degrees and curriculum
C-11.1 Specification of Degrees Offered
C-11.2 Minors and Concentrations

Table 3

Appendix 6

Table 3 Environmental Concepts in Kuwait University Syllabus for the Bachelor Degree of Architecture

200 Level Courses

Course number and title	Pre-Req/Co-Req	Credit Hours	Course Description	Teaching Methodology
0690-205 Architectural Design (1)	Prereq. 0690-105	3 hours lecture 6 studio hours 5 credits	Issues and methods in designing environments for human habitation and well-being. Projects addressing concepts such as site, functional planning, spatial ordering, form generation. Theory and practice of architecture as art and science. Interrelationship of function, structure, and form in building design through analytical approach to problem identification and problem solution. Exercises in identifying conflicts of various forces normally associated with a variety of building types and the generation of a range of design solutions.	
0690-206 Architectural Design (2)	Prereq. 0690-205	3 hours lecture 6 studio hours 5 credits	Continuing issues and methods taught in ARCH205 in designing environments for human habitation and well-being. Projects addressing concepts such as site, functional planning, spatial ordering, form generation. Theory and practice of architecture as art and science. Interrelationship of function, structure, and form in building design through analytical approaches to problem identification and problem solution. Exercises in identifying conflicts of various forces normally associated with a variety of building types and the generation of a range of design solutions.	
0690-211 Computer Applications in Architecture	Prereq. 0690-111	2 hours lectures 3 studio hours 3 credits	Visual communication techniques applicable to the design of the built environment using the computer.	Lecture, studio. Computer applications include drawing, modelling, rendering, animation, and multimedia presentation.
0690-221 History of Architecture (2)	Prereq. 0690-121	3 hours lectures 3 credits	Architecture of the Islamic civilization.	Lecture, discussion.
0690-222 Indigenous Architecture	Prereq. None	3 hours lectures 3 credits	Descriptive analysis of the factors contributing to the distinctive aspects of indigenous architecture of the region. Research, field survey, and documentation of the traditional and transitional architecture of the region.	
0690-224 Architectural Criticism	Prereq. 0690-205	3 hours lectures 3 credits	The aim of this course is to introduce architectural criticism as the methodological bases for evaluation of the premises, the process, the final product, the impact (social, formal, and other) of architectural projects on the surrounding environment. The course illustrates methods of analyzing buildings, and evaluates their impact on people and the environment. Students are required to select an architectural landmark from Kuwait for continuous study throughout the course and apply the discussed theoretical knowledge on it.	
0690-232 Architects and	Prereq. None	3 hours lectures 3 credits	Architectural thoughts of the various ages and civilizations, different materials, tools, and ideas that have determined the contemporary styles of buildings.	

Table 3

Architecture				
0690-241 Structural Analysis (1)	Prereq. 0410-101, 0430-101, 0430-105	3 hours lectures 3 credits	Basic theories of structural analysis and behaviour of typical systems.	
0690-242 Materials and Methods of Building Construction (1)	Prereq. 0430-101, 0690-105	2 hours lectures 3 studio hours 3 credits	Physical and behavioural properties of building materials. Construction methods and processes for buildings including safety requirements and selection of equipment and materials.	Lectures are supplemented with laboratory sessions and field trips to illustrate the subject matter.
0690-281 Painting	Prereq. None	1 hour lecture 6 studio hours 3 credits	None	
0690-282 Photography (1)	Prereq. None	1 hour lecture 6 studio hours 3 credits	None	
0690-283 Photography (2)	Prereq. 0690-282	1 hour lecture 6 studio hours 3 credits	None	
0690-284 Ceramics (1)	Prereq. None	1 hour lecture 6 studio hours 3 credits	None	
0690-285 Ceramics (2)	Prereq. 0690-284	1 hour lecture 6 studio hours 3 credits	None	
0690-286 Introduction to Graphic Design	Prereq. None	2 hours lectures 3 studio hours 3 credits	None	

300 Level Courses

Course number and title	Pre-Req/Co-Req	Credit Hours	Course Description	Teaching Methodology
0690-305 Architectural Design (3)	Prereq. 0690-206	3 hours lecture 6 studio hours 5 credits	These design studios deal with site and building design problems, and place emphasis on programmatic and environmental determinants and building in the natural and urban context.	Lecture, studio, and field trips.
0690-306 Architectural Design (4)	Prereq. 0690-305	3 hours lecture 6 studio hours 5 credits	Continuing the with site and building design problems that were investigated in ARCH 305, and place emphasis on programmematic and environmental determinants and building in the natural and urban context.	Lecture, studio and field trips.

Table 3

0690-321 History of Architecture (3)	Prereq. 0690-221	3 hours lectures 3 credits	The history of architecture of the regional civilization and the Arabian Gulf region with major emphasis on Kuwait. It also covers the history of architecture of the 19th and the 20th century, especially of the western civilization, and the history of contemporary architects throughout the world.	Lecture discussion.
0690-322 History of Western Art	Prereq. Completion of 45 credits	2 hours lectures 3 studio hours 3 credits	The history of western art reviewed chronologically from the Renaissance period to the present day, with special emphasis on the relationship of history and visual thought.	
0690-331 Introduction to Interior Design	Prereq. Completion of 45 credits	2 hours lectures 3 studio hours 3 credits	Basic principles of interior design approach and methodology, including derivation of standards, planning and spatial conception, materials and technical considerations.	Lecture, studio and field trips.
0690-332 Introduction to Landscape Architecture	Prereq. Completion of 45 credits	3 hours lectures 3 credits	Principles, theories, methods, and technologies of landscape architecture. Design and practice processes in small and moderate scale urban projects.	Lecture, discussion.
0690-333 Introduction to Urban Design	Prereq. Completion of 45 credits	3 hours lectures 3 credits	None	Lecture, discussion.
0690-341 Structural Analysis (2)	Prereq. 0690-241	3 hours lectures 3 credits	Problems and processes of design of building structures, structural investigation for design, codes and standards, design of elements and systems of wood, steel, masonry, and concrete for gravity and lateral forces.	
0690-342 Materials and Methods of Building Construction (2)	Prereq. 0690-242	2 hours lectures 3 studio hours 3 credits	None	Lectures are supplemented with laboratory sessions and field trips to illustrate the subject matter.
0690-345 Solar Energy in Buildings	Prereq. Completion of 45 credits	3 hours lectures 3 credits	Policy, design, and development implications of using solar energy in new and existing constructions.	
0690-358 Architectural Professional Training	Coreq. 0690-306, Consent of the Department	No theoretical lecture 10 hours studio 3 credits; 200 hours of training	Students gain practical experience by attending a training programme at one of the approved institutions engaged in the practice of architecture. Training includes architectural design and construction supervision. Each student should submit a formal report related to the programme attended at the end of the training period.	A minimum of 200 hours of design and supervision training is required for the course

Table 3

0690-361 Architectural Theory (1)	Prereq. 0690-206	3 hours lectures 3 credits	Characteristics and principles of significant aspects of behavioural sciences such as environmental determinants of building design.	Lecture, discussion.

400 Level Courses

Course number and title	Pre-Req/Co-Req	Credit Hours	Course Description	Teaching Methodology
0690-405 Architectural Design (5)	Prereq. 0690-306	3 hours lecture 6 studio hours 5 credits	This design studio deals with comprehensive projects requiring accountability for the full range of factors presented thus far in the curriculum.	Lecture, studio and fieldtrips.
0690-406 Architectural Design (6)-CAAD	Prereq. 0690-405	3 hours lecture 6 studio hours 5 credits	None	The use of digital media as a tool for design, analysis, and final presentation.
0690-421 Architecture in the Middle East	Prereq. Completion of 45 credits	3 hours lectures 3 credits	Lecture and seminar course focusing on the development of architecture in the Middle East in the twentieth century. Research and visual illustrations of the works of prominent architects.	Lecture and seminar course
0690-441 Design of the Luminous Environment	Prereq. 0690-306	2 hours lectures 3 studio hours 3 credits	Basic theories of lighting. Ideas, problems, and computations related to the design of buildings in response to the luminous environment.	Lectures are supplemented with laboratory sessions to illustrate the subject matter.
0690-442 Design of the Sonic Environment	Prereq. 0690-306	2 hours lectures 3 studio hours 3 credits	Basic theories of acoustics. Ideas, problems, & computations related to the design of buildings in response to the sonic environment	Lectures are supplemented with laboratory sessions to illustrate the subject matter.
0690-443 Building Systems	Prereq. Completion of 60 credits	3 hours lectures 3 credits	The basic elements, organization, & design of the building services such as heating, ventilation and air-conditioning systems, mechanical & electrical, plumbing, communication, security and vertical transportation systems pluming, fire safety, etc. Architectural design implications of heating, ventilation & air-conditioning systems, and their application.	Lecture and discussion.
0690-444 Advanced Environmental Systems	Prereq. 0690-443	2 hours lectures 3 studio hours 3 credits	This course is a compressed course in design criteria and calculation methods for (1) mechanical and passive solar systems including loads, plant system, duct, and storage sizing and (2) lighting and acoustics (CIE and IES methods, DBA and NC systems).	Lecture, laboratory.
0690-451 Professional Practice (1)	Co-req. 0690-406	3 hours lectures 3 credits	Design methodology, typology programming, site analyses, budget formulation and pro-form procedures. Development of comprehensive project documentation, detailing, specifications, drawing formats and	Lecture, discussion.

Table 3

			organizations. The architect's role in project design and construction, the administration of the construction contract, and in the relationship with others involved with the project. Types of documentation required to render competent and responsible professional service.	
0690-452 Professional Practice (2)	Prereq. 0690-451	3 hours lectures 3 credits	Implications of economic systems, finance, and building costs on specific building projects as well as the roles of value engineering, life-cycle cost analysis, and construction cost estimation in the framework of a design project. Project and office management, emphasizing professional services and professional ethics and project responsibilities during design and construction. Laws and regulations affecting the architecture practice as well as building economics and financing.	Lecture, discussion.
0690-461 Architectural Theory (2)	Prereq. 0690-361	3 hours lectures 3 credits	Basic theories of environmental control, and building systems and energy management, as well as the relevant codes and regulatory standards and their application to physical and environmental systems.	Lecture, discussion.
0690-491 Architectural Graduation Project (1)	Prereq. 0690-406	1 hour lecture 3 hours studio 2 credits	Data collection on selected topic under the guidance of a faculty advisor. Formulation and preparation of space programme and design brief and requirements in the form of design report study and analysis of selected site constraints and environmental factors.	
0690-492 Architectural Graduation Project (2)	Prereq. 0690-491	2 hours lectures 6 hours studio 4 credits	Formulation of schematic design as translation of the previously prepared design brief under the guidance of a faculty advisor. Development of schematic design into preliminary design drawings. Modification of design report toward final design drawings. A thesis is required to be submitted.	

Appendix 7

Table 4 Total credit hours in Kuwait and Newcastle University

Year 1

Semester 1

Stage1[6]

Kuwait[7]			Newcastle		
Course #	Course title	credit	Course #	Course title	**Value**
ARCH 131	Introduction to Architecture	1	ARC111	Architectural History 1.1	5
ENGL 123	Intermediate writing skills	3	ARC112	Principles and Theory of Architecture 1.1	5
ARCH 111	Architectural Communication	3	ARC113	Architectural Technology 1.1	10
MATH 101	Calculus	3	ARC116	Professional Studies 1.1	5
PHYS 101	Physics I	3	ARC101	Architectural Design 1.1	35
PHYS 105	Physics I Laboratory	1			
	Sub-total	14		Sub-total	60

Semester 2

Stage1[13]

Kuwait			Newcastle		
Course #	Course title	credit	Course #	Course title	**Value**
ARCH 105	Design Basics in Architecture	5	ARC111	Architectural History 1.1	5
ARCH 121	History of Architecture 1	3	ARC112	Principles and Theory of Architecture 1.1	5
Elective	Architectural Elective **OR** Liberal Arts Elective	3	ARC114	Architectural Technology 1.1	10
HIST 102	History of Arab and Islamic Civilization	3	ARC116	Professional Studies 1.1	5
Elective	Liberal Arts Elective	3	ARC102	Architectural Design 1.1	35
	Sub-total	17		Sub-total	60
Year Total		31	Year Total		120

[6] Reference: APL. (2005/2006a) *Programme of Studies; B.A. Architecture Studies.* Newcastle upon Tyne: School of Architecture, Planning and Landscape, University of Newcastle.

[7] The composition of the proposed curriculum of architecture agrees with NAAB curricular requirements, which specifies that a minimum of 20 percent of the total credits required for the completion of the programme must be satisfied by courses in liberal studies. The remainder of the curriculum must be divided between required architectural courses satisfying the performance criteria with a maximum of 60 percent and electives totalling a minimum of 20 percent of the total required credits for a degree. The proposed curriculum in architecture is detailed in the following sections.

Year 2

Semester 3 Stage2[13]

	Kuwait			**Newcastle**	
Course #	Course title	Credit	Course #	Course title	**Value**
ARCH205	Architectural Design I	5	TCP840	History of the Designed Landscape	5
ARCH211	Computer Applications in Architecture	3	ARC213	Principles and Theory of Architecture 2.1	5
ARCH241	Structural Analysis I	3	ARC209	Architectural Technology	7.5
Elective	Architectural Elective	3	ARC210	Environmental Design and Services 2.1	5
Elective	Architectural Elective	3	ARC201	Architectural Design 2.1	35
	Sub-total	17		Sub-total	57.5

Semester 4 Stage2[13]

	Kuwait			**Newcastle**	
Course #	Course title	Credit	Course #	Course title	**Value**
ARCH206	Architectural Design II	5	ARC211	Twentieth Century Architecture	5
ARCH221	History of Architecture II	3	ARC209	Architectural Technology	7.5
ARCH242	Materials and Methods of Building Construction I	3	ARC210	Environmental Design and Services 2.1	5
Elective	Architectural Elective	3	ARC220	Dissertation in Architecture Studies 2.1	5
Elective	Liberal Arts Elective	3	ARC 202	Architectural Design 2.2	40
	Sub-total	17		Sub-total	62.5
Year Total		34	Year Total		120

Year 3

Semester 5 Stage3[13]

Kuwait			Newcastle		
Course #	Course title	credit	Course #	Course title	**Value**
ARCH305	Architectural Design III	5	ARC313	Building Construction and Materials 313	5
ARCH342	Materials and Methods of Construction II	3	CIV338	Structures CIV338	5
ARCH361	Architectural Theory I	3	ARC220	Dissertation in Architectural Studies22_3	15
Elective	Architectural Elective	3	ARC308	Architectural Design 3.1	35
Elective	Liberal Arts Elective	3			
	Sub-total	17		Sub-total	60

Semester 6 Stage3[13]

Kuwait			Newcastle		
Course #	Course title	credit	Course #	Course title	**Value**
ARCH306	Architectural Design IV	5	ARC314	Professional Practice and Management 314	10
ARCH321	History of Architecture III	3	ARC 312	Principles and Theories of Architecture	5
ARCH341	Structural Analysis II	3	ARC302	Architectural Design 302	45
Elective	Architectural Elective **OR** Liberal Arts Elective	3			
Elective	Liberal Arts Elective	3			
	Sub-total	17		Sub-total	60
Year Total		34	Year Total		120

Year 4

Semester 7 — Stage5[89]

Kuwait			Newcastle		
Course #	Course title	Credit	Course #	Course title	**Value**
ARCH405	Architectural Design V	5	ARC501	Building Technology	10
ARCH221	Technical Writing	3		Special Topics (20)-Electives	20
ARCH461	Architectural Theory II	3	ARC511	Architectural Design	30
Elective	Architectural Elective	3			
Elective	Liberal Arts Elective	3			
	Sub-total	17		Sub-total	60

Semester 8 — Stage5[9,10]

Kuwait			Newcastle		
Course #	Course title	Credit	Course #	Course title	**Value**
ARCH406	Architectural Design VI-CAD	5	ARC807	Competing Concepts of Design	10
ARCH443	Building Systems	3	ARC521	Architectural Theory Seminars(10)	10
Elective	Architectural Elective	3		Special Topics- electives (20)	20
Elective	Architectural Elective	3	ARC512	Architectural Design (20)	20
Elective	Liberal Arts Elective	3			
	Sub-total	17		Sub-total	60
Year Total		34	Year Total		120

[8] For the SAPL, exchange schemes with several European universities and the National University of Singapore take place in Stage 1 of the programme.
[9] According to RIBA/ARB Stage 4 includes professional training of the undergraduates in Architectural firms.

Year 5

9th Semester Stage6[10]

Kuwait			Newcastle		
Course #	Course title	credit	Course #	Course title	Value
ARCH451	Professional Practice I	3	ARC504	Architectural Theory	5
ARCH491	Architectural Design Project I	2	ARC505	Architecture and Construction	10
AR-Elective	Architectural Elective	3		Special Topics	20
AR-Elective	Architectural Elective	3	ARC518	Architectural Design	25
Elective	Liberal Arts Elective	3			
Elective	Liberal Arts Elective	3			
	Sub-total	17		Sub-total	60

10th Semester Stage6[11]

Kuwait			Newcastle		
Course #	Course title	credit	Course #	Course title	Value
ARCH452	Professional Practice II	3	ARC504	Architectural Theory	5
ARCH492	Architectural Design Project I	4	ARC518	Architectural Design	55
AR-Elective	Architectural Elective	3			
Elective	Liberal Arts Elective	3			
Elective	Liberal Arts Elective	3			
	Sub-total	16		Sub-total	60
Year Total		33	Year Total		120

[10] APL. (2005/2006b) *Programme of Studies; Bachelor of Architecture.* Newcastle upon Tyne: APL, University of Newcastle.

Appendix 8

Table 5 Environmental Content in University of Sydney Undergraduate courses

Course title & Number	Course Description
ARCH4201: Architectural Design Studio B	Students will approach the design of a building in a holistic way, exploring the design of building types, and their context, the preparation of contract documents and the resolution of structures. Reflective teaching and learning of cultural and **environmental sustainability** will provide a context within which all projects will be framed.
ARCH4202: Design Technology 1	Students will learn to realise their design intentions initially in the studio projects of the degree and then in subsequent practice providing the basis for the development of technical and design skills required of a professional architect; develop the application of the requirements of the BCA and relevant Australia Standards; develop the primacy of detailing, skills in accurate drafting for contract documents, and the design principles of advanced construction materials in relation to structural and **environmental** concerns.
ARCH6301: Design Studio Workshop A, B, C & D	Through design projects offered by visiting national and international design practitioners and faculty staff this module will provide students with the opportunity to explore a wide range of design issues and ideas within design studio environment. Students will develop their creative responses to a design brief or situation; extend their understanding of the theoretical, historical, cultural, **environmental** or technical framework of design; apply these understandings and demonstrate good architectural judgement; and communicate these ideas and understandings effectively through different presentation means which are assessed in a jury context.
AWSS2020: Object Design	This module will develop and inter-relate students' manufacturing and artisan skills with research, analysis and design development. It aims to develop a critical awareness of the **nature of all objects** which surround us, exploring cultural, contextual and symbolic aspects of object design as well as functional and aesthetic qualities. **Sustainability** and social issues relating to their manufacture, use and disposal are also discussed. The unit aims to increase appreciation of the materiality of objects focusing on timber as an example and introduces students to the wonderful diversity of timber species, **environmental and ethical** issues associated with their selection, and also emerging alternative materials.
DAAE2002 Architecture, Place and Society	This module aims to investigate the relationship between architecture, place and society and to explore the meaning of cultural and **social sustainability** in architectural design. It assumes that designers will increasingly work in places where cultures are unfamiliar at home or in a global context, and that an ability to understand, and interpret diverse cultures, and the way design occurs in diverse locations is an important area of knowledge for designers. A key aspect of social **sustainability** is the practice of social responsibility, and it explores how this may occur including involving people in the design process.
DAAE3001: Sustainable Architectural Practice	This module begins by learning the concept of **ecologically sustainable design** as it applies to architectural practice and defines those key attributes of buildings which make them **sustainable**. It then explores the implication of applying **sustainable design principles** upon contemporary architectural practice. Potential new design paradigms are investigated which could lead to more **sustainable design practice** in the future.
DAAP3002: Architectural Technologies	This module aims to develop knowledge about structural and **environmental control systems** for medium scale non domestic buildings. The **environmental module** explores **sustainable environmental control technologies** suitable for medium scale buildings focusing upon the integration of these technologies with constructional and structural systems and the design of the building fabric as an **environmental filter**. Thermal controls such as heating systems, mechanical ventilation, natural ventilation and air conditioning are studied along with electric lighting and acoustic control systems.

DECO1006: Understanding Design & Cognition	This module aims to give the student an understanding of design as a general activity in its own right, comparative to other activities such as science and art. It emphasises the importance of design and its consequences as an activity concerned with changing the state of the **existing environment** through a set of conscious and purposeful actions. It aims to demonstrate that the study of the design process can be undertaken in a general manner independent of any discipline through the study of design methodology and design cognition.
DESA1001: Design Practice 1A & 1B	Designing components of the built environment is a method which requires skill from graduates of the BA Design in Architecture at a pre-professional level. The design process is complex because a statement of what is to be designed always contains only part of the information needed to produce a design, and also does not specify the required physical form of the object to be designed. Designing therefore involves identifying the issues relevant to each specific design and its context or setting, and undertaking appropriate design processes which interpret, apply and integrate the relevant knowledge into a single design. This knowledge broadly concerns aspects of inhabiting, designing and constructing the built environment as it relates to the human, **environmental**, cultural, social and technological contexts, which influence the form of the built environment. Students will learn the built environment at towns' scale and suburbs, focusing on the design of an individual element, such as a small building and its associated outdoor places. Learning in this unit will be extended by study of wider aspects of the knowledge in the concurrent unit DESA11001 Design Studies 1A. The unit also will involve a sequential development of learning to apply knowledge and skills in designing at an introductory level.
DESA1004: Designing with Surfaces and Light	The module deals with the basic properties of light and the way these properties effect the behaviour of light in a **three dimensional environment** and the **experience of the environment**; the basic visual process associated with dealing with change in light intensity within the **environment** and the seeing of detail; surface and surface structure, the reflection of light off a surface and effects on perceived surface properties; selective absorption of light by a surface and perceived colour space and colour. In addition to knowledge about these aspects of the experience of surfaces and light, the way in which this knowledge can be used to understand our experience of the environment is illustrated by the detailed analysis of examples of both everyday and **designed environments**. Students then demonstrate their understanding of the knowledge presented and the way that it can be used to understand their experience of the environment by finding and analysing their own **environmental** examples.
DESA1005: Mathematics and Science in Architecture	Mathematical, scientific knowledge and skills covered in this unit will provide foundations for assumed knowledge in other areas of further study such as structures, **environmental** sciences and practice. In addition it will assist in providing a broader view of the historical and theoretical context of architecture.
DESA1101: Design Studies 1A & 1B	This module introduces conceptual, precedent and procedural knowledge about inhabiting, designing and constructing the built environment focusing upon essential foundation knowledge and skills. It aims at establishing a basic comprehension of the cultural context, influences on and historical precedents of our present built environment which will allow exploration of other cultural 'histories', including architectural movements and theories, at a later stage. (2) **Environment and Sustainability**: introduces fundamentals of the operation of climatic, ecological and energy systems and their impact. Also the module provides a basic understanding of these issues in order to subsequently study **environmental** and **ecological sustainability** issues in relation to the built environment. (3) **Environment and Behaviour**: Basic knowledge about the **physical, sensory and behavioural relationship between people and the environment** is introduced. It will also provide knowledge as a necessary prelude to studying **environmental cognition** and interaction and its impact on spatial experience and construction at a later stage. (4) Structures: The module aims to introduce students to a fundamental understanding of how structures are realised including basic structural knowledge. This includes an understanding of the basic properties of common structural materials, the ability to recognise simple structural types and the behaviour of structural elements to provide a basis for assembling structural systems.

DESA2001: Design Practice 2A and 2B	The main aim of this module is to develop students' design understanding and skills. This includes encouraging them in the pursuit of excellence in all aspects of designing the built environment. To do this students apply and extend the knowledge and abilities they gained in Design Practice 1A and 1B, and Design Studies 1A and 1B. The complexity of a design situation increases in terms of the number of key issues and in the level of resolution expected of students in dealing with them. Students will continue to study the built environment at the scale of the urban form of a neighbourhood in a city focusing on the interplay between interior of a building and its context, both physical and cultural. Also they'll explore the formulation of **simple environmental**, structural and constructional strategies that enhance the **environmental and physical quality of the built environment** and the experience of those who use it, and support the intent and aims of their design. Their abilities in testing, evaluating and developing their design processes will also be developed, including both physical and digital modelling. Collaborative working within groups will continue to be emphasised as a key way to learn designing. Through engaging in and reflecting on their design processes within the iterative learning situations provided in this module, students will develop their ability to evaluate those design processes, and develop them to improve their design outcomes.
DESA2111: Design Studies 2	The aim of this module is to establish a basic comprehension of major historical developments as a basic component of architectural literacy, in particular historical precedents for design practice. (2) Environment and **Sustainability**: **Environmental** evaluation, performance and design techniques and are expanded in this module, particularly in relationship to aspects of "passive" design and the **environmental** response of the building envelope with the aim of providing detailed design knowledge especially for use in design practice. (3) Structures: This module introduces a greater variety of structural element types available for assembling structural systems and subsystems in buildings to increase the informed range of choice available to students. To this end it introduces behavioural models, for understanding and predicting the behaviour of different structural assemblies. It also explores the relationship between structural form, action and efficiency, especially through the use of physical models, to develop a better understanding of structural efficiency in design. (4) Construction: Constructional knowledge is explored through a study of the various systems used for ground, floor, wall, roof and opening construction, including their details, to provide students with constructional literacy for design practice.
DESA3001 Design Practice 3A and 3B	The aim of this unit of study, together with the following unit, Design Practice 3B, is to develop students' architectural design abilities in all areas to a pre-professional level. They will be required to demonstrate the progressive use of the understanding they have gained in all their previous core modules of study. In this module and in Design Practice 3B they will be engaged in architecture at the scale of the city. In both units of study the emphasis is on complex, medium scale design projects, resolved to an increasingly high level of competence as you move from Design Practice 3A to 3B. As projects of this type are usually the result of collaboration between teams of architects and other design professionals, including consultants, there is an increasing emphasis placed upon collaborative working with consultants, within groups. Students will also be required to interpret multiple levels of complex interacting design issues, problems and opportunities. These will include site, context and programmatic issues, organisational, formal, spatial and compositional issues, and programming interpretation. The technical design skill and knowledge they will be required to understand and demonstrate includes the following: the design of key **aspects of the internal environment of a medium scale building and impact of design decisions upon aspects of the external environments**; the construction and materiality of their designs particularly typical systems of construction for medium scale buildings and their adaptation for particular circumstances; sufficient structural understanding to develop architectural structural strategies for medium scale buildings.

Appendix 9

Table 6 Census of KU undergraduates and graduates

(1) Census of Students Registered in Department Of Architecture Year 2005/2006[11]

Faculty	Department	Year	Sex	Total
Engineering & Petroleum	Architecture	00	Female	6
Engineering & Petroleum	Architecture	00	Male	2
Engineering & Petroleum	Architecture	01	Female	13
Engineering & Petroleum	Architecture	01	Male	7
Engineering & Petroleum	Architecture	02	Female	22
Engineering & Petroleum	Architecture	02	Male	8
Engineering & Petroleum	Architecture	03	Female	15
Engineering & Petroleum	Architecture	03	Male	10
Engineering & Petroleum	Architecture	04	Female	15
Engineering & Petroleum	Architecture	04	Male	12
Engineering & Petroleum	Architecture	05	Female	9
Engineering & Petroleum	Architecture	05	Male	16
Engineering & Petroleum	Architecture	97	Female	1
Engineering & Petroleum	Architecture	98	Female	1
Engineering & Petroleum	Architecture	99	Female	1
			Total Female undergraduates	83
			Total Males undergraduates	55
			Total	138

(2) Census of Graduates of Department Of Architecture[12]

Faculty	Department	Sex	Semester	Graduates
Engineering & Petroleum	Architecture	Female	2nd 2002/2003	8
Engineering & Petroleum	Architecture	Male	1st 2002/2003	2
Engineering & Petroleum	Architecture	Male	2nd 2002/2003	3
Engineering & Petroleum	Architecture	Male	Summer 2002/2003	1
Engineering & Petroleum	Architecture	Female	2nd 2003/2004	10
Engineering & Petroleum	Architecture	Female	2nd 2004/2005	8
Engineering & Petroleum	Architecture	Female	Summer 2003/2004	6
Engineering & Petroleum	Architecture	Female	Summer 2004/2005	1
Engineering & Petroleum	Architecture	Male	1st 2003/2004	3
Engineering & Petroleum	Architecture	Male	1st 2004/2005	2
Engineering & Petroleum	Architecture	Male	2nd 2003/2004	4
Engineering & Petroleum	Architecture	Male	2nd 2004/2005	5
Engineering & Petroleum1	Architecture	Male	Summer 2003/2004	1
Engineering & Petroleum	Architecture	Male	Summer 2004/2005	2
			Total Female graduates	**33**
			Total Male graduates	**23**
			Total	**56**

[11] Source: Admission and Registration Deanship at Kuwait University, 2006.
[12] Source: Admission and Registration Deanship at Kuwait University, 2006.

Appendix 10

Kuwait University Undergraduates Questionnaire Structure

A questionnaire- for Kuwait University Architecture Undergraduates

Dear student,

This questionnaire aims at measuring the awareness of senior undergraduates of School of Architecture- Kuwait University. Your answers will be confidential & there will be no pass/ fail to it, so please relax and try to **answer all the questions listed below** as they hold a major importance to the result of this research project. *Thank you.*

Part I :

1- Name (optional) . . . . . .

2- Age range ə 18-25 ə 26-35 ə 36-45 ə Over 45

3- Gender ə Female ə Male

4- Nationality ə Kuwaiti ə Non-Kuwaiti

5- Year . . . . . .

Part II :

6- I think my environmental background is

ə very excellent ə excellent ə fair ə bad ə very bad

7- Kuwait government is very wise when it comes to laws organising utilizing energy.

ə I completely disagree ə I disagree ə I don't know ə I agree ə I couldn't agree more

8- In Kuwait, people are wise when it comes to energy consumption issues.

ə I completely disagree ə I disagree ə I don't know ə I agree ə I couldn't agree more

9- Government builds are much better than private sector buildings in terms of safety & energy utilization & buildings life duration.

AAA ə I completely disagree ə I disagree ə I don't know ə I agree ə I couldn't agree more

10- People in Kuwait contribute to environmental pollution problem through their insensible living styles, and bad energy utilization inside their dwellings.

ə I completely disagree ə I disagree ə I don't know ə I agree ə I couldn't agree more

11- Spring season activities are a very good example of people's negligence towards keeping their environment safe & clean.

ə I completely disagree ə I disagree ə I don't know ə I agree ə I couldn't agree more

12- All people use electricity generators in their tents during camping season in Kuwait.

ə I completely disagree ə I disagree ə I don't know ə I agree ə I couldn't agree more

13- No one cares for sustainability during camping season.

ə I completely disagree ə I disagree ə I don't know ə I agree ə I couldn't agree more

14- I like to park my car as close as possible to wherever I go.

ə I completely disagree ə I disagree ə I don't know ə I agree ə I couldn't agree more

15- The reason why I park my car very near to buildings is:

ə The hot climate ə Don't want to waste time. ə I don't like walking ə I think it's safer. ə Other reason, ...

16- I don't practice any kind of sports

ə I completely disagree ə I disagree ə I don't know ə I agree ə I couldn't agree more

17- When I graduate, I'll do my best to apply architectural sustainability in my designs

ə I completely disagree ə I disagree ə I don't know ə I agree ə I couldn't agree more

18- Kuwait government should revise & improve their legislations regarding energy conservation.

ə I completely disagree ə I disagree ə I don't know ə I agree ə I couldn't agree more

19- I am involved in environmental activities.

ə Yes ə No

20- If your answer is yes elaborate . . . . . .

21- I am a member of one of the environment-related societies.

ə Yes ə No

22- If your answer is yes,
write down the name of the society you're member of

a. . . . . b. . . . . c. . . . . d. . . . . e. . . . . .

23- I learnt so much about sustainable architecture during my undergraduate years

ə I completely disagree ə I disagree ə I don't know ə I agree ə I couldn't agree more

24- Complete the following statements :
' Sustainable Architecture is based on . . . . . .', whilst ' Green Architecture involves . . . .' And both aim at protecting the outer environment from future damage.

25- I think sustainable architecture is 'an international trend' that has got nothing to do with Kuwait & Kuwaiti society.

ə I completely disagree ə I disagree ə I don't know ə I agree ə I couldn't agree more

26- I think my lecturers/ tutors didn't explain the idea of sustainability real good to me, for that I am not sure what it really stands for.

ə I completely disagree ə I disagree ə I don't know ə I agree ə I couldn't agree more

27- I think, in order for people to learn more about sustainability, and green architecture, they need first to be taught how to recycle, consume water & electricity wisely , etc.

ə I completely disagree ə I disagree ə I don't know ə I agree ə I couldn't agree more

28- Beside cars, buildings use energy and they even contribute more to the environments pollution.

ə I completely disagree ə I disagree ə I don't know ə I agree ə I couldn't agree more

29- The more people use energy, the more impact there is on power plan.

ə I completely disagree ə I disagree ə I don't know ə I agree ə I couldn't agree more

30- When it comes to environmental awareness, architects play a key role in enlightening their clients about their future houses.

ə I completely disagree ə I disagree ə I don't know ə I agree ə I couldn't agree more

31- Nowadays, architects know much better about the key role they're playing towards designing sustainable buildings .

ə I completely disagree ə I disagree ə I don't know ə I agree ə I couldn't agree more

32- In the middle east, no architect really care about the effect of their designs on the outer environment.

ə I completely disagree ə I disagree ə I don't know ə I agree ə I couldn't agree more

33- In Kuwait, architects care about their designs effect on the environment.

ə I completely disagree ə I disagree ə I don't know ə I agree ə I couldn't agree more

34- Architects take good care on designing environmental friendly buildings, because :
a. The Law compels them to do so.
b. They were taught how their designs might affect the micro & macro climate, in the future.
c. Both a & b are correct.
d. Architects most of the time want to please their clients.
e. It all works by pure chance.

35- I think studying in Kuwait's School of Architecture enhanced my environmental knowledge in comparison to before I join in.

ə I completely disagree ə I disagree ə I don't know ə I agree ə I couldn't agree more

36- All buildings have direct effect on the surrounding environment in comparison to other things in nature.

ɜ I completely disagree ɜ I disagree ɜ I don't know ɜ I agree ɜ I couldn't agree more

37- The way architects design a building affects it's energy consumption levels.

ɜ I completely disagree ɜ I disagree ɜ I don't know ɜ I agree ɜ I couldn't agree more

38- Name 3 buildings in Kuwait that you really think they can be considered sustainable:

a. . . . . .

b. . . . . .

c. . . . . .

39- Building materials could contribute to environmental degradation

ɜ I completely disagree ɜ I disagree ɜ I don't know ɜ I agree ɜ I couldn't agree more

40- How do you evaluate the current situation in Kuwait in terms of public awareness of environmental issues?

ɜ Complete absence ɜ Confusion & uncertain knowledge ɜ well-informed ɜ I don't know ɜ Better than 10 years ago

41- Where I live, we buy light bulbs according to their colours & sizes

ɜ I completely disagree ɜ I disagree ɜ I don't know ɜ I agree ɜ I couldn't agree more

42- Where I live, we make sure to buy light bulbs according to their energy efficiency consumption besides other features.

ɜ I completely disagree ɜ I disagree ɜ I don't know ɜ I agree ɜ I couldn't agree more

43- Please state what you do with old furniture:

a. Chuck it out in the trash b. Give it away for charity

c. I don't know d. Recycle it

44- Please state what you do to old electrical machines.

a. Chuck it out in the trash b. Give it away for charity

c. I don't know d. Recycle it

45- Please state what you do to old computers & electronic machine

a. Chuck it out in the trash b. Give it away for charity

c. Re-sell it d. Recycle it

Thank you for your participation!

Appendix 11

Key Questions of Semi structured Interviews with Kuwait University Students and graduates

1. How do you evaluate your environmental back ground?
2. Who plays the key role in sustainable architecture, the architect or the engineer?
3. Where do you see Kuwait's place in the international community in terms of applying sustainable architecture?
4. How do you see the cars contribution to pollution in Kuwait?
5. Sustainability indicates continuous caretaking and maintenance in a repetitive manner, whilst development involves a continuous accumulation in capital, material, services, etc. Is it possible to integrate both paradoxical concepts in one through time?
6. Can we really have sustainable development?
7. How do you evaluate the current situation in Kuwait in terms of public awareness of environmental issues? Is it complete absence, confusion, uncertain knowledge? Or inaccuracy? Or are they better than 10 year ago?
8. How do you evaluate the knowledge you received during your undergraduate years?
9. What did you expect to learn through your school years before starting your programme?
10. What environmental issues –you feel- that are lacking or maybe need more emphasising on them in the current programme?
11. What was the main source of knowledge which you depended on during your school years; your text book, the lectures, or practical applications?
12. What were the environmental concepts you were taught during your school years, but you never applied in practice?
13. What's the main source of energy in Kuwait? Are there any other energy sources?
14. Where does this energy go?
15. What's the environmental impact of electricity power plans?
16. How can consumers/share holders contribute in decreasing energy consumption?
17. What's the role which the government plays in reducing energy consumption?
18. In your opinion which is better choice; to build environmental awareness among consumers or to implement tough environmental measures through governmental legislations?
19. Are you involved in any environmental activities/ a member in any society/ committee that's involved in any environmental activities?
20. Sustainable architecture means guidelines, rules, standards and codes. How can the architect implement those things in his designs?
21. How does architectural sustainability conceptualize?
22. Do ethics offer a basis for sustainable architecture action?
23. What's the major cause of energy consumption in Kuwait?
24. How does sustainable architecture come in response to human activity?
25. Building that's sensitive to its environment; protect the environment from the potential pollution and degradation caused by human habitation. Can we say that sometimes built environment is seen as a source of danger and threat?

Appendix 12
End users Questionnaire

استبانة موجهة نحو قياس الوعي البيئي لدى مواطني دولة الكويت

الشريحة المستهدفة: الأفراد التابعين لإحدى الفئات التالية (شراء منزل – تعديل منزل قديم – بناء منزل جديد)

أولاً/ معلومات عامة:

(1) هل سبق أن سمعت عن موضوع الإستدامة؟
(2) هل تعتقد أن التنمية المستدامة هي فقط من المسئوليات الحكومية؟
(3) هل تعلم فيما إن كان منزلك مصمم بطريقة تراعي موضوع الإستدامة؟
(4) ما هو العدد الكلي لغرف النوم في منزلك؟
(5) هل تنوي/ شراء منزل – تعديل منزل قديم – بناء منزل جديد
(6) هل تستخدم طرق العزل المختلفة في منزلك؟
(7) ما هو العدد الكلي لأفراد عائلتك؟
(8) ما هو العدد الكلي للمستخدمين في منزلك؟
(9) كيف تنوي تركيب أجهزة التكييف في منزلك؟
(10) ما هي أنواع لمبات الإضاءة في منزلك؟
(11) ما نوع الزجاج المستخدم في شبابيك منزلك؟
(12) ما هي أحجام الشبابيك الموجودة في منزلك؟
(13) هل لديك حوض سباحة في منزلك؟
(14) ما هو حجم الحوض؟
(15) كم عدد غرف المطبخ في منزلك؟
(16)

ثانياً/ معلومات شخصية:

Appendix 13

Selected Excerpts from the Interview with End user 1, E

(1)
Interviewer: You have four kids?
E: Yes I have four kids; one girl and three boys.
Interviewer: How did you organise your house?
E: For each of the kids I built a separate room. I also have built two flats upstairs.
Interviewer: Why did you build the two flats? They will be empty, right?
E: No. I intend to rent them out, but if I can't rent them, then I will leave them for my kids to use in the future. This way they won't suffer from paying rent. [Laughing] I will have two flats ready for them.
(2)
Interviewer: Did you intend to have a balcony in your house?
E: No I didn't-[stops, then ads] I have a very small balcony upstairs in the living room.
Interviewer: Why?
E: As you see the weather here [laughing] it requires loads of cleaning in this dusty weather [Laughing together].

Interviewer: But some people have balconies just as a decoration.
E: Yes, it's just as a decoration, that's right. I mean my windows looks big, so my husband said to me, why don't we decrease the size the height of one brick? I told him yes let's do it. Why? Because of too many sand storms and the need to clean all those windows, so we decreased their sized a little bit.
Interviewer: You know by doing so, you are decreasing your energy consumption, because when the window size is smaller, it brings less sun light and heat in.
E: Yes, that's right.

Appendix 14
Selected Excerpts from Interview with Engineer B

Interviewer: Can you please answer this questionnaire for me. [I hand Arabic written survey to a gentleman].

B: Yes sure, [looking at the survey] sustainability? I never heard of it. What is sustainability?

Interviewer: [I Say the word in English, then again in Arabic, and then mention another synonym of the word in Arabic].

B: I never came across it before! I can't remember it.

Interviewer: [Explains with details what sustainability is]

B: Oh! This is sustainability? Conserving environmental resources? No, I actually I never thought of sustainability while building my house, but maybe I will start thinking of it now.

Interviewer: Thank you very much for your time.

B: You won't believe this; I am working for the Municipality since my graduation from Kuwait University College of Engineering and Petroleum for fourteen years, but I never came across sustainability till I met you!

Interviewer: Oh! OK, thank you.

Appendix 15

The main points of the interviews with four main headings; sustainability, sustainability policy, source of the problem and ways to improve sustainability in Kuwait.

Table 7 Architect S - Head of the Department of Architecture of Public Authority for Housing Welfare - Kuwait

Main points			
Sustainability Awareness in Kuwait	Sustainability Policy	Source of the problem	Ways to improve sustainability in Kuwait
1- Low public awareness witnessed through actions of demolishing newly built public houses because they don't comply to individual's preferences/ needs/	1- PHA architects consult standards from other countries: USA, UK, Germany and France, and they choose the best ones to apply to Kuwait. Sometimes they consider them insufficient; 2- PHA has set certain environmental standards for the public housing sector including the specifications of building materials that can be used, types of water reservoirs and water pipes; 3- Sustainability standards have been upgraded to comply with international standards; 4- Kuwait adopts American building standards rather than UK standards as they're set for higher temperatures;	The provision of dwellings by the government does not properly meet people's demands and the government's requirements from the public have been largely ignored by them.	1- PHA comply to people's actual housing requirements (see Figure 3.5; 2- Media increases the public's awareness in the short run; 3- Education has an impact on students environmental awareness in schools in the long run;

Table 8 Engineer B. Electrical engineer at Kuwait Municipality

Main points			
Sustainability Awareness in Kuwait	Sustainability Policy	Source of the problem	Ways to improve sustainability in Kuwait
At a personal level admitted never noticed the term *sustainability* before the interview. After explaining the objective of sustainable development with him said that this term or sustainable actions are not practiced by his family and friends		The media does not cover sustainability issues enough for people to grasp the idea.	Both Education and Media have effect on public's sustainability awareness.

See Appendix 12 Selected Excerpts from Interview with Engineer B

Table 9 Architect Al-Salih- Chair of Kuwait Architecture League (KAL)

Main points			
Sustainability Awareness in Kuwait	Sustainability Policy	Source of the problem	Ways to improve sustainability in Kuwait
Graduates of the Department of Architecture will definitely affect architectural design in Kuwait in the future.		1- Ambiguity of Kuwaiti Urban Planning policy resulted in persistent mistakes passed from generation to generation since the mid 1950s. 2- Faulty Kuwait city urban planning led to unsustainable practices such as, using cars; 3- Research recommendations are never implemented; 4- Lack of disincentives (punishment) or role model to follow; 5- Extreme consumerism; 6- A lot of wishful thinking with no real action is taking place at a government level. 7- Architecture curriculum is rigid. It does not encourage students to participate in solving their society's problems and it does not contain any kind of research-based projects in relation to their country's needs. It is isolated from reality at a time when schools of architecture should be addressing human needs. 8- Clients favour the lowest bids, which lead to the employment of the cheapest architects.	1- University undergraduates should participate in finding solutions to society's problems in relation to their disciplines during their course years as part of a formal exercise. 2- Kuwait university should become a centre of research and knowledge. 3- Architectural design projects should encourage innovation and professional development rather than sterile project designs. 4- Staff academics should participate in society's projects; 5- The government's role in raising the level of the public's sustainable actions should play upon their sense of citizenship. 6- Architectural bodies should participate more in governmental and public actions. 7- More collaboration between architectural bodies in the Gulf area; 8- The architectural curriculum should be developed in each Arab country prior to having a set Arab curriculum; 9- Human resources in Kuwait University should be developed through recruiting highly qualified international architecture professionals.

Analysis of the interviews with experts in architectural design

The following tables (10 and 15) include summarized points extracted from results of and analysis of interviews conducted with experts from different disciplines on the topic of sustainability. Each one of them will tackle the issue of sustainability from a different angle, resulting in a range of opinions that will be investigated in the discussion and conclusion section of Chapter 3.

Table 10 Ronald Lewcock- Aga Khan Prof. of Architecture at MIT, a consultant in conservation to UNESCO, and a Technical Coordinator of many UN Campaigns for conservation of architecture in many Middle Eastern countries including Kuwait and Yemen; a Prof. of Doctoral Program in Architecture in Georgia Institute of Technology in Atlanta.

Main points			
Sustainability Awareness in Kuwait	Sustainability Policy	Source of the problem	Ways to improve sustainability in Kuwait
Optimistic towards achieving sustainable architecture in the Gulf region, in spite of the current modernization activities and high energy consumption rates in the development process taking place there, which many regard as unsustainable			1- Environmental education should start from a very young age at school, so the concepts will stick in the new generation's minds, leading them to take positive steps towards their environments when they are older. Children may also positively influence their parents in favour of environmental awareness. 2- Achieving any kind of change, whether at international level or at a state level always begins with decision makers who take the initiative and others who follow them away from wishful thinking. 3- Sustainability in any society begins with policy makers, and the population follows after (*see* Appendix 13 interview with Prof. Lewcock).

Table 11 Architect H- Owns architectural firm in private sector

Main points			
Sustainability Awareness in Kuwait	Sustainability Policy	Source of the problem	Ways to improve sustainability in Kuwait
Low public and end users' sustainability awareness		1- Public Housing Welfare Authority does not consider environmental elements (sun light, wind direction, seasonal changes and humidity) when designing public housing; 2- Kuwaiti architecture is lacking in its own culture, the students of the Department of Architecture are weak and the architecture curriculum is altogether inadequate; 3- Undergraduates get enrolled in the Dep. of Architecture on the basis of their high school results rather than their talents and aptitudes; 4- The university has a readymade curriculum that has nothing to do with any institute of higher education.	1- The necessity of having a cosmopolitan academic staff in the department to enrich the programme; 2- Supplying the architecture industry with sustainable building materials through the market; 3- Influence of architects on their clients choices, to make them more sustainable; 4- Developing the architectural curriculum to be environmentally positive;

Table 12- Dr. Amer- Head of Architecture Department, Kuwait University (2006)

Main points			
Sustainability Awareness in Kuwait	Sustainability Policy	Source of the problem	Ways to improve sustainability in Kuwait
1- The students' sustainability awareness is satisfactory as a result of the well equipped curriculum;			The curriculum will be further developed to meet the international sustainability requirement through introducing three new courses to it.

Table 13 Architect Al-Rashid- Architect in consulting firm specializing in the design and construction of private houses

Main points			
Sustainability Awareness in Kuwait	Sustainability Policy	Source of the problem	Ways to approve sustainability in Kuwait
Low: the average house area in Kuwait reaches 350m^2, which is very large in comparison with1968 Parker Morris Minimum Floor Areas Chart, that specifies 120m^2 as very comfortable for seven to eight persons to live in.		1- Waste has become a characteristic of Kuwaiti Society, echoed in the exaggerated nature of their building designs, aimed at ostentation or emulation or competition in having unique luxurious houses	Kuwait's total area is 17,820km^2, of which the percentage urbanised is very small: the government and the end users should start thinking about creating more sustainable living spaces, such as flats, rather than houses; that is, the country needs to move from horizontal housing to vertical housing.

Source: Al-Qabas newspaper (Fathy 2006).

Table 14 Dr.Saleh Al-Mezaini - head of the board of trustees of the Arab-European Conference on Environment

Main points			
Sustainability Awareness in Kuwait	Sustainability Policy	Source of the problem	Ways to approve sustainability in Kuwait
	Environmental laws and legislation were enacted in Kuwait many years ago, but sadly they were not enforced, neither have they been reviewed since they were introduced. that Governmental committees have neglected these laws to the extent that they have become ambiguous, and need much explanation and renovation	1- Poor implementation of environmental legislation 2- Many challenges facing the environment currently have arisen as a result of institutions implementing development programmes without adhering to environmental laws and legislation	Any development programmes should factor into consideration all the environmental issues that are affected by and that affect these programmes

(Farahat, 2007)

Table 15 Interview with Dr. Hasan Eidi NLP consultant therapist, lecturer and writer, Ph.D Psychological therapy

Main points			
Sustainability Awareness in Kuwait	Sustainability Policy	Source of the problem	Ways to improve sustainability in Kuwait
Is not meeting satisfactory levels as people ignore environmental laws.	Environmental policies exist but are partially implemented	A psychological source where people know the laws, they know the effect of their behaviour on the environment and the resulting damage, and yet still they turn a blind eye on it.	1- The need to educate children about the environment from an early age; or in the case where we receive information as adults, NLP[13] might be a better alternative for communication, whereby people can learn indirectly without having to attend seminars or public lectures. 2- Both the media and education are important in building such awareness, but perhaps education is more important since it embraces the media in its essence. 3- For adults who would rather not attend seminars, short summarised informative messages should be conveyed to them indirectly through colourful stickers placed where their eyes might catch them in public places, using the NLP technique. 4. The curriculum development process must first involve scientists and researchers from different countries undertaking objective studies aimed at changing people. These specialists should work independently from any administrative supervision. Secondly, a curriculum must be developed that will begin in childhood, but it should not become an obstacle to the child's happiness. It should help him/her to become creative and productive. This curriculum should not focus only on providing knowledge, but it should also be fun to learn, with practical activities, workshops and field visits that will make concepts more enjoyable to learn.

[13] NLP: Neurolinguistic Programming

Appendix 16

Selected Excerpts from Interview with Professor Ronald Lewcock

Original interview duration: 4.5 hours.

Interviewer:... I don't know if you're familiar with the Arabian Gulf countries?
R: Yes.
Interviewer: If the curriculum is good and the student is bad, is it not going to help them?
R: Oh, yes it's going to help them, certainly when you have good students they would survive a bad curriculum.
Interviewer: Oh, I see. OK, you know in the Arabian Gulf area there's not so much thinking about sustainability.
R: No! Not at all...
Interviewer: Is it possible to build a curriculum that just focuses on sustainable architecture for the Middle Eastern countries, because, you know, because of temperature differences, the climate..
R: I actually think not only possible, it should be done! The problem with that is, only a few clients are willing to spend extra money to make their building sustainable. Most people feel that they would like to keep the cost of the building down and the result is they can't spend the money on making [a building] sustainable because if you want to keep the cost down, you can't spend the money you need to make the building last better, need less maintenance, react better towards the climate.
Interviewer: Sustainability costs extra money?
R: Yes! Sustainability costs extra money. All right! It's very good equation, because if you look at the building over 20 years, you'll find that a sustainable building is cheaper, but that's not the way accountants put up the money to begin with, [they] think of the first 3 years.
Interviewer: But can't we use current building materials to make a sustainable building?
R: We can, but because you're putting the effort towards cutting down the costs of running the building, therefore you have to spend in the first years, so that they - but I still think there's no reason for not teaching it..I think they should teach it in school.
Interviewer: Regardless of ...
R: Regardless of ... they will always have.... sometimes they will use it sometimes they won't, but the students should know how to do it.
Interviewer: Do you think that the public are aware of sustainable architecture?
R: The public are more....when the public become more aware of it, the public will be more willing to pay for it- and the more architects know about it, the more likely the public will know about it.
Interviewer: You've been to Bahrain, do you think they're aware about sustainability? Did you notice this in their building design?
R: I think they were more aware 30 years ago than they are aware now!
Interviewer: Because of what? Because they used to use vernacular architecture?
R: Because there wasn't so much 'glass'! And because the international architecture is an influence away from sustainability, it's an influence towards, ah, glossy appearance, which you make liveable by using air conditioning instead of.....--- they come for the glossy appearance first.
Interviewer: Maybe ..perhaps energy cost is very cheap?
R: Very cheap, that's right! That's why, exactly.
Interviewer: So, how do we go about it? How do I raise up the publics' awareness and the students' awareness towards- I mean for example, undergraduates, I should teach them how to decrease energy consumption, how do I go about that?
R: Yeah, how to- for two reasons, the first reason is the one I have just given. If you go for the life of a building over 20-25 years, it is always cheaper to be sustainable, so that no matter how rich they may be now, or how cheap the energy may be, it will actually make sense to design them more sustainably, because running the buildings will be cheaper and they will last longer.
Interviewer: How do I convince them about that? If they say they don't care!
R: Well, then you'll have to- well if they don't care then it will be harder, but if the architect shows them that it's a cheaper cost, the first costs are there, but the running costs over the next twenty years are less, that's how you demonstrate it.
Interviewer: And this is the job of the architect?
R: This is the job of the architect.

Interviewer: So, how do I enlighten the architect now?
R: Well, then we have to teach it, we should teach it.-
Interviewer: Is it included in the curriculum here in the UK?
R: I... to some extent ....I think it's becoming more and more...-
Interviewer: Is this because of RIBA instruction?-
R: And because many architects are aware of sustainability, certainly they know it's one of the new 'catch phrases' in architecture - sustainability, it's the fashion.
Interviewer: I begin with the undergraduates and then I end up with the end users?
R: That's right! But I also like the idea that it is taught to students in high schools of all kinds in general studies classes because I think that that's about it, the general public should know about it-
Interviewer: Well, for Kuwait and Gulf Area countries, they enjoy the same curriculum as Saudi Arabia. They all concentrate on environmental conservation rather than sustainability.
R: Yes, I agree with you, that needs to be included. One of the things you could argue for in your thesis, is that- and you might be able to find examples in ....
Interviewer: In undergraduate school years?
R: In high school years, but if you can't find it in high school years.... general public awareness of general use of sustainability
Interviewer: So, if I educate younger generations ...
R: Then I think everybody in the public will start to use more sustainable architecture.
Interviewer: OK, there's another thing here, you know...the building materials...We import them from outside....they don't fit with our climate-
R: Of course!
Interviewer: So, how will - I mean can I build another kind of architecture?
R: Yes you can! But your point is a good one because sustainable design includes looking at the best building material from any source they [--] and available. It's [about getting] the best material not just the most fashionable material.
Interviewer: No! Even for example cement...it radiates so much and it really disturbs the environment? I need to manufacture another kind of cement that goes with the Arabian Gulf countries temperatures?
R: Yes! People already studied this and it's already available in the literature...
Interviewer: Even early...even granite-
R: Yes! There are already studies have been done about that! Yes there are a lot of studies about that... building material for the hot climates.
Interviewer: You need to develop a sustainable architecture for the Middle East?
R: Yes! And you need to look at all the published literature.. There's a lot of it now! Uh....so...you must start with the most recent published literature in architecture. I mean I presume you have gone through the word sustainability in order to find there are many... Amazon lists of book on sustainable... And that way you [learn] what's the latest state of learning [about] sustainable knowledge. you'll find a lot of research on it.
Interviewer: Yeah!
R: Some of them will be...
Interviewer: Yeah! OK, supposedly we found the right building material, so I need to involve two parties in that; the government as a legislator, because in Kuwait...say....energy efficient laws, legislations and building codes....they are all out of date, they were set in the 1980s.
R: Yeah. That's a big problem always in architecture, for the legislations do not change to keep pace with the knowledge.
Interviewer: So, we need to 'renew' the building codes?
R: Yes, you do probably, but one of the best ways for architecture to improve the situation is to 'educate the public'.
Interviewer: Yeah, but we need also in Kuwait and Gulf countries, they import their text books from America and Europe and they teach them in Schools, we need to build a-
R: Library.
Interviewer: For the Gulf area especially-
R: For all sustainable [issues], that's the least thing we could do.
Interviewer: What about .... You know, in America...you know they have NAAB as a validating body,...,,in Australia you have....AACA and RIBA in here to validate-but in the Arabian Gulf countries they have nothing, do we need to initiate a body...a validating body?
R: I think it's a very good idea-
Interviewer: And then they will set the curriculum especially for these countries and also they put in legislation and codes.

R: All right-
Interviewer: And also they put in legislation and codes, also validate certificates that all the Universities-
R: A very good idea. There is an architect engineer who I met in Dubai, he comes I think from Bahrain, or he may come from Saudi, who seems to be very knowledgeable about the syllabus. I will try and get you his name, and I think if you make contact with him - but I think it's a very good idea what you said. You have my e-mail, so write me to remind me to get you the name of this man who I met in Dubai. I'll see if I could find it. [He's not comfortable in his seat]
Interviewer: Tell me, do you think Islamic Architecture is disappearing now? Or does it still exist?
R: It's disappearing, but of course some cultures are very strong, so it's not disappearing as fast in some places as others. For instance, in a country with a big population like Yemen, where a lot of the population are in the countryside...
Interviewer: May be it's because there's not enough capital to build-
R: And there's not enough money, you get a lot of new buildings, but you also get a lot of traditional buildings, and buildings that are definitely Arabic are not far [removed from these?].
Interviewer: So, Yemen and Oman will be exceptions to the case -
R: And Oman,
Interviewer: And maybe Cairo, the old city?
R: Some parts of Cairo, yes, although I don't think that there are many buildings in the old style, I think there are new buildings; ...yes Cairo,. [He's searching in his bag for something to show me, but again he didn't find it, the address of the Saudi Architect]. So I do have to look it up! Somewhere I have it. He was doing something I thought it was quite interesting! He's doing something about the use of modern building technology in relation to the area.
Interviewer: In Saudi Arabia they have like - two sky scrapers, don't they?
R: Yes they do, and in Dubai too.
Interviewer: But this doesn't mean, I mean they have so much money that they have been building these buildings regardless of their effect on the environment?
R: That's correct. That's right.
Interviewer: They just think that they could consume energy -
R: As much as they like, very bad. OK, go on and ask your questions!
Interviewer: OK.
R: I think we could go and sit there, right?
Interviewer: OK!
R: Oh, no it's sunny, so lets stay, and it's too hot, let's stay here!
Interviewer: All right!
R: Yeah, it's very sunny, let's not go there!
Interviewer: The London climate is going hotter!
R: Yes it is.
Interviewer: Strange! I have this long question-
R: That's all right!
Interviewer: In a region where the net cost of energy production and consumption is very low, people become less environmentally concerned. How do we solve this dilemma? What are the best ways to build up our undergraduates' environmental awareness in order to create sustainable building design? How can we develop the curriculum so that the architects become better equipped with architecture design skills as well as environmental awareness?
R: Yes I think the answer is that people tend to be short sighted and one of the things that you can explain to the students whether either in Architecture school or in high school is that they would be intelligent not to be short sighted.....and if they use long sight, they will see that sustainable design will save more money over the long run and therefore they'll have more money to spend on something else. Secondly, if they are, uh, wise they will think about the future, and while it's true that there's plenty of money right now as energy is cheap, that might not be the situation in ten years' time, so if you build badly now, you may find it hard to put in air conditioning in ten years.
Interviewer: Yeah, I cannot operate this building in ten years if there's no energy.
R: That's right, no cheap energy, so those are the two arguments you can use.
Interviewer: You know, I mean, do we have any other kind of architecture, other than vernacular architecture, that can be sustainable?
R: Oh yes we have....we have, lots.
Interviewer: There are -

R: Oh, yes...There are lots of experiments around the world in new architecture, other than sustainable, they don't look like sustainable architecture at all [!--]
Interviewer: But it seems that the Middle Eastern countries are isolated from the entire world?
R: No no, they were not. They used to be quiet good in financing experiments with new ideas, and considering new ideas, but that's changed. There was about fifteen years ago, there has been some quite interesting thinking down in Saudi Arabia about alternative ways of climate
Interviewer: But they didn't apply it in reality.
R: They didn't apply it, that's right, that's right
Interviewer: It was all experimenting
R: It was all experimental, but never the less, uh, there is a traditional business in doing it in the Middle East, except that in the last fifteen years it has-
Interviewer: But how do you see the future there in terms of...
R: I think the future will, and this is how I think it will, what will happen, within a short period of time people will realise that energy is too expensive, and that those cheap forms of energy are no longer will be around, and that the energy is going to be expensive, and then they will start saying we must build in a different way, we must design our environment in a different way-
Interviewer: But now there is a trend to go to high rise building. In Kuwait they decided the 100 storey building is OK with them from this year.
R: But it's only a short lived thing. I believe it won't last long. It's a fashion. And wisdom will prevail, and wisdom will prevail because of a higher energy cost.
Interviewer: You've been in Kuwait in which year?
R: Oh, I haven't been for a long time. It's certainly a long time. I think I've last been to Kuwait ten years ago, the last time.
Interviewer: Oh, OK...ten years, so you ....but before that you've been as well, right?
R: Oh, yes, I was there a lot in the 1970s.
Interviewer: In Kuwait, it seems that there's a relationship between having the money and building, and being unconcerned about the e....
R: There's a relation.
A; Say, in the old days, no, human beings, one hundred, no 200 years ago they were more sustainable than nowadays?
R: That's right.-
Interviewer: Because poverty forced them to be more sustainable-
R: I think that's right. And it will happen again, as I say I believe it's quiet coming fast within five years people will do be very concerned about the cost-
Interviewer: Here?
R: In the Middle East too, it's coming very fast. I think the days of cheap energy have gone. You see the oil supplies are drying up. The only two countries that have much oil, uh, that will last beyond the next 5-6 years are Iraq and Saudi Arabia, all the others... the oil is drying up.
Interviewer: Yes, that's the theory, so the government will - I think it's not the energy....it's the water is one that most -
R: And the water is the other problem, absolutely both of these things are very serious concerns.
Interviewer: So, the government might suppress their people, I mean they force their people to be more sustainable in the future?
R: More sustainable, absolutely, and its not any government that will force it, it's the people being more sensible, they will realise they have to. So I think now is the time to start teaching it.
Interviewer: With education, people's awareness will build up more?
R: Absolutely, and then they'll be able to use it because they've been taught it.
Interviewer: And then we'll need also materials developed for that-
R: But I think a lot of that development has taken place. What we need to do, you need to do, others need to do is identify it. Much better pieced are already known. What can be done can be used immediately. It just needs a careful...working through very much to find out what's been discovered about cheaper ways of doing things and...
Interviewer: Yeah, you're right OK. Everywhere, I mean I've read a thesis from Northern Ireland University; the architects there, they said that building... environmentally wise building or sustainable building, it doesn't have to do with the architects' skills or the consumers skills, uh knowledge. It's more to do with two things: that architects are restricted to certain budgets, and a certain amount of time in which to finish their project.

R: That's why the general public have to be taught. That's exactly why it's at least as important to educate the high school children as it is to educate the architects.
Interviewer: So, it will go in their inner conscious and they will...
R: So that everybody in the community has been educated on sustainability and understands it
Interviewer: But here, people are more sustainable than others...
R: Yes-
Interviewer: I mean as regards recycling for example-
R: Yes yes.
Interviewer: And-
R: That's why you need to do it consciously in schools in the Gulf-
Interviewer: We educate the youngsters and then-
R: Oh yes, and then it will spread quickly through the community when it comes to the youngsters. It's the access through which to educate the parents.
Interviewer: Yeah
R: If they convince the child, they'll educate their parents.
Interviewer: The children will educate their parents? They can do that? They influence them?
R: They'll realise. If they think they are important, they'll influence them
Interviewer: I think the parents will control the children, not the other way round!
R: Sometimes it happens the other way round.
Interviewer: Really?
R: Yeah!
Interviewer: I don't know about that!
R: Maybe not so much in Kuwait, but I think it happens there.
Interviewer: Maybe it's international, but I don't know about it-
R: In Kuwait, yes. I think it happens, it'll start happening-
Interviewer: Maybe you're right about this, because my father was an illiterate man, and then when my elder brother got into school he started bringing news papers into the house, and my father started reading letters, so...
R: Very good, very good from his son...Yes, I think so, but go on!
Interviewer: Yeah, I'm digesting the idea that children influence the education of the elder ones.
R: When I bought my house in Cambridge the shower was in the kitchen, and the bath.
Interviewer: But why do they do that? It's like.....more warm for example?
R: And I think they were not worried about.....it made it a lot cheaper to put all the plumbing in one room-
Interviewer: Oh.
R: And they weren't worried about it . It didn't bother them the way it bothers us.
Interviewer: In the past people were more, you know, sustainable that.... I mean this plumbing stuff is...
R: Very yes it's very concentrated in one place.
Interviewer: Yes, it reduces their consumption levels-
R: That's right.
Interviewer: But they used not to live in the same house, were they?
R: Um-
Interviewer: How many generations lived in the same house?
R: Well, when I, when I moved into our house in Cambridge, people in the street they were often three generations in the same house, quite often.
Interviewer: OK, and now they became just-
R: They're only one.
Interviewer: And sometimes what? Single mothers alone, and...
R: And few children, but there used to be always grandparents.....always grandparents.
Interviewer: Now I think they're coming back, to the same old system-
R: Yes, they're returning a little bit. I'm glad to hear it. Too many old age homes. I don't like old age homes. People must look out for their families -
Interviewer: I don't know why, even in Kuwait (**]حكي ضاي**[you know what happened, you know in the 1960s they made a residential home for elder people. This is aimed at someone who doesn't have children.[...]
R: [...]
Interviewer: Maybe this has to do with the awareness of the needs of elderly people?

R: It does, that's right. Very good. They do that of course in England. It's the use of *intelligence in the community*. Yes I think it's very clever, let go for another question!
Interviewer: OK, uh. I had so many questions about education, but I don't know, maybe... . What do you think of the current architectural educational systems in the Middle Eastern countries in terms of employing sustainability? Is it possible for those countries to develop other forms of sustainable architecture - other than vernacular architecture?
R: Yes, the answer is that I don't know enough about the first part, but the answer to the second part is yes it's definitely is possible. You can't do too much on sustainability regarding incomes, the other question-
Interviewer: You've been to-to Kuwait?
R: Yes! Obviously-
Interviewer: How did you find it the first time you visited Kuwait?
R: Um, well the first time I was lucky, it was still, it was still not too radically spoilt. That was in the early 70s. It was quiet well preserved somehow as a traditional environment, with a little bit of modification. They'd built few modern buildings at the sea front.
Interviewer: Do you....do you like - you agree with maintaining cultural buildings?
R: I do on the whole, yes. In that I think it is a service to prosperity, to let them see what the old way was like, what the old building was like, and also because there are always in the community some people like that , they prefer them anyway, they prefer to live like that.-
Interviewer: In the old way-
R: Even in the most modern communities. Yes we find it for instance in Cairo, that the young people, they who want to go and live in the older city.
Interviewer: Really?
R: Yes! Because-
Interviewer: Even though there's no infrastructure?
R: No, and even if the buildings are overrun and in bad condition, they like the idea of living there because they're much a more homogeneous group of people.
Interviewer: But then the mud houses would not stand the hot climate.
R: No, the mud house is pretty good in the hot climate because they have a high insulation factor in the walls and in the roof. Yes they have a problem to maintain it, but they're quite good enough-
Interviewer: Because my supervisor, uh, his student was making, um experimenting on the wall insulation and stuff - and found that the mud is less sustainable than the other kinds. Adobe is less sustainable than -
R: Than what?-
Interviewer: Than than .. um .. he did it on certain materials like cement and adobe clay, and- so the adobe is the cultural one, but he found out it's poorly insulated.
R: Oh, yeah something is wrong with the test, because it depends really - you have to be careful what you're experimenting about. You're talking about a properly constructed building-
Interviewer: I mean I read in A.... papers and books that – what - mud houses they're cool during the day and warm during the night -
R: That's right.-
Interviewer: But what he said contradicted what I've read -
R: Well, I would be very careful with scientific testing because there's two things; you have to use a lot of samples, and you have to be carefull that the sample is a good sample and not a bad sample, so I don't know how, on what bases these tests were done, but everybody, if you ask the old people in most of the Gulf Countries, they will say the old architecture was cheaper and much cooler than the new architecture.
Interviewer: But you know it takes too much land because you have the courtyard in the middle-
R: Yes, yes that's right-
Interviewer: So you might need-
R: That's why you need to look for new forms of sustainability, but I still think that one should be careful about the assumption that a couple pieces of scientific equipment today can give you an accurate test of these buildings. Because I think the problem is that the sample is not big enough.
Interviewer: Do you agree with the- sorry- sorry.
R: That's why I think, that one, I would go more about the old, what they said, I believe the old architecture was cooler and I think they must have a good reason for saying so, and they were not talking about one or two buildings. They were talking about hundreds.
Interviewer: Yeah, and in the old days they used to know how to orientate the house-

R: And so they will not get the sun in the windows and the doors, yes -
Interviewer: But now I found that so many in Kuwait, that they're facing the sun -
R: Right.
Interviewer: With big windows, I – one university academic said that the existence of glass doesn't add to the temperature really, but I disagree with this!
R: I disagree with that. I also, we have a very good example in the issue in, ah, in Yemen the Jewish people, uh, started to build in earth and not in brick and stone The assumption was that they were building in earth because they were not allowed to build in brick and stone, but we have not found evidence that they were not allowed to. It looks like the Jews had discovered that the earth was, was better-
Interviewer: Cooler?
R: Was cooler. And what happened when the Jews left Yemen as they did in their big migration in 1940s and 50s, the Arabs all jumped in to buy their houses, because they were cooler.
Interviewer: Oh!
R: So, that's just...-
Interviewer: That's the very common sense, that they know that the earth is cooler
R: Suggests that the earth is cooler than brick or stone
Interviewer: But Yemen has got skyscrapers, right?
R: Skyscrapers, yeah. And the other thing about the Jews' houses is that they weren't so high, they were lower. And they had courtyards, so they had been in every way more comfortable, more homogeneous.
Interviewer: Like how many storeys they were?
R: Three - four storeys-
Interviewer: Maximum?
R: Two to three stories maximum.
Interviewer: Maybe, even three storeys will bring more shade into the house?
R: Right. You should have a look and see my book on Sana. You seen my book on Sana? You'll see the two types of buildings; the Jewish ones and the Arab ones.
Interviewer: I didn't know they had two types - but what...they had smaller windows?
R: Yeah, very small, but the main thing is I think is the material thing is more important than anything: the earth and mud seems to be cooler.
Interviewer: Wait! Yemen is closer to the equator?
R: Yemen is closer to the equator. It's interesting too, when you get down to the coast, they deliberately don't build in stone and brick, they build in mud in the coast.
Interviewer: Sir, it's like humans get wise through time -
R: Yeah they are -
Interviewer: They don't learn through education, just they note-
R: Well, they, they ....it's a kind of education because it is practical education...they get it from their parents, and from wise people in the community. They say to them don't do this, do that, that's another point in education-
Interviewer: They build up experience through time -
R: Experience -
Interviewer: I see, but not now, in Yemen they're shifting to new modern architecture?
R: Yes, a lot, uh that's true they are. Except in the smaller towns where people are still happy to be traditional.
Interviewer: The thing is with the Gulf area, there's much capital so-
R: You get pressured to be modern -
Interviewer: I mean you've been to Dubai?
R: Oh yes, a lot..
Interviewer: What do you think of the heights?
R: Well, strange. It's nothing to do with the older Dubai at all. It's very international; globalization-
Interviewer: But, do you think people - I mean these high rise buildings, anybody will...I mean there will be empty flats.
R: Well, if they are hotels, they probably can keep them, because if they can raise the rents, raise the room rates, as they build they raise the profit saving , but when, I think that they are not for visitors from overseas with plenty of money, but they are full of apartments...
Interviewer: They won't find tenants?
R: They won't find tenants...in ten years time they won't have tenants.

Interviewer: I mean now they're talking about the...the effect of raising the rents of these apartments, everybody is shifting from Dubai to Sharja.
R: Yeah, it's too expensive. So there you are, that's what I'm predicting to happen right through the Gulf.
Interviewer: The best procedure to shift to hotels.
R: Yeah. Well the best procedure is to build a new house that is sustainable or new apartment building that is sustainable.
Interviewer: Like, do you think there might be other alternatives to this kind of energy we're using now?
R: Yes! A lot of people are looking into the possibility that there are cheaper ways of cooling a building that involves some electricity, but electricity may come from solar panels, and not from gasoline.
Interviewers: What about here in the UK? They're shifting into windmills-
R: And windmills, yes.-
Interviewer: You think it's practical?
R: Uh, It's practical in areas which have a lot of wind, but there seems to be a limit to the percentage of the national fuel that you can get from wind. In other words, if you can take another country like Denmark. It's fairly densely populated, so you get a lot of people needing energy. They think that the amount of wind in the Denmark is only enough to generate, the maximum is, to generate one third of their energy needs. Two thirds will have to come from some other source, because there's not enough wind.
Interviewer: They're noisy as well. These things also make a lot of noise?
R: No, not too bad.
Interviewer: What about the, there's something to do with the solar, solar light going through the fins of the...-.
R: You're thinking of the wheels flashing?
Interviewer: Yeah!
R: Yah, it's bad for you, is it? I didn't know about that. I didn't know about that.
Interviewer: But there are two objections over this, and they saw, I mean there's a theory about how it's possible to place a small wind mill above each house in the UK.
R: Yes, I haven't seen that-
Interviewer: That costs around £1500.
R: Very good, but I think I'm right to say they will not be able to make enough energy for the house. It would help to capture it though. But they wouldn't give you all the energy you need.
Interviewer: They say, it will be able to make so much energy that you will be even able to sell it to the government.
R: Oh, really?
Interviewer: Yeah! Because it's a windy country!
R: Yeah, that's a very interesting theory. Where I live in Cambridge, it is not windy enough I think.

Appendix 17

A table of the Rational for Sustainability Society Index

Indicator	Rationale
1 Healthy Life	Condition for development of each individual in a healthy way
2- Sufficient Food	Condition for the development of an individual
3- Sufficient to Drink	Condition for the development of an individual
4- Safe Sanitation	Condition for the prevention and spreading of diseases that would severely hamper a person's development
5- Education Opportunities	Condition for a full and balanced development of children
6- Gender Equality	Condition for a full and balanced development of individuals and society at large
7- Air Quality	Condition for human and ecological health
8- Surface Water Quality	Condition for human and ecological health
9- Land Quality	Condition for production of crops, livestock and timber
10- Good Governance	Condition for development of all people in freedom within the framework of (international) rules and laws
11- Unemployment	Access to the labor market is condition for well-being for all people
12- Population Growth	Limitation of population pressure on earth is a condition for sustainability
13- Income Distribution	Fair distribution of prosperity is a condition for sustainability
14- Public Debt	Measure of a country's ability to make independent decision with respect to budget allocation
15- Waste Recycling	Measure of sustainable use of raw materials in order to prevent depletion of resources
16- Use of Renewable Water Resources	Measure of sustainable use of water resources in order to prevent depletion of resources
17- Consumption of Renewable Energy	Measure of sustainable use of energy resources in order to prevent depletion of resources
18- Forest Area	Preservation of forest area is a condition for sustainability
19- Preservation of Biodiversity	Condition for perpetuating the function of nature, in all its aspects
20- Emission of Greenhouse Gases	Measure of main contribution to climate change, causing unsustainable effects
21- Ecological Footprint	Measure of people's (un)sustainable usage of the earth's resources
22- International Cooperation	Measure of a country's willingness to take up its responsibility for the world at large with respect to sustainability

Source Van de Kerk and Manuel (2008): 231

Appendix 18

The responsibilities of the EPA

These are to:

1- Prepare and apply public policy for the protection of the environment and prepare strategies and action plans to achieve sustainable development.

2- Prepare and supervise the execution of the complete action plan relating to the protection of the environment.

3- Control activities, procedures and practices concerned with the protection of the environment.

4- Identify pollutants and specify environmental criteria and standards and prepare regulation and systems for the protection of the environment

5- Prepare and participate in directing and supporting environmental research and studies.

6- Identify the problems resulting from environmental pollution and deterioration with the assistance of state agencies.

7- Study and review the ratification or accession of regional or international conventions related to environmental protection.

8- Prepare an integral action plan for training citizens on means and ways of environmental protection.

9- Study environmental reports submitted to it relating to the environmental conditions of the country.