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**Sustainability within Interior Design curriculum in UAE &  
Impact on design mindset**

الاستدامة في المناهج التصميم الداخلي في دولة الإمارات العربية المتحدة و التأثير على  
عقلية التصميم

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**A DISSERTATION**  
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## **Abstract**

Because of the alarming situation of the current global environmental problems, Arab nations need to take immediate and comprehensive action in saving the environment. One of these actions is offering environmental education as one of the solutions. The United Arab Emirates is facing a serious situation, as the World Wide Fund for Nature organization WWF published the Living Planet Report in 2008, which declared that the UAE had a highest per capita Ecological Footprint. Consequently, the UAE government is playing a vital role towards sustainability nowadays.

Sustainability is the key-solution to the problems our environment is experiencing today, which are slowly and lethally damaging our planet Earth. Interior designers should be able to know the causes of the earth's problems and determine how to resolve, avoid, heal, and otherwise restore the damages done. Education is one of the problems, which affect the design practices in sustainability. Hence, it is necessary to amend the design curriculum to be able to help interior designers to have the high sense of responsibility toward caring for our environment by integrating sustainability principles in the curriculum of interior design program.

This study aims to explore the current status of sustainability within same major in all universities in UAE, while proving and evaluating the impact of early incorporation of sustainability in interior design curriculum and its impact on the design mindset, and to investigate the difficulties and limitations which prevents the incorporation of sustainability into the interior design curriculum.

In order to achieve this goal, all accredited universities in the UAE have been selected and analyzed, however only three of them have been chosen to study the impact of incorporating sustainability into their curriculum. Two surveys were conducted with students and instructors in four universities that have different levels of sustainability integration in their curriculum. An interview with instructors who are involved in teaching sustainability has been conducted. Lastly a field experiment has been issued with 38 interior design

students in order to examine how early incorporation of sustainability to the design curriculum will affect the mindset.

The study showed that after incorporating sustainability in each design class in design III as a field experiment, 38 projects applied sustainability principles on their projects within only 8 weeks. Only 30% of UAE universities are offering obligatory Sustainable courses; therefore the rest 70% of are offering only elective Sustainable courses, which means 70% of our students might take it or might not. 50 % of the universities are offering specialized course, which means it is related to the design practices, and only 20 % integrated sustainability within the requirements of design studio. Moreover the ratio of the core credit hours and elective credit hours showed that the range of the elective credit hours in these universities is between (20-33%).

In conclusion, the instructors and students who participated in this study emphasized the importance of integrating sustainability with other parts of the curriculum besides highlighting the lack of knowledgeable instructors to teach the needed courses as they are playing a critical role. 89% of the students agreed to see more courses offered related to sustainability while 97% from our students believe that integrating sustainability in each design class is helpful. Moreover, the educators underlined the significant role of the higher education in leading the developing plan of building new generation of sustainable interior designers to contribute in saving the earth.

Finally, in order to minimize the ecological foot print of the UAE, this study recommend for the UAE government to integrate sustainability into interior design curriculum via incorporating sustainability within each design class. Sustainability should be mentioned in the submission requirements throughout design I, II, III, IV and V so graduation projects can potentially harvest what has been seeded through all of the design courses. Moreover, we should minimize the credit hours of the universities' requirements and increase the core or the major credit hours in order to focus more in the market needs, as the completion out there is really high.

## Arabic abstract

تحتاج الدول العربية إلى اتخاذ إجراءات فورية وشاملة في إنقاذ البيئة بسبب الوضع الذي يندر بالخطر من المشاكل البيئية العالمية الحالية. واحدة من هذه الإجراءات هو توفير التعليم البيئي باعتباره واحدا من هذه الحلول. تواجه دولة الإمارات العربية المتحدة وضعا خطيراً حيث ان الصندوق العالمي اشار ان منظمة الطبيعة نشرت تقرير عن الكوكب الحي لعام 2008 والذي أعلن أن دولة الإمارات لديها أعلى معدل نصيب الفرد من البصمة البيئية. وبالتالي، فإن حكومة الإمارات تلعب دوراً حيوياً نحو تحقيق الاستدامة في أيامنا هذه.

الاستدامة هي مفتاح الحل لمشاكل بيئتنا التي نشهدها اليوم، والتي ببطء تدمر كوكبنا. مصمم الديكور الداخلي ينبغي أن يكون قادراً على معرفة أسباب مشاكل البيئة وتحديد كيفية حلها، وتجنب حدوثها وخلافاً عن ذلك اصلاح الأضرار التي تمت بها. التعليم هي واحدة من المشاكل التي تؤثر على ممارسات التصميم الداخلي في الاستدامة. وبالتالي، فمن الضروري تعديل تصميم المناهج الدراسية لتكون قادرة على مساعدة مصممي الديكور الداخلي لتنمية مسؤولياتهم تجاه رعاية بيئتنا من خلال دمج مبادئ الاستدامة في المناهج الدراسية في برنامج التصميم الداخلي.

تهدف هذه الدراسة إلى استكشاف الوضع الحالي للاستدامة في تخصص التصميم الداخلي في جميع الجامعات المعتمدة في دولة الإمارات العربية المتحدة، في حين تثبت وتقييم أثر التأسيس المبكر للاستدامة في المناهج التصميم الداخلي وتأثيرها على عقلية المصمم، والتحقيق في الصعوبات والقيود التي تمنع إدراج الاستدامة في المناهج التصميم الداخلي. من أجل تحقيق هذا الهدف قد تم اختيار جميع الجامعات المعتمدة في دولة الإمارات العربية المتحدة وتحليلها، وتم اختيار ثلاثة منهم لدراسة تأثير دمج الاستدامة في مناهجها الدراسية. وأجريا عمل استبيانين مع الطلاب والمعلمين في أربع جامعات لديها مستويات مختلفة من دمج الاستدامة في مناهجها الدراسية. وقد أجريت مقابلات هاتفية مع الأساتذة الذين يشاركون في تدريس الاستدامة. وأخيراً تمت تجربة ميدانية مع 38 طالباً بقسم التصميم الداخلي بجامعة عجمان للعلوم والتكنولوجيا من أجل تقييم أثر دراسة الاستدامة المبكر في منهج التصميم الداخلي وأثره على عقلية الطلبة والطالبات.

وأظهرت الدراسة انه بعد دمج الاستدامة في كل محاضرة من محاضرات التصميم الداخلي من مادة تصميمات 3 كتجربة ميدانية على مدار 8 أسابيع ان 38 مشروعاً من مشروعات الطلبة تم تطبيق الاستدامة فيها من خلال استخدام الخامات. وأظهرت الدراسة أيضاً ان 30% فقط من جامعات دولة الإمارات العربية المتحدة تطرح مساق إجباري للاستدامة وبالتالي نسبة الجامعات التي تطرح مساق الاستدامة بشكل اختياري 70% وبالتالي هناك احتمالية ان 70% من طلابنا في الجامعات لن يدرسوا مساق الاستدامة. ومن ضمن النتائج الدراسة ان 50% من الجامعات تطرح مساق الاستدامة بشكل متخصص للتصميم الداخلي وممارساته. و فقط 20% من الجامعات يفرض على طلابها في مساق التصميم الداخلي الالتزام بالاستدامة ضمن متطلبات المساق. وعلاوة على ذلك أظهرت الدراسة ان نسبة الساعات المعتمدة الأساسية للساعات المعتمدة الاختيارية ما بين (33%- 20%).

وأكد المعلمين والطلاب الذين شاركوا في هذه الدراسة على أهمية دمج الاستدامة في جميع مساقات المنهج الدراسي مع تسليط الضوء على عدم وجود محاضرين مؤهلين لتدريس الطلاب منهج الاستدامة ولما لهم من دورا حاسما في توصيل المعلومات للطلاب. ومن المبشر ان نسبة 89% من الطلاب موافقين على طرح مساقات أكثر ذات العلاقة بالاستدامة و97% من الطلاب يؤمنون بالدور الهام الذي تلعبه دمج الاستدامة في مساقات التصميمات. وعلاوة على ذلك أكد المحاضرين على الدور الهام الذي يلعبه التعليم العالي في قيادة خطة التطوير لبناء جيل جديد لمصممي الديكور الداخلي للمساهمة في المحافظة على البيئة.

وأخيرا توصي هذه الدراسة لحكومة دولة الإمارات العربية المتحدة بدمج الاستدامة في مناهج التصميم الداخلي عن طريق فرضها ضمن متطلبات مساقات التصميمات كإحدى الحلول لتقليل معدل نصيب الفرد من البصمة البيئية حتى تحصد مشاريع تخرجهم ما تم زراعته طوال دراسة هذه المساقات. وعلاوة على يجب تقليص عدد الساعات المعتمدة الاختيارية من اجل إضافتها للساعات المعتمدة التخصصية لمواكبة سوق العمل الخارجي وما يحمله من منافسات.

## **Dedication**

I dedicate this work to my beloved Family, friends and students.

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Thank you God for the unlimited blessing in which you are surrounding me with. Thank you.

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## List of abbreviations

- ADP:** Architecture, Design, and Planning
- ASID:** American Society of Interior Designers
- CAA:** Commission for Academic Accreditation
- CEUs:** Continuing Education Units
- c2c:** Cradle to Cradle
- CIDA:** Council for Interior Design Accreditation
- Cr. H.:** Credit hour
- CSP:** Concentrated Solar Power
- Dewa:** Dubai Electricity & Water Authority
- DIAC:** Dubai International Academic City
- FSC:** Forest Stewardship Council
- HCT:** Higher Colleges of Technology
- ID:** Interior Design
- IDEC:** Interior Design Educators Council
- IIDA:** International Interior Design Association
- LCA:** life cost assessment
- KHDA:** Knowledge and Human Development Authority
- NCIDQ:** National Council for Interior Design Qualifications
- NQA:** National Qualifications Authority
- MHESR:** Ministry of Higher Education and Scientific Research
- UAE:** United Arab Emirates
- UNCED:** United Nations Conference on Environment and Development
- UNEP:** United Nations Environment Programme
- UNESCO:** United Nations Educational, Scientific, and Cultural Organization
- UNFCC:** United Nations Framework Convention on Climate Change
- USGBC:** United States Green Building Council
- VOCs:** volatile organic compounds
- WWF:** World Wide Fund for Nature organization

# Chapter I

## Introduction

### 1.1. Global situation

There is a problem in this world and the whole civilization is in jeopardy because of the impending threat to the environment (Anatol Kuznetzov cited in Chermayeff, 1982, p.100). Kuznetzov's alarming message is one of many such numerous warnings that have been broadcasted but not given any attention. According to Crane, (2008) several experts like David Orr, Barry Commoner, and Rachel Carson have raised their concerns regarding the environmental stability of this world. However, no one listened to them and now severe environmental problems are damaging the earth (Crane, 2008). Everyone living in this planet should be obliged in protecting the environment since we are sharing the earth's resources and enjoying all its advantages. Governments, engineers, builders, interior designers, educators, students as well as scientists across different fields are all obliged to protect the environment, but each one of us has his/her own type of contribution since the role of each one is different to complete others' gaps in saving the world. As members of a community, and the wider society, we should contribute on fixing the damage and minimizing the danger that could threaten everyone living in this world as problems like globalization, global warming, deforestation, species extinctions, over population, extreme climate change, and loss of non-renewable energy resources are just some of the problems people are facing today (Chermayeff, 1982).

McDonough and Braungart (2002) pointed out that developed countries have required more resources and developing societies have tried to cope with the rising standards of developed countries. The consumerist countries have resulted in an increase on the demand of the world's life cycles. The consequence of this is the necessity for raw products to sustain developed countries, which has become astronomical as stressed out by Robins (1999).

One side of the problem regarding environmental issues is consumption. The other side concerns the wastes that are kept within the Earth's life cycles. If the amount of consumption remains unchanged, then our environment is in great danger. Yet, there is still hope. Hope can be achieved only if people start practicing sustainability that will preserve the world's life cycles (Crane, 2008).

Sustainability is the key-solution to the problems our environment is experiencing today, which are slowly but lethally damaging the planet Earth. Sustainability respects that earth's life forms and reduces the impact to our environment. It conserves the Earth's natural resources, establishes enhanced connections between nature and humans, and supports economic activities, which does not destroy life cycles as mentioned by Chermayeff (1982), Orr (1992, 2002, 2004), and Van Der Ryn and Cowan (1996). Countries, which practice sustainability, give value to the natural resources for both the present and future generations.

## **1.2. Environmental education in Arab nations**

In light of the problems facing the world as described earlier, education is seen as the key to education the masses in practicing sustainability. Thus, curriculum needs to be adapted to the changing environmental demands. Malhadas (2003, p. 3) asserts that "[E]ducating for a sustainable future requires a change in approach in the teaching and learning process". He further highlighted that education about sustainability for today and the future requires changes in the teaching approach and learning system. Nieminen (2006) stressed that sustainability has been accepted socially as a genuine channel of making a difference in our needs for the environment.

Arab nations have started educational transformation for individual advancement. Education about environment is logically a component of the bigger educational transformation that is happening in several places of the Arab world. This has concurred with the global awareness, actions, treaties, and plans for the environment, in specific, for the environmental education and studies on issues affecting the environment (Tolba & Saab, 2008).

According to Tolba and Saab (2008), the Tbilisi Declaration in 1977 made Arab nations react in a positive way in raising initiatives over issues about environment. The attention on environment education has been evident for both the basic and the higher education levels in which there is a continuous rise in the quantity of universities that have integrated Environmental Studies as a major at the Ph.D., Master's, and Bachelor levels (Tolba & Saab, 2008). There are no statistics or data available because environmental education needs to be established throughout the Arab continent. With regard to the higher education level, the accessibility of the information is important to its continuous growth and accountability because information is the main factor for enhancing the availability and accuracy. For basic education, particular courses are yet to be developed for environmental studies although environmental issues have been integrated into other mandatory subjects like science classes or civic education (Tolba & Saab, 2008).

Numerous universities have started development of specialized degrees and programs in different fields about environmental education. There are also several research companies that have undertaken problems about environment in the Arab world. The United Nations Decade of Education for Sustainable Development (UNDESD) has the goal of encouraging the global incorporation of the practices, principles, and values of sustainable development into each level of the basic and the higher education. During the 59<sup>th</sup> conference of the UN General Assembly held in October 2004, and again at the 171<sup>st</sup> and 172<sup>nd</sup> conferences of the UNESCO Executive Board in April and September 2005, the United Nations Educational, Scientific, and Cultural Organization (UNESCO) prepared a structure for its global International Implementation Scheme (ILS) (Tolba & Saab, 2008).

In perspective of the major issues of educational programs in the Arab world, it is expected that the quality of environmental education is legitimately low as compared to the multinational levels in other parts of the world. However, plans are continuously being done to resolve these issues (Tolba & Saab, 2008).

### 1.3. Sustainability within UAE

In the United Arab Emirates (UAE), Sheikh Zayed (the first President of the nation) highlighted that the important asset of any progressive country is its people, particularly the literate ones, and the success and future of the people depends on the quality and level of their education as the National Qualifications Authority (NQA) (2015) pointed out. The goal of improving the education opportunities still persist up to this moment as envisaged in the UAE Vision 2021. The highest form of utilization of wealth is to put it in the development of groups of skilled, trained, and educated human race (NQA, 2015).

Since the UAE is facing alarming situation, as in 2008 the World Wide Fund for Nature organization (WWF) published the Living Planet Report, which declared that the UAE had a highest per capita Ecological Footprint as shown in figure 1.1 (UAE, 2015).

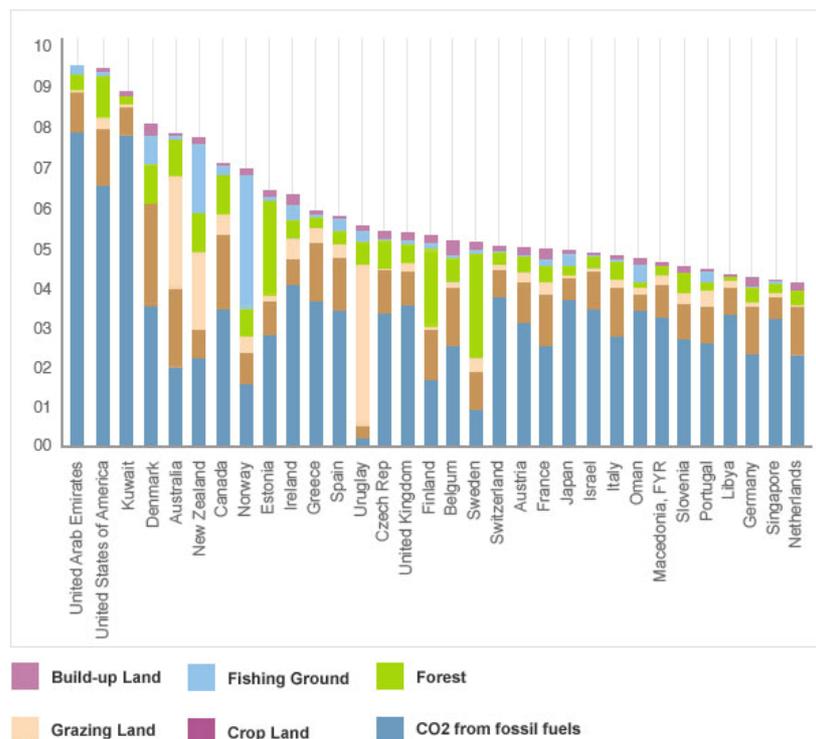
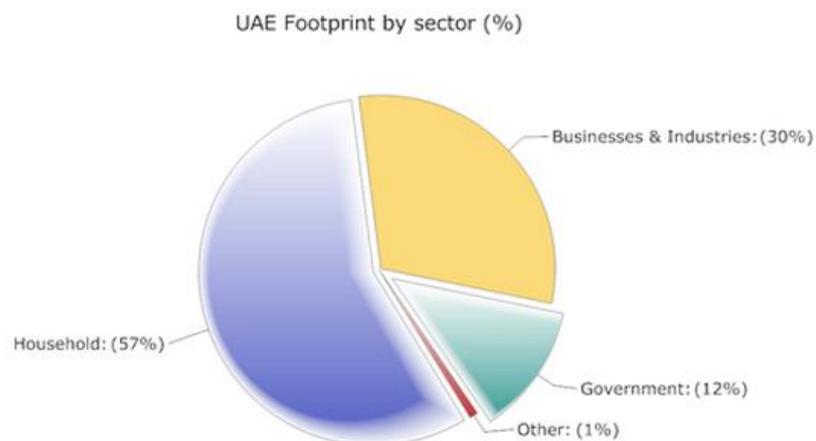


Figure 1.1: Ecological footprint (Adapted from UAE, 2015).

Consequently, currently, the UAE government is playing a vital role towards sustainability, for instance, Masdar, Estidama, and Dewa are such active organizations that are moving rapidly to change this situation. Shams1 is as well one of the best governmental projects that have been done recently, as it's "One of the largest Concentrated Solar Power CSP plants in the world and the first in the Middle East" as cited by Shams Power Company (2015).

#### 1.4. Designers role; obligation and obstacles

Everyone is responsible for the UAE footprint, and as elaborated in figure 1.2 our main target is the household as they are the biggest footprint sector (UAE, 2015). The households comprise the UAE's students, clients and as well us as educators.



**Figure 1.2: UAE footprint by sector** (Adapted from UAE, 2015).

Building construction industry is responsible for a huge share of the entire global emissions as Moxon, (2012) pointed out, as 40 % from the Co2 emissions is caused by the existing buildings in US and Canada, while if we choose to build in a sustainable way the percent of emissions will be reduced from 30 to 50 % without a remarkable cost increment.

Margolin (2007:4) states “Designers like everyone else on the planet have good reason to be concerned about the future”. In the sustainability puzzle here comes the role of the interior designers (Leddy, 2013). And as stressed by El Zeney (2011) interior designers are playing a vital part in the development of the built environment. Chermayeff (1982 in Crane 2008, p. 28) said, “Being a designer comes with great responsibility”. However, education as Hankinson (2012) point out is one of the problems that affect design practices in sustainability. Malhadas (2003) also agrees that education is considered one of the hindrances, and added that the impact of how interior designers understand sustainability principle will subsequently affects their sustainability design practices. Hence, Malhadas (2003) stressed that it is necessary to amend the design curriculum to be able to help interior designers to have the high sense of responsibility toward caring for our environment.

Consequently, the UAE government in the education sector should take more decisions, for instance, the higher education should unite the aim with other sectors, to minimize the ecological footprint of the UAE within a short time span. Raising the awareness of the design students by improving the design curriculum will be one of the solutions to do so as interior design field is integrated extensively with the households sector in that already has the big chunk of the footprint problem.

### **1.5. Aim and objectives:**

Accordingly, this dissertation aims to explore the current status of sustainability education within the same major in all universities in the UAE, while proving and evaluating the impact of early incorporating sustainability in interior design curriculum and its impact on the design mindset. However, the objectives of this study concluded on the three points below;

1. Identifying the level of integrating sustainability in interior design curriculum throughout 3 levels; Al Ghorair University, University of Sharjah and Ajman University.

2. Assessing the impact of multiple levels of sustainability integration on the design practices/mindset of ID students and potential environmental impacts.

3. Applying advanced level of integration and assessing its impact and improving on the mind streams.

In light of the objectives outlined above, the following research questions have been developed to fulfill the objectives of this study:

### **Primary Question**

To what extent can early integration of sustainability within design studio change the mind sets of interior designers so they can graduate by default-sustainability conscious IDs?

### **Secondary Questions**

1. What is the current status of sustainability in the curriculum of the interior design program in the UAE?

2. How can multiple level of integration affect the students' in the three selected Universities?

3. Are there any difficulties and limitations that can hinder the incorporation of sustainability into the education programs of interior design courses?

## **1.6. Dissertation structure**

### **Chapter I: Introduction**

In this chapter an overview of the global situation was presented along with the situation of environmental education in Arab nations and Sustainability within the UAE was also discussed. Moreover, designers' role, aim and objectives were clarified.

### **Chapter II: Literature Review**

This chapter will study and discuss all thesis topics by different research techniques beginning with all definitions related to sustainability, the UAE footprint and education in the UAE. Then the roles for interior designers, sustainable design education and sustainable design education for educators will be explored as well.

### **Chapter III: Methodology**

In this chapter, firstly papers with similar subject will be investigated to study the best method that could serve this study; secondly the selection of the most appropriate method will be elaborated.

### **Chapter IV: Data collection**

In this chapter, all procedures and processes are described and analyzed starting from efforts to collect data about sustainability within the UAE Universities. Then the three levels of interior design curriculum along with sustainability situation are analyzed, seeding sustainability in each studio in ID III course and lastly, the surveys and interview analysis will be presented as well

### **Chapter V: Findings**

In this chapter, all the data collection will be evaluated and interrelated to each other, in order to achieve the aim and objectives of this study.

## **Chapter VI: Conclusion**

In this chapter, all findings will be summarized and concluded, recommendations will be provided and questions for further research will be suggested.

## **Chapter II Literature Review**

### **2.1. Introduction**

This literature review will give information about sustainability and the topics related to sustainable education as well as highlight the situation of education in the UAE. Resources chosen for this literature review include the following concepts: history of sustainability, interior design, green design, the need for sustainable practices, the role of the educators in this cycle and how significant they are in it.

Many types of sources of literature were considered in this review. Research articles, several secondary resources, books, and other articles proved to be helpful. Both computer and manual way of searches were beneficial in looking for books and articles. On-line periodicals and journals proved useful in identifying latest materials regarding the topic. Keywords that provided the perfect results include sustainability, sustainable design, environmental education, sustainable design education, interior design education, the role of the educators, interior design and the higher education in the UAE.

### **2.2 Sustainability history**

Moving on with our review of literature, let us discuss about some history about the emergence of sustainability and other related topics.

The world has faced lots of problems and challenges because of the way and practices of the human's consumption. McDonough and Braungart (2002) highlighted that the Industrial Revolution, the Information Era, and the technological advancements have influenced the progress of a consumerist way of thinking. This principle 'consumerism' evolved without much

consideration for the environmental impact on the earth's life span for the present and future era.

However, these effects are now being experienced globally with problems like pollution, reduction of non-renewable resources, deforestation, climate change, global warming, and many other harmful issues as stressed by Orr (1992, 2002 & 2004). Many nations have realized that there should be a 'change' as the true cost of consumption has been known.

The building and construction industry is considered one of the largest industries that use huge amounts of energy and raw materials. Based on the World Watch Institute, around 10% of the global economy is attributed to construction, operations, and equipping of buildings, which utilizes from 17% to 50% of the natural resources available in the world as mentioned by Jones (2007). Reports from USGBC stated that the built environment has been growing three times more than the population rate and the buildings use around 30 to 40 percent of the world's energy and use 30 percent of the world's raw materials as confirmed by Bonda (2007). Nichols (2007) highlighted that the industry of architecture, design, and planning (ADP) produce significant amounts of rubbish from the building construction sites that are ultimately shifted to the landfill areas on a yearly basis. This rate of expenses has increased tremendously and has changed the patterns of the natural consumption. Almost all consumption is a cycle, which uses resources then produces wastes from the used materials according to Crane (2008).

One type of change has been evident in the development of green practices or sustainability principles. The integration of sustainability principles originates from a complete education that covers math, science, liberal studies, design and fine arts. Stieg (2006) confirmed that one of the most significant factors interior designers are facing today is the application of sustainable design principles within the interior design profession. Stieg (2006) emphasized that the interior design business has the basic chance of integrating sustainable design in their profession. However, to realize this possibility, interior designers should have the training, knowledge, and

information about sustainable design to enable them to offer their customers sustainable design solutions. Further, Stegall (2006) believes that the knowledge about sustainable design will significantly improve the effects on the environment the interior designers are creating on the earth and enable them to remove non-sustainable standards and practices. This is the reason why sustainable design education integrated in the design curriculum is very important to the development of interior design industry.

Stegall (2006) and Stieg (2006) argued that educators who were trained and studied sustainability principles are necessary to teach sustainable standards and practices. To further understand the concept of sustainability, various definitions of sustainability will be discussed first.

## **2.3 Definitions**

### **Definition of Sustainability**

Sustainability, environmental design, sustainable design, eco-design, green design, ecological design, etc. are all terminologies used when discussion is all about designs with concern for our mother earth. With regard to these terms, it will be confusing for interior designers to determine which place to locate the necessary information. The Forestry Service (2007 in Crane 2008) acclaimed that an exact definition of sustainability that is accepted globally is not achievable because it differs among sectors with diverse values over a period of time. Van Der Ryn and Cowan (1996 p.4) highlighted that “sustainability is not a single approach or movement. It is as diverse as the interests and communities presently dealing with the problems it exposes.”

According to Sassi (2006) the term ‘sustainability’ is not only considered a theoretical principle but has been regarded also as a very technical word during the process of finding solutions for problems. He defined ‘sustainability’ as a way of life, which affects all aspects of what a person, does, and does not refer to professional activity or academic goals. The first consideration is to know the type of relationship a person wants to have with the local and

global environment. Next, is to plan on achieving this type of relationship. To allow transition from theory to practice, it is a must to identify the effects resulting from our work and life-related actions and activities.

Sustainable interior design has been defined in Altawell (2012) by Ayalab as “an interior design in which all materials and systems are designed to be integrated as a whole one system with the objective of decreasing the hazardous effects on the occupants and environment while increasing the favorable effects on the social, economic, and environmental systems throughout the life span of the building”.

Crane (2008) mentioned that when sustainability is defined, there were two various approaches that have been considered in reference to probable solutions to the environmental issues. The first approach is related to technology as the solution in improving our environment. As an environmental instructor, Orr (1992, 2002, 2004) defined the word technological sustainability as a condition where each problem has either a market solution or a technological answer. Chermayeff (1982 in Crane, 2008 p. 11) used the word ‘technozoic’ in explaining that individuals believe in the “unlimited ability of the technology to helps us in resolving the crisis without the requirements for us to make change.” The second approach is related to ecology, referring to methods and natural cycles of thinking that will sustain our environment. Sustainability of our environment will limit the usage of technology, reduces the use of materials, and diminishes the pressure experienced by the biosphere as stated by Van Der Ryn and Cowan (1996), and Orr (1992, 2002, & 2004). Chermayeff (1982 in Crane, 2008 p. 11) explains the word ‘ecozoic’ as “coming into a new relationship with the nature by recognizing the interdependence between the human race and mother Earth and limiting the damaging impact people have on our environment.” It is significant to consider the dissimilarities in the two approaches of sustainability. Ecological sustainability allows the restricted usage of technological solutions to the environmental problems while focusing more on natural solutions. Technological sustainability proposes the usage of new technologies which are ecologically friendly that will replace ineffective technologies that are

hazardous to our environment. Based on Crane (2008), the differences between these two approaches have been the main topics of arguments. Orr (1992) confirmed that 'technological sustainability is putting stability on the planet's vital signs, while ecological sustainability is the way of looking for remedies to the malpractices that we have in the beginning'. Both types work to resolve the present issues and problems, which are long term, however, it has been suggested there is a problem with the economic complications that can be experienced with the ecological sustainability (Crane, 2008). These two strategies show the difficulty in looking for a definition of sustainability that is accepted universally.

Chick (2000) perceived sustainability as partially controlled by politicians and environmentalists, likewise social and environmental groups. However, communities and indigenous people who actually tried to conserve their present and future generations are those who are normally taken for granted but are a significant part of sustainable standards and practices. Pollack and Pillote (2006 in Crane, 2008) perceived sustainability as objectives for societies and individual persons to achieve. They have seven R's of sustainable design, which are:

**Rethink** – compartmentalized or lineal fragmented way of thinking should be changed.

**Redesign** – design to achieve ease of maintenance, flexibility, long-term disassembly, and durability.

**Reduce** – achieve more with less, decreased, or avoidance of toxic materials and pollution.

**Reuse** – Recommend products that can be utilized over and over again. Clarify the critical consequences and effect of new products.

**Renew** – Recommend products from resources that are rapidly renewed.

**Refurbish** – Provide new life to existing buildings and products.

**Recycle** - Propose a standard procedure to recycle all relevant materials.

**'Sustainability'** has been defined by NCIDQ (National Council of Interior Design Qualification) as "a way of practice or the usage of materials that has

the ability to be continued with the least long-term impact on our environment” (Leddy, 2013, p. 20).

**‘Sustainable’** is defined as the activities that attend to the current requirements but remain sufficient enough to make sure that the future requirements and needs can be satisfied as highlighted by Hyllegard et al. (2006).

**‘Sustainable Interior Design’** is defined as the interior design that has the least negative impacts and the most positive impacts on our environment all throughout the building’s life span as outlined by Kang & Guerin (2009).

**‘Green’** is defined as buildings that are designed in a way that it has minimal environmental effects as compared to normal or typical buildings as mentioned by Leaman and Bordass (2007).

According to McLennan (2004, in Leddy, 2013, p. 21) **‘Sustainable Design’** has been defined by McClennan as “a design concept that aims to achieve maximum quality of the built environment while reducing or eradicating negative effects to our natural environment.”

**‘Sustainable Education’** has been defined by Stephen Sterling as “a change in the culture of education where one develops and represents the practice and theory of sustainability in a critically aware manner” (Leddy, 2013, p. 21).

According to Krasner (1980, in El-Zeney, 2011), “In the Environmental Education Act of 1970(Public Law 91-516) **‘environmental education’** is defined as “the educational process dealing with man’s relationship with his natural and man-made surroundings, and includes the relation of population, pollution, resource allocation and depletion, conservation, transportation, technology and urban and rural planning to the total human environment.”

## 2.4 Traditional Interior Design Approaches and Process

Templeton (2011) stresses that the interior design process is accepted traditionally which follows particular steps like programming, initial and conceptual design phase, development of design, documentation for construction and bidding, construction phase, and post-occupancy assessment. However, Templeton (2011) mentioned that the NCIDQ declares sustainability to be one of the major aspects of interior design, alongside with the functions, aesthetics, accessibility, and building codes. Kang and Guerin (2009) argued that although interior designers are already aware and design companies are fully support the concept of sustainability, sustainability per se has not been completely and globally recognized as an integral part of the interior design process. If the health of the human beings is affected by the health of the surrounding environment, therefore sustainable design must be taken into consideration to be a significant part of the responsibilities of the interior design professionals.

Despite the fact that ASID does not consider sustainable design within its code of ethics and professional conduct, they still established a committee that takes care of problems associated with sustainability at the same time to create awareness about sustainable interior design as claimed by American Society of Interior Designers (2010 in Templeton, 2011). International Interior Design Association (IIDA), which is the same as ASID, encourages its members by promoting education about environment and sustainability concepts but it does not include sustainable design in its mission statement. However, the mentioned organizations stated in their statements that the function of the interior design professionals is to protect the welfare, safety, and health of their clients. However, Nussbaumer (2004) and U.S. Environmental Protection Agency (1997) declared that the environmental effect of the interior design can right away impact human's health, an interior designer who is environmentally aware should conclude that sustainability is a key factor of interior design process, Templeton's (2011). Kang and Guerin (2009) pointed that interior design professionals are mostly the ones who

have direct impact on anyone in two vital areas in the built environment, first is the interior finishing materials and second is the indoor air quality. Both these facets can either be healthy and sustainable, or contaminating and wasteful. U.S. Environmental Protection Agency (1997 in Templeton, (2011) have mentioned that the EPA has considered the factors which are directly associated with the interior design to be key parts that helps indoor air pollution such as building renovation, fixtures, furniture, and space planning. Kang (2004 in Templeton, 2011) addressed that a design solution can become sustainable if environmental concerns are considered to be key factor within the interior design process. According to Templeton (2011) NCIDQ has started to create awareness about environmental effect of the interior design by integrating sustainability into the newest version of NCIDQ examinations and the National Council for Interior Design Qualification (2010) confirmed that NCIDQ are now presently announcing sustainable design and sustainability as official parts of the interior design practice. Both ASID and IIDA have been offering CEUs particularly to provide training for members about sustainable design practices and to inform them about various sustainable products. ASID and IIDA have also started sponsoring yearly competitions about sustainable design projects as well as sustainable products as confirmed by American Society of Interior Designers (2010 and International Interior Design Association (2010) in Templeton, 2011). American Society of Interior Designers (2010) declared in Templeton, (2011) that ASID had established a committee, which is known as the Sustainable Design Council, which focuses on the problems associated with sustainable interior design and promotes practice of interior design and sustainable education opportunities for its members. Moreover, USGBC and ASID lately combined their efforts in launching a program that handles residential remodeling, Templeton's (2011). Regreen provides certification, education, and guidelines for the sustainable home remodeling, in which both associations felt this was the gap in the current efforts on sustainable building that will address commercial modeling or new construction as highlighted by American Society of Interior Designers (2008) and U.S. Green Building Council (2009 in Templeton, 2011).

## 2.5 Approaches for Sustainable Interior Design

Sev (2009, in Templeton, 2011) argues that the possible best approaches that can be used by interior design professionals and related professional that will help our environment face the current challenges is their skill to apply sustainability in their building design. A latest white paper from USGBC (Pyke et al., 2010) concluded that a combination of the understanding from people, understanding of design principles and practices, adequate information, and analysis will empower professionals in the construction field to have a huge and positive effect on how the people's experience with the built environment. Moussatche and Languel (2002) affirmed that interior design professionals are distinctively qualified to implement sustainable project decisions as a result of their training in the participatory design programming techniques. Tucker (2010) highlighted that a competition which requires entries to provide a cradle-to-cradle design was able to differentiate that the entrants who made a general approach to the design process produced more sustainable designs that those entrants whose approach focused on the sustainability of the materials or selection of system only. McDonald (2005) echoed that designers should put emphasis on the sustainable design process instead of the finished product of the sustainable building. Horsley et al. (2003) also confirmed that a design process, which was initially prepared well, is vital to the application of sustainable practices in the construction industry. Similarly, according to Majdalani et al. (2006) pointed out that inadequate construction methods can aggravate the depletion of the environment and this should be taken into account, however Enck (2010) stated that building use and construction techniques can vastly impact the energy performance of the building, they should be included in the pre-design stage to make sure that a sustainable building design is met. Additionally, McDougall et al. (2006 in Templeton, 2011) emphasized that understanding the building owners' requirements is significant to the post-occupancy assessment of the performance of green building. Materials and finishing selection is a crucial part from which interior design professionals can attain sustainable design solutions. Kang and Guerin (2009) declared that one feasible solution accessible to interior

designers to conserve natural resources is to specify long-term and sustainable materials. Non-organic cotton and synthetic fabrics can be replaced by textiles which are made of natural fibers like linen, organic cotton, ramie, or wool, and the production of these textiles accounts for an estimate of 25% of the earth's usage of pesticide. Moreover, Berman (2008) debated that textiles which have been dyed with mineral or vegetable dyes must be indicated as much as possible, and dyeing techniques like 'clean process' that uses only non-hazardous chemicals should also be utilized.

Another way to decrease the environmental impact of a building is when interior designers specify lesser finishes. Kang and Guerin (2009) supported this statement by mentioning that other strategies considered to be sustainable could be specifying the salvaged materials, or finishes which can be done by using recycled materials. Cork or hardwoods that are sustainably grown are specified as renewable materials and are considered responsible design strategies. Berman (2008) mentioned that Forest Stewardship Council certifies several other hardwoods, which are available; likewise numerous tropical hardwoods like mahogany and iroko must not be used due to the depletion of rainforests. There are other sustainable options to replace particleboard that are considered healthy also. Templeton (2011) pointed out that boards made of alternative fibers like wheat straw will not emit hazardous gas compounds in comparison with particleboard, which emits VOCs. The choice of materials is a particularly significant subject for interior design professionals who would like to have sustainable projects, because the process of manufacturing material although natural or recycled components also uses up resources and energy. Pile, (1995) echoed that interior design professionals could affect the health of the end-users and our environment by identifying materials, which have the minimum over-all environmental impact on the resource depletion, waste production, and energy consumption. Berman (2008) agreed that various manufacturers have demonstrated that sustainable production methods are also economically feasible. Furthermore, specifications must be clearly written to avoid insufficient substitutions or improper interpretations in the field as argued by Templeton (2011). These substitutions might be slightly sustainable than what the designer has

planned. American Society of Interior Designers (n.d.) suggested that interior design professionals should be responsible environmentally and socially. If recovered materials are appropriate and available, they can be utilized which makes them sustainable alternative instead of transporting them to landfill. Reusing existing materials of the building is always more cost effective than using new materials as stated by McDonald (2005).

Several sustainable finishes and materials also support increased quality of indoor air because they emit low VOCs. According to Iverson (2010 in Templeton, 2011) declared that poor quality of indoor air could badly impact people with respiratory problems. Berman further stated that ventilation systems that are passive could also be considered to make sure there is a healthy circulation of indoor air and outdoor air. However, Templeton (2011) suggested that several traditional finishing practices like carpets, adhesives, paints and furniture finishing have dangerous chemicals such as benzene, toluene, and formaldehyde and must not be implemented anymore. Berman (2008) explained that natural materials does not have the negative effect on the quality of the indoor air as compared to traditional materials, and these include fabrics dyed without using chemicals, grass and wool carpets, untreated stone, linoleum, and woods which are not finished or treated with hazardous substances. Berman (2008) again stated that finishes and materials, which contain VOCs, chemicals such as phenols and benzene, and heavy metals such as cadmium and zinc, should not be used because they release gas which contains hazardous contents. The ideal finishing materials for people with MCS should be ceramic, porcelain, and stone, however stain resistant and color treated grouts might cause respiratory ailments for people who are sensitive to the involved chemicals. Jones (2008 in Templeton, 2011) further explained that although linoleum might not affect the quality of the indoor air, the chemical adhesives that are normally used to fix it would have an impact on it.

Berman (2008) highlighted that stains and paints are occasionally the most detrimental finishing materials available, but there are healthier options for chemical finishes like stains coming from low-VOC and natural oils paints that

are preferable to be made of natural ingredients instead of latex or acrylic contents. Vinyl wall covers also promotes poor quality of indoor air, although there are sustainable options such as natural fibers and papers. Jones (2008 in Templeton, 2011) mentioned that biodegradable and recycled wall covers are also better replacement for those, which are made of PVC and contain other hazardous chemical contents, furthermore added that it is a fact the any building interior is not totally free of off-gassing materials and VOCs, hence interior design professionals should ensure that the finished spaces must not be occupied for an adequate period of time in order to allow the chemical gases to vaporize. Berman (2008) agreed that indoor gardens and plants could be considered to clean indoor air. Since indoor air quality is most likely to affect serious health problems, the quality of indoor air and the finishes that impact it should be of major concern to interior design professionals as one of the professional requirements to ensure protection of health. Akkurt (2009 in Templeton, 2011) claimed that traditional housing could impart interior design professionals regarding sustainable techniques such as natural ventilation, energy conservation, the application of local materials, and passive solar source. Berman (2008) even pointed out that before the extensive use of fossil fuels started in the nineteenth century, buildings have been designed using natural materials and older building structures were not wasted or demolished just because they were already unfashionable.

Fixtures and furniture may be well selected with a mindset of sustainability. Locally manufactured furniture items, preferably built from locally available materials might impact the environment on a lesser level because they are not transported over long distances. Likewise, there is rattan or wood that are natural materials having less toxins and it is advisable to use less non-renewable resources like plastics. Berman (2008) again stressed out that fixtures and furniture are available which are made of recycled rubber, plastic, glass, and other materials because they are not transported to landfill areas and they lessen the requirement for new plastics and few hazardous substances. In addition, noting that metals are not renewable resources, fixtures and furniture, which have metal in it, must be constructed so it can be recycled when it is not anymore in use or must be made from metals that are

recyclable. Interior design professionals are encouraged to specify plumbing materials designed to use less water, which can decrease the consumption of water in a significant value inside a building. Pile (1995 in Templeton, 2011) further reiterates that proposing to clients a proficient design solution for waste disposal and recycling can inspire occupants to reduce their impact to the environment as well.

Interior design professionals can make sure their design project is environmentally friendly by looking at two more subjects like the windows and lighting. For example, in order to reduce pollution of the indoor air, operable windows are the solutions in providing fresh air. Friedman (2010) highlighted that when windows are used effectively, fresh air could help decrease HVAC loadings, which eventually reduce the energy consumption of the building. The location of the window is another significant lighting concern. Gordon (2003) claimed that if windows are installed in a sufficient height, it is possible that natural light can enter far in the space. Berman (2008) and Gordon (2003) argued that if daylight is more available, it reduces dependency on using artificial light sources all throughout the day, likewise light tubes and skylights may also be used as daylight. Templeton (2011) highlighted that windows having proper veneering can provide year-round light, providing warm temperature in the interior space on cold weather periods at the same time avoiding excessive entry of heat on warm weather periods. Gordon (2003) confirmed that to inhibit heat gain and glare, interior design professionals might also propose coverings of window such as louvers, draperies, screens, and shades. Gordon (2003) further stated that external views also permit the occupants to gaze at distant objects, which lessen strain of the eyes.

The planning of the space must also consider daylighting issues, because the room arrangements may be helpful to take advantage of the sunlight direction all throughout the day. Views from any interior space to another interior space in the form of interior glass walls or windows could achieve maximum sunlight from the exterior windows. Berman (2008) pointed out that frosted or colored glass is a method of introducing natural light while the privacy of the

occupants is maintained. Berman (2008) and Gordon (2003) further proposed that halogens and fluorescents that are high efficiency lightings could be specified, and timers and dimmers can be fixed to reduce the consumption of energy.

Finishing of the wall can be considered to take advantage of the sunlight as well. Berman (2008) and Gordon (2003) clarified that reflective surfaces and light colors reflect and improve the current light levels, however care should be observed to make sure that they do not produce any glare. Berman (2008) further explained that dark flooring surfaces such as stone, concrete, and tile could captivate and allocate the heat energy that the windows provide.

## **2.6 Sustainability within interior design education**

Talib and Sulieman (2012) pointed out that the necessity to integrate sustainability principles in the curriculum of interior design program has become seriously significant. The stress on the sustainability in all parts of environmental design is very visible in the interior design industry as adopted in the resolution at the meeting in 2005 of the International Interior Design Educators Council (IDEC). In that meeting, it was mentioned that IDEC supports the principles of socially responsible design which includes the frame to frame pattern as the important part of interior design program as per IDEC 2005 Annual Report 2.

Interior designers should be able to know the causes of the earth's problems and determine how to resolve, avoid, heal, and otherwise restore the damages done (Crane, 2008).

It is also worthy to know the industry standard nowadays shows that the client recognizes the critical role of interior designers have in the construction stage. Moreover, studies have shown that several project owners began to be interested in making their building or houses green or sustainable as part of

their social responsibility to our mother earth. Everyone should be conscious that global warming and climate change have no limits (Talib & Sulieman, 2012).

As interior designers we are starting to put attention on the issues about environment as we appreciate the significance of sustainable interior design. Few of the interior designers are already using design criteria, which are environmentally sustainable in their design, but research shows that they have applied it in their design problems. Once a baseline is determined, it will lead to the development of education strategies for the sustainability of interior design (Kang & Guerin, 2009)

Moreover, Malhadas, (2003) added that interior designers must focus on designs which are environmentally friendly and responsible, and they must plan, identify, and carry-out solutions to the interior environments that will show concern for both the Earth's environment and the human race's quality of life. To realize this, interior designers are required to determine and study the raw materials, the methods of manufacturing, the use of transportation, maintenance methods, and the discarding of all equipment, fixtures, and furnishings particularly used for an interior.

According to Crane (2008), the information about sustainability should be accessible and available to design instructors and professors who will eventually transfer their knowledge to their students and he added that with sustainability integrated into the interior design curriculum, these programs will empower and enhance their students with valued knowledge and the time will come that sustainable design practices will be embedded and taught in the interior design subjects just like the fire codes and safety practices. Kang and Guerin (2009) stated that the professors of interior design would be able to know the components of sustainable design, which are not used very often and identify teaching techniques to enhance how particular components are utilized and continuing education programs, can be improved for the interior design specialists as well.

All interior design programs should be accredited by CIDA as highlighted in the Council for Interior Design Accreditation (CIDA) standards in 2009 (Templeton, 2011). The USGBC claims that universities and colleges still do not have sufficient complete curriculum about sustainable building standards and practices by US Green Building Council 2008 (El Zeney, 2011).

In Crane's (2008) viewpoint, the role of education is to give interior designers the fundamental knowledge necessary to practice in their specific field. Some recommend that the curriculum of interior design can include sustainable design concepts and principles. Whitemyer (2007) in Crane 2008, p. 33) remarks "Education is the only thing that will drive green design into the mainstream." The higher education is still the foundation that helps the sustainable society to grow. A non-profit association called Second Nature Inc. (2005, in Crane, 2008, p. 33) which helps higher education to develop sustainability program, asserts that "higher education portrays a crucial and important but most of the time unnoticed role in achieving the vision of a sustainable future to become a reality...higher education plays a significant part in the creation and dissemination of the values, skills, and knowledge to the society". Crane (2008) stipulates that higher education in the 21st century has raised challenges to educators so their students will be prepared and educated about the environmental effect, which every individual is held responsible for. However, Wheeler and Bijur (2000) debated that education has a crucial role in the empowerment of the individuals to attain better choices by being properly informed.

CIDA Professional Standards (2009, 2008 in Templeton 2011), pointed out that as per the statement of 2009 Council for Interior Design Accreditation (CIDA) standards, environmental sustainability has been expected to be an important part of any interior design program accredited by CIDA. USGBC (2008) as well in Templeton (2011) declared that universities and colleges are presently lacking comprehensive and adequate curricula regarding building practices that are sustainable. Kunkle-Tomaseski and Jones (2005) further echoed in Templeton (2011) that based on a survey done in 2005, an estimated 34% only of accredited interior design programs focused on

sustainable design in either a specialization under the design curriculum or as an independent class. However, it is not an indication that each instructor is not tackling sustainability topics in their classes. Crane and Waxman (2009) also explained that unintentionally teaching students to classify sustainability as not part of the design process was identified by many design instructors as the cause of not teaching sustainable design as a part of specialty class or an independent class. Those design instructors believed it was better to teach sustainability all throughout the complete curriculum which gives the students several opportunities to study about sustainable solutions and products.

Ruff et al. (n.d. in Leddy 2013) explains that the outcome of a study conducted to measure the students' perception toward environmental concerns resulted that 'the instructors who are most likely pro-environment cannot simply assume that their students know and understand their values and that the "design instructors need to establish the platform of sustainability instead of assuming that their students will support the concept". Based on their initial study, it was learned that for the undergraduate interior design programs in the United States, the school faculty could teach sustainable design and other related courses in general. Sustainability may be included in the teaching as a general idea or can be discussed as related to particular design components such as building systems. Ruff et al (n.d.) in Leddy 2013) recommended that interior designers who are socially responsible are required to make sure that the interior design discipline will fulfill its responsibility in the conservation of the world's resources and in pushing the development of more sustainable design methods. Interior design students are the next generation of interior design experts. The goal of the interior design instructor is to identify the needs for the paradigm change and to bring up relevant information. The instructor should generate a formula response as necessary for the incorporation of sustainability practices by improving the knowledge base which will permit the discussion and open up opportunities for the use of newly introduced ideas (Leddy, 2013).

El-Zeney (2011) echoed Crane's (2008) theory regarding the role of education to interior designers. Interior designers require education to have the

knowledge foundation necessary to practice in the interior design field. The education in the 21st century has raised challenges to instructors to educate and prepare their students regarding their effect on the environment that each individual is held accountable for (El-Zeney, 2011).

Educational programs in the interior design, engineering, and architecture require sustainability to be imparted in their curriculum. Gould (2002) debated that “schools of interior design, architecture, and engineering should amend their mission statements, employ and allow environmental professionals to work as educators, embrace LEED for the campus facilities, push for regional and campus activities as well as international and national events”. Gould (2002) also confirmed that the interior design field requires balance undergraduate training, continuous education programs and support that will provide research about sustainability.

Any interior design program, which integrates sustainability principles provide students an extra approach to utilize in their design process. Students and designers should understand the whole system to progress the components, they should learn that actions have corresponding effects, and problems cannot be resolved when isolated El-Zeney’s (2011).

The Interior Design Educators Council’s (IDEC) Sustainable Design Task Force has provided another approach of integrating the principles of sustainability. Stieg (2006) mentioned that IDEC proposed to McDonough and Braungart to include recommendations for incorporating the principles of sustainable design in the undergraduate curriculum. Likewise, accreditation of interior design through the Council for Interior Design Accreditation or CIDA has amended its requirements that will include sustainable design education. Accreditation guidelines of CIDA (previously named FIDER) require sustainability in the programs’ curriculum. CIDA (2006) clearly stated in El-Zeney (2011) that there are five standards out of the nine standards made as specific referenced goals such as the indoor air quality, green design, sustainable building methods and materials, sustainability, and environmental ethics and these should be included all throughout the curriculum.

## 2.7 Philosophies on Sustainable Design Education

As Crane (2008) suggests, it is very important to know that several philosophies of education occur, and that these might be supporting or against the incorporation of sustainability standards and principles. Some of the commonly known philosophies are holistic, where education is focused on each individual's understanding of all concepts of the whole system as well as their functions in the system; progressive, where education is focused on the needs of each individual; and technocratic, where education should be responsible to the requirements of the employers. Timpsons et al. (2006) remarked that sustainable design would work only when holistic philosophy is implemented. "Sustainability as an image of the societal, economic, and environmental factors...an interconnected and more holistic viewpoint makes it logical in both theoretical and practical focused terms" (Timpsons et al., 2006, p. xvi).

Sustainability education also needs an international method. Kucko et al. (2005 in Crane, 2008) highlights that the international and national education enhance the quality of living for the inhabitants and the society. In the same light, Brainbridge (2000) confirms that well relationship among countries, both at the professional levels and at the student are essential to enhance development without ignoring the lessons received elsewhere or duplication of mistakes". Brainbridge (2000) further pointed out that academia should mandate curriculums that have a global charisma but can be tailor made to satisfy the regional requirements.

Institutes of higher education are reliant on the curriculum. Thompson and Lang (1997) pointed out that 'the most straight forward and long term effect a university can impart to its students is the delivery of the whole curriculum'. Hutchison (1998 in Crane, 2008) believes that the universities have the responsibility of formally inculcating each generation the values and norms of the current culture. However, based on some authors, the present culture should not be shared without any modifications. They believe that

environmental education must be the major idea of the current teaching programs, letting the students to master information processing and textbook facts. Thompson and Lang (1997) and Wheeler and Bijur (2000) both agree that sustainable design curriculum should change the labels of natural sciences, liberal arts, and social sciences.

Few accepted that a written curriculum only is not sufficient. Brainbridge (2000) debated that universities and professional associations should initiate sustainable attitude and culture in the education system with focusing on the planning and development of buildings and lands. Smith and Williams (1999, in Crane, 2008) clarified that school programs include as many curriculum as any course inculcated with regards to sustainability principles. Chick (2000) stressed that every actions to develop the awareness of environmental obligation in the curriculum will be useless if the operations management methods were not environmentally accountable.

## **2.8 Education for educators**

Environmental education has been recognized to be a beneficial medium for the coming generations (Crane, 2008). However, in order for environmental education to reach its goals and objectives across the globe, trained and educated instructors are necessary. The Brundtland Report of the World Commission on Environment and Development (1987, in Crane, 2008) has highlighted that teachers around the world have a great responsibility in helping to effect the general social transformations needed alongside to a sustainable future.

Several individuals have perceived that the participation of the faculty members, recruitment and hiring of new faculty members in particular departments, and the partnerships of instructors are the foundation of the sustainable design education. According to Crane, (2008) several experts reached an agreement that instructors at all levels require training, education,

and materials. Bergman and Doering (2007 in Crane, 2008) further pointed out that numerous instructors have not gained any formal training in environmental or sustainable design because this field either was not given full attention or was not available at their time hence it is necessary to provide sound and concise curriculum. There are currently a number of programs that were developed to provide education to instructors on sustainable design, as follows:

- Wheeler and Bijur (2000, p. 96) pointed out that there is ‘the teaching for a Sustainable World which is an expanded and revised international edition of the materials established by the Australian Environmental and Development Education Project for Teacher Education, and it gives twenty-six 3 to 5 hours workshop sections about education for sustainability to be used for the instructor’s education.
- The Learning for a Sustainable Environment – Innovations in Teacher Education Project started in the first half of year 1994 as a joint action of United Nations Educational, Scientific and Cultural Organization’s Asia-Pacific Center for Educational Innovation for Development (ACEID) and the Griffith University in Australian region. Wheeler and Bijur (2000) further explained that the main objective of the project was to help teacher educators in the Asia-Pacific region to incorporate the innovative teaching, learning strategies, and educational purposes of sustainability education in all their programs.
- Thompson and Lang (1997 in Crane, 2008) clearly stated that the European Union’s Environmental Education into Initial Teacher Education (EEITE) project had the goal of coordinating the development of the teaching units, which will be used in the teacher education intended for the preparation of the teachers for sustainable education in the primary, secondary, and in the vocational programs.

- Bergman and Doering (2007, in Crane, 2008) confirmed that the 'Educating the Educators: A crash course on Eco-Design' is a widespread seminar aimed to present to the faculty members the teaching approaches, history, and theory of environmental design.

Based on these revelations for the need of sustainability education at third level, the next chapter will describe the methodology that will be used in this study.

## **2.9 Background to higher education in the UAE**

Countries around the globe have taken the initiative to recognize the need for some change with regard to environmental issues and problems, and have established agendas and programs to regulate the development of sustainability according to Crane (2008).

In the UAE, his Highness Sheikh Zayed bin Sultan Al Nahyan stated:

The real asset of any advanced nation is its people, especially the educated ones, and the prosperity and success of the people are measured by the standard of their education (Maitra, 2007, in NQA, 2015, p. 5).

The great leader Sheikh Zayed emphasized long time ago the importance of education as he stated that the strength of any progressive country is its residents, and the future of the people depends on the quality and level of their education as mentioned in Sheikh Zayed - A Special Tribute report (Anon, 2015). Consequently, the UAE Government as envisaged in the UAE Vision 2021 still maintains the goal of improving the education opportunities (NQA, 2015), and through protecting the environment by using the sustainable development and by achieving a dynamic balance between social growth and economic (Vision2021.ae, 2015). Moreover, the UAE Vision 2021 National Agenda emphasizes on water resources preservation, enhancing the air quality, applying green growth plans and raising the role of clean energy (Vision2021.ae, 2015).

The higher education in the UAE market has been very competitive and in the private companies, the supply of labor is presently exceeding the demands. The growth of the new higher education centers have been rapid and extensive due to the attraction of universities from other nations with stable higher education to install and establish branches of their campuses. Becker (2009) highlighted that a minimum of 49 international branch school campuses have been opened in the past three years, at presently there are at least 162 branch school campuses worldwide. British, American, and Australian universities have significantly benefited from the globalization process that has emerged in the higher education, as the nations from which they are established have treated well higher education system because English language has been the standard language in the international higher education (Wilkins, 2010).

According to Wilkins (2010), the UAE Education system is mainly a very remarkable case study since it is the biggest higher education center of international branch universities in the world at the same time the rate of putting up branches by foreign countries in UAE. It is a fact that any proficient market requires the 'perfect' or 'right' combination of supply.

In 1971, the UAE established a federal state through an agreement by the rulers of the seven states or emirates, which make up what is now the UAE. By that time, only 74 schools provided education in the whole country. University level education was not available at that time. Kirk and Napier, (2009) confirmed that after the UAE was founded, the education system has been established based on the British system, although nowadays, US models have been used in few universities and schools. One example is for Federal institutions, the quality assurance systems are adopted from US standards. The first institution of higher education formed in the UAE is the UAE University in Al Ain way back 1977. Then followed the establishment of Higher Colleges of Technology (HCT) in 1988, which mainly provided technical and vocational programs, although presently they cater to a broad list of courses, which includes postgraduate, and undergraduate degrees (Wilkins, 2010).

The Higher Colleges of Technology has presently 16 campuses under its umbrella in the whole country with males separated from females. In 1998, Zayed University was founded with branch campuses in Dubai and Abu Dhabi, and considered the third and last institution to be formed by the Federal Government. These three higher education institutions, namely the UAE University, Higher Colleges of Technology, and Zayed University are managed by the Federal Government and are recognized as 'federal' or 'public' institutions, while all the others are considered to be as 'private' institutions (Wilkins, 2010). The private institutions are categorized into two: first, they are controlled and owned locally by local organizations or by individual emirates, second, they are controlled and owned by foreign institutions from abroad which have established higher education branch campuses here in UAE. Some of the private universities which are locally owned are the American University of Sharjah formed in 1997 and being controlled by Sharja's Ruler; the University of Dubai, founded in 1997 as Dubai Polytechnic by the Dubai Chamber of Commerce and Industry; Paris-Sorbonne University Abu Dhabi, founded in 2006 by the Abu Dhabi Education Council; and Al Ghurair University, owned and managed by the Al Ghurair Group, an organization with multiple interests, such as cement industry, shopping malls, and bank (Wilkins, 2010).

Wilkins, (2010) added that in 1993, Dubai established the first international branch campus which was the University of Wollongong, a well-known university based originally in Australia. Since then, many other universities have opened which includes the Herriot-Watt University and Middlesex University originally based in UK. In 2009, the University of Pune from India that is considered one of the higher-rated state universities was established in the free trade zone area of Ras Al Khaimah. Few years back, the Abu Dhabi Government and the New York University have signed a partnership and established the New York University Abu Dhabi, which allowed enrollment of its first students last August 2010. The Abu Dhabi Government will finance the UAE campus, hence the financial resources will not be provided by the university's campus based in New York (Wilkins, 2010).

## **2.10 Quality of higher education in the UAE**

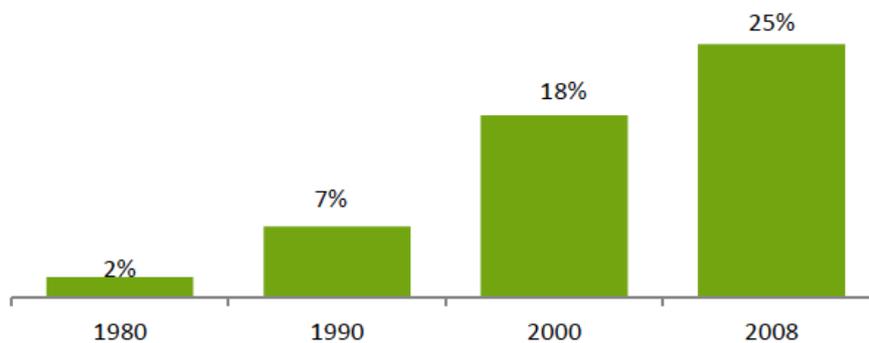
The huge number of higher education in the United Arab Emirates has possibly affected the quality on a positive note because institutions are compelled to compete through the improvement of their education programmes as well as the employability of their student graduates. An analysis of online forums like [www.desertspeak.com](http://www.desertspeak.com) and [www.dubaifaqs.com/universities](http://www.dubaifaqs.com/universities) have shown that many students are very concerned about the quality of the higher education in United Arab Emirates Wilkins (2010).

The various departments of the Ministry of Higher Education and Scientific Research (MHESR) has been responsible for the higher education's planning, development and implementation of the policy, quality assurance, data gathering and investigation, the facility of admission services for the federal institutions, and the granting of scholarships to UAE citizens. The Higher Education Council will be responsible for the quality control process of the three federal institutions. Moreover, these three federal institutions have pursued the international accreditation primarily from US regional accreditation organizations (Wilkins 2010).

Private Higher Education Institutions in the United Arab Emirates are mandated to have licensed by the Commission for Academic Accreditation (CAA), then later on their academic programmes should also be accredited individually. The standards used by CAA are patterned from US model, but they have been tailor-made for the UAE requirement. The scope covers all the major activities of a higher education institution. The foreign institutions are able to skip the requirements from the CAA by setting up institutions in specific free zone areas all over the different Emirates. However, they are still mandated to comply with the requirements from each individual Emirate, for example, in Dubai region, higher education institutions must comply with the licensing requirement of the KHDA or Knowledge and Human Development Authority as stated by Wilkins (2010).

Through that time, another way of the government contribution in enhancing the education, in 2007, the United Arab Emirates have published a new master plan for the higher education with the theme 'Educating the future generations of the Emiratis', which highlighted the complete reforms focusing on the improvement of the quality and quantity of education in the whole United Arab Emirates as mentioned in DIAC and Aon Hewitt (2015). The strategic direction of the UAE government regarding sustainable social development is apparently based on the Federal Budget of the UAE in 2013 showing 50.9% is budgeted for the social development and infrastructure, and from this 22% or AED 9.9 Billion is allotted for the education, as stated by Mohammed Abdel Rahman Al-Asoomi in UAE's Federal Budget 2013, Ecssr.ac.ae (2015).

The rise in the spending of UAE government on the education, supplemented by the higher income levels of Emirati families at the same time the growing populations of Emirati and foreign-national students, has prompted a higher demand for strong and quality educational systems across the whole country, as mentioned by DIAC and Aon Hewitt (2015). Figure 3 below clearly shows the increase in the percentage of the higher education, with 18% in 2000, which jumped to 25% in 2008 (NQA, 2015).



**Figure 2.1: UAE higher education participation** (Adapted from NQA, 2015).

Then in 2009, the Dubai Emirate initiated the University Quality Assurance International Board or UQAIB. In January 2010, the UQAIB has achieved assessment of almost half of the 24 free zone higher education institutions. UQAIB clearly states through a press release that it has the authority and power to cancel the license of any international branch institutions that do not comply with its requirements, as confirmed by Bardsley (2010, in Wilkins, 2010). The head of UQAIB mentioned that the end of 2010 could cancel licenses of substandard higher education institutions. Remarkably, the UQAIB is not only responsible for the assessment of institutions, but it also checks if an international branch campus is properly working by conducting a thorough review of the branch campus, as reiterated by Wilkins (2010).

## **Chapter III Methodology**

### **3.1. Introduction:**

The methodologies that will be used in this study will be mixed methods using both quantitative and qualitative research methods. At the beginning, a survey questionnaire on sustainability knowledge and principles will be administered with a number of undergraduate interior design students from 3 different universities in the UAE, which will be used to investigate and evaluate the content that is taught in each university. This method will be used with the interior design students and instructors as well.

From the qualitative aspect, phone call interviews were selected, as a second method that will be used with only the design instructors who are involved only with teaching sustainability; to highlight the obstacles they are facing with the existing curriculum and their recommendations to develop it.

Lastly, Field experimental method was applied to prove and evaluate how adding a different level of integration to the curriculum in Ajman University will improve the students' awareness of sustainability and how it would reflect on the level of their projects.

### **3.2. Case studies**

The following studies will be analyzed to justify this present study's choice of research approach.

El-Zeney's (2011) study identified a problem where the current practices of all the programs of interior design in Egyptian universities do not include sustainability in their syllabus, and highlighted some difficulties in teaching sustainability. The study concentrates on the response of Egypt's interior

design program to the task of establishing sustainable and responsible programs or solutions. The paper concluded with future approaches to establish the integration of sustainability in the interior design program in Egypt.

El-Zeney (2011) made use of survey questionnaire in the gathering of data, which clarified the confusion with regard to the perspective of educators regarding sustainability. A survey questionnaire was prepared and provided to 87 academic employees in the Faculty of Fine Arts from 5 various universities that offered undergraduate studies for interior design and architecture degrees. The universities who participated in the survey program were Alexandria University, Minia University, Helwan University, and Luxor University.

Crane (2008) conducted a study on the existing status of sustainability in the programs of interior design and established a model for effectively integrating it in the education program. In order to accomplish this goal, the study examined the historical phases of sustainability, verified its existing effect on the building space, analyzed the current sustainability standards and practices, and evaluated the current sustainability development.

Crane (2008) utilized a survey methodology where the survey questions were provided to 568 members of the Interior Design Educators Council. Out of 568 members, 131 members or 23% participated in the survey.

Leddy (2013) demonstrated a new approach for interior design course in the US by development of a Program Template. The Program Template is adaptable to any acknowledged undergraduate interior design program and can be tailor-made based on the required approach and structure. The target participants are students who are familiar and having knowledge in the use of sustainability standards and principles. These students will ultimately form the future generation of interior design field and they will raise it to a higher level that will make sustainability a vital component of the interior design itself, and will not be considered as an option anymore.

The objective of the Program Template is to make a complete change by including the sustainability principles in all courses and subjects of the undergraduate interior design program. The survey questionnaires were given to certain number of students in the Fashion Institute of Technology who were taking interior design during the spring of 2012. The participants were students in their first and sixth semesters.

The study identified that sustainability should automatically be part of all courses at all levels of an undergraduate interior design program. The paper concluded that if a Program Template is established in the university, the students will start to initiate the best design approaches in creating healthy, functional, and appropriate environments which will satisfy their clients' requirements at the same time reduce the hazardous impacts to the environment, people, and economy.

The three reports mentioned above used a quantitative approach in the form of survey questionnaires in their studies with the following advantages. First, this method uses a standard approach by providing questions based on the objectives of the study. The nature and type of questions are the key points in making this method a success. Second, it is easy to administer and can be done with a larger group of participants. The number of respondents can be in hundreds which can provide a solid basis of establishing conclusions and developing generalizations. Third, this approach is supported by numerical and statistical analysis of information and data, which are usually presented through charts, tables and graphs. . Fourth, this technique does not need costly materials because it can be done electronically or on-line, which also makes it 'green'.

Schneiderman (2008) recommended in his paper a design studio project that highlighted sustainability by doing research, which focused on the environment. The studio project starts with students researching if the steel is efficient as a sustainable material and its sustainable effects when it is being pre-fabricated. Recycling steel used 94% recycled materials but during the

process it emits dioxins to the environment. The goal is for the students to find out if steel is sustainable to the environment.

The report also explained the Sustainable Envelope Studio, which made use of 22 senior employees in the Interior Design Department in determining the sustainability of material and its specifications in the interior design. Thirty-four teams of students participated in all aspects of the project. The crucial part of the project is the coordination and response among the teams since sustainability issues is related to all fields. It is significant that the academic employees of the university encourage and lead the students to excellently cooperate during complex actual problems to make sure that solutions are implemented properly and timely.

The technique of the Envelope Studio uses detailed situation with a whole point of perspective. The teams have to take care of different problems, client selection, programming, site selection, verification of materials on its sustainability, and development of full design.

Schneiderman (2008) uses field study in his report on the Sustainable Envelope Studio. This method focuses on the actual situation of the research study. The report was conducted as a project with the actual participation of the academic employees and the students. The advantage of this method is the study or experiment being done on an actual situation, which gives actual results.

(Aktas, 2013) presented a report with a goal of incorporating sustainability principles in the interior design and architecture programs to achieve a stable future for sustainable interiors. The inclusion of sustainability in both interior design and architecture is very significant, as this will yield contented occupants as well as a 'green' interior design.

(Aktas, 2013) made use of review of literature as the methodological approach of the report. It made a comparison of various methods of interior design like interdisciplinary, trans-disciplinary, and self-regulated learning

techniques. These methods were look at their effects on improving the sustainability of architecture and interior design programs.

The benefit from using the review of literature method is it provides detailed information about the topic like the various methods of interior design in reference to its sustainable practices and principles. Comprehending the important facts, principles, and concepts of the three disciplines provides a clear understanding about the subject.

Hankinson et al. (2012) emphasized in his report the comprehension of the architects and interior design professionals on sustainability as well as the obstacles that affect the practice of sustainable design. The paper demonstrated the outcomes of a semi-structured interview of interior design professionals and architects in South Africa. It was an important study because the outcomes were documented and it exposes the problems and hindrances the professionals were encountering.

The advantage of this approach is a personal conversation with the participants can be conducted. This will result in a more complete outcome of the expected results and having an interview with other people makes it a learning experience. Another benefit is a quantitative result will provide more reliable results in arriving at a conclusion.

### **3.3. Selected methodologies:**

#### **3.3.1. Survey**

In the UAE there are nine universities whom are offering interior design major and accredited by the ministry of higher education and scientific research's (MOHESR) as well. These universities are; Abu Dhabi University, Ajman University, American University of Sharjah, American University in Dubai, American University in the Emirates, University of Sharjah, Al ghorair university, Al Hosn university Canadian University of Dubai and Manipal University. However, in order to achieve the aim of this study, two surveys on

sustainability knowledge and principles were developed and distributed to three of the universities that listed above; Sharjah, Al Hosn and Ajman University students and instructors please see Appendix A. These three universities are the ones that this study will investigate and evaluated how their level of sustainability integration in their curriculum can affect the level of their students' graduation projects. Starting by Sharjah University which does not offer any sustainability course, Al Hosn University that offer one sustainability course as an elective and lastly Ajman University which has more advanced level by offering two obligatory courses.

The surveys questions were selected based on reviewing papers like El-Zeney's (2011), Leddy (2013) and Crane (2008) that were covering how to integrate sustainability into interior design curriculum. The first goal behind the students' survey is investigating the sustainability awareness of the student from the first year until the fourth year and as well through different levels of sustainability incorporation. The second goal of this survey is knowing if the students agree with the idea of integrating sustainability with each design course or not and how interested they are to study more about sustainability while the last goal, from the students' survey is to gauge students' opinion whether their instructors are knowledgeable enough or not.

On the other hand, the goals from the instructors' survey is firstly probing how far the instructors are really interested in teaching sustainability in the first place, and secondly, what are the resources they depend on for teaching sustainability. Finally, the survey seeks to establish what is the most appropriate approach to incorporate sustainability into the interior design curriculum from their point of view.

In order to insure prompt response from students, hard copies of the surveys were brought to each university and the objectives of the survey were explained to faculty after securing an appointment.

The Students' survey contained questions about their gender, age and university year. Then, the following parts probed students' knowledge of

sustainability, their interest in the topic and their previous knowledge. After that the students who had sustainability course(s) in their curriculum completed the survey to elaborate what type of sustainability course(s) they have, how many courses are offered, in which year the course(s) are offered, awareness of the materials impact, did they apply sustainability to their projects, their opinion in integrating sustainability in each design class and lastly, if they are satisfied with their curriculum or not.

While the instructors' survey contained questions in gauging instructors' opinion whether their colleagues and students are interested in sustainability or not and if their design curriculum offered sustainability course(s). If there are such courses, then the survey proceeded to find out about their approaches to incorporate sustainability into the interior design curriculum, development of teaching techniques for sustainable courses and what obstacles faced. Lastly, like the students' survey it was important to know if they are satisfied with their existing curriculum or not, please see Appendix A.

The responses of both surveys were gathered manually and data were collated using Microsoft Excel.

### **3.3.2 Interviews**

Next methodology used was the phone call interview, as, after reviewing papers like Hankinson et al. (2012) and Crane (2008) the questions of the interview were selected to investigate the instructors' feedback by interviewing in order to provide more qualitative data. Hence, the phone call interview will assess the current teaching status of sustainability from instructors whom are teaching sustainability in six different universities in the UAE. Phone call interview was deemed the best solution in compromising between the hectic schedule of the instructors' and the interviewer.

A list of instructors teaching sustainability was obtained from the administration of each university. Then an email has been sent to the

concerned instructors with a brief about the topic, and asking them to consent to the interview.

Only 7 instructors responded with appointment timing, but another 3 asked requested the questions be sent in advance to prepare for the interview happens. The conversation period was from 15 to 20 minutes, as the participants were asked a series of questions. It started by questions about their teaching position and the curriculum, and accreditation. During the phone call interview, obstacles they faced in developing the curriculum were also discussed, and if all design instructors encourage their students to do green project and if not, why? Lastly they were asked what they would need from higher education to enhance their level of knowledge about sustainability, and their recommendations for improvement, please see Appendix A.

The interview calls were done using a landline phone in order to record the conversation on a mobile phone. Moreover, notes were also kept during the interviews. To maintain credibility, participants' responses were obtained from a phone recorder and were transcribed as shown in Appendix B. The transcriptions were then analyzed in detail.

### **3.3.3 Field experimental**

The last method used is field experimental, to link between the philosophies of the literature and the real life in here. Accordingly, the attitudes of 38 female and male students towards the sustainability incorporation during joining Interior Design III (290213) course interior design were investigated. The students are in year 2 in Ajman University in Ajman and are from various nationalities.

Most sustainable interior design topics were presented gradually while in some other topics students were asked to conduct research. Educational visit to sustainable places were organized along with a workshop that would widen

the students' knowledge. Seeding sustainability will start from the first semester in February 2015 till the end of the semester in June 2015. The girls and the boys are attending the classes separately according to the university policies. Each design class will be divided into 2 days and its duration three hours and half, with total 4 Cr. H, one theory while the left six hour are studio.

During the period students were investigated, there was a positive correlation between implementing sustainability as it manifest itself in weekly assignments throughout their material selections, moreover it was documented by handwritten notes in order to study the improvement route. Moreover, some students were more motivated to come up with creative ideas that emphasize sustainability strategies. However because of the short time line of this study, their first submission was evaluated, while the final submission will be discussed on another paper. The details of the experiment will be explored in the data collection chapter.

### **3.4 Assumptions and Limitations**

There are some limitations that can be identified in the conduct of this study:

- Sustainability within the interior design education is somewhat a new topic in the Middle East, thus while investigating instructors whom are involved in teaching sustainability, it was hard to find a substantial sample, obtain their recommendation and insight in developing the interior design curricula in UAE.
- Students' views are usually objective rather than subjective. Moreover, many students tend to not take surveys very seriously and they tend to complement their instructors and to improve the university's image and reputation.
- While assessing the three different levels of teaching sustainability, Al Hosn University wasn't able to provide access to their projects for confidentiality reasons.

## **Chapter IV**

### **Data collection and analysis**

#### **4.1. Introduction:**

The data collection chapter will describe all procedures and processes that have been done in order to obtain the ultimate goal. Starting from efforts to collect data about the status of sustainability education in the UAE. Then all the steps needed to assess three levels of interior design curriculum along with the sustainability situation in it, stages of seeding sustainability in each studio in the ID III course and lastly the surveys and interview processes will be presented as well.

#### **4.2 Selection of participating universities**

Identifying all the universities in the UAE that are teaching interior design major was the initial main target. Accordingly, the ministry of higher education and scientific research's (MOHESR) web site was visited as all the governmental and non-governmental accredited universities are listed there, in order to be certain about which universities are accredited and which are not. The following criteria were applied to differentiate between each university;

- Universities that teach sustainability course(s).
- Type of the sustainable course(s) offered.
- The ratio of Core Credit Hours to elective Credit Hours.

Later, each university's web site was explored in order to gather all needed information. The phone numbers of the concerned persons were collected and as well all information about their curriculum.

### 4.3 Sustainability within the UAE Universities

The proceeding part will present a brief about all universities that contain interior design programmes in the UAE and are accredited by the MOHESR. Hence, sustainability situation in those Universities, the differences between them along with their students' feedback will be also explored;

- **American Uni. Of Sharjah-** [www.aus.edu/](http://www.aus.edu/)

**Study plan overview:** 4 years study, 129 Cr. H should be completed (30 cr. H in first year. + 36 Cr. H in the second. + 33 Cr. H in the third + 30 in the last year). Studio I, II, III, IV and V are offered, but in the final year, they have final Project Research and in the last semester Interior Design Studio VI.

**Sustainability situation:** There is no sustainability course as a stand-alone course; however there is a course **Environmental Control Systems (IDE 352)** in Interior Design that includes sustainability issue at a minimal level.

**Students' feedback:** In design courses, it usually depends on the instructors as they stated, if they have sustainability background; all the submission criteria will be based on the sustainable principles and design elements as well, but if there is no sustainability experience the criteria will be based on the design basics only.

- **American University in Dubai-** [www.aud.edu/](http://www.aud.edu/)

**Study plan overview:** 4 years study, 124 cr. H should be completed. 19 cr. H for foundation, Design Core for 51 cr. H, however, they have Professional electives or ICD emphasis for 15 Cr. H 36 Cr. H for Arts and Sciences Core and 3 Cr. H for elective to complete the 124 Cr. H needed. Interior design studio I, II, III, IV, V and VI are offered but in the final year, senior thesis course is proposed in both semesters the 7<sup>th</sup> and 8<sup>th</sup>.

**Sustainability situation:** No sustainability course offered as an obligatory course but there is an elective, **Water Sustainability (SCIE 211)** but for long time it has not been offered and not related to sustainability for interior design.

**Students' feedback:** According to several discussions with their students about sustainability within design courses, they clarified that it depends on the instructors, if the instructors have any sustainability background they would demand basic level of sustainability requirements

- **University of Sharjah-** [www.sharjah.ac.ae/](http://www.sharjah.ac.ae/)

**Study plan overview:** 4 years study; 98 cr. hours should be completed according to US credits or 490 UK credit. In Sharjah University the system is quite different, as their system comprises two phases. In the first phase, college Requirements is offered with 26 cr. hours as a foundation stage to fulfill general University electives and requirements. While in the second phase, the Program Requirements is offered through the second, third and fourth stages with 72 Credit Hours, as in each stage 24 cr. are obtained to complete the 98 Cr. hours needed.

**Sustainability situation:** No sustainability course is offered as an obligatory course or even an elective one. But there are intentions to prepare a course description of sustainability course.

**Students' feedback:** Sharjah University's students stated that before they didn't know about sustainability, but recently one of their instructors had a sustainability background and she encouraged them to start doing their project based on sustainability aspects.

- **Al Ghurair University-** [www.agu.ae/](http://www.agu.ae/)

**Study plan overview:** 4 years study, 123 cr. should be completed. 30 cr. Hours for general education, 27 cr. hours for foundation courses, 57 cr. for specialization courses and finally 9 cr. hours for elective courses.

**Sustainability situation:** **Sustainable design (IDS 307)** is offered as an obligatory course as well as **Healthy indoor environment course (IDS 313)**. Moreover, in **Design studio III (IDS308)** they incorporate sustainable design practices to the students.

**Students' feedback:** Al Ghurair students' showed that their design's instructors are emphasizing the importance of the sustainability, and they have more intentions to increase the awareness of the role of the interior designers towards the environment.

- **ABU DHABI UNIVERSITY-** [www.adu.ac.ae/](http://www.adu.ac.ae/)

**Study plan overview:** 4 years study, 132 cr. hours should be completed. In Abu Dhabi University, 33 cr. H for university requirements, 93 cr. Hours for major requirements and nine cr. hours for open electives.

**Sustainability situation:** **Sustainable design (ARC 540)** course is offered as an elective course. And it could be taken starting from the third year till fourth year.

**Students' feedback:** The students in Abu Dhabi University stated that if the student wants to do his/her project sustainably; their instructors will help and encourage them but it is not one of the requirements there.

- **Canadian University of Dubai-** [www.cud.ac.ae/](http://www.cud.ac.ae/)

**Study plan overview:** 4 years study, 134 cr. hours should be completed. 116 cr. H is compulsory included 18 cr. H. for university requirements, 50 Cr. H for design foundation, 30 Cr. H for major core and 18 Cr. H for major concentration. 18 cr. H. remains as elective courses to complete the 134 Cr. H needed.

**Sustainability situation: Sustainability of Buildings 1 (DESI 270)** is offered as an obligatory course while **Sustainability of Buildings 2 (DESI 420)** is offered as elective concentration requirements.

**Students' feedback:** the CUD students' feedback was similar to same other students' that sustainable projects are started by the idea of the student and some of the instructors can help while others cannot.

- **Ajman University of Science & Technology-** [www.ajman.ac.ae/](http://www.ajman.ac.ae/)

**Study plan overview:** 4 years study, 134 cr. hours should be completed. 18 cr. Hours for obligatory university requirements, 9 cr. H. for university electives, 98 cr. H. for major requirements, and finally 9 cr. H for major special electives.

**Sustainability situation:** Two major courses are offered; the first one is Sustainability for interior design, which is offered, in the third year and the second one is Materials technology course in the first year that explains the environmental effect of each material.

**Students' feedback:** Ajman university students' stated that after the sustainability course offered the awareness increased hence some of the was motivated to think of their project sustainably. And the majority of the design instructors encourage them.

- **Manipal University-** [www.manipal.edu/](http://www.manipal.edu/)

**Study plan overview:** 3 years study, 127 cr. hours should be completed. 119 cr. H. obligatory courses while the left 8 cr. H. for specialization courses.

**Sustainability situation:** There are no sustainability course offered by Manipal University's as a stand- alone course as shown in their study plan, however what has been told that **Building Construction & Materials – IV (IDE 229)** course is mainly presenting the impact of the materials on the environment. Hence they could apply that practice in **Interior Design - Commercial Design (IDE 221)** projects in the fourth semester.

**Students' feedback:** Manipal students' claimed that three out of five instructors are obliged to teach them sustainability aspects. But they added it is not obligatory to submit their design projects sustainably before the fourth semester and they wish to have sustainable courses as a stand-alone course soon.

- **American University in the Emirates-** [www.aue.ae/](http://www.aue.ae/)

**Study plan overview:** 4 years study, 126 cr. hours should be completed. 33 cr. H. for general education courses which is compulsory, Core courses that is also compulsory 27 cr. H., specialization courses 57 Cr. H. and finally 9 cr. H. for free electives.

**Sustainability situation:** There is no sustainability course mentioned on their website. However, they knew that some of the instructors are preparing a new course to cover the environmental impact of the material as a first step towards sustainability.

**Students' feedback:** The students clarify that the majority of the projects designed based on the design bases not on the sustainability principles.

- **ALHOSN University-** [www.alhosnu.ae/](http://www.alhosnu.ae/)

**Study plan overview:** 4 years study, 129 cr. hours should be completed. University general requirements 27 Cr. H., Faculty requirements 9 Cr. H., program requirements 87 Cr. H. and lastly interior design option studios 6 Cr. H.

**Sustainability situation:** there is one elective course offered which is **Sustainable interior design practices (INT 472)** and students can take it from year three.

**Students' feedback:** Al Hosn students' stated that only one of their instructors are encourage them to do green projects while the others did not. And some of them claimed, "Anyway we are still afraid from trying".

#### **4.4. Assessing three level of incorporating sustainability in interior design curriculums**

Through investigating all the teaching systems in interior design curriculum in the UAE universities, I was checking my entire network to facilitate offering a shared project for the students in some of the universities to help me in studying the outcomes of incorporating sustainability in the design curriculum within different levels of integration according to each university policy and vision. So that the comparison's results appears more, it would be better to study the differences between the outcomes of the graduation project in Ajman University before and after teaching sustainability courses, and then compare the last group with other graduation projects in other universities (Sharjah and Al Hosn University) which the level of teaching sustainability in their curriculum are different. As Sharjah University does not offer any sustainability course, while Al Hosn University offers one sustainability course as an elective and lastly Ajman University, which has more advanced level, by

offering two obligatory courses. Hence we agreed to have the same criteria of judging the graduation projects' outcomes, and below are the following universities who participated in this field experiment:

**Ajman University:** Under my super vision, Dina Ibrahim.

**Al Hosn University:** Under my super vision of Ms. Ghadeer

**Sharjah University:** Under the super vision of Dr. Abdel Samad and Mrs Nadia.

### **Ajman University graduation projects'**

In 2013, Sustainability for interior design course (290485) was offered in the interior design curriculum in Ajman University as a specialization elective and in 2014-1 the interior design department made a modification on the curriculum after the Council of Academic Accreditation CAA directed to enhance the awareness of sustainability and sustainability for interior design course changed to be obligatory instead of being an elective one.

Accordingly, the graduation projects before the year 2013 were collected and the projects for the whole batch have been analyzed. In order to start collecting these projects firstly an email was sent to the head of the department to take his permission to collect the projects and to facilitate ease of data collection, please see Appendix C. After that another email was sent to all academics that were teaching the graduation project on that time. These academics were contacted by phone to explain the need for collecting and analyzing the projects and the outcomes of this study.

However, some obstacles were faced in collecting and analyzing the projects as some of them were not maintained well and it was difficult to access them. Some of the graduates could not be contacted as they were from different countries and had returned to their home countries after graduating or the instructors had left the university without leaving a copy of the students' projects. Thus, the numbers of the projects that were ready to be analyzed were less than the origin total number of submitted projects.

### **Sharjah University graduation projects'**

Sharjah University does not offer any sustainability courses within the interior design curriculum, consequently the students are not asked to do their projects on sustainability. However, recruitment of new instructors who have a sustainable background and experience has started to show the students how to get the maximum benefit of the natural daylight and natural ventilation along with the sustainable materials to be used.

### **Al Hosn University graduation projects'**

Al Hosn University refused consent in obtaining a sample of their graduate projects. But according to our discussions with their students they claimed that their graduation projects' till now do not mention sustainability aspects.

### **Evaluation and comparison criteria**

All projects from the three universities were evaluated using the three aspects as below;

1. Did students mention anything related to the environmental impact of the chosen material?
2. Did students consider the daylight factor when designing their projects?
3. What kind of furniture did students depend on? Did they use recycled or reused furniture in order to reduce waste?

### **4.5 Seeding sustainability in each ID III course studio (Field experiment)**

During that period since the classes begin in Ajman University on February second, the researcher's role was mainly in elaborating to **Interior Design III (290213)** students' the role of interior designers to create a dynamic balance

between the environment, economy and society, as “Sustainability as an image of the societal, economic, and environmental factors” according to (Timpsons et al., 2006, p. xvi). However we could achieve that balance by covering the material selection, cost reduction and human comfort aspects in the design course.

In the first class, the course description of ID III was explained to the students. This included introducing the students to the design of office interiors, the outcomes of it and terms of submission, assessment and requirements, which have been modified, as this project has a sustainable requirement. Then, each student had to select a type of business that they will fit in their space given with at least one case study to analyze all needed data.

Throughout this time students were given lectures about the objective needed, an educational trip to a sustainable site have been organized and seminar of local materials have been planned so they could start sense their obligation towards the environment. From these objectives things that were highlighted were the importance of reducing the cost, considering the environment through all design steps and the human comfort factors as well to enhance productivity and the wellbeing of the employees.

Going through why do we need sustainability, as it was an answer to one of the student’s questions previously. Accordingly, the depletion of natural resources, climate change and sick building syndrome as some of the main reasons which have been discussed. Moreover, the researcher explained how the construction industry contributed in the tragedy of the increment of the CO<sub>2</sub> emissions and how only by considering which material, finishes, lighting, water and energy system the designer will select we could reduce the emissions by 30 to 50 % of the carbon emissions (Moxon, 2012).

Design steps were one of the most important part as they got the chance to know how each stage has its impact on the environment and what does the embodied energy and life cycle analysis mean, as well as which material is better to choose, cradle to cradle or cradle to grave. All of those terms

introduced to the students plus the types of the project and the right implementation needed in each type of interior design projects.

The teachers' role was basically seeding sustainability in each lecture and to vary the teaching method used in order to keep them alert and interested to what they have been taught. Below are some of the actions that were taken:

- As an example to attract their attention, Prezi presentations were used instead of the ordinary power point ones to present the lectures. The students were encouraged to hold a few lectures by themselves on sustainability topics of their choice as shown in figure 4.1, which was also motivational. Besides asking them to pick one of the topics offered by the lecturer related to sustainability for interior design like; c2c, triple R, sustainable acoustics, sustainable lighting, passive ventilation, sustainable materials for flooring, ceiling and wall treatments, LCA, companies in UAE selling sustainable interior products, interior project types and lots of other topics related, please see Appendix D-1.



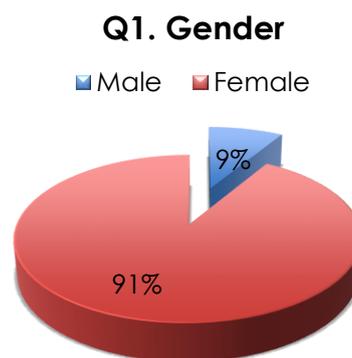
**Figure 4.1: One of the students while presenting his sustainability topic (By Author).**

- A visit to Masdar city was organized as another way to enlighten Ajman university students'; they saw how a huge space like Masdar city could be totally built in a sustainable way. They experienced the air produced by their 45- meter height wind tower, enjoyed touching the terracotta walls, which were decorated with arabesque designs and were amazed to travel in podcars in the personal rapid transit (PRT) station, please see Appendix D-2.
- As a step forward to improve the level of our designers, every lecture stressed the importance of sketching in the design process. Using CAAD, 3D max, Sketch up is good for designers but using their hand is much better. Improving their freehand sketching creates designers to be.
- Creating a 'What's App' group as a teaching tool reduced the gap between the students and the lecturer, as they felt they are always connected in being able to declare ideas and queries anytime after class timing and one more goal from this is to minimize the printing problem.
- As a plan for the second part of the semester, a seminar will be held about the local materials by one of the expertise on that field (please see Appendix C), in order to reduce the embodied energy of the materials they used in their projects, from these points that will be discussed that there are three main locations that produce sustainable local materials; Mountain Sides, Coastal Sides, and Internal Areas, hence each zone have its own material specifications. As an example of those materials are the limestone of the mountainside, and coral stone as of the coastal.

#### 4.6 Students' survey analysis

While distributing the survey it has been realized that the majority of the students showed interest about the topic while few of them didn't even want to complete the survey because they were busy with other tasks. And for those who never had any sustainability courses before it was a quite difficult for them to understand what this all about so a short lecture was given about the meaning of sustainability, why do we need it, the role of interior designers and so the need of integrating sustainability throughout the design curriculum. While those whom already had a sustainable course(s) it was a quite easier for them.

Figures from 4.2 to 4.21 will briefly analyze the responses of the 21 questions of the students whom participated in this study;



**Figure 4.2: Gender of the participants**

91% from the participants were females while the males were only 9%. As the females might be more interested in studying interior design than the males.

### Q2. Age Group

■ Under 20 ■ 21-29

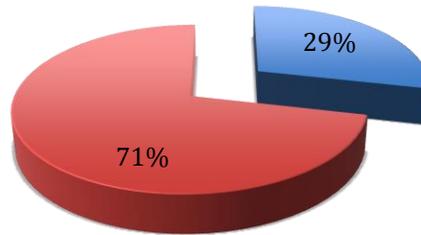


Figure 4.3: Age group of the participants

The majority of the students' age was from 21 to 29 years old whereas only 29 % were under 20.

### Q3. Current Year Level

■ 1st year undergraduate ■ 2nd year undergraduate  
■ 3rd year undergraduate ■ 4th year undergraduate

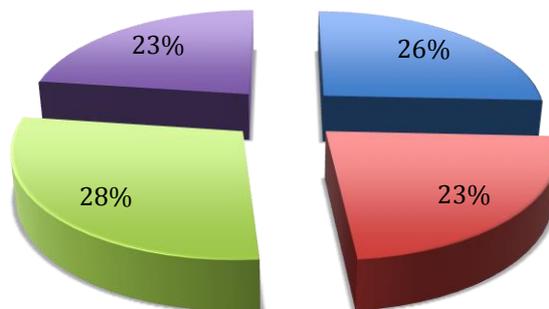


Figure 4.4: Current year level

The surveys were almost equally distributed to all years of study; thus, they were nearly all equally weighted in the responses.

#### Q4. Do you know what sustainability means?

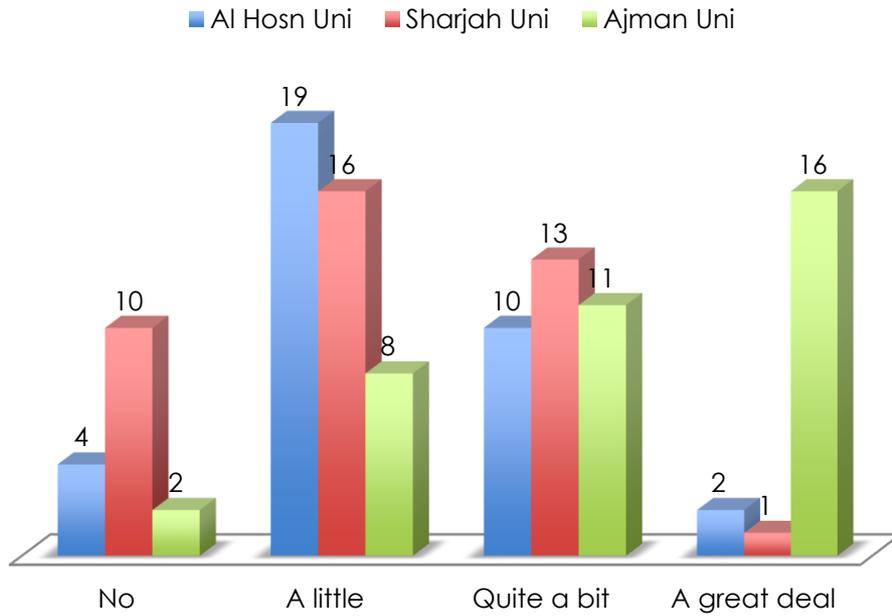


Figure 4.5: Knowledge about Sustainability

As clearly shown, Sharjah University gets the highest “No” column amongst the other universities whilst Ajman gets the shortest. Hence, Ajman University gets the higher column in “A great deal” and Sharjah gets the shorter one. At the same time Al Hosn University gets the moderate results.

#### Q5. Knowledge Source about Sustainability

■ School ■ University ■ Books ■ Web ■ General media ■ Others

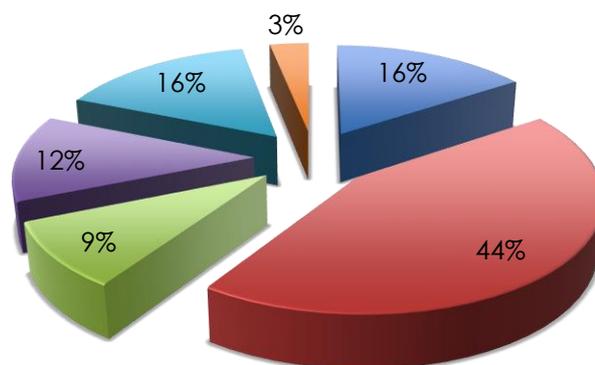
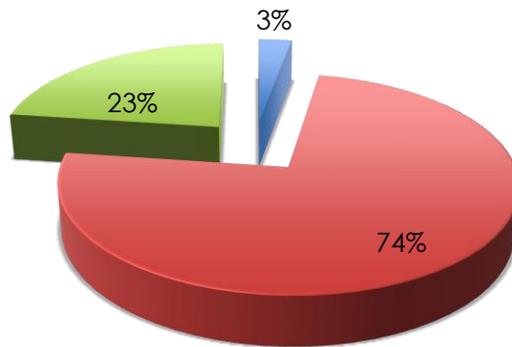


Figure 4.6: Knowledge Source about Sustainability

The majority of the students specify the university as the main source of knowledge about sustainability while, school and general media were mentioned equally. Books and web were the least selected source among the students.

**Q6. Interest to Learn about Sustainability**

■ Not very interested ■ Somewhat interested ■ Interested

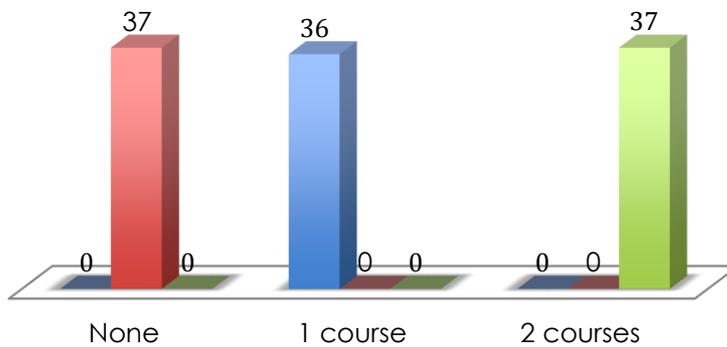


**Figure 4.7: Interest to learn sustainability**

Almost 3% were not interested to learn about sustainability, however, the other 97% are interested in learning sustainability as clearly illustrated in the above pie chart.

**Q 7. Does your institution offer sustainability courses?**

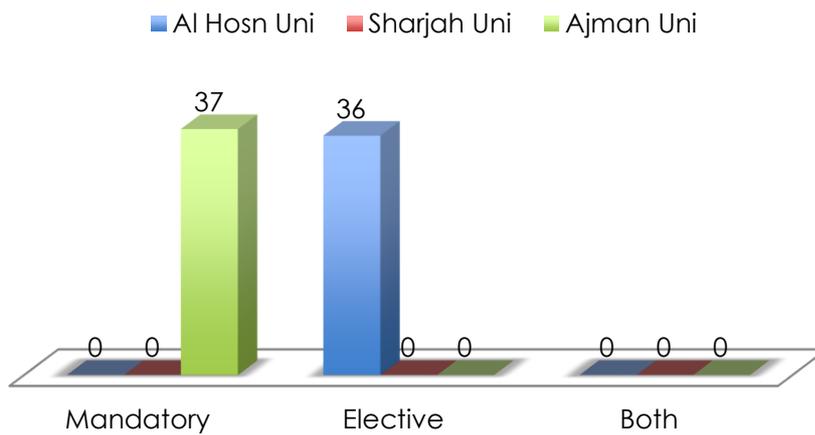
■ Al Hosn Uni ■ Sharjah Uni ■ Ajman Uni



**Figure 4.8: Sustainability situation in the institution**

37 students in Ajman University confirmed that there are 2 courses offered, while the 36 students in Al Hosn University responded that they have only one course. However, Sharjah university students confirmed that no courses at all were offered to them.

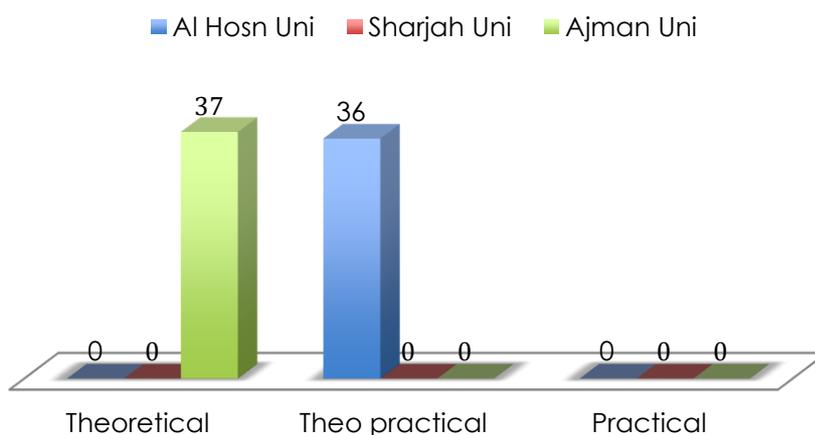
**Q8. Are these sustainability courses mandatory or elective?**



**Figure 4.9: Courses are mandatory or elective**

In Ajman University the courses offered are mandatory however in Al Hosn University the courses offered are electives.

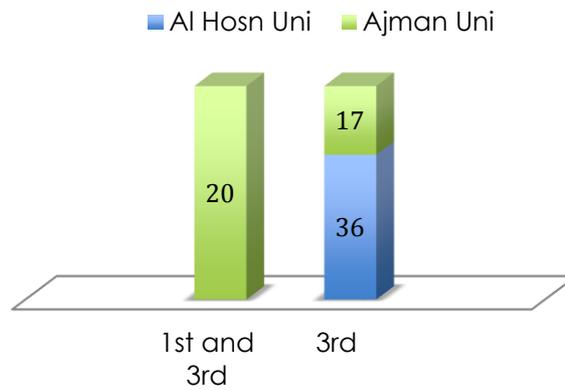
**Q9. What types of sustainability courses are offered?**



**Figure 4.10: Types of sustainability courses are offered**

Students clarified that courses that are offered in Ajman University are theoretical while in Al Hosn University it is the Theo practical course.

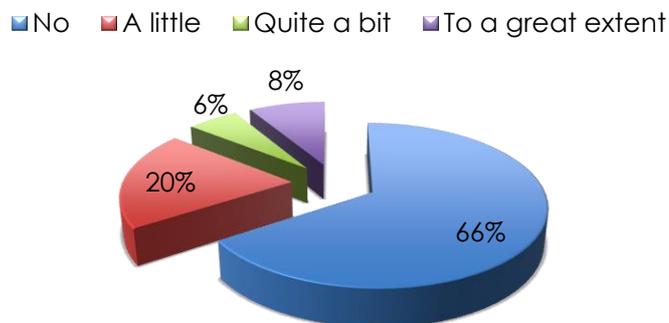
**Q 10. In which year are the courses offered?**



**Figure 4.11: Year level sustainability course offered**

37 students from Al Hosn University stated that the sustainability course is offered in their university in the third year, however 20 students in Ajman University showed that their new study plan offers sustainability courses in the first and third year, while 17 students from Ajman university who are following the old study plan stated that the sustainability courses are offered in the third year.

**Q 11. Have you applied sustainability in any of your design projects?**



**Figure 4.12: Applying sustainability in design projects**

Unfortunately, 66% of all the participants didn't apply sustainability in their projects, while only 8% applied it to a great extent.

### 12. Would you like to see (more) courses offered related to sustainability?

■ No ■ Maybe ■ Yes ■ Definitely

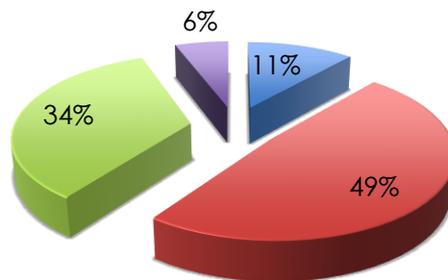


Figure 4.13: To have more courses related to sustainability

Almost half of the students with 49% answered maybe, 34% answered yes, 11% answered no and finally only 6% were definitely sure that they want more courses related to sustainability.

### 13. How helpful would it be to integrate (more) sustainability in each design class?

■ Not helpful ■ A little helpful ■ Quite helpful ■ Very helpful

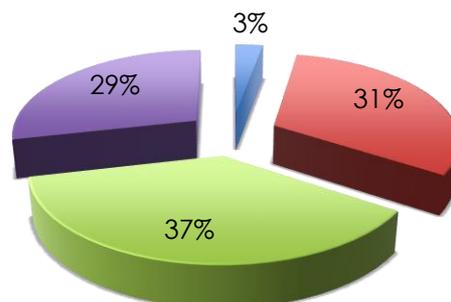
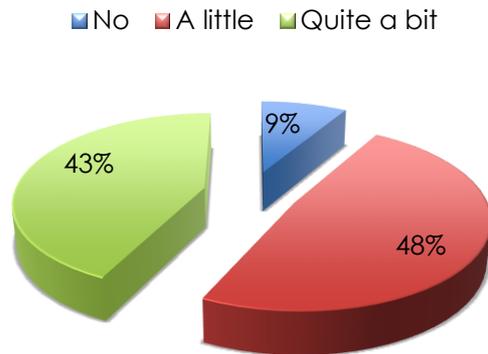


Figure 4.14: Integration of sustainability in design class

66% of respondents believe that the integration of sustainability in each class is helpful, 37% quite helpful and 29% find it very helpful. On the other hand, 31% shows that it is a little helpful and only 3% of the students appear to disagree.

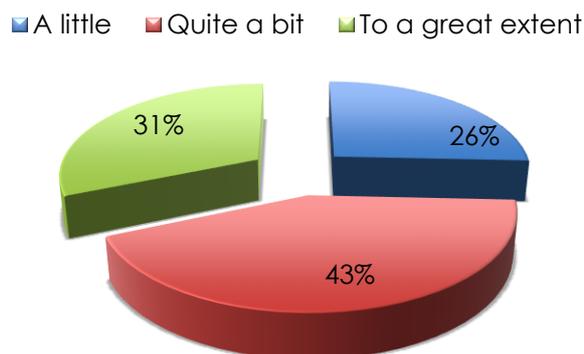
**14. Do you think your instructors are knowledgeable enough about sustainability?**



**Figure 4.15: Instructors awareness about sustainability**

In question 14, 9% of the students believe that their instructors are not knowledgeable enough, while the majority of the participants (48%) answered that their instructors are a little knowledgeable about sustainability. However, 43% of the participants consider their instructors quite a bit knowledgeable in that field.

**Q 15. From your point of view to what extent can interior designers contribute to the sustainability issue?**

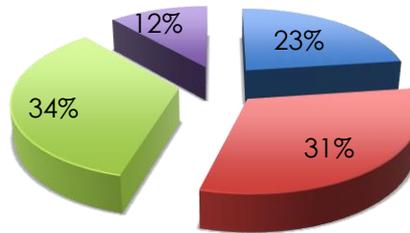


**Figure 4.16: Interior designers contribute to the sustainability issue**

The majority seems to understand the role of interior designers towards the environment whereas the minority does not.

**Q16. Did your instructors explain the environmental impact of the materials that could be used in interior projects?**

■ No ■ A little ■ Quite a bit ■ A great deal

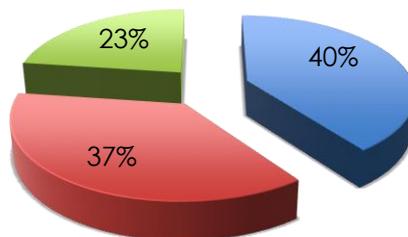


**Figure 4.17: Instructors explain impact of the materials in interior projects**

23% of the respondents declared that their instructors do not explain the environmental impact of material used in design projects, and 31% felt that the instructors explain a little. But 34% of the respondents clarified that their instructors explained quite a bit and only 12% seem to have very qualified instructors.

**Q17. Are you aware of local building regulations and their potential impact on ID material selection?**

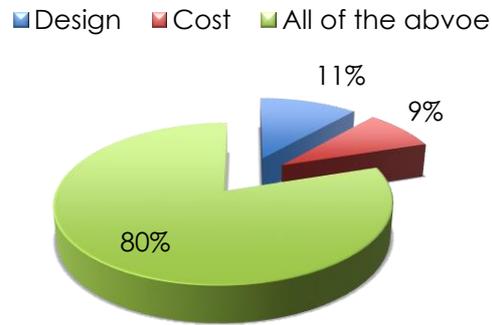
■ No ■ A little ■ Quite a bit



**Figure 4.18: Awareness of local building regulations and impact on material selection**

The majority of the participants are not aware of building regulations, 37% admit that they know a little about it and 23% declared that they are aware of it.

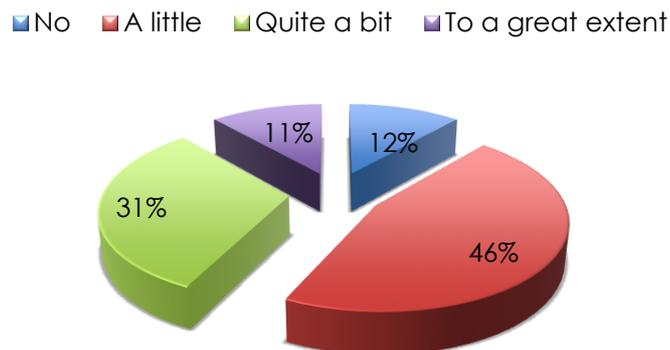
**Q18. If you have to select material for a future client, which criteria would be the most important?**



**Figure 4.19: Criteria of material selection for a future client**

80% of the participants' chose all the criteria offered in the question like sustainability, design and cost. While 11% from the future designers responded their selection will depend on the design criteria and the remaining 9% said that they would select the materials depending on the cost.

**Q19. In general, are you satisfied with your existing Interior Design curriculum?**



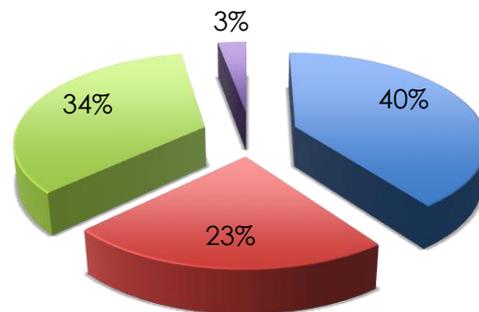
**Figure 4.20: Satisfaction with your existing Interior Design curriculum**

In question 19, the respondents were asked whether they are satisfied or not with their curriculum, the majority answered that they are not that much satisfied with their curriculum as 12% answered no and 46% answered a little.

On the other hand, 31% claimed they are quite satisfied, and 11% added that they greatly satisfied.

**Q 20. Do you think that your campus is sustainable?**

■ No ■ A little ■ Quite a bit ■ To a great extent



**Figure 4.21: Is your campus sustainable**

In question 20, 40% believe that their campus is not sustainable, 23% declared that it is a little sustainable building, 34% of the participants announced that it is quite a bit sustainable, and only 3 percent showed that their campus is a great deal sustainable.

**Q 21. From your observation, how would you know if your campus is a sustainability-committed institution?**

All the students who answered this question identified the recycled bin as the only sign that shows their institution is committed to sustainability from their point of view. However it's definitely not the only sustainable strategy that could be applied in their campus yet, they are still young adults who do not have enough experience.

#### 4.7 Instructors' survey analysis

Figures from 4.22 to 4.40 will briefly analyze the responses of the 19 questions of the instructors whom participated in this study;

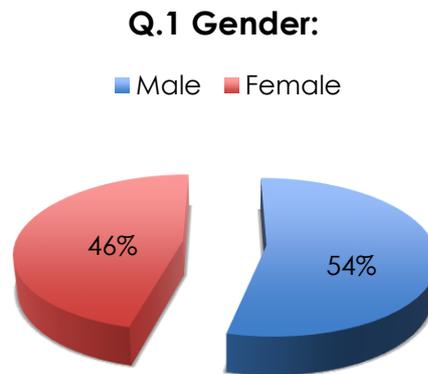


Figure 4.22: Gender of the instructors

As shown above, the female participants were less than the male participants with a percentage of 46%.

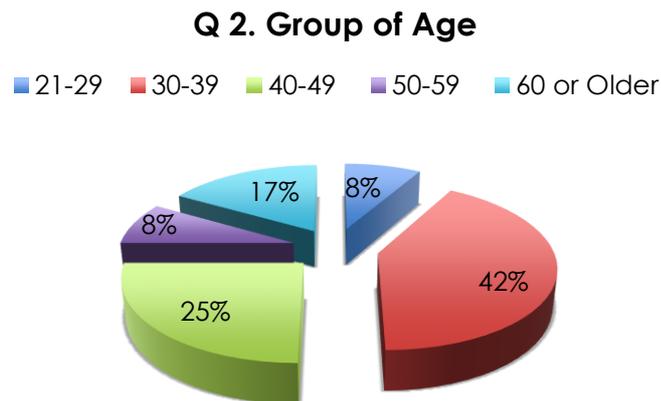


Figure 4.23: Group of age of the instructors

67% from the participants were from the group of 30-39 and 40-49 years. While instructors from 60 years old and above were only 17%. However,

participants between 21-29 and 50-59 years old were the age group who participated the least.

### Q 3. Highest level of Education you have achieved

■ B.A. ■ B.Sc. ■ BFA ■ M.A.) ■ M.Sc. ■ MFA ■ Ph.D.

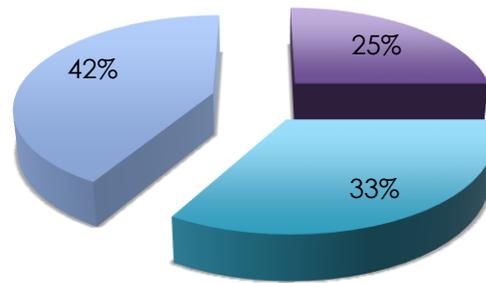


Figure 4.24: Highest level of Education achieved

The majority of the participants were Ph.D. holders (42%), 33% of them achieved the M.Sc. and the other 25% had the M.A. certificate as their highest achievement.

### Q 4. How far are you interested in sustainability and sustainable design?

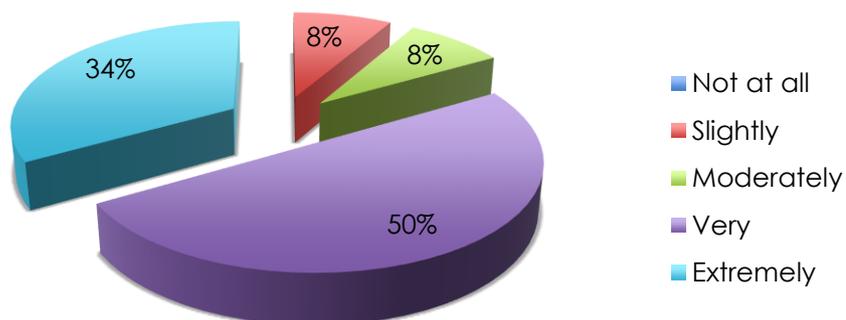
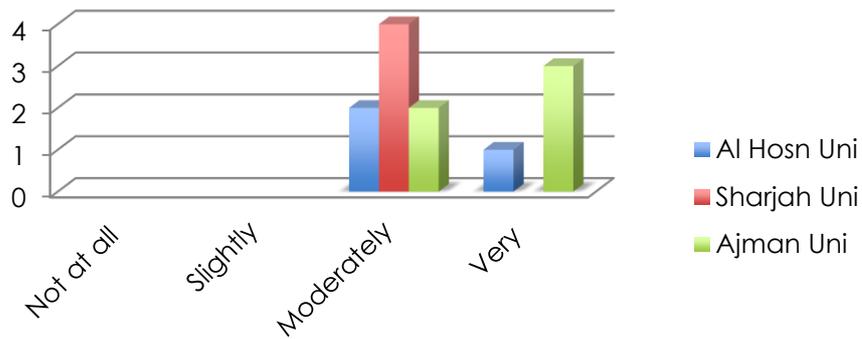


Figure 4.25: Interest in sustainability and sustainable design

Question 4's target was to know how far participants are interested in sustainability and sustainable design. 34% were extremely interested, 50% of them were very interested while the rest of them had answers that varied between moderately and slightly.

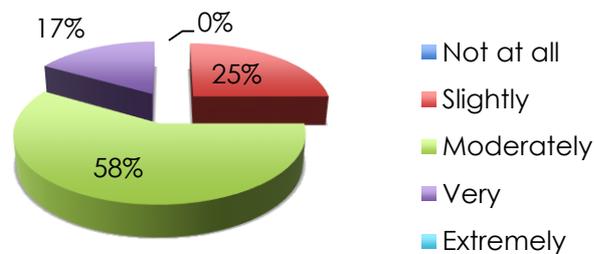
**5. Do you feel that your students are interested in Sustainable Design subject?**



**Figure 4.26: Students interest in Sustainable Design subject**

Al Hosn University 'instructors' feedback on their student interest was from moderately to very, which clearly shows that all students are somewhat interested in the sustainable design subject. In comparison, all Sharjah University instructors notice that their students are moderately interested in sustainable design subject. In contrast, the majority of Ajman University's instructors believe that their students are very interested while the others observe that they are moderately interested.

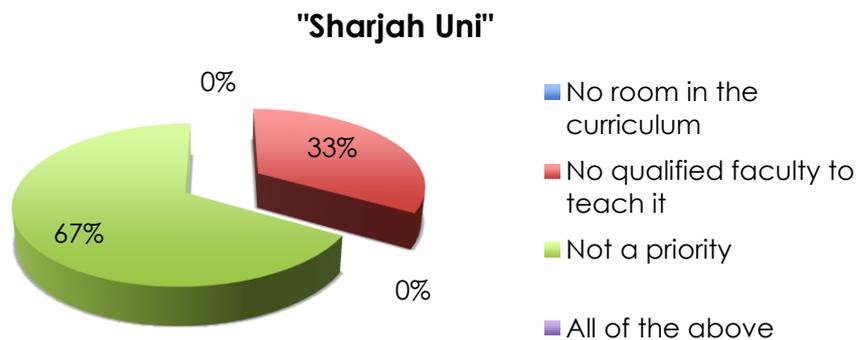
**6. Do you feel that the majority of the ID faculty members in your institution are interested in sustainable design?**



**Figure 4.27: Faculty members interested in sustainable design**

58% of the participants' colleagues are interested in sustainable design, 17% are very interested as the instructors claimed, while 25% are slightly interested in sustainability issues.

**Q7. If your institution does not teach sustainability subjects, please provide the reasons.**



**Figure 4.28: Reasons for not offering sustainability**

In question 7, only Sharjah University answered as 67% of Sharjah University instructors' admitted that the reasons behind not incorporating sustainability into interior design curriculum until now is because it is not a priority. Moreover, 33% claimed the reason was because there is no qualified faculty to teach it.

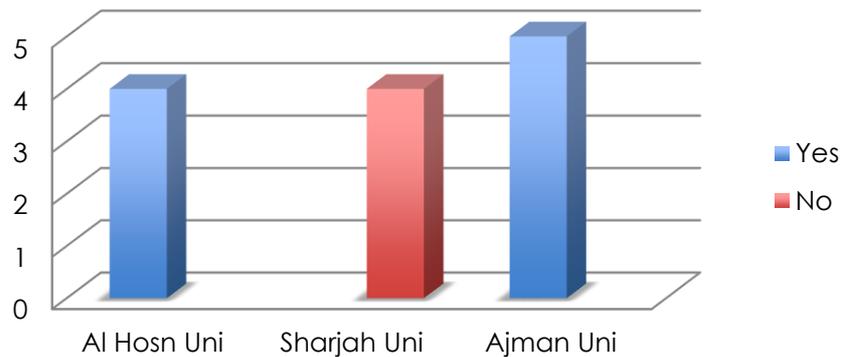
**Q 8. When will you be interested in adding sustainability to your current curriculum?**



**Figure 4.29: Adding sustainability to ID curriculum timeline**

As only shajah University does not offer sustainability course(s), hence only sharjah university replied this question, as Sharjah University instructors' agreed that within 2 years they would add sustainability to their current curriculum.

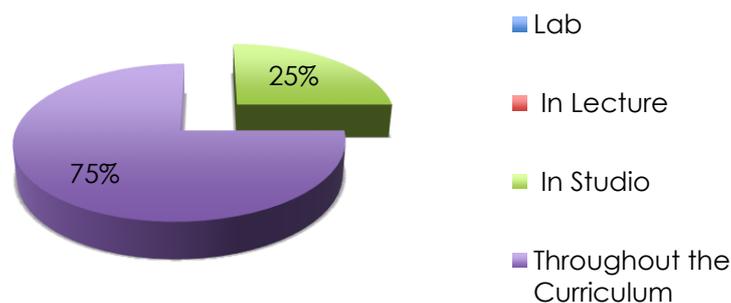
**Q9. Is sustainability included in any area of the curriculum?**



**Figure 4.30: sustainability integration in the curriculum**

The chart above shows that all instructors in Al Hosn and Ajman University answered yes, that sustainability is included in any area of their curriculum, while all Sharjah university participants answered no.

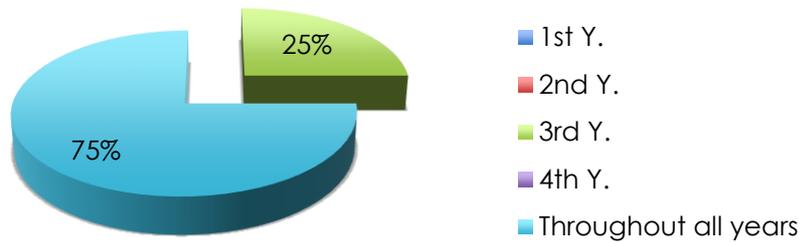
**Q 10. What do you think is the most appropriate approach/strategy to incorporate sustainability into the interior design curriculum?**



**Figure 4.31: The most appropriate strategy to incorporate sustainability in ID curriculum**

75% said that the most appropriate approach to integrate sustainability into the curriculum of interior design is by incorporating it throughout the curriculum while the others believes that the integration through studio would be better.

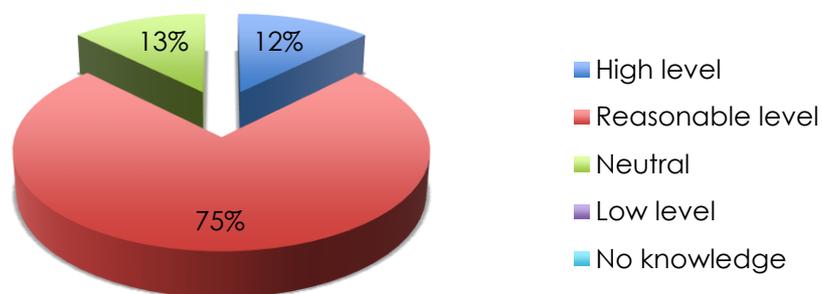
**Q 11. At what level should sustainability be included in the interior design curriculum?**



**Figure 4.32: level of sustainability integration**

The importance of including sustainability throughout all years in the curriculum of interior design was emphasized by 75 %. However, the other 25% see that the integration would be better if it is in the third year.

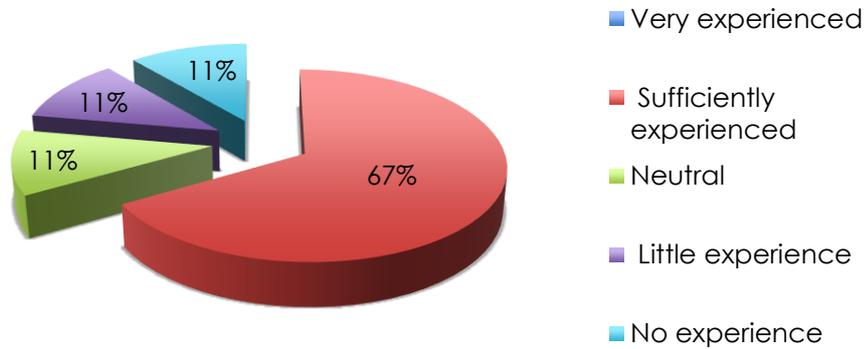
**Q 12. Please rate your level of knowledge with regard to teaching sustainability?**



**Figure 4.33: Level of knowledge with regard to teaching sustainability**

Only 12% of Ajman and Al Hosn instructors rated their level of knowledge of teaching sustainability with high level, whereas the majority of them rated it at reasonable level. Moreover, the others rated it as neutral with 13%.

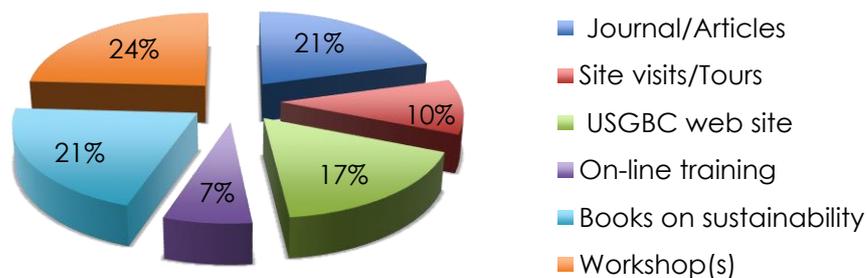
**Q 13. Please rate your level of experience with regard to teaching sustainability?**



**Figure 4.34: Level of experience with regard to teaching sustainability**

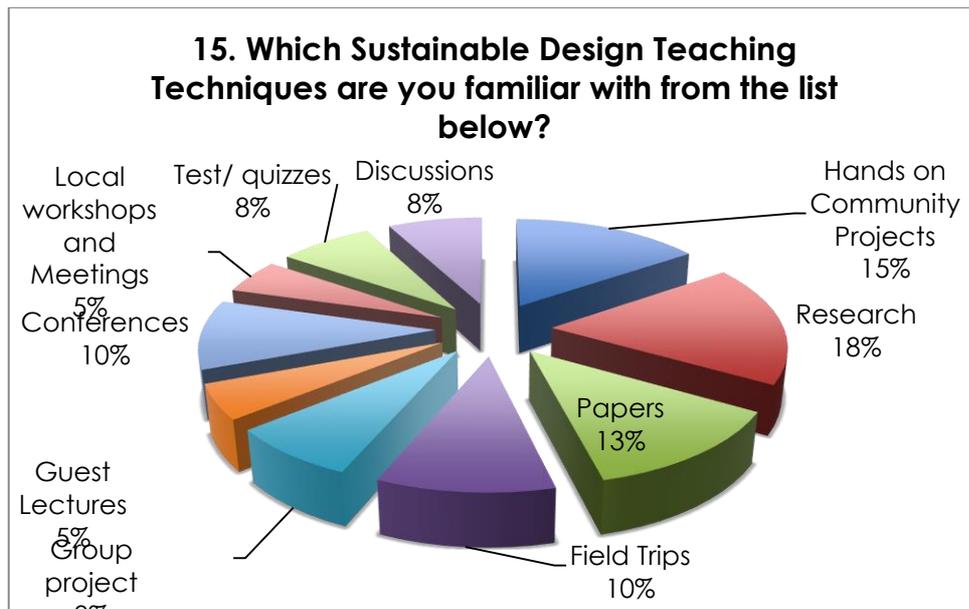
67% were sufficiently experienced as per their judgment while the other three group of instructors' rating varied from neutral, little experience and no experience with 11%.

**Q 14. Please select the resource(s) that would prepare you to teach sustainability.**



**Figure 4.35: Resource(s) to prepare teaching sustainability**

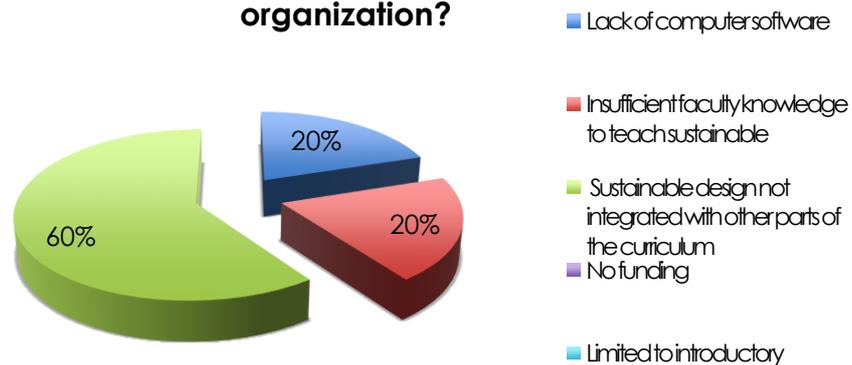
Instructors in Ajman and Al Hosn selected the workshop(s) as the best resources that would help to teach sustainability with 24%, while 21% nominated books and journal, 17% for USGBC web site, 10% for site visits and only 7% selected online training.



**Figure 4.36: Sustainable Design Teaching Techniques**

Figure 4.36 above illustrates which sustainable design teaching techniques the instructors of Ajman University and Al Hosn are familiar with. The most common teaching technique was research with 18%, while next were hands on community projects (15%), and the third most popular was papers at 13%.

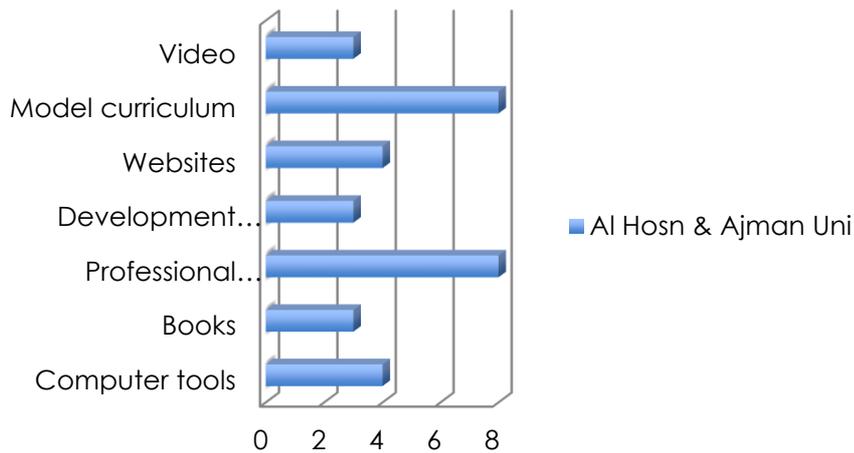
### Q 16. What difficulties have you faced in integrating sustainable courses in your organization?



**Figure 4.37: Difficulties in integrating sustainable courses**

60% of the participants emphasized that sustainable design not being integrated with other parts of the curriculum was the main obstacle. Lack of knowledgeable instructors and computer software were also other barriers.

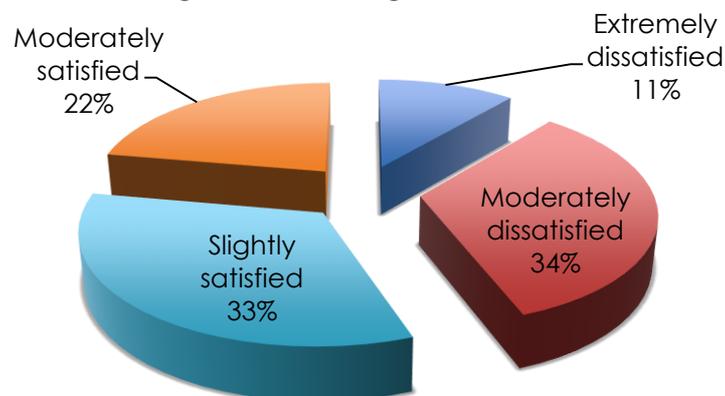
**Q 17. can you select the instructional resource(s), that could help you the most in order to teach sustainable environmental design courses.**



**Figure 4.38: Instructional resource(s) to teach sustainable design courses**

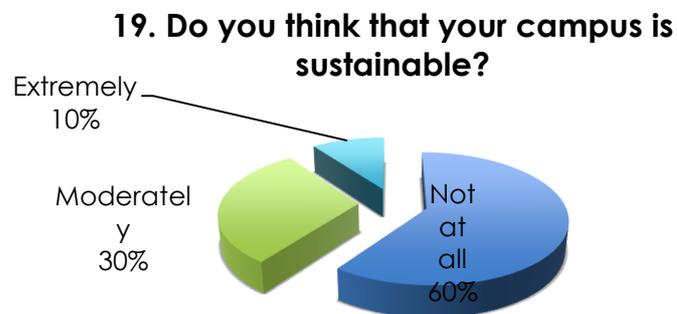
Model curriculum and professional faculty were the most popular instructional resources, which help the instructors in Ajman and Al Hosn University to teach sustainable environmental design courses.

**Q 18. In general, are you satisfied with your existing interior design curriculum?**



**Figure 4.39: satisfaction with your existing interior design curriculum**

Almost 45% from the participants in both universities are not satisfied with their existing interior design curriculum between 11% (extremely dissatisfied) and 33% moderately dissatisfied, while the other 55% are satisfied with it, with 33% slightly satisfied and 22% moderately satisfied.



**Figure 4.40: Situation of the campus**

As shows in the chart above, with a majority with 60% does not consider their campus sustainable, while the other 30% and 10% see it as moderately and extremely sustainable respectively.

## **4.8. Interview Responses**

As described earlier, a total of six phone call interviewees were conducted with willing instructors,

The following is a brief synopsis of the interview responses. For detailed transcripts of all the interviews, please see Appendix B.

### **1. What is your existing teaching position?**

Two of the instructors are holding the position of Assistant professor however the rest are currently working as Lecturers

### **2. Who accredits your University?**

All respondents said CAA accredited their institutions.

**3. Which area of teaching you are in? For instant Theory, studio, lab,,,**

Two of the instructors are teaching both theory and practical, however, the rest are involved in studio area.

**4.Are you teaching interior design for a quite long time?**

Three of the educators are teaching interior design for 7 to 8 years while the other three have been teaching in this field for more than 15 years.

**5. And how many years have you been teaching sustainability?**

Almost all the interviewees have been teaching sustainability for 2 to 3 years; however, instructor 4 has been teaching sustainability for 8 years.

**6. Your education or experience about sustainability based on what?**

About half of the participants' education or experience on sustainability is based on their master's degree and the other half is based on their individual efforts like for instance, books, journal articles and related research, etc.

**7. And what was the motivation?**

All the interviewers seem to be somewhat motivated towards saving the environment. However, there are challenges as Instructor 1 stated "To be updated always with anything new as it is the future language for the designers" while said Instructor 5 added "many factors actually, the first one is to create a new motivation to the new generation, as there is a gap between the market and the education" additionally instructor 6 suggested that "the first motivation comes from the need to update myself in order to know everything my students might ask about, then when I read more and more I got obliged towards the environment".

**8. What difficulties did you face while developing sustainability curriculum?**

From question 8's responses we can conclude the difficulties, which faced the instructors, starting with instructor 5 as she stated "Actually I have two experience with different two universities, and both of them sustainability is not included in the curriculum, one of the universities it is not mentioned at all.

However the other one it's only mentioned as a minor part in material course but in design courses it's not available at all as well". However Instructor 6 stated "still the faculty not yet convinced to add more sustainability courses but we are still trying". And Instructor 2 added "the society in general is not accepting the idea, as it is still new for lots of people here" while Instructor 3 revealed "Mainly that the faculty itself, as they think that we don't need it, it's not a priority for them, this is the problem".

Instructor 4 believes that the main obstacle, which is facing him, is "that it just takes time as it has to make it as a cultural for the students, not only by offering one elective course. Finally instructor 1 seems to have different experience as she stated, "No I didn't face any".

### **9. Does your university offer sustainability course(s) on its campus?**

Interviewers 1, 2 and 6 stated that they have only one course offered in their institution while Instructor 2 said that in his university two courses are offered. But Instructor 5 sadly claimed "As I mentioned in interior design curriculum no, we don't offer any, but for other majors yes they do have integrated sustainability", while Instructor 4 proudly showed that "for us it's different, as our sustainability course is compulsory course, moreover sustainability is integrated with other three courses; interior design studio III, lighting and material course".

### **10. Do you think sustainability is a vital part of an interior design education?**

All the interviewers agreed that sustainability is a vital part of an interior design education, however, instructor 5 elaborated that "yes surely it is, actually am an architect but since 5 years am teaching interior design and from my experience I figure out that interiors are dealing with lots of specific elements which is indoor air quality and the materials as we spent 90% of our timing in interior spaces, so it affect our health and mode so it is very important. I believe that integration between the architecture and the interiors are very important as well to achieve the sustainability".

## **11. And usually which areas do you cover within the sustainability courses?**

As the interviewers' area of teaching sustainability vary accordingly its better to mention all of their responses. Instructor 1 mentioned "Sustainable fabric and the impact each fabric on the environment" and instructor 2 claimed "because am teaching sustainability for interior design and it is a stand alone course so am trying to cover everything generally related to sustainability, and we don't go deep to the detailed topics but we give only the general ones that are related to the indoor environment then we gradually grab the attention of the students to the sustainable interior spaces".

Moreover, Instructor 3 stated "Actually am trying to emphasize the importance of material selection and usage of natural day lighting as well as the water and energy systems" While instructor 4 said that "The theory part talks about the sustainability philosophy and methodology of it but if we are talking about studio, so we will discuss the implementation of the sustainability through reducing the use of raw material, using the recycled material, using the natural light, how I can I use the smart technology, the furniture itself how can I create it while reducing the energy consumption.

Additionally as instructor 5 has different situation she stated that "in the syllabus sustainability is not mentioned at all but all the time am trying to emphasize the importance of the natural light, the north and south and the location of the building, choosing the materials that has low embodied energy and low environmental impact, using reused or recycled materials and flexibility in designing". And instructor 6 concluded "topics like climate change, Co<sub>2</sub> emissions, C2C, embodied energy, triple R, selection of materials, usage of natural lighting, passive ventilation, water and energy systems, human comfort and all related topics".

## **12. How can you develop and improve your lecture on sustainability?**

The instructors' usually improve their lectures through Videos, web sites, books, journal articles, latest research and exploring new materials in market. However instructor 2 and 6 added that visits to sustainable projects and

governmental projects like Masdar or DEWA will be quite helpful. Moreover instructor 5 stated “I join lots of conferences to update myself actually, but for my students, there is no any sustainability course, but I suggest a course and I submitted it already to my department, this course is about adding sustainability as an elective course for all students, even for whom study art is part of sustainability as we reuse the fabrics we reuse the material to make other piece of art or whatever”.

### **13. Do we need more research about sustainability?**

All the participants totally agreed that we need more research about sustainability, however Instructor 4 claimed “everyone is obliged towards the environment so it is never enough when it comes to researches” while instructor 5 stated “we need more especially in the Middle East as the awareness is less here”.

### **14. Is sustainability in interior design limited only to product specifications and material?**

The interviewees disagreed that interior design is limited only to product specifications and materials as they showed that it's also related to lighting and ventilation systems, energy and water systems, human health, the cost and the economy. However, Instructor 6 added “No way, it related to everything related to human comfort and indoor air quality and those keywords have lots of sub keywords, so you can imagine the interior planet”. And lastly Instructor 5 stated “the role of interior designers are involved with many things, such as the location of the window opening area to create passive ventilation or to get the maximum benefit of the daylight, flexibility methods should be followed for furniture designs. Again integration between the architect and the interiors are very important, architects are the skin and interiors are the veins”.

### **15. Are we, as interior design instructors knowledgeable enough to teach sustainability or not?**

The replies to this question were varied, as instructor 6 stated, “Yes and no, actually yes as a starting and no as we have to be always updated. Hence

each instructor should evaluate his/her situation and then develop the level of his/her knowledge”, while Instructor 5 claimed “I think we need to be involved in sustainable projects as theories is not enough for instructors practices is important as well”. And the rest of the instructors clarified that although they have knowledge but it is still not enough as instructor 2 specified, “I think sustainable education like any type of education, it is a non-stop education, so we should always keep developing ourselves to proof that we can teach it”.

**16. Do all the design instructors encourage the students to do green projects? If no, why?**

Five of the interviewers doubted that all the design instructors encourage the students to do green projects except instructor 4 as he stated “instructors who are teaching studio here are encouraging them, but in studio III it is not optional they have to do their project sustainably”. The instructors all agreed that it might be because of the lack of knowledge. However, instructor 3 added that “it’s not as a priority for them, they don’t see it as an important thing to the students, and they refuse to change the way of teaching”.

**17. How many instructors in your University are obliged to carry the responsibility of those students?**

It seems that the availability of instructors whom are obliged to carry the responsibility of teaching students how to integrate sustainability within their projects are very limited as in Instructor 1 emphasized the importance of improving our level as educators to be always really obliged, however instructor 3 and instructor 5 mentioned that its only them in their departments, while Instructor 5, 4 and 2 have two instructors in their institution.

**18. What is the role of the higher education in order to raise the level of awareness for the instructors to ensure sustainable projects as outcomes?**

Most of the instructors expected from the higher education to organize conferences, workshops, seminars and symposiums for all instructors, to improve the level of the ones whom are involved already with teaching sustainability and also to motivate others whom are not. But instructor 1

added “the higher education should keep monitoring the faculty-developing center and provide them with the needed updates”. And instructor 3 underlined that “communication with the market is very important to be updated with the market needs and nowadays all the market is moving towards sustainability as we see in Abu Dhabi for an example. To sum up there should be a link between the market and all institution so when the students graduates they will be ready for the market needs”.

However Instructor 2 seems to have another point of view as he stated “first of all each instructor should start from himself to remove the fear of getting into this field, it is not something scary, we should all know about it, then once you start by individual efforts you can join any governmental support or any support around, it’s there but we have to search as well for it”.

### **19. What are your recommendations in order to enhance the level of sustainability in the interior design curriculum?**

All instructors’ recommendations emphasized the importance of integrating sustainability throughout the entire interior design program gradually, as instructor 4 explained “It should be integrated with all aspects of interior design, because we have sustainability in lighting and lighting is a part of interior design, same for acoustical solution, same for fabrics, furniture all are also parts of interior design aspects. Sustainability should be incorporate in all aspects of interior design”. While instructor 1 stated that, “Sustainability should be mentioned in the submission requirements throughout design I, II, III, IV and V so in graduation project we will harvest what we have been seeded through all of the design courses”. But the minimum integration according to instructor 5 said, “should start at least from year two, one course should deal with all the materials and its impact, and another course for elaborating sustainable principles and concept and how I can implemented in designs”

Instructor 2 also added “I think we need as well a sustainable material lab so students can touch and feel the texture, they can see the photo voltaic cells this is our role as an instructors to fulfill all the gaps of the students”.

And additionally instructor I declared “we should to minimize the credit hours of the universities’ requirements and increase the core or the major credit hours in order to focus more in the market needs, as the completion out there is really high”.

# Chapter V

## Results and discussion

### 5.1. Introduction

This chapter will analyze the data collected to clarify the key findings and implications from each process and attempt to answer the research questions posed earlier in this paper in order to fulfill its rationale of this study.

### 5.2. Sustainability within the UAE Universities

Table 5.1 addresses one of the secondary questions by presenting all accredited universities along with summary of offered courses.

**Table 5.1: All accredited universities in the UAE along with summary about their details- (By Author)**

No	University name	No. of Sustainable courses	Type of course	Obligatory	Elective	Core Cr. H	Elective. Cr. H
1	American Uni. Of Sharjah	1	Not specialized	-	<b>IDE 352</b>	87 (68%)	42 (32%)
2	American University in Dubai	1	Not specialized	-	<b>SCIE 211</b>	85 (68%)	39 (32%)
3	University of Sharjah	None	-	-	-	89 (79%)	24 (21%)
4	Al Ghurair University	3	Specialized Not specialized Specialized	<b>IDS 307</b> <b>IDS 313</b> <b>IDS308</b>	- - -	93 (75%)	30 (25 %)
5	ABU DHABI UNIVERSITY	1	Specialized	-	<b>ARC 540</b>	93 (70%)	39 (30%)
6	Canadian University of Dubai	2	Specialized	<b>DESI 270</b>	<b>DESI 420</b>	104 (77%)	30 (23%)
7	Ajman University	2	Specialized Not specialized	<b>290 306</b> <b>290 107</b>	- -	107 (80%)	27 (20%)
8	Manipal University	2	Not specialized Specialized	<b>IDE 229</b> <b>IDE 221</b>	- -	127 (100%)	-
9	American University in the Emirates	None	-	-	-	84 (67%)	42 (33%)
10	ALHOSN University	1	Specialized	-	<b>INT 472</b>	105 (81%)	24 (19%)

**IDE 352:** Environmental Control Systems in Interior Design  
**SCIE 211:** Water sustainability  
**IDS 307:** Sustainable design  
**IDS 313:** Healthy Indoor Environment  
**IDS308:** Design studio III  
**ARC 540:** Sustainable design  
**DESI 270:** Sustainability of Buildings 1

**DESI 420:** Sustainability of Buildings 2  
**290 306:** Sustainability for ID  
**290 107:** Materials Technology  
**IDE 229:** Building Construction & Materials – IV  
**IDE 221:** Interior Design - Commercial Design  
**INT 472:** Sustainable interior design practices

**Secondary Questions:** 1. What is the current status of sustainability in the curriculum of the interior design program in the UAE?

**Answer:** 70% of the universities in the UAE, which offer interior design major and are accredited as well, are offering sustainable courses; accordingly, the other 30% are not. Unfortunately, only 30% of these universities are offering obligatory Sustainable courses. Therefore, the rest of the 70% of are offering

only elective Sustainable courses, which means 70% of the students might take it or might not.

50% of the universities are offering specialized course, which means they are involved with design practices, and only 20% integrated sustainability within the requirements of design studio.

### **The ratio of Core Credit Hours to elective Credit Hours**

Due to the alarming situation that the United Arab Emirates is facing, Ministry of higher Education should focus on minimizing the elective credit hours as a solution to be competent in the market and compete globally with other universities. As an observation noted, elective credit hours usually lower the GPA and does not add value to the knowledge interior designers need. As figure 5.2 illustrates the range of elective credit hours is between (20-33%). On the other hand, only one University, which is Manipal University, offers a program, which consists of only core credit hours therefore the Ministry of higher education, can achieve a dynamic balance between the ratio of core credit hours and elective credit hours. Consequently, the current and future interior designers will have the adequate knowledge and information needed to compete globally on the same level.

### **5.3. Assessing three levels of interior design curriculum**

In this section students' final projects will be compared among the participating universities. Firstly, Ajman University's graduation projects before and after 2013 will be presented. Next, Sharjah University's projects will be analyzed and finally, Al Hosn University projects will be looked into. Then, an overall comparison will be made.

#### **Evaluation and comparison criteria:**

1. Do the projects include any elements related to the environmental impact of the chosen material?

2. Did students consider the daylight factor when designing their projects?
3. What kind of furniture did the students depend on? Did they use recycled or reused furniture in order to reduce the waste?

**Ajman University before 2013:** 17 graduation projects of students were collected and evaluated, and they were mainly designed based on design bases and principles without considering and mentioning at all the sustainability principles. None of the evaluation criteria were considered in the 18 projects before 2013 please see Appendix E-1. Hence, the necessity to integrate sustainability principles in the curriculum of interior design program has become seriously significant as Talib and Sulieman (2012) pointed out.

**Ajman University after 2013:** After teaching sustainability course as a specialized elective in 2013 which was offered, the students started to get interested about sustainability and the desire of learning and searching about applying sustainability in their projects was planted. The percentage of the students who were interested and applied sustainability in their design projects increased by 2% before and after 2013. This was suggested by Whitemyer (2007) in Crane, 2008, p. 33), who stated that “Education is the only thing that will drive green design into the mainstream”.

Although it is a small percentage of increment but it is promising as within a year the curve has been raised. The two students showed a great deal of concern about using sustainable material and where to use durable material and where to use flexible ones. They also used recycled and reused elements for the furniture and the accessories for each space in both projects. As showed in project no. 1 in Appendix E-2 the student used green roofing to act as insulation and cooling method as well, to suit the UAE weather. While in second project the student used sunlight transport system in order to get the maximum benefit of the natural daylight besides sun-censored solar cells as showed in project no. 2 in Appendix E-2. Both of the projects have considered the three evaluation criteria.

**Sharjah University:** Prior to 2015 there were no graduation projects submitted, however, after recruitment of a new instructor who had sustainable background, four projects showed promising results in this semester for graduation I, which is step one before Graduation II. The four projects showed the potentials of considering the environment by all aspects as a first step which will be continued and implemented in the coming semester. They mentioned as well the daylight factor as one of the energy saving strategies. However, they didn't mention the type of furniture they will be using Check Appendix F.

**Al Hosn University:** Although Al Hosn University is offering Sustainable interior design practices INT 472 course but none of the graduation projects until now considered sustainability. Unfortunately, their graduation projects could not be analyzed due to confidentiality reasons set by the university's management.

**Secondary Questions:** 2. How can multiple level of integration affect the students' in the three selected Universities?

**Answer:** In the three universities, it shows that the students' attitude was mainly personal, which means that if only the student is interested in sustainability he/she will ask the design instructor about how he/she could apply sustainability principles on his/her interior spaces. It depends then if he/she is lucky to find design instructors are who knowledgeable enough to guide them. If the design instructors include sustainability in their submission requirements, all the students would consider the environment in their upcoming projects.

Thus, as Crane (2008), highlighted the role of the instructors is crucial. Availability of instructors with expert knowledge is critical; as if the instructors are knowledgeable they will encourage students and enlightened them, but if they are not, they will guide the students will be taught to deal with their projects only through the design aspects.

## **5.4 Seeding sustainability in each studio in ID III course: Field experimental feedback**

According to Malhadas (2003), in order to have a sustainable future, education needs a different method of teaching, thus it is important to vary the teaching approaches. Hence, when more teaching methods for ID III students' were added; the data showed that their reaction was surprising, as well as in every lecture students were asking for more information about sustainability. This means that they can absorb any amount of sustainability given to them. Some of the students were even searching for extra information, which means that they were really interested. Within a quite a short time the students showed an impressive improvement in their level of knowledge about sustainability principles and solutions, knowing that by sustainable designs they would definitely reduce the environmental impact of their design projects without affecting the design aspects. As according to Templeton (2011) sustainability should be one of the major aspects of interior design, alongside with the functions, aesthetics, accessibility, and building codes.

After 8 weeks of hard work from teacher, the students' projects have been evaluated as a first evaluation by instructors who have sustainability background and experience, based on extensive criteria to get the maximum amount of constructive criticism so the students can improve their level in the coming projects. The points, which the students will be evaluated on, included the material selection of the interior elements (wall, ceiling and flooring), the acoustics treatment and the usage of the natural daylighting as Berman (2008) and Gordon (2003) confirmed that daylight if available, it reduces dependency on using artificial light sources all throughout the day.

The 38 projects showed great amount of understanding how they could make differences to the interior spaces through choosing material criteria, and how they could transfer the interior spaces from a spot full of emissions and far away from any environmental consideration to better zones that provide more

human comfort to the users and ecofriendly environment. As approving from Kang and Guerin (2009); the interior design specialists are having a direct impact on anybody in two vital areas in the built environment, first is the interior finishing materials and second is the indoor air quality. Table 5.2 presents the choices of the materials, which the students selected to suit their design and to be sustainable as well, please see appendix G.

**Table 5.2: Choices of the materials by the students-** (By Author)

Flooring materials	Ceiling materials	Wall treatments	Acoustical solutions	Usage of Daylight
- Concrete	- Metal ceiling	- Concrete	- Sustainable sound	-Smart, sage,
- Reclaimed wood	- Reclaimed wood	- Recycled glass	proof paneling	silicon glass
- Concrete pre-cast tiles	ceiling	- Non-VOC paint	- Spray for sound	window
- Rubber	- Exposed ceiling with	- Wood wool	reduction	- Light shelf
- Bamboo	suspended acoustic	- Sustainable	- Recycled cotton	- Curtain
- Sustainable carpet tile	panels	acoustic partitions,	-Sustainable	
- Cork	- Mineral fiber	- Stones,	absorptive material	
	- Stretching	- Recycled bricks	- Electronic masking	
	- Fabric ceiling	- Recycled	system	
	- Recycled	acoustical fabric	- Sustainable acoustic	
	- Gypsum board		tiles	
	- Concrete drop ceiling			
	- Barrisol			

For flooring treatments almost all of the students chose sustainable materials; Concrete, reclaimed wood, concrete pre-cast tiles, rubber, bamboo, sustainable carpet tile and cork. While for ceiling materials they mostly chose; metal ceiling, reclaimed wood ceiling, exposed ceiling with suspended acoustic panels, mineral fiber, stretching Fabric ceiling, reclaimed wood, recycled gypsum board, concrete drop ceiling and lastly barrisol material.

Additionally, the wall treatment which were chosen by the majority of the students were mainly from; Concrete, recycled glass, non-VOC paint, wood wool, sustainable acoustic partitions, stones, recycled bricks and recycled acoustical fabric.

However not all the students present acoustical solution, as some of them chose; sustainable sound proof paneling, Spray for sound reduction, recycled cotton, Sustainable absorptive Material, electronic masking system and sustainable acoustic tiles. For the daylight usage and controlling the glare as well, the majority of the students used; smart, sage, silicon glass window, light

shelf and also curtain which is the most common treatment. Moreover all the students chose the LED lighting instead of halogen, as it is the most energy efficient, however the rest have chosen metal halide. For the furniture selection, some of them selected; up cycled waste wood and recycled furniture however the rest did not mention the material and just present the photos.

**Primary Question:** To what extent can early integration of sustainability within design studio change the mind sets of interior designers so they can graduate by default-sustainability conscious IDs?

**Answer:** In the previous years, there was only one project in design III level, submitted a sustainable project between all of the students' projects that have been submitted but after the field experiment, the 38 projects that were received applied sustainability principles in their projects. Results indicated that they are now aware of each design step and its impact on the environment as McDonald (2005) confirmed that designers should put emphasis on the sustainable design process instead of the finished product of the sustainable building. Furthermore, recently they are aware of the sustainable materials that could be used for flooring, ceiling, wall treatment and acoustics as Kang and Guerin (2009) confirmed that one sufficient solution available to interior designers to conserve natural resources is to specify long-term and sustainable materials as well as recycled materials. To sum up they are totally now knows their role as interior designers, for example, one of the students' ways to express their obligation towards the environment they are now against printing any sort of papers.

Thus, incorporating sustainability in each design class will surely enhance the awareness of the students about sustainability, as Stegall (2006) confirmed that the knowledge about sustainable design will significantly improve the effects on the environment the interior designers are creating on the earth and enable them to remove non-sustainable standards and practices. Accordingly, without any doubt if sustainability is seeded through design I, II, III, IV, V until the final design project, the students will graduate as sustainable interior

designers. As Stieg (2006) highlighted that the interior designers should be aware and trained enough to be ready for advising clients who are keen to reduce carbon emissions, ready for contributing with the whole society in saving the environment by being a sustainable interior designer.

## **5.5. Students' survey results**

While analyzing the students' responses to the survey many interesting outcomes were identified. These outcomes are divided into three divisions: students' awareness of sustainability, Sustainability incorporation and finally the role of instructors. The proceeding will discuss these three categories:

**Students' awareness of sustainability:** Question four results showed that the awareness of the students who are studying in Sharjah University which do not offer sustainability course in its interior design curriculum is much lower compared to those students at other universities that offer sustainability course(s).

Question five mainly indicates awareness to the role of spreading the sustainability concept from the school stage, as only 16% of the students claimed their source of sustainability knowledge were based on school. Hence, the ministry of education could increase the amount of sustainability given to the school students' creatively.

From question six responses, it was very clear that almost all the students are interested to know more about sustainability, which will be as a message to the higher education to increase the sustainability portion in the interior design curriculum.

Question seven, eight, nine and ten answers already been analyzed in Sustainability within the UAE Universities part.

In question 11, as progression to what has been discussed above, 66% of

students did not apply any of the sustainability principles to their projects. The 20% who chose '**A little**' is worrying as this level is not enough to graduate as sustainable interior designers. Overall, this shows only 14% students applied sustainability to 86% who almost did not apply.

**For this part two questions were raised:**

1. What is the role of the UAE Ministry of Education to raise awareness of sustainability among school students' in a creative way?
2. What is the role of higher education to increase the sustainability portion in the interior design curriculum?
3. What is exactly our role as educators to raise the percentage of applying sustainability to our students' projects?

**Sustainability incorporation:** For this part, one question got two answers; How we can integrate sustainability in the interior design curriculum?

Responses of question 12 and 13 answered that question. Responses of question 12 showed that 89% of the students seems that they agreed to see more courses offered related to sustainability while in question 13's answers, 97% from our students believes that integrating sustainability in each design class is helpful. Hence one of the helpful strategies to integrate sustainability into our curriculum could be via incorporating sustainability within each design class and add more courses related. While, CIDA, (2006) clearly stated that there are five standards out of the nine standards made as specific referenced goals such as the indoor air quality, green design, sustainable building methods and materials, sustainability, and environmental ethics and these should be included all throughout the curriculum El-Zeney's (2011).

**Instructors' role:** 48% of the students declared in question 14's replies that their instructors' level about sustainability is "**A little**", moreover 9% believes that they don't have any knowledge, so total percentage of not enough knowledge is 57%. However, responses of question 16 and 17 showed that there is lack of information given about the materials impact and the local building regulations. However (Crane, 2008), mentioned that training and

educating instructors are necessary for environmental education to reach its goals and objectives across the globe.

**For this part two questions are popped;**

1.What is the role of the faculty-developing center in each university in the UAE to develop the instructors' knowledge and awareness?

2.What are specifically needed from each instructor to improve his/her level individually?

## **5.6. Instructor's survey results**

The instructors' survey opened a debate between the instructors within the same university around lots of questions in the survey. However, analyzing the instructors' charts shows many results; these results will divide into four divisions related to instructors'; interest about sustainability, sustainability incorporation feedback and obstacles facing them. The coming part will go through them shortly;

**Instructors' interest about sustainability:** Question 4 responses' showed that mostly all of the instructors are interested however their level of interest varies. This implies their awareness about sustainability is at a good level and they have good intentions to discover more about it.

**For this part one question raised:** 1. If the instructors are interested in sustainability, what is missing in order to encourage our students to do more green projects?

**Sustainability incorporation:** In question 10, 75% of the instructors' answers emphasized that the most appropriate strategy for incorporating sustainability is throughout the interior design curriculum while the other 25% of the participants believes that through the studio. Crane and Waxman

(2009) also agreed that it is better for the students to incorporating sustainability throughout the interior design curriculum. Moreover, the IDEC offered to McDonough and Braungart to include recommendations for incorporating the principles of sustainable design in the undergraduate curriculum, Stieg's (2006).

In response to question 11, instructors acknowledged that importance of including sustainability throughout all years (75%), while other instructors stated that it is better to offer sustainability starting from third year (25%).

**One more question is posed:** 1. How can higher education move towards incorporating sustainability throughout the entire curriculum and throughout the studio?

**Obstacles in integrating sustainability:** Question 16's responses showed that the obstacles which the instructors are facing in integrating sustainability are mainly: sustainable design is not integrated with other parts of the curriculum (60%), lack of knowledgeable instructors to teach these courses (20%) and lack of computer software (20%). Additionally, question 17's answers showed that most of the instructors emphasized the need of a model curriculum and expert faculty members to help them. .

**Overall satisfaction for both students and instructors;** 45% from the instructors in Ajman and Al Hosn universities are not satisfied with the existing interior design curriculum. Similarly, the majority of the students too are that satisfied with their curriculum as 12% answered no and 46% answered a little. These responses need attention from the higher education in the UAE.

## 5.7. Interview's survey results

The phone call interview results mainly revealed what are the obstacles which are facing the instructors who are teaching sustainability while integrating sustainability into the interior design curriculum, besides giving their recommendations and what could be needed to facilitate their mission to produce sustainable interior designers for a better future. Below are the additional outcomes, which the surveys' results do include.

**Not a priority:** as of the instructors highlighted "It's not as a priority for them, they don't see it as an important thing to the students, and they refuse to change the way of teaching". Moreover, Bergman and Doering (2007 in Crane, 2008) mentioned that numerous instructors have not gained any formal training in environmental or sustainable design because this field either was not given full attention or was not available at their time.

**Sustainability and change culture:** as one of the interviewees' said "The society in general is not accepting the idea, as it is still new for lots of people here."

However, another one added "Mainly that the faculty itself, as they think that we don't need it, it's not a priority for them, this is the problem, that it just takes time as it has to make it as a cultural for the students, not only by offering one elective course". While according to Hutchison (1998 in Crane, 2008) the universities have the responsibility of formally inculcating each generation the values and norms of the current culture.

**Lack of experts Instructors:** Half of the instructors' education or experience about sustainability is based on their master's degree and the other half is based on their individual efforts. Moreover, it seems that the availability of instructors who are obliged to carry out the responsibility of teaching our students how to integrate sustainability within their projects are very limited as instructor 1 emphasized the importance of improving the level of educators to be always really obliged towards the students. However, Stegall (2006) and

Stieg (2006) argued that educators who were trained and studied sustainability principles are necessary to teach sustainable standards and practices. And in Crane, (2008) the Brundtland Report of the World Commission on Environment and Development (1987), has highlighted that teachers around the world have a great responsibility in helping to effect the general social transformations needed alongside to a sustainable future.

**Role of higher education:** Most of the instructors expected higher education organizations to organize conferences, workshops, seminars and symposiums for all instructors, to improve the level of the ones who are already involved with teaching sustainability and also to motivate others who are not, as one of the instructors added that they should be “monitoring the faculty-developing center and provide them with the needed updates”. Hence according to Second Nature Inc. (2005, in Crane, 2008) the higher education is still the foundation that helps the sustainable society to grow besides it plays a significant part in the creation the values and knowledge to the society.

**Recommendations for instructors:** All instructors’ recommendations emphasized the importance of integrating sustainability throughout the entire interior design program gradually as one of them mentioned “Sustainability should be mentioned in the submission requirements throughout design I, II, III, IV and V so in graduation project we will harvest what we have been seeded through all of the design courses”.

However, another instructor who stated “there should be a link between the market and all institution so when the students graduates they will be ready for the market needs” made another recommendation.

The need of the material lab was highlighted as well besides the need for doing more research especially in the Middle East as the awareness is less here. “I think we need to be involved in sustainable projects as theories is not enough for instructors practices is important as well” as one of the interviewees recommended. Additionally, minimizing the credit hours of the

universities' requirements and increasing the core or the major credit hours in order to focus more in the market needs is also heightened. As Stieg (2006) stressed that the interior design business has the basic chance of integrating sustainable design in their profession. And he added, this possibility, interior designers should have the training, knowledge, and information about sustainable design to enable them to offer their customers sustainable design solutions.

# Chapter VI

## Conclusion

### 6.1. Introduction

In this chapter, the major question of this study will be solved by showing how early integration of sustainability within design studio can change the mind streams. Hence, the current status of sustainability in the curriculum of the interior design program in the UAE will be presented. Then, the assessment of multiple levels of integrations in the three selected Universities and how it affects the students will be shown as well.

This chapter will also discuss the difficulties and limitations, which faced the incorporation of sustainability into the interior design curriculum from the instructors and students point of view through the surveys and the phone call interview feedback.

### 6.2. Summary of Findings

#### **Sustainability within the UAE Universities**

70% of the universities in the UAE, which are offering interior design major and accredited as well, are offering sustainable courses; accordingly, the other 30% are not. Unfortunately, only 30% of these universities are offering obligatory Sustainable courses, therefore, the rest 70% of are offering only elective Sustainable courses, which means 70% of our student might take it or might not. 50 % of the universities are offering specialized courses, which are related to design practices, and only 20 % integrated sustainability within the requirements of the design studio. Moreover the ratio of the core credit hours and elective credit hours showed that the range of the elective credit hours in these universities is between (20-33%).

### **Assessing three level of interior design curriculum**

In the three universities, it shows that the role of the instructors who are ready to help is very critical. In the three universities, if the students are interested in sustainability they will ask the design instructor about how they could apply sustainability principles in their projects, and it depends again if the instructors are knowledgeable enough to guide them or not. In Ajman University, the percentage of the graduation projects with sustainable ideas increased 2% after applying sustainability for interior design course in 2013. Although it is a small percentage of increment but it is promising as two of the students who have taken this course in 2013 became motivated and applied it in their graduation projects in 2014, which means that within a year the learning curve was raised.

Hence, the outcomes of Ajman University are higher than Sharjah University and Al Hosn. However, Sharjah University's outcomes are more than Al Hosn outcomes, although Sharjah University does not offer any sustainability course(s) but the role of the instructors appears as equivalent with offering a course. Unfortunately, there is no sustainable graduation project as an outcome from Al Hosn University although they are offering one sustainability course.

To sum up, it can be concluded that offering sustainability course(s) can raise the awareness and the outcomes, however, the role of the instructor is equally as important as offering a course.

### **Seeding sustainability in each studio in ID III course**

After incorporating sustainability in each design class in design III a as field experiment by giving lectures about the objective needed which could be concluded in reducing the cost, considering the environment through all design steps and the human comfort factors as well to enhance productivity and the wellbeing of the employees, 38 projects applied sustainability principles on their projects and they are aware now of each design step and its impact on the environment, aware of the sustainable materials that could be used for flooring, ceiling, wall treatment and acoustics. In conclusion, they

felt how obliged they are as interior designers towards their environment. Consequently, seeding sustainability through design I, II, III, IV, V until the final design project means that the students will graduate as a sustainable interior designer.

### **Difficulties and limitations, which prevent the incorporation of sustainability into the interior design curriculum**

In this part, the third secondary question of this study will be answered. As per the 60% of the instructors who participated in this study, the major difficulty faced is that sustainable design is not integrated with other parts of the curriculum besides the lack of knowledgeable instructors to teach these courses (20%) and lack of computer software (20%). However, the interview results showed that it is still not a priority for the management in their institution plus more time is required with the students as it is a cultural issue.

57% of the students added that their instructors' level in sustainability is not enough for them as well as the lack of information given about the materials impact and the local building regulations further acts as an insurmountable barrier.

In conclusion, the instructors and students who participated in this study emphasized the importance of integrating sustainability with other parts of the curriculum besides highlighting the lack of knowledgeable instructors to teach the needed courses as they are playing a critical role. 89% of the students agreed to see more courses offered related to sustainability while 97% from our students believe that integrating sustainability in each design class is helpful. Moreover, the educators underlined the significant role of the higher education in leading the developing plan of building new generation of sustainable interior designers to contribute in saving the earth.

One of the helpful strategies to integrate sustainability into our curriculum could be via incorporating sustainability within each design class and adding more related courses.

Sustainability should be mentioned in the submission requirements throughout design I, II, III, IV and V so graduation projects can potentially harvest what has been seeded through all of the design courses.

We should minimize the credit hours of the universities' requirements and increase the core or the major credit hours in order to focus more in the market needs, as the completion out there is really high.

### **6.3. Questions for future studies**

**Our role:** Are we, as interior design instructors are knowledgeable enough to teach sustainability or not? How many instructors in each University are obliged to carry the responsibility of those students? Do all the design instructors encourage the students to do green projects? If no, why? How can each instructor improve his/her level individually? What is exactly our role as educators to raise the percentage of applying sustainability to our students' projects?

**Governmental role:** What is the role of the ministry of education to raise the awareness of sustainability to the school students' in a creative way? What is the role of the higher education in order to raise the level of awareness for the instructors to ensure sustainable projects as outcomes? How the higher education can take moves towards incorporating sustainability throughout the entire curriculum and throughout the studio? What is the role of the faculty-developing center in each university in the UAE to develop the instructors' knowledge and awareness?

When all the universities, which are offering interior design program in UAE, will be accredit by (CIDA)?

All these questions need more researches to be answered, and more efforts need to be done in order to address the complex issue of sustainability.

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# Appendix A

## Students' Survey

### Sustainability within Interior Design curriculum in UAE & Impact on design mindset and environment

Date: \_\_\_\_\_

Institution: \_\_\_\_\_

Please choose one option for each item/statement/question below.

**1. Gender:**

1. Male
2. Female

**2. Age group:**

1. Under 20
2. 21-29
3. 30-39

**3. If you are still a student, in which year are you in currently?**

1. 1st year undergraduate
2. 2nd year undergraduate
3. 3rd year undergraduate
4. 4th year undergraduate
5. Graduated / year\_\_\_\_\_

**4. Do you know what sustainability means?**

1. No
2. A little
3. Quite a bit
4. A great deal

**5. If you know about sustainability, please specify the source of knowledge?**

1. School
2. University
3. Books
4. Web
5. General media
6. Others: \_\_\_\_\_

You can choose more than one option here.

**6. How far are you interested in learning more about sustainability?**

1. Not very interested
2. Somewhat interested
3. Interested
4. Very interested
5. Other: \_\_\_\_\_

**7. Does your institution offer sustainability courses?**

1. None
2. 1
3. 2
4. 3
5. 4
6. 5+

If no courses are being/were taught, please skip questions 8,9&10 and proceed to question 11.

**8. Are these sustainability courses mandatory or elective?**

1. Mandatory
2. Elective
- Both

**9. What types of sustainability courses are offered?**

1. Theoretical
2. Theo practical
3. Practical

**10. In which year are the courses offered?**

1. 1st year undergraduate
2. 2nd year undergraduate
3. 3rd year undergraduate
4. 4th year undergraduate
5. Throughout the programme

You can choose more than one option here.

**11. Have you applied sustainability in any of your design projects?**

1. No
2. A little
3. Quite a bit
4. To a great extent

**12. Would you like to see (more) courses offered related to sustainability?**

1. No
2. Maybe
3. Yes
4. Definitely

**13. How helpful would it be to integrate (more) sustainability in each design class?**

1. Not helpful
2. A little helpful
3. Quite helpful
4. Very helpful

**14. Do you think your instructors are knowledgeable enough about sustainability?**

1. No
2. A little
3. Quite a bit
4. To a great extent

**15. From your point of view to what extent can interior designers contribute to the sustainability issue?**

1. Not at all
2. A little
3. Quite a bit
4. To a great extent

**16. Did your instructors explain the environmental impact of the materials that could be used in interior projects?**

1. No
2. A little
3. Quite a bit
4. A great deal

**17. Are you aware of local building regulations and their potential impact on ID material selection?**

1. No
2. A little
3. Quite a bit
4. To a great extent

**18. If you have to select material for a future client, which criteria would be the most important?**

1. Sustainability
2. Design
3. Cost
4. All of the above
5. Do not know

**19. In general, are you satisfied with your existing Interior Design curriculum?**

1. No
2. A little
3. Quite a bit
4. To a great extent

**20. Do you think that your campus is sustainable?**

1. No
2. A little
3. Quite a bit
4. To a great extent

**21. From your observation, how would you know if your campus is a sustainability-committed institution?**

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**Please add any additional comments below:**

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## Instructors' Survey

### Sustainability within Interior Design curriculum in UAE & Impact on design mindset and environment

Position: \_\_\_\_\_

Institution: \_\_\_\_\_

Please choose one option for each item/statement/question below.

**1. Gender:**

1. Male
2. Female

**2. Age group:**

1. 21-29
2. 30-39
3. 40-49
4. 50-59
5. 60 or Older

**3. Please state the highest level of Education you have achieved.**

1. Bachelor of Arts (B.A.)
2. Bachelor of Science (B.Sc.)
3. Bachelor of Fine Arts (BFA)
4. Master of Arts (M.A.)
5. Master of Science (M.Sc.)
6. Master of Fine Arts (MFA)
7. Doctor of Philosophy (Ph.D.)

**4. How far are you interested in sustainability and sustainable design?**

1. Not at all
2. Slightly
3. Moderately
4. Very
5. Extremely

**5. Do you feel that your students are interested in Sustainable Design subject?**

1. Not at all
2. Slightly
3. Moderately
4. Very
5. Extremely

**6. Do you feel that the majority of the ID faculty members in your institution are interested in sustainable design?**

1. Not at all
2. Slightly
3. Moderately
4. Very
5. Extremely

**7. If your institution does not teach sustainability subjects, please provide the reasons.**

1. No room in the curriculum
2. No qualified faculty to teach it
3. Not a priority
4. All of the above
5. Other (please specify) \_\_\_\_\_

If your institution teaches sustainability subjects please skip this question and go to Q. 8.

**8. If your institution does not currently teach sustainability, will you be interested in adding it to your current curriculum? If so, when:**

1. In the next two years
2. In the next five years
3. In the next ten years
4. We don't have a time line
5. Other (please specify): \_\_\_\_\_

**9. Is sustainability included in any area of the curriculum either by theory, studio, lecture, etc. in the interior design program you currently teach?**

1. Yes
2. No

**For those who answered NO to question #9, thank you for participating in this survey.**

**For those who answered YES to question #9, please continue with the survey.**

**10. What do you think is the most appropriate approach/strategy to incorporate sustainability into the interior design curriculum?**

1. Lab
2. In Lecture
3. In Studio
4. Throughout the Curriculum
5. As Stand-alone
6. Other, (please specify):  
\_\_\_\_\_

**11. At what level should sustainability be included in the interior design curriculum?**

1. 1st year undergraduate
2. 2nd year undergraduate
3. 3rd year undergraduate
4. 4th year undergraduate
5. Throughout all years

You can choose more than one option in Q. 11.

**12. Please rate your level of knowledge with regard to teaching sustainability?**

1. High level
2. Reasonable level
3. Neutral
4. Low level
5. No knowledge

**13. Please rate your level of experience with regard to teaching sustainability?**

1. Very experienced
2. Sufficiently experienced
3. Neutral
4. Little experience
5. No experience

**14. Please select the resource(s) that would prepare you to teach sustainability.**

1. Journal/Articles
2. Site visits/Tours
3. USGBC web site
4. On-line training
5. Books on sustainability
6. Workshop(s)
7. All above
8. Other (please specify): \_\_\_\_\_

You can choose more than one option in Q. 14.

**15. Which Sustainable Design Teaching Techniques are you familiar with from the list below?**

1. Hands on Community Projects
2. Research
3. Papers
4. Field Trips
5. Group project
6. Guest Lectures
7. Conferences
8. Local workshops and Meetings
9. Test/ quizzes
10. Discussions
11. All above
12. Other (please specify): \_\_\_\_\_

You can choose more than one option in Q. 15.

**16. What difficulties have you faced in integrating sustainable courses in your organization?**

1. No funding for elective courses like sustainable design
2. Limited to introductory or survey course(s) only
3. Lack of computer software and hardware to support curriculum
4. Insufficient faculty knowledge to teach sustainable design practices or topics
5. Sustainable design not integrated with other parts of the curriculum
6. All of the above
7. Others (please specify):  
\_\_\_\_\_

**17. Q 17. Can you select the instructional resource(s) that could help you the most in order to teach sustainable environmental design course(s).**

1. Computer tools
2. Books
3. Professional Faculty

4. Development opportunities
5. Websites
6. Model curriculum
7. Video
8. All above
9. Others: \_\_\_\_\_

**18. In general, are you satisfied with your existing interior design curriculum?**

1. Extremely dissatisfied
2. Moderately dissatisfied
3. Slightly dissatisfied
4. Neither satisfied nor dissatisfied
5. Slightly satisfied
6. Moderately satisfied
7. Extremely satisfied

**19. Do you think that your campus is sustainable?**

1. Not at all
2. Slightly
3. Moderately
4. Very
5. Extremely

**Please add any additional comments below:**

---

## Phone call interview Questions

### Sustainability within Interior Design curriculum in UAE & Impact on design mindset and environment

1. What is your existing teaching position?
2. Who accredits your University?
3. Which area of teaching you are in? For instant Theory, studio, lab,...
4. Are you teaching interior design for a quite long time?
5. And how many years have you been teaching sustainability?
6. Your education or experience about sustainability based on what?
7. And what was the motivation?
8. What difficulties did you face while developing sustainability curriculum?
9. Does your university offered sustainability course(s) on its campus?
10. Do you think sustainability is a vital part of an interior design education?
11. And usually which areas do you cover within the sustainability courses?
12. How can you develop and improve your lecture on sustainability?
13. Do we need more research about sustainability?
14. Is sustainability in interior design limited only to product specifications and material?
15. Are we, as interior design instructors knowledgeable enough to teach sustainability or not?
16. Do all the design instructors encourage the students to do green projects? If no, why?
17. How many instructors in your University are obliged to carry the responsibility of those students?
18. What is the role of the higher education in order to raise the level of awareness for the instructors to ensure sustainable projects as outcomes?
19. What are your recommendations in order to enhance the level of sustainability in the interior design curriculum?

## **Appendix B**

### **Interview Responses**

#### **Sustainability within Interior Design curriculum in UAE & Impact on design mindset and environment**

##### **Interview 1**

Sorry for any disturbing but as promised it wont take more than 15 to 20 minutes.

1. What is your existing teaching position?

Instructor 1: **Assistant professor**

2. Who accredits your University?

Instructor 1: **CAA**

3. Which area of teaching you are in? For instant Theory, studio, lab,,,

Instructor 1: **Theory and Studio**

4. Are you teaching interior design for a quite long time?

Instructor 1: **30 years**

5. And how many years have you been teaching sustainability?

Instructor 1: **you can say 2 years**

6. Your education or experience about sustainability based on what?

Instructor 1: **It's only by Individual efforts**

7. And what was the motivation?

Instructor 1: **To be updated always with anything new as it is the future language for the designers.**

8. What difficulties did you face while developing sustainability curriculum?

Instructor 1: **No I didn't face any,**

9. Does your university offered sustainability course(s) on its campus?

Instructor 1: **Yes one course elective**

10. Do you think sustainability is a vital part of an interior design education?

Instructor 1: **Yes surely it is**

11. And usually which areas do you cover within the sustainability courses?

Instructor 1: **Sustainable fabric and the impact each fabric on the environment.**

12. How can you develop and improve your lecture on sustainability?

Instructor 1: **Videos, web sites, books, latest researches and new materials in market.**

13. Do we need more research about sustainability?

Instructor 1: Yes sure, it is never enough when it comes to researches.

14. Is sustainability in interior design limited only to product specifications and material?

Instructor 1: No of course not, it is related to lighting and ventilation systems, energy and water systems as well

15. Are we, as interior design instructors knowledgeable enough to teach sustainability or not?

Instructor 1: No I think we need to widen our knowledge more and more as we need each day updating.

16. Do all the design instructors encourage the students to do green projects? If no, why?

Instructor 1: No, not all of them. I believe because the lack of knowledge.

17. How many instructors in your University are obliged to carry the responsibility of those students?

Instructor 1: None, as I believe all of us needs more and more to be obliged as you said, it's a huge responsibility.

18. What is the role of the higher education in order to raise the level of awareness for the instructors to ensure sustainable projects as outcomes?

Instructor 1: The faculty developing center under the super vision of the higher education should organize condense courses for like 2 months by specialized institution or workshops, seminars, etc,,, And the higher education should keep monitoring the faculty-developing center and provide them with the needed updates.

19. What are your recommendations in order to enhance the level of sustainability in the interior design curriculum?

Instructor 1: The sustainability topics should be integrated through all the design courses gradually and not only as a stand-alone course as it is not enough. And sustainability should be mentioned as a one of the submission requirements throughout design I, II, III, IV and V so in graduation project we will harvest what we have been seeded through all of the design courses.

And we should to minimize the credit hours of the universities' requirements and increase the core or the major credit hours in order to focus more in the market needs, as the completion out there is really high.

Well thank you so much for your timing and it was pleasure talking with you

Instructor 1: Thank you,, same here,, it is really an important topic and I hope it could be done within a short period.

Thank you so much.

**Sustainability within Interior Design curriculum in UAE & Impact on design mindset and environment**  
**Interview 2**

Sorry for any disturbing, but as promised it wont take more than 15 to 20 minutes.

1. What is your existing teaching position?

Instructor 2: **Am currently working as a Lecturer**

2. Who accredits your University?

Instructor 2: **CAA**

3. Which area of teaching you are in? For instant Theory, studio, lab,,,

Instructor 2: **Studio and theory**

4. Are you teaching interior design for a quite long time?

Instructor 2: **8 years**

5. And how many years have you been teaching sustainability?

Instructor 2: **For the last 2 years**

6. Your education or experience about sustainability based on what?

Instructor 2: **My master degree was in sustainable built environment**

7. And what was the motivation?

Instructor 2: **The current environment situation over all and responsibility of each person towards the environment**

8. What difficulties did you face while developing sustainability curriculum?

Instructor 2: **The society in general is not accepting the idea, as it is still new for lots of people here.**

9. Does your university offered sustainability course(s) on its campus?

Instructor 2: **Yes, as we are offering sustainability for interior design course as an elective course thus some of the student didn't have the chance to take it but now the department changed the course type from an elective to be an obligatory course. And they added another course in the first year, which covers the environmental impact of all materials.**

10. Do you think sustainability is a vital part of an interior design education?

Instructor 2: **Definitely it is, and it should start with the early stage, as barreled to each design we should focus in more sustainability dose.**

11. And usually which areas do you cover within the sustainability courses?

Instructor 2: **Because am teaching sustainability for interior design and it is a stand alone course so am trying to cover everything generally related to sustainability, and we don't go deep to the detailed topics but we give only the general ones that are related to the indoor environment then we gradually grab the attention of the students to the sustainable interior spaces.**

**12. How can you develop and improve your lecture on sustainability?**

**Instructor 2:** Videos, researches, governmental project like Masdar or DEWA, web sites and books.

**13. Do we need more research about sustainability?**

**Instructor 2:** Definitely yes.

**14. Is sustainability in interior design limited only to product specifications and material?**

**Instructor 2:** Not at all, it isn't limited to that only, its related to human health, electricity saving, the cost and the economy.

**15. Are we, as interior design instructors knowledgeable enough to teach sustainability or not?**

**Instructor 2:** I think sustainability education like any type of education. It is a non-stop education, so we should always keep developing ourselves to proof that we can teach it.

**16. Do all the design instructors encourage the students to do green projects? If no, why?**

**Instructor 2:** No, due to the lack of knowledge. Am sure if they are knowledgably enough, definitely the will motivate their students but if they aren't so they will not.

**17. How many instructors in your University are obliged to carry the responsibility of those students?**

**Instructor 2:** 2 instructors.

**18. What is the role of the higher education in order to raise the level of awareness for the instructors to ensure sustainable projects as outcomes?**

**Instructor 2:** First of all each instructor should start from himself to remove the fear of getting into this field, it is not something scary, we should all know about it, then once you start by individual efforts you can join any governmental support or any support around, its there but we have to search as well for it.

**19. What are your recommendations in order to enhance the level of sustainability in the interior design curriculum?**

**Instructor 2:** I think there is a vast effort done in this nowadays, we can see this in the codes of the municipality as they are changing it accordingly, and it is a bit very advanced topic to people but what you want to do is totally right I agreed with you as we are talking about next generation so we have to focus on them so after five to ten years we will rise up a generation with enough awareness of sustainability practices and it will increase the number of the sustainable projects. Moreover I think we need as well a sustainable material lab so students can touch and feel the texture, they can see the photo voltaic cells this is our role as an instructors to fulfill all the gaps of the students.

**Well thank you so much for your timing and it was pleasure talking with you**

**Instructor 2:** Thank you,, am totally agreed with you and I wish you all the best.

**Sustainability within Interior Design curriculum in UAE & Impact on design  
mindset and environment**  
**Interview 3**

Sorry for any disturbing, but as promised it wont take more than 15 to 20 minutes.

1. What is your existing teaching position?

Instructor 3: **Am currently lecturer**

2. Who accredits your University?

Instructor 3: **CAA**

3. Which area of teaching you are in? For instant Theory, studio, lab,,,

Instructor 3: **Well, am teaching only studio**

4. Are you teaching interior design for a quite long time?

Instructor 3: **almost 7 years**

5. And how many years have you been teaching sustainability?

Instructor 3: **2 years**

6. Your education or experience about sustainability based on what?

Instructor 3: **Masters degree**

7. And what was the motivation?

Instructor 3: **Environment situation of course**

8. What difficulties did you face while developing sustainability curriculum?

Instructor 3: **Mainly that the faculty itself, as they think that we don't need it, its not a priority for them, this is the problem.**

9. Does your university offered sustainability course(s) on its campus?

Instructor 3: **Yes but only 1 course with no intentions to increase it as I said.**

10. Do you think sustainability is a vital part of an interior design education?

Instructor 3: **Sure it is.**

11. And usually which areas do you cover within the sustainability courses?

Instructor 3: **Actually am trying to emphasize the importance of material selection and usage of natural day lighting as well as the water and energy systems.**

12. How can you develop and improve your lecture on sustainability?

Instructor 3: **Mainly from the multi media, books and journal articles.**

13. Do we need more research about sustainability?

Instructor 3: **We are always should be in developing stage, its never enough.**

14. Is sustainability in interior design limited only to product specifications and material?

**Instructor 3:** I believe that our mission is involved with lots of factors, for instant the ventilation, natural daylight, water and energy systems as well as I mentioned now.

**15. Are we, as interior design instructors knowledgeable enough to teach sustainability or not?**

**Instructor 3:** Some of the instructors have solid bases, while the others need more improvement for sure.

**16. Do all the design instructors encourage the students to do green projects? If no, why?**

**Instructor 3:** Unfortunately no, because as I said, it's not as a priority for them, they don't see it as an important thing to the students, and they refuse to change the way of teaching.

**17. How many instructors in your University are obliged to carry the responsibility of those students?**

**Instructor 3:** Just one, me.

**18. What is the role of the higher education in order to raise the level of awareness for the instructors to ensure sustainable projects as outcomes?**

**Instructor 3:** They could organize seminars, field trips, also communication with the market is very important to be updated with the market needs and nowadays all the market is moving towards sustainability as we see in Abu Dhabi for an example. To sum up there should be a link between the market and all institution so when the students graduates they will be ready for the market needs.

**19. What are your recommendations in order to enhance the level of sustainability in the interior design curriculum?**

**Instructor 3:** My recommendation is to offer more sustainability courses throughout the entire program, not only as elective course without linking it with whole curriculum. From the first year we should begin with the students.

**Well thank you so much for your timing and it was pleasure talking with you**

**Instructor 3:** Thank you and am so sorry, we did it so fast as I have to go.

**Thank you so much**

**Instructor 3:** Thank you and wish you luck.

Sustainability within Interior Design curriculum in UAE & Impact on design mindset and environment

Interview 4

Sorry for any disturbing, but as promised it wont take more than 15 to 20 minutes.

1. What is your existing teaching position?

Instructor 4: Am an assistant professor

2. Who accredits your University?

Instructor 4: CAA I believe CAA accredits all of us

3. Which area of teaching you are in? For instant Theory, studio, lab,,,

Instructor 4: Am teaching both theory and practical

4. Are you teaching interior design for a quite long time?

Instructor 4: ooh lets say since 1995

5. And how many years have you been teaching sustainability?

Instructor 4: 8 years I guess

6. Your education or experience about sustainability based on what?

Instructor 4: I did some researches on sustainability within the interior design practices, so I can say by individual efforts.

7. And what was the motivation?

Instructor 4: Actually we can say the motivation coming out of the interesting of saving the environment, reducing the emissions from carbon dioxide and the consumption of the raw materials.

8. What difficulties did you face while developing sustainability curriculum?

Instructor 4: One of the obstacles that am facing from educational point of view, that it just takes time as it has to make it as a cultural for the students, not only by offering one elective course.

9. Does your university offered sustainability course(s) on its campus?

Instructor 4: for us it's different, as our sustainability course is compulsory course, moreover sustainability is integrated with other three courses; interior design studio III, lighting and material course.

10. Do you think sustainability is a vital part of an interior design education?

Instructor 4: Absolutely yes.

11. And usually which areas do you cover within the sustainability courses?

Instructor 4: The theory part talks about the sustainability philosophy and methodology of it but if we are talking about studio, so we will discuss the implementation of the sustainability through reducing the use of raw material, using the recycled material, using the natural light, how I can I use the smart technology, the furniture itself how can I create it while reducing the energy

consumption.

12. How can you develop and improve your lecture on sustainability?

Instructor 4: Books, visits for sustainable projects and reviewing related thesis.

13. Do we need more research about sustainability?

Instructor 4: Absolutely yes, as everyone is obliged towards the environment so it is never enough when it comes to researches.

14. Is sustainability in interior design limited only to product specifications and material?

Instructor 4: Absolutely no,

15. Are we, as interior design instructors knowledgeable enough to teach sustainability or not?

Instructor 4: No

16. Do all the design instructors encourage the students to do green projects? If no, why?

Instructor 4: instructors whom are teaching studio here are encouraging them, but in studio III it is not optional they have to do their project sustainably.

17. How many instructors in your University are obliged to carry the responsibility of those students?

Instructor 4: 2 instructors only.

18. What is the role of the higher education in order to raise the level of awareness for the instructors to ensure sustainable projects as outcomes?

Instructor 4: More conferences, more seminars and symposiums as well to show how we can do more sustainable solutions.

19. What are your recommendations in order to enhance the level of sustainability in the interior design curriculum?

Instructor 4: It should be integrated with all aspects of interior design, because we have sustainability in lighting and lighting is a part of interior design, same for acoustical solution, same for fabrics, furniture all are also parts of interior design aspects. Sustainability should be incorporate in all aspects of interior design.

Well thank you so much for your timing and it was pleasure talking with you

Instructor 4: Not at all, wish you all success.

Thank you so much.

**Sustainability within Interior Design curriculum in UAE & Impact on design  
mindset and environment**  
**Interview 5**

Sorry for any disturbing, but as promised it wont take more than 15 to 20 minutes.

1. What is your existing teaching position?

Instructor 5: **Am currently lecturer**

2. Who accredits your University?

Instructor 5: **Still from CAA**

3. Which area of teaching you are in? For instant Theory, studio, lab,,,

Instructor 5: **am teaching both theory and studio**

4. Are you teaching interior design for a quite long time?

Instructor 5: **7 years almost**

5. And how many years have you been teaching sustainability?

Instructor 5: **3 years only**

6. Your education or experience about sustainability based on what?

Instructor 5: **my master degree and lots of researches as individual efforts.**

7. And what was the motivation?

Instructor 5: **many factors actually, the first one is to create a new motivation to the new generation, as there is a gap between the market and the education.**

8. What difficulties did you face while developing sustainability curriculum?

Instructor 5: **Actually I have two experience with different two universities, and both of them sustainability is not included in the curriculum, one of the universities it is not mentioned at all. However the other one its only mentioned as a minor part in material course but in design courses its not available at all as well.**

9. Does your university offered sustainability course(s) on its campus?

Instructor 5: **As I mentioned in interior design curriculum no, we don't offer any, but for other majors yes they do have integrated sustainability.**

10. Do you think sustainability is a vital part of an interior design education?

Instructor 5: **yes surely it is, actually am an architect but since 5 years am teaching interior design and from my experience I figure out that interiors are dealing with lots of specific elements which is indoor air quality and the materials as we spent 90% of our timing in interior spaces, so it affect our health and mode so it is very important. I believe that integration between the architecture and the interiors are very important as well to achieve the sustainability.**

**11. And usually which areas do you cover within the sustainability courses?**

**Instructor 5:** Well, in the syllabus sustainability is not mentioned at all but all the time am trying to emphasize the importance of the natural light, the north and south and the location of the building, choosing the materials that has low embodied energy and low environmental impact, using reused or recycled materials and flexibility in designing.

**12. How can you develop and improve your lecture on sustainability?**

**Instructor 5:** I join lots of conferences to update myself actually, but for my students, there is no any sustainability course, but I suggest a course and I submitted it already to my department, this course is about adding sustainability as an elective course for all students, even for whom study art is part of sustainability as we reuse the fabrics we reuse the material to make other piece of art or what ever.

**13. Do we need more research about sustainability?**

**Instructor 5:** yes sure we need more especially in the Middle East as the awareness is less here.

**14. Is sustainability in interior design limited only to product specifications and material?**

**Instructor 5:** No I believe as I said that the role of interior designers are involved with many things, such as the location of the window opening area to create passive ventilation or to get the maximum benefit of the daylight, flexibility methods should be followed for furniture designs. Again integration between the architect and the interiors are very important, architects are the skin and interiors are the veins.

**15. Are we, as interior design instructors knowledgeable enough to teach sustainability or not?**

**Instructor 5:** I think we need to be involved in sustainable projects as theories is not enough for instructors practices is important as well. To see how the solar panels are integrated with designs how to implement the passive ventilation and how the smart technologies are integrated, etc.,

**16. Do all the design instructors encourage the students to do green projects? If no, why?**

**Instructor 5:** No, simply because they aren't knowledgably enough or they don't know even what sustainability practices means.

**17. How many instructors in your University are obliged to carry the responsibility of those students?**

**Instructor 5:** 2 only

**18. What is the role of the higher education in order to raise the level of awareness for the instructors to ensure sustainable projects as outcomes?**

**Instructor 5:** I think in each interior department at least 2 instructors with sustainable background should be there, and the higher education could organize for those whom had interest in sustainability conferences and workshops but I think we can't force other instructors with no any interest in sustainability to join the journey.

**19. What are your recommendations in order to enhance the level of sustainability in the interior design curriculum?**

**Instructor 5:** In my opinion, sustainable courses should start at least from year two, one course should deal with all the materials and its impact, and another course for elaborating sustainable principles and concept and how I can implemented in designs, so in the end it would reflect easily in the graduation projects.

**Well thank you so much for your timing and it was pleasure talking with you**  
**Instructor 5:** Thanks and wish you all the best.

**Thank you so much.**

Sustainability within Interior Design curriculum in UAE & Impact on design  
mindset and environment  
Interview 6

Sorry for any disturbing, but as promised it wont take more than 15 to 20 minutes.

1. What is your existing teaching position?

Instructor 6: **lecturer**

2. Who accredits your University?

Instructor 6: **by CAA, I believe CAA accredits all of us**

Yes, I guess so also, I have to check why all of us accredited by CAA.

Ok well,

3. And which areas of teaching you are in? For instant Theory, studio, lab,...

Instructor 6: **mainly studio**

4. Are you teaching interior design for a quite long time?

Instructor 6: **14 years almost**

5. And how many years have you been teaching sustainability?

Instructor 6: **2 years only**

6. Your education or experience about sustainability based on what?

Instructor 6: **well it is basically by individual efforts, books, journal articles and related researches.**

7. And what was the motivation?

Instructor 6: **the first motivation comes from the need to up date myself in order to know every thing my students might ask about, then when I read more and more I got obliged towards the environment.**

8. What difficulties did you face while developing sustainability curriculum?

Instructor 6: **still the faculty not yet convinced to add more sustainability courses but we are still trying.**

9. Does your university offered sustainability course(s) on its campus?

Instructor 6: **yes one elective course, offered in the third year.**

10. Do you think sustainability is a vital part of an interior design education?

Instructor 6: **yes definitely it is.**

11. And usually which areas do you cover within the sustainability courses?

Instructor 6: **well topics like climate change, Co<sub>2</sub> emissions, C2C, embodied energy, triple R, selection of materials, usage of natural lighting, passive ventilation, water and energy systems, human comfort and all related topics.**

12. How can you develop and improve your lecture on sustainability?

Instructor 6: **Am always trying to be updated, through attending the latest**

conferences, workshops, Internet surfing and reading new references.

13. Do we need more research about sustainability?

Instructor 6: **Yes sure.**

14. Is sustainability in interior design limited only to product specifications and material?

Instructor 6: **No way, it related to every thing related to human comfort and indoor air quality and those keywords have lots of sub keywords, so you can imagine the interior planet.**

15. Are we, as interior design instructors knowledgeable enough to teach sustainability or not?

Instructor 6: **Yes and no, actually yes as a starting and no as we have to be always updated. Hence each instructor should evaluate his/her situation and then develop the level of his/her knowledge.**

16. Do all the design instructors encourage the students to do green projects? If no, why?

Instructor 6: **No not all of them, because of there low level of knowledge or they might not believe in sustainability.**

17. How many instructors in your University are obliged to carry the responsibility of those students?

Instructor 6: **1 instructor**

18. What is the role of the higher education in order to raise the level of awareness for the instructors to ensure sustainable projects as outcomes?

Instructor 6: **The higher education can force all universities to offer sustainability courses in the design curriculum as obligatory courses, and increase the awareness of the sustainability to all instructors to motivate those whom are not interested by workshops, seminars and encourage them to participate in real project. And sustainability should be part of each course offered.**

19. What are your recommendations in order to enhance the level of sustainability in the interior design curriculum?

Instructor 6: **Just as I have said now as a starting.**

Well thank you so much for your timing and it was pleasure talking with you

Instructor 6: **Thank you and wish you luck.**

Thank you so much.

## Appendix C

### Emails

**Dina Ibrahim** <jrac.dina.i@ajman.ac.ae> Mar 26     
to me 

---

**From:** Dina Ibrahim  
**Sent:** Wednesday, March 11, 2015 12:19 PM  
**To:** Mohsen Elfadl  
**Subject:** My Thesis

Dear Dr. Mohsen

Hope this finds you well,

As you know Dr. Mohsen am doing my thesis which is about early incorporating sustainability into interior design curriculum in the UAE and its impact on design mindset and environment. Thus am studding the graduation projects before and after offering sustainability for ID course.

So kindly can you give me the permission to collect the graduation projects for 2011 batch and 2014 as well to compare between them.

Your cooperation is highly appreciated,  
Best regards,  
Dina.

m.elfadel@ajman.ac.ae  +dina

    **Move to Inbox**  **More** 

**Sustainable Local Materials seminar**    

 **dina ibrahim** <d.ibrahim77@gmail.com>  **Mar 12**     
to hayati, m.elfadel 

Dear Dr. Faher and Dr. Mohsen

Hope this finds you well.

In order to enhance the awareness of the role of the interior designers towards the environment we would like to organize a seminar for the students of the interior design department entitled **(Sustainable Local Materials)**. As recommended by Dr. Hanan from the faculty of Engineering and IT, Sustainable Design of the Build Environment in British University in Dubai, she recommended Eng. Khalid Shuhail as an expertise in this field.

Please find attached his passport copy in order to start the needed procedure as after a phone call discussion, he is available only for the coming week between March 15 and 19.

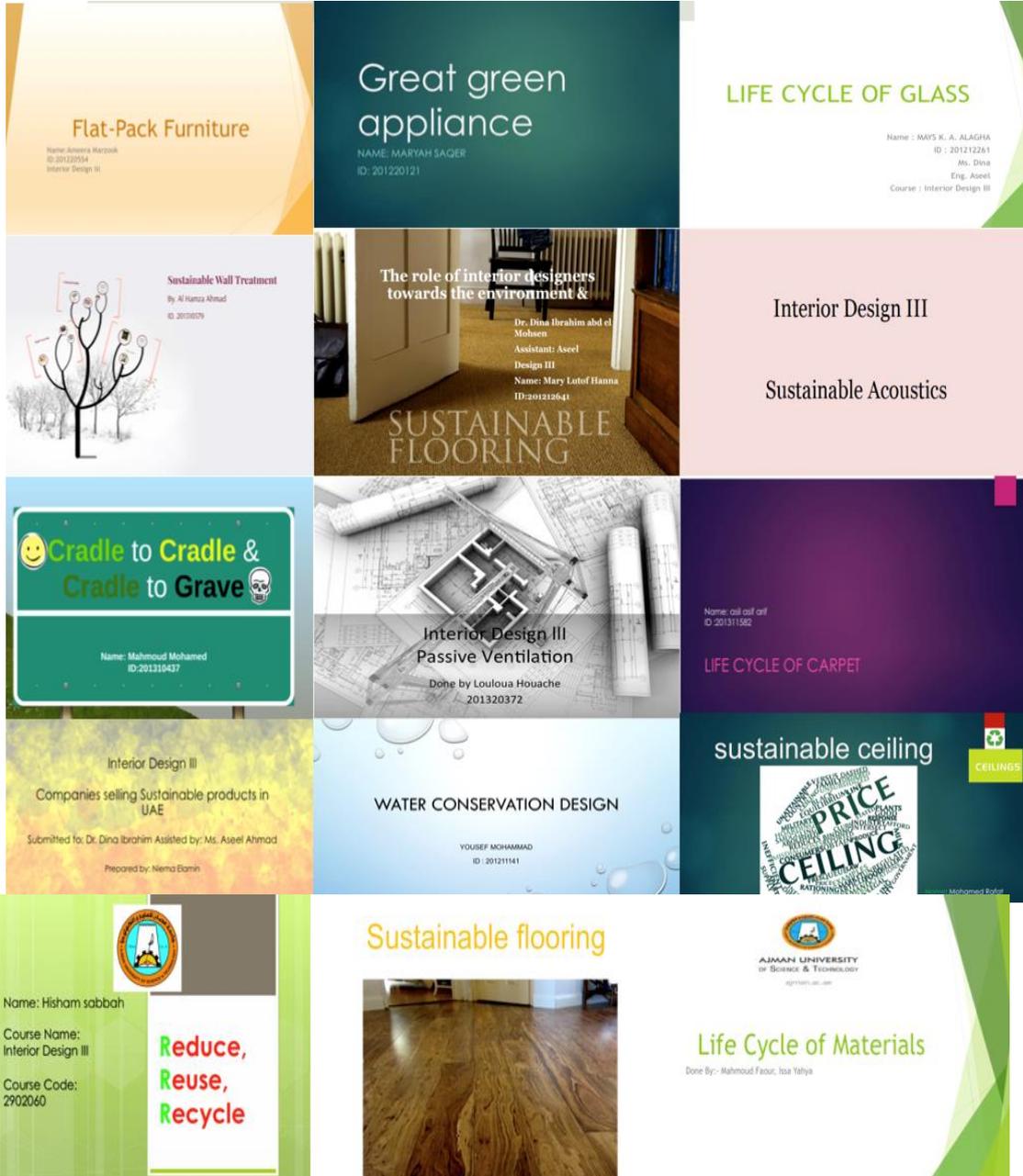
Your prompt reply is highly appreciated,

Best regards,

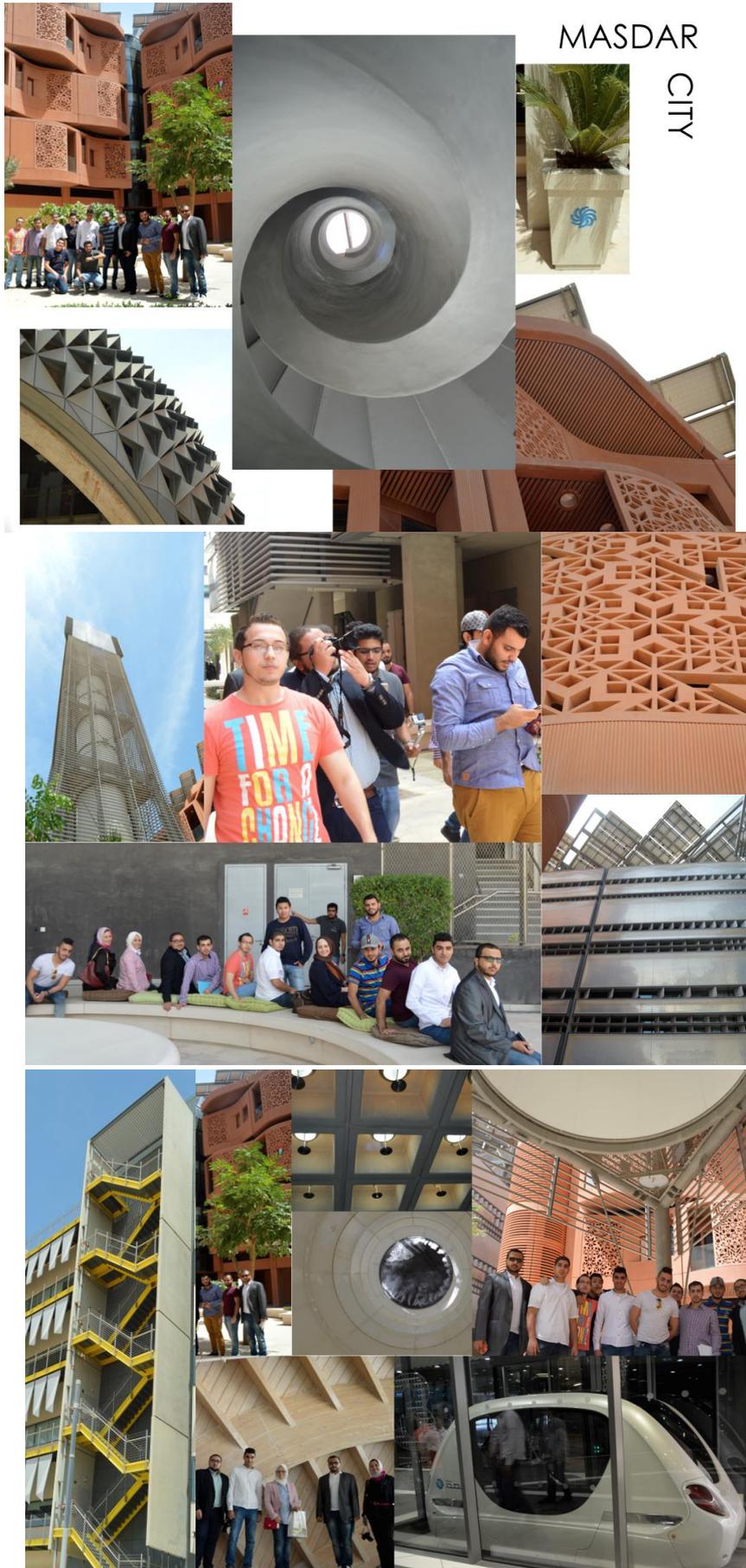


# Appendix D-1

## Students' research



**Appendix D-2**  
Masdar city trip



MASDAR  
CITY

# Appendix E-1

## Ajman University's project before 2013

### Project No. 1



**NATIONAL GEOGRAPHIC CENTER**

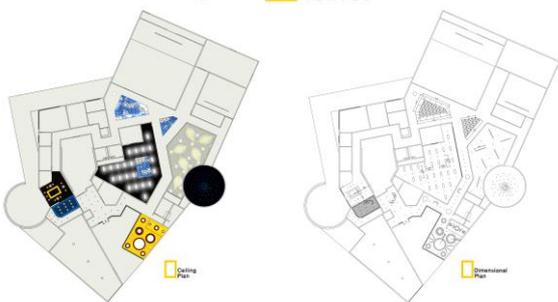


NatGeo Center is a place for all ages, friends and families, it's fun and educational at the same time, at NatGeo center you will learn more about mother nature, and communicate with it. We will open your eyes wildly to discover and know more about earth, and how important it is to take care of the environment

At NatGeo Center you will know the Causes, Effects and Dangers of Global Warming, how to defeat it and, go green through our workshops, you will get to know more about recycling and saving energy also we have lots of activities / exhibitions/ documentary movies and events



	Ali Murad	INT.Design	Dr.Abdulmunem	Final Project	12.06.2012	Sheet: 1/8
	200710388	Graduation	Assis.Taher	NatGeo Center	Tuesday	Scale: fit





	Ali Murad	INT.Design	Dr.Abdulmunem	Final Project	12.06.2012	Sheet: 3/8
	200710388	Graduation	Assis.Taher	NatGeo Center	Tuesday	Scale: fit



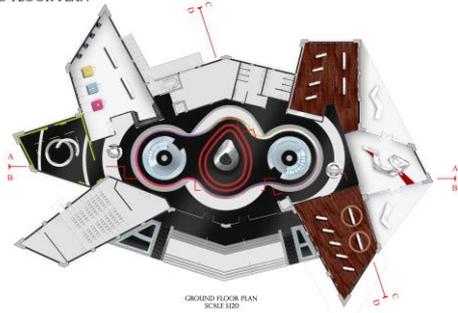


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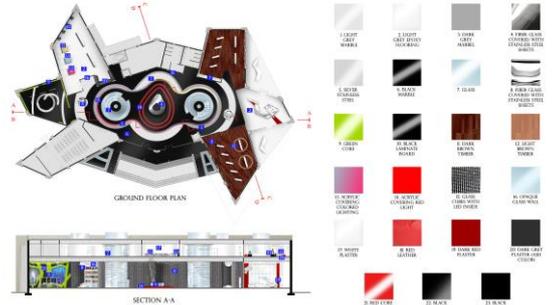
	Ali Murad	INT.Design	Dr.Abdulmunem	Final Project	12.06.2012	Sheet: 5/8
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# Project No. 2

GROUND FLOOR PLAN



MATERIAL BOARD I



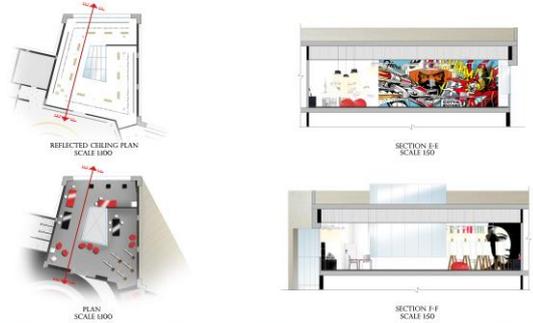
AIMAN UNIVERSITY OF SCIENCE & TECHNOLOGY NETWORK // ENGINEERING FACULTY // DEPARTMENT OF INTERIOR DESIGN  
GRADUATION PROJECT II // INSTRUCTOR: DR. ABDEL MOUSSA FARHA // DONE BY: ATHAM MASOUD // ID: 200808993  
TITLE: GROUND FLOOR PLAN // DATE: 12-06-2012 // SHEET NO. 1/2

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GRADUATION PROJECT II // INSTRUCTOR: PROFESSOR ABDEL MOUSSA FARHA // DONE BY: ATHAM MASOUD // ID: 200808993  
TITLE: MATERIAL BOARD I // DATE: 12-06-2012 // SHEET NO. 1/17

SECTIONS (A-A & B-B)



WORKSHOP SECTIONS & PLANS



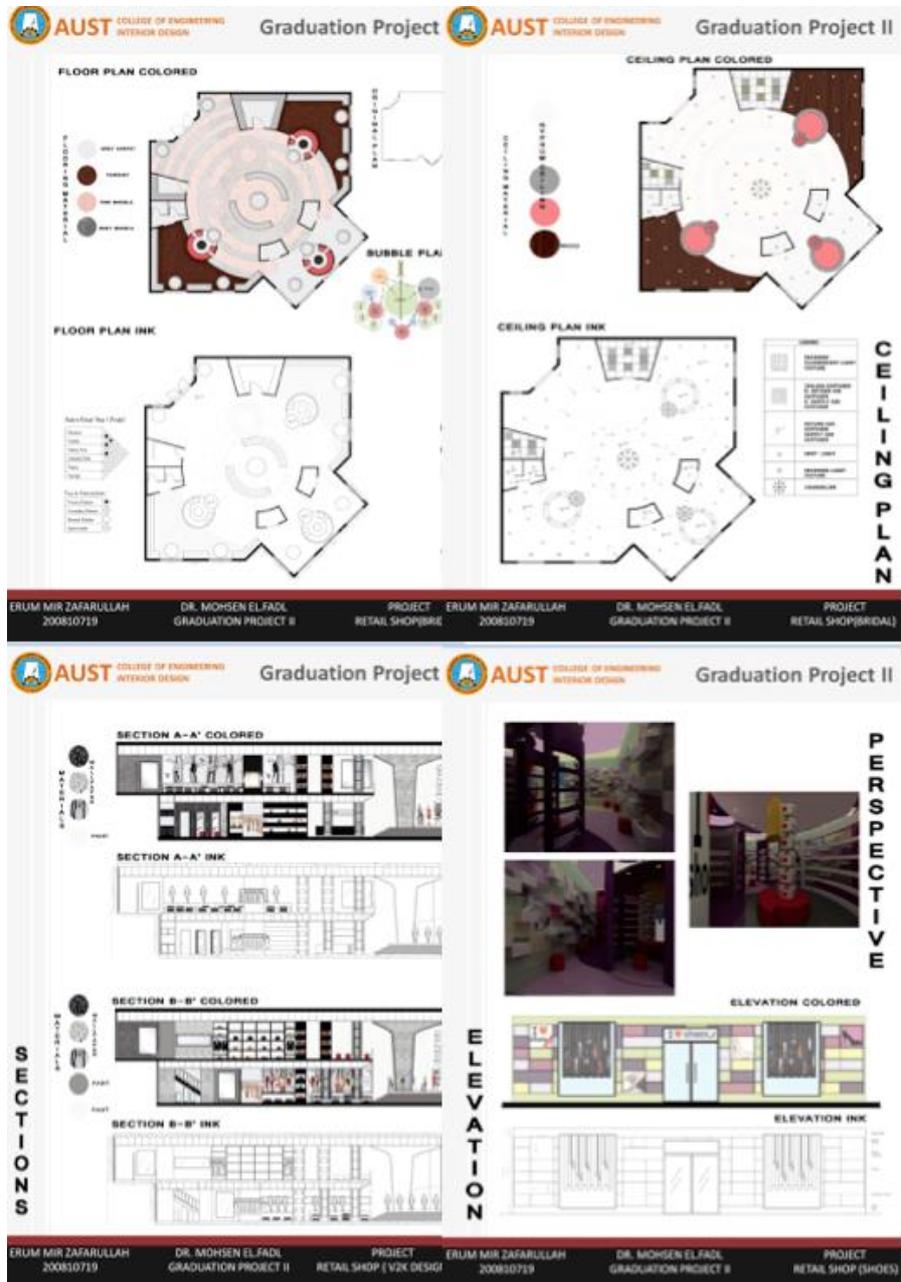
AIMAN UNIVERSITY OF SCIENCE & TECHNOLOGY NETWORK // ENGINEERING FACULTY // DEPARTMENT OF INTERIOR DESIGN  
GRADUATION PROJECT II // INSTRUCTOR: DR. ABDEL MOUSSA FARHA // DONE BY: ATHAM MASOUD // ID: 200808993  
TITLE: SECTIONS (A-A & B-B) // DATE: 12-06-2012 // SHEET NO. 2/2

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GRADUATION PROJECT II // INSTRUCTOR: PROFESSOR ABDEL MOUSSA FARHA // DONE BY: ATHAM MASOUD // ID: 200808993  
TITLE: WORKSHOP SECTIONS & PLANS // DATE: 12-06-2012 // SHEET NO. 3/17

# Project no. 3



Project no. 4



Project no. 5



Project no. 6



# Project no. 7

**Ajman university of science and technology** Graduation Project **The Red Crescent**

**Location**

**The Plan**

- Reception Area
- Waiting and Information Area
- Presented office and meeting Area
- Cafe Area
- Workshop Area
- Decorational room
- Lecture hall
- Storage

**Concept**

The Red Crescent is International organization that is characterized by humanity and serves all states of society regardless religion and discrimination. Here is a point of view to express the hidden secret idea of love and care behind the plan. The designed idea that represent this organization is giving unity and humanity, with this motto we will work with life one step closer to our dream world one reorganization at a time.

**The Red Crescent**  
The power of humanity

**Section**

**In plan**

**Camera position**

**Section (A-A)**

**Section (A-A) Reception**

**Section (B-B)**

**Section (B-B) Reception**

**Section (C-C)**

**Section (C-C) Reception**

**Section (D-D)**

**Section (D-D) Reception**

**Sheet no. 1**

**Sheet no. 2**

**Sheet no. 3**

**Sheet no. 4**

# Project no. 8

**Design Concept**

Ruzate is one of the famous types of dates in UAE. The interior design will be inspired from Emirati heritage mixed with Arabic Calligraphy.

**Materials**

**Flooring plan**

**Flooring & Furniture plan**

**Sections**

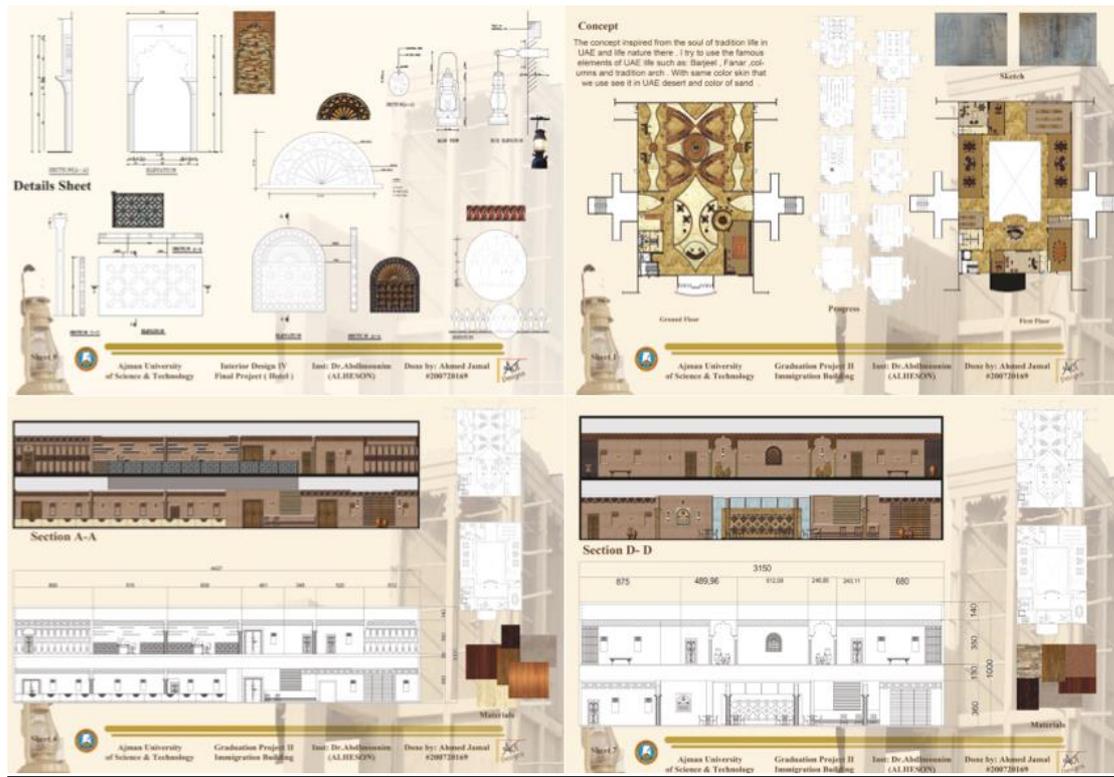
**Restaurant Sections**

**Cafe Sections**

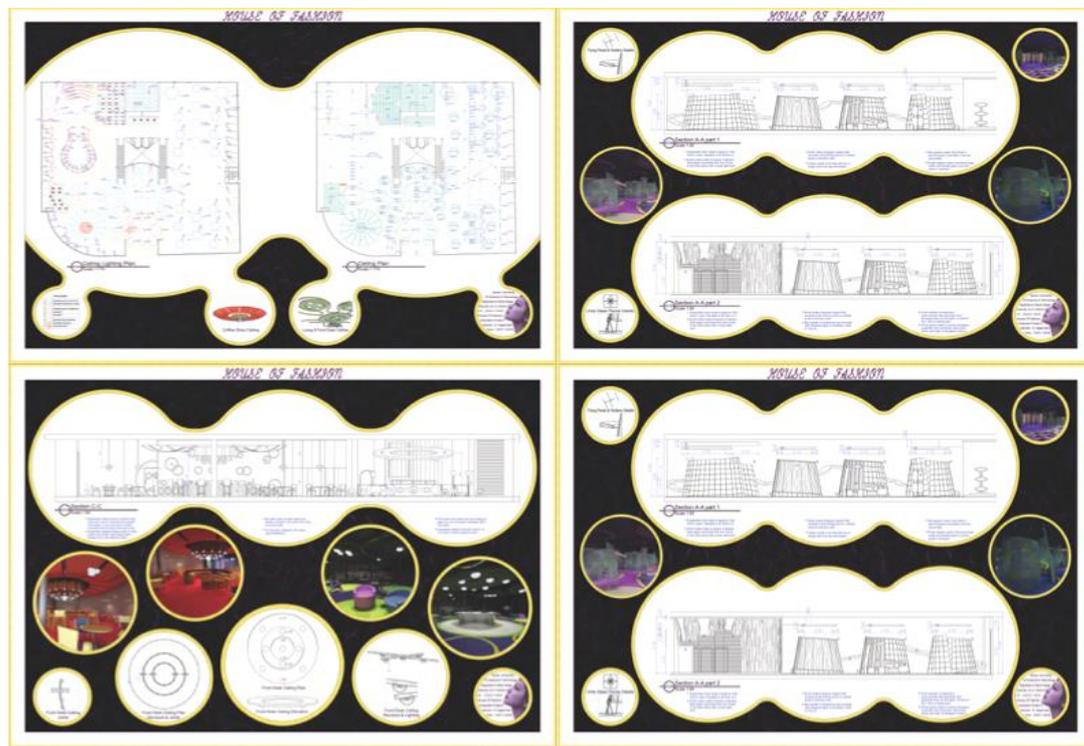
**3D Views (Restaurant)**

Project no. 8

## Project no. 9



## Project no. 10



Project no. 11



Project no. 12



# Project no. 13

**LEGEND**

1 Reception	2 Cafe	3 Store	4 Weight Room	5 Locker	6 Wash Room	7 General Manager's Office	8 Cardiac Room	9 Yoga	10 Aerobics	11 Caric Room
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**CONCEPT**

One of the most important elements in modern interior design is form. Modern design uses geometric shapes, including triad squares and rectangles along with smooth, even curves. Perfect circles and ovals are also common. In modern interior design, Modern interior design is also generally very simple and even minimal, with few ornamental flourishes to interrupt the even, unbroken lines and flat surfaces. Geometry in your layout plan can be as simple as decorating in a square or in a circle, or more involved if there are hexagonal windows or a view that needs to be incorporated into the design of the room. Placing an entertainment stand at an angle in a corner is an example of using geometry.

**LIVE LIGHT (FITNESS CLUB) COLLEGE OF ENGINEERING INTERIOR DESIGN**  
 Graduation Project 2  
 Instructor: Dr. Abdulminam Taha  
 Name: Omar Younes ID: 200810436  
 Dimensional Plan

**LIVE LIGHT (FITNESS CLUB) COLLEGE OF ENGINEERING INTERIOR DESIGN**  
 Graduation Project 2  
 Instructor: Dr. Abdulminam Taha  
 Name: Omar Younes ID: 200810436  
 Colored plan

**LIVE LIGHT (FITNESS CLUB) COLLEGE OF ENGINEERING INTERIOR DESIGN**  
 Graduation Project 2  
 Instructor: Dr. Abdulminam Taha  
 Name: Omar Younes ID: 200810436  
 3D SHOTS

**LIVE LIGHT (FITNESS CLUB) COLLEGE OF ENGINEERING INTERIOR DESIGN**  
 Graduation Project 2  
 Instructor: Dr. Abdulminam Taha  
 Name: Omar Younes ID: 200810436  
 Colored + Ink Sections

# Project no. 14

**ZOO Restaurant**

Colored Plan Scale 1:100  
 Ceiling Plan Scale 1:100  
 Dimension Plan Scale 1:250  
 Dimension Section Scale 1:100

**ZOO Member Corner**

Colored plan Scale 1:100  
 Ceiling plan Scale 1:100  
 Dimension Plan Scale 1:250  
 Dimension Section Scale 1:100

**ZOO Restaurant**

Section A-A Scale 1:50  
 Section B-B Scale 1:50

**ZOO Member Corner**

Section A-A Scale 1:50

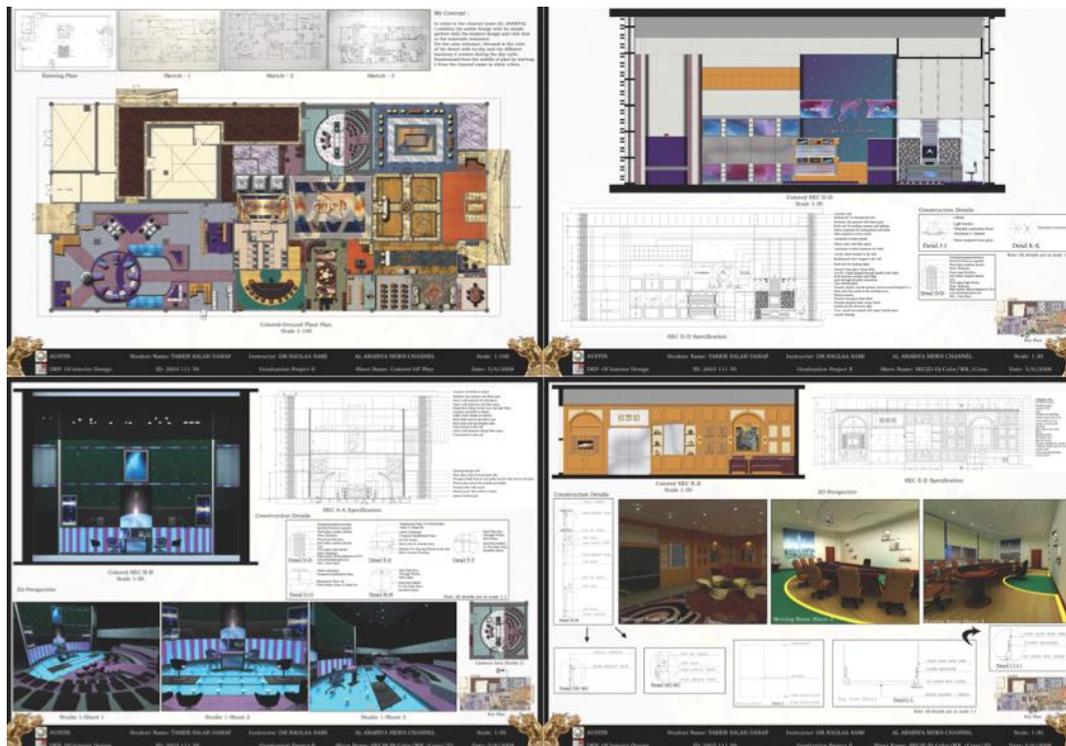
**LIVE LIGHT (FITNESS CLUB) COLLEGE OF ENGINEERING INTERIOR DESIGN**  
 Graduation Project 2  
 Instructor: Dr. Abdulminam Taha  
 Name: Omar Younes ID: 200810436  
 3D SHOTS

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 Graduation Project 2  
 Instructor: Dr. Abdulminam Taha  
 Name: Omar Younes ID: 200810436  
 Colored + Ink Sections

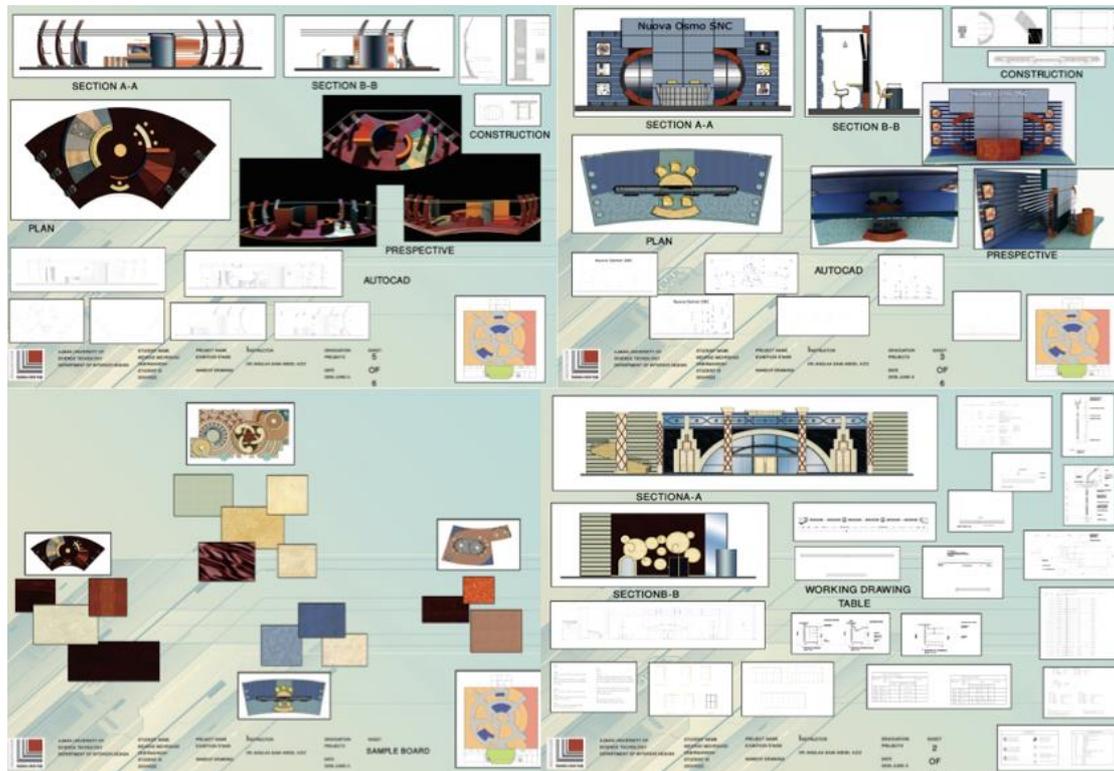
Project no. 15



Project no. 16



Project no. 17



# Appendix E-2

## Ajman University's project after 2013

Project no. 1



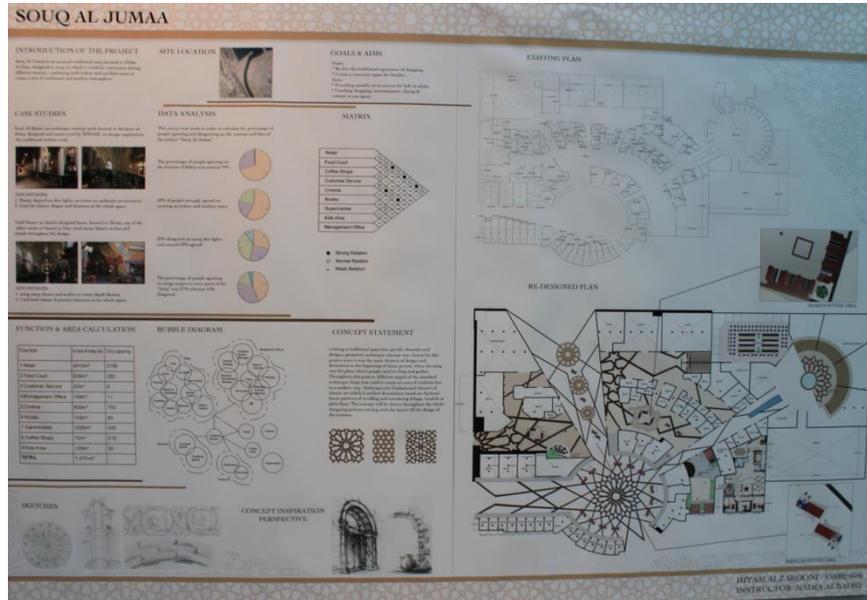
## Project no. 2



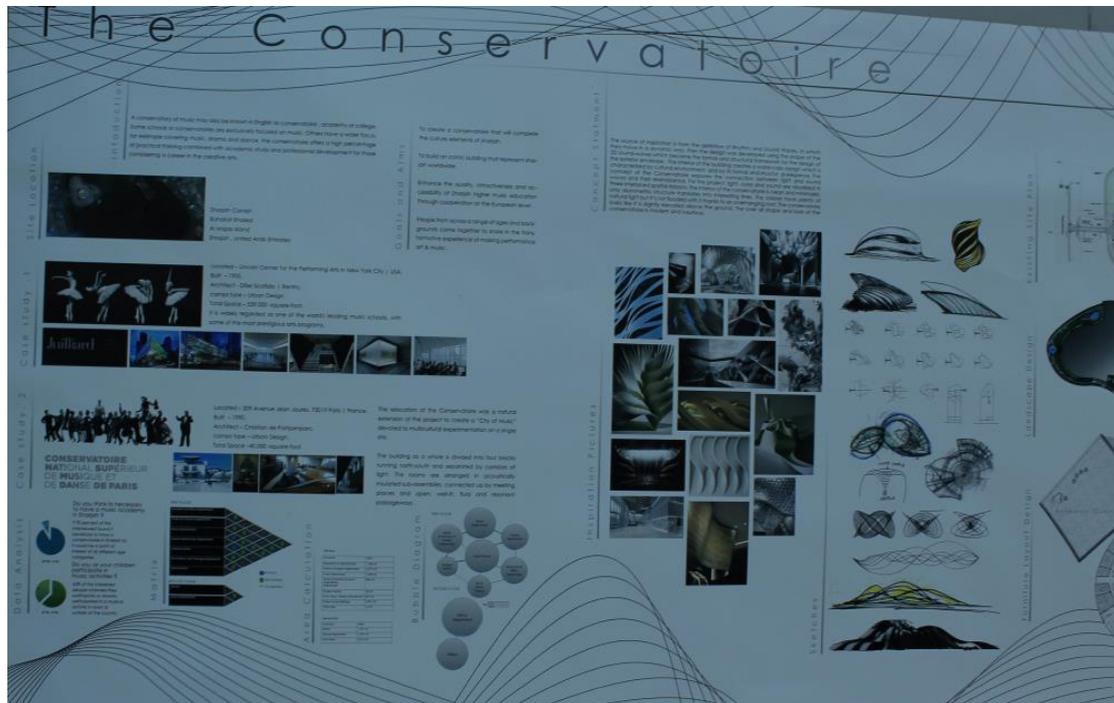
# Appendix F

## Sharjah University projects

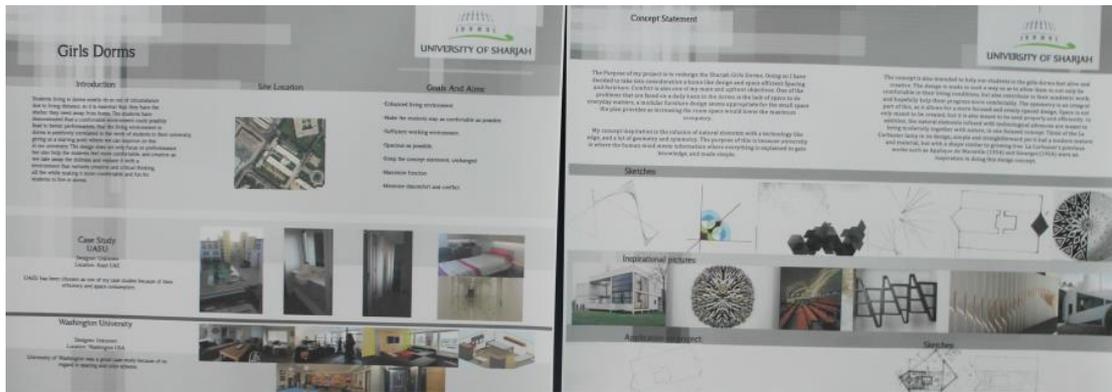
### Project no. 1



### Project no. 2



# Project no. 3



# Project no. 4



# Appendix G

## Interior design III projects

