EVALUATION OF THE EFFECTS OF PARTICIPATORY METHODS IN THE TEACHING OF ECOLOGICAL THINKING IN DESIGN IN KUWAIT.

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To my mother and aunt, who sadly left this

world before seeing me fulfill my dream- I hope

I made them proud.

God rest your souls.

Also, to my dear father, my beloved wife and children

Hamed, Summer and Abdullatif.

I dedicate this work to you.

PREFACE

This thesis stemmed from a self-exploratory journey to investigate why Kuwait, as a country, lagged behind in taking substantial measures toward ecological and environmental awareness. During my studies, I questioned whether or not the Kuwaiti built environment matched its natural environment and soon realised that traditional Kuwaiti houses were very different from those found today. Houses and their natural environment used to be in great harmony.

For a number of years I worked for an architectural firm that specialised in interior home and office designs. Throughout this time, the questions I have had during my undergraduate degree kept coming back to me. These unanswered questions drove me to investigate them more. In turn, this brought me to research and I decided to undertake postgraduate studies in the College of Basic Education and Training. I then applied for a master's degree in interior and spatial design at the University of Hertfordshire, researching in using sustainable techniques and interior spatial circulation methods to impact users in indoor public areas.

I came to the conclusion that sustainable and ecological consciousness is profoundly absent among most designers and stakeholders in Kuwait. This pushed me to investigate the area further, and has strongly influenced and shaped the research described here. After completing this degree, I hope to return to teaching and taking this research forward by applying and testing the ideas discussed with design students in higher education.

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Ioan Fazey provided countless comments and insightful advice on all chapters and on the thesis structure, also on topics concerning engagement, facilitation, processes development, and the social dimensions of environmental change. Jeannette Paul provided essential discussions on design and architecture education and with key issues in those areas within higher education, also revised the outcome of the thesis and the thesis draft. Seaton Baxter provided indispensable guidance and discussions that helped me focus the thesis aim and discover ways to approach environmental challenges, which helped me to realise the importance of education in making change.

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DECLARATION

I, Sami Alazemi, declare that I am the author of the thesis; that, unless otherwise stated, all references cited have been consulted by me; and that the work of which the thesis is a record has been done by me and that it has not been previously accepted for a higher degree.

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SUMMARY

In a world that faces global warming and other major environmental challenges, it is essential that students learn about the principles of sustainability so that they can apply these principles in their future lives and careers. This is particularly so in fields such as interior design, which will impact how well humans can move toward a sustainable way of life. The aim of the present study was to evaluate a participatory teaching approach for students of interior design that incorporates ecological thinking. It is particularly intended for use at universities and other places of higher education where such contexts are not currently available and, furthermore, where the teaching has been primarily of a didactic, teacher-centred form. The teaching approach was developed and tested through the involvement of students and staff at a technical institute in Kuwait – a country with severe environmental problems in which teaching at all levels has traditionally been rigidly didactic. A review was carried out of literature on learning theories, design principles, and sustainability paradigms that bore upon the research aim. Following this, a method was chosen, based on action research that involved running two types of workshop, one didactic in nature, the other participatory, in order to measure the impact of the different teaching styles. Measurements of student reaction were obtained via a questionnaire, using a Likert scale for responses, which was completed by participants both before and after the interventions. Students and staff also took part in semi-structured interviews, which provided further, qualitative data. In addition, data was collected from observations of students during the workshops and group work type experiments. A statistical analysis of the quantitative (Likert) measurements was conducted and triangulated with the qualitative results. The outcome was used to inform

in creating a new eco-module, which is highly student-centred and participatory. The process in developing this participatory approach is presented in a form that can be used by educators to add sustainability content to their existing programmes.

TABLE OF CONTENTS

LIST OF TABLES

LIST OF FIGURES

CHAPTER 1

RESEARCH INTRODUCTION

1.1 Introduction

This chapter explains the background to the subject of the present research, the rationale behind carrying it out, and the specific aim of the study and the questions upon which it is based. A discussion of the background to the research is followed by identification of the specific research aims and questions. The methodological approach that has been applied throughout the research will be outlined. Finally, the structure of the thesis and the steps involved in the research, including an overview of the chapters to follow, are described.

1.2 Background

The researcher is a native of Kuwait, a small country (area 17,820 km^2) at the northern tip of the Persian Gulf, with a population of about 4.2 million, 70% of which consists of expatriates (Public Authority for Civil Information, 2015). Kuwait is facing some severe environmental pressures, including an extreme shortage of fresh water, pollution on land and in the sea, and an overreliance on oil, which, since the 1940s, has been its main source of income and energy. These pressures have been exacerbated by the adoption, over the past half-century or so, of Western lifestyles and architecture (Al-Hassan and Dudek, 2007). Traditional knowledge and appreciation of how to live sustainably in the harsh environs of Kuwait have, by

contrast, been increasingly ignored and forgotten (AlSanad, Gale, and Edwards, 2011).

At a time when there are serious concerns about how humans are detrimentally affecting the global ecosystem, it is essential that countries such as Kuwait, which already have a challenging climate and suffer a severe shortage of some essential resources, reintroduce traditional modes of living and green design and integrate them into modern techniques of sustainability (AlSanad, Gale, and Edwards, 2011). One approach to encouraging a movement toward greater environmental awareness and action is via education. It is well established that the process of education, in which knowledge is transmitted and shared, powerfully influences behaviour and cultural beliefs (Orr, 1992). A vital step towards rediscovering this knowledge and combining it with a modern understanding of green science and technology is to incorporate sustainability and ecological thinking into the curriculum at all levels of schooling. In turn, this would facilitate the permeation of this type of thinking into areas such as professional design and architecture and, more generally, into the outlook and behaviour of the public at large. It would thus become a paradigm that could potentially benefit all aspects of analysis, decision-making, planning, and action (Crane, 2008).

1.3 Aims and research questions

As indicated above, evidence available from the literature and the researcher's own experience is that where environmental education is lacking, so also is a knowledge and understanding of sustainability among students, professionals, and the public at large. The central aim of this research is to provide a means of integrating sustainability into tertiary level courses, notably those of interior design, which is the

researcher's speciality, in countries that at present lag behind in environmental teaching. In this way, design students will be given the tools and ability to create sustainable and environmentally-friendly designs and, more generally, to think and behave in ways that are harmonious with, and beneficial to, their natural surroundings. The main aim of this research can be stated thus:

> *To evaluate the effects of participatory methods in the teaching of ecological thinking in design in Kuwait.*

In order to achieve this aim, a number of questions have been identified. Each question addresses a gap in the current knowledge and has the objective of leading to conclusions and recommendations that will help provide a solution to the research question. The questions fall into two categories: those with a theoretical basis and those based on fieldwork. Questions one, two, and three (see below) are theoretical in nature and will be addressed in the form of literature reviews. Questions four and five pertain to the practical evaluation of participative approaches to teaching design students in Kuwait and are approached through data collection and statistical analysis. The research questions are as follows:

1. What is the current context for teaching theory and practice in Kuwait?
2. What is an appropriate ecological approach to teaching in a post-oil context?
3. What are the contested issues and best practices for teaching ecological theory, especially in an interior design context?
4. What are the qualitative and quantitative effects of the empirical research using innovative teaching practices on student engagement and learning in ecological design theory and practice?

5. How can a new module in ecological design be developed to address the issues outlined above?

The module referred to in question 5 is intended to have wide applicability, so that it can be adapted for use in any country or institution where design students are not presently exposed to environmental teaching. However, it will be developed and trialled at a specific academic institute in Kuwait. To maintain its anonymity and in order to have more freedom to highlight any negative aspects of this institution, the institute will be referred to simply as the Kuwait Educational Institution (KEI). This is appropriate as the researcher is Kuwaiti and is familiar with this particular body of higher learning. As already discussed, the current built environment of Kuwait is, to some extent, both a product and a symptom of the lack of environmental-awareness in architecture and interior design curricula in the country (AlSanad, Gale, and Edwards, 2011). A practical purpose of the research is to enhance the curricula in interior design programs, such as that at KEI, by developing an ecological module that will influence the thinking of students toward greater environmental awareness. If it is effective in this one institute then it is hoped that it may be adapted and adopted for use elsewhere in improving ecological literacy and helping change outlooks and behaviours toward the environment.

1.4 Approach

The overall approach used in this research, for reasons that will be discussed in more detail in Chapter 7, follows the principles of action research (Brydon-Miller, Greenwood, and Maguire, 2003). The questions to be asked, and the information to be used in answering them, were continually revised and refined as the researcher explored issues related to them. In particular, while conducting the literature reviews

and fieldwork, the discoveries made were fed back so as to help determine optimal ways of teaching and presenting to students information on sustainable design, with which they were previously unfamiliar.

An overarching aim of this work is to evaluate how effectively participatory methods could be used to teach ecological thinking to design students in Kuwait. As the design of the proposed module uses data from trials conducted in KEI, a first step is to understand and evaluate the teaching approaches currently used in this institute. Armed with this knowledge, it is possible to come up with better solutions for addressing the lack of ecological and sustainable knowledge that students presently have. As will be seen, it became clear that the best way to deliver this ecological knowledge is through participatory teaching and learning. In order to move forward with this approach, however, it was necessary to test how students would react to this new style of teaching and learning. It was also important to establish what are the necessary principles that students should grasp to enable them to become competent at ecological thinking and be able to apply it in their design.

1.5 Significance

This research makes its first original contribution in the form of a thorough review and investigation of theories of ecological thinking, paradigms of teaching sustainability, and the incorporation of such theories and paradigms into design courses. Its second main innovation is to devise and test a methodology for evaluating a new approach to teaching sustainability in interior design. Although this evaluation involves tertiary level students in Kuwait, the research is aimed much more broadly, at applying innovative, participative techniques that embed sustainability in the teaching of interior design.

The broad significance and philosophy of the present research is to promote a holistic perspective and to embrace ideas, such as those suggested by Kossoff (2012), aimed at creating a sustainable society through design. This approach is far removed from that which presently exists in Kuwait or in many other countries in the Arabian Peninsula. However, it is vital for these nations, which are experiencing an increasingly extreme climate and shortage of essential resources, to recognise the need to change, reduce energy consumption, and adopt sustainable designs, architectures, technologies, and lifestyles. The present research focuses on grassroots modification of teaching at the tertiary level with the following anticipated outcomes:

- Initially, the thesis will be significant in offering guidance and suggestions to encourage Kuwait and Kuwaiti people to adopt a new, participatory paradigm of environmental thinking. It is believed that Kuwait is falling behind many other countries in this respect. However, lately, many specialists have realised the need to change the practices in the country, as soon as possible, both in education and other areas of life.

- Kuwait is considered to be a country that values the importance of higher education. KEI is one of the higher educational institutions in Kuwait that offers multidisciplinary programmes with a curriculum dedicated to training students in the skills needed to teach within their own subject areas. The main reason for this policy is to fulfil the constant demand in the country for teachers at all levels of education. On the one hand, once the ideas of ecological education are adopted, new generations of interior designers who are familiar with ecological literacy and design will inevitably have an impact on the many school levels that automatically hire graduates of KEI. On the

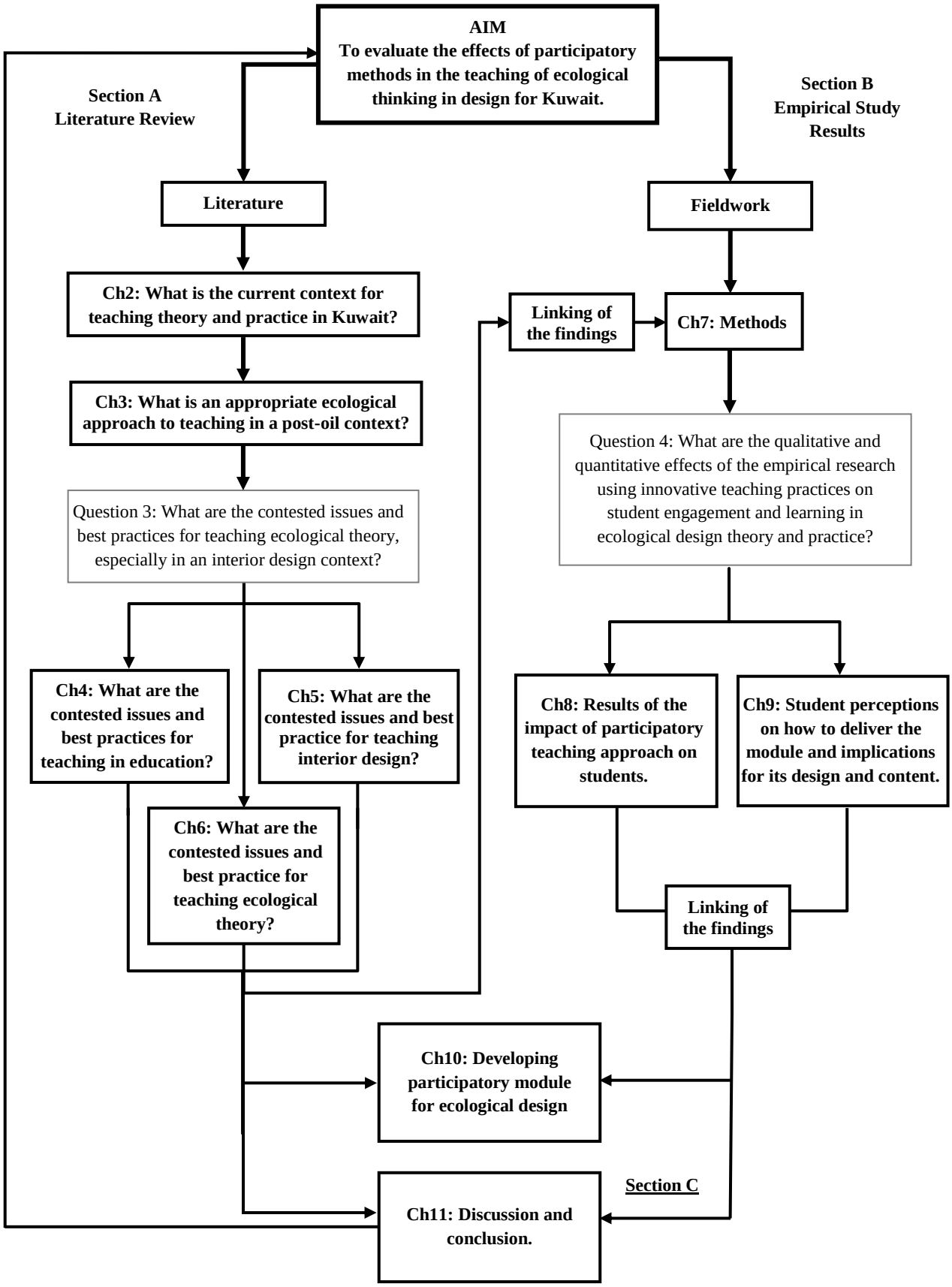
other hand, enhancing the curriculum of KEI in interior design with regard to ecological concepts will potentially increase the chances of its implementation in other design disciplines.

- Due to the lack of environmental considerations in many design disciplines, the thesis will have importance and possible applications for other art and design disciplines, such as products, fashion, graphic design, and so on.
- Not only will the thesis be significant in Kuwait but also in other countries in the region that share many demographic, cultural, and economic similarities.
- The research will cover a gap in knowledge about the theories and practices of ecological design skills and techniques with regard to the hot and desert climates of the Arabian Peninsula.

1.6 Structure of the Thesis and the Research

The following diagram illustrates the structure of this thesis and the relationship between the chapters and the different aspects of the research: those that are theoretical and those based on fieldwork. It also reveals the process used by the researcher in designing the module.

The process of the research and structure: Aims, questions, and outcomes.



Starting from the central aim of the research, shown in the box at the top of the diagram, the research work divides into two parts: on the left of the diagram (Section A) the theoretical aspects, and on the right (Section B) the fieldwork aspects. The theoretical side will be from chapter 2 to chapter 6. Chapter 2 will discuss the current context for teaching theory and practice in Kuwait and where didactic teaching and a lack of environmental education have traditionally been the norm. Chapter 3 will focus specifically on the optimal approach for teaching ecological principles in post-oil context. Chapter 4, 5 and 6 will be addressed to answer the third question of the research to examine the contested issues and best practices in education, interior design and ecology respectively. The results of the reviews will inform the methodology to be used in the fieldwork aspects of the research in chapter 7 and chapter 8. They also feed into the final design of the module (Chapter 10) and are recapitulated in the discussion and conclusions (Chapter 11).

The fourth question will be addressed in two chapters; chapter 8 and chapter 9 placed in the fieldwork side of the research. Chapter 8 is considered one of the important parts of this study by presenting a comparison between two different types of sustainability workshop, one that employs traditional didactic teaching methods and the other a participatory approach. Chapter 8 will also discuss the impacts of these workshops on students and the implications they have for evaluating the participatory approach and on the final design of the module. Feedback from students who took part in the workshops, together with the opinions of both staff and students on what should be contained in the new module, are presented and discussed in Chapter 9. All the results from Chapters 8 and 9 are taken into account in the design and construction of the new module in Chapter 10. The outcome of the research, in both its theoretical and practical dimensions, is presented in Chapter 11.

CHAPTER 2

WHAT IS THE CURRENT CONTEXT FOR TEACHING THEORY AND PRACTICE IN KUWAIT?

Environmental education is now common at all levels in Europe and North America. In the US and Canada, for university and college courses in interior design to receive approval from the Council for Interior Design Accreditation, they must meet the criteria specified in the Leadership in Energy and Environmental Design (LEED) guidelines (El-Zeney, 2011). These criteria cover such issues as indoor air quality, green materials, and eco-friendly building methods. In countries where sustainability is not yet included in the curricula, students demonstrate a lack of environmental knowledge (Michalos, Creech, McDonald, and Kahlke, 2009). Moreover, studies have found that there is a direct link between the level of education in this subject and attitudes and behaviour that are friendly to the environment (Dillon and Gayford, 1997; Tikka, Kuitunen, and Tynys, 2000). Another benefit of teaching sustainability is to bring to students the latest information on green products and sustainability techniques (Ruff and Olson, 2009).

With regard to interior design, Kuwait is among those countries where tertiary level courses do not yet incorporate environmental teaching (Al-Mohaisen and Khattab, 2006). A consequence of this, and of other areas of deficiency in environmental education, is that Kuwaitis have a low level of awareness of green design and formal concepts in sustainability

– a fact that the author of this thesis was able to verify first-hand. At the start of this study, the researcher visited a number of homes in Kuwait to examine for himself their design and degree of eco-friendliness. He also engaged with their occupants in order to ascertain their level of environmental knowledge. These visits were followed by an online visual survey, carried out with Kuwaiti residents to see if they could differentiate between sustainable solutions in architecture and conventional, non-sustainable approaches (see Appendix 1 – published paper). Finally, meetings were held with heads of department of interior design from two higher education universities to know if they offer any material that consist of ecological considerations in their undergraduate programme. As a result of these preliminary investigations it was clear that there is presently a disconnection between the built environment in Kuwait and the natural environment, and that the former is being constructed without the latter in mind. In addition, it emerged that the individuals who were surveyed had little knowledge of environmentally-benign and sustainable methods. Most people were dwelling in homes of international design and construction that were not suited to the local ecology and climate of the region. This will be discussed in detail in section 2.2. Notably, no information to develop ecological thinking were included in undergraduate curriculum of interior design in Kuwait government higher education as discussed in section 2.3.

2.1 Introduction

In what follows, consideration is given to the approach to teaching predominantly found within the educational system of Kuwait and, specifically, the status of teaching with regard to environmental and ecological issues in design. As in the case of most Arab nations, the majority of teaching in Kuwait continues to be didactic and teacher-directed and thus not conducive to encouraging creativity, critical thinking, and independent problem solving (UNDP, 2003). Teachers and lecturers communicate in classrooms using textbooks and other prepared materials, which contain information that is presented as being indisputable. Assessments and

examinations test the ability of students to accurately memorise and regurgitate facts and definitions, rather than to come up with original thoughts and concepts (UNESCO, 2009).

Efforts have been made within some Kuwaiti schools and university and college departments to introduce new methods of teaching and assessment. These include such approaches as continuous assessment, use of interactive media, and participatory courses. Although the results have been positive, implementation is often complicated by the inherent freedom of the new methods and the difficulty students may experience in adapting from the traditional, didactic style to a learning culture in which they are expected to think for themselves and use their own initiative (Christoforou et al., 2003).

Innovation and creativity is central to the subject of design, and, in particular, to the subject of ecologically sensitive design (Trigwell, 2002). The severe environmental problems now facing Kuwait, described in the next section, require that present and future designers in the country evolve new, and rediscover old, strategies for optimising how people live and work in harmony with their surroundings (Darwish, Al-Awadhi, and Darwish, 2008).

2.2 Educational context of teaching in Kuwait

In a world that faces many environmental challenges, including climate change, it is necessary to change our way of thinking to incorporate the living and non-living things around us (Kemmis and Mutton, 2011). A case in point is the unsustainable way in which buildings are designed and occupied in Kuwait. From an interior design context, the current interiors of homes that cover 65% of the built

environment of Kuwait are far from sustainable. The unsustainable built environment of homes is directly reflected in the environmentally-unaware curriculum that is imposed on design tutors, design students, and professional designers. Kuwait is falling behind many other countries, which have adopted and incorporated environmental considerations into their educational systems. However, lately, many specialists have recognised the need to change the current practices in the country as soon as possible and in all areas of life (AlSanad, Gale, and Edwards, 2011).

Although Kuwait has much catching up to do, it is considered one of the countries that most value the importance of higher education as an influential element in determining careers and employment, career development, and wages. Kuwait Educational Institution (KEI) is the only higher educational institution in Kuwait that offers multidisciplinary programmes with a curriculum dedicated to training their students in the skills needed to teach within their own subject areas. The main reason for this policy is to fulfil the constant demand for teachers at all levels of education (Unevoc.unesco.org, 2012). Once the ideas of ecological education are adopted, new generations of interior designers who are familiar with ecological literacy and design will inevitably have an impact on the many school levels that automatically hire graduates of KEI. Furthermore, enhancing the curriculum of KEI in interior design with regard to ecological concepts will potentially increase the chances of its implementation in other design disciplines.

Over the past 25 years, the Kuwaiti job market and educational bodies have come to appreciate the importance of design disciplines. This has led the educational sector to incorporate some of its disciplines within their institutions (Unevoc.unesco.org, 2012). KEI was one of the first educational institutions to adopt design-based

disciplines into its programme. Addressing the design disciplines offered by KEI offers a better chance and a faster route to, introducing sustainability into Kuwaiti culture. Since KEI's curriculum is aimed at developing qualified teachers, its close involvement with the Ministry of Education means that their own graduates, who gain their qualifications from the institution, will have priority with regard to job vacancies in teaching and administrative titles offered by the Ministry of Education. Graduates can also seek other private or government careers if they do not wish to work in the education sector.

At present, most of the art and design disciplines offered, including interior design, tend to focus on a conventional and linear type of design teaching that relies on the tutor to develop knowledge (Anderson and Al-Bader, 2006). The skills, tasks and information that the student is expected learn come from a very fixed and static curriculum, and enhancements to the programme rarely occur. Tutors often tell students about well-known designers and make them familiar with the latest trends and how to reflect these in their work. In addition, according to Almadani's research (Almadani, 2012), the adopted teaching method in the Gulf Cooperation Council (GCC), which consists of Kuwait and other regional countries, including UAE, Oman, Saudi Arabia, Bahrain, and Qatar, depends on memorisation in many of its curriculum subjects. Besides applied-practice subjects, most of the subjects taught in the interior design department use memorisation as the main method to pass the required courses in the curriculum (Almadani, 2012).

The difficulty with this is that students often follow the ideas and skills of the programme tutors and what is placed in the subject's texts instead of developing their own creativity, which is a quality needed in any design-based discipline. Various

reasons have now prompted the department of interior design to initiate plans to enhance the current programme. Part of these plans involves the incorporation of ecological subjects into the programme. However, without changing the way in which design is learned and developed, it is hard to achieve any progress that can be nurtured between design students and tutors for sustainable concepts. In addition, targeting higher education for a sustainable ethos in society means that students need to be objective, committed, and able to adapt and respond rapidly to the complex issues facing the world (Orr, 1994; Foster, 2002).

In educating a new generation of designers in Kuwait, a number of hurdles need to be overcome. The most significant of these is that the present education system places too much of an emphasis on didactic teaching, in which students are expected to memorise material that the lecturer has prepared rather than creatively developing new designs in a participatory situation in which tutors and students interact and solve problems together. The purpose of this research is to help encourage a participatory approach by proposing a new module for interior designers that emphasises sustainability and environmental awareness.

2.3 Effects of the lack of incorporating ecological thinking on education and interior design practices

Currently Kuwaiti architectural curricula and current teaching approaches are lacking to develop designers and architects that can revive Kuwaiti's past vernacular life or encourage to integrate vernacular and sustainable ways for building new and modern building techniques tailored for Kuwait's local environment, to guarantee its success (Anderson and Al-Bader, 2006).

The rapid changes that Kuwait has witnessed reshaped a simple and modest desert culture into a highly modernised and affluent society. The shift has been dramatic, from a traditional, vernacular way of living to a society based on Western-type consumerism and imported goods and lifestyles, dependent on high power demands for such modern conveniences as central air-conditioning (Hamad, 2016). This situation may have serious consequences for future generations who wish to preserve their natural resources and environment while also enjoying a good measure of prosperity and stability.

Recognising that the past can help shape the future, many believe that Kuwait's desert heritage, its skills, rituals, ceremonies, and artefacts should not be lost (Al-Anjari, 2003). However, most of the traditional skills and crafts that helped to maintain life in old Kuwait have disappeared. Social relationships and family structures have changed, often adversely, echoing the changes seen in building designs and spaces (Al-Anjari, 2003).

Traditional, vernacular life like that in the past in Kuwait can still be found in some nations around the globe, particularly in Africa. An interesting interview with an African master builder of mud buildings was conducted by Jonathan Dimbleby, who worked as a TV reporter for four decades in Africa and decided to begin an epic journey tracing changes across the continent, when he passed into the ancient town of Djenne in Central Mali, currently a UNESCO World Heritage site for its unique earth architecture. Dimbleby went to see a mason, called Kambaba, who had worked as an earth mason for most of his life. While Kambaba was mixing the clay to build a house, Dimbleby asked: "Do you think that the tradition will survive?"

Kimbaba replied: “Some people have started building with concrete; they say it is more convenient. That’s a view we deplore. We like mud, mud forever! The tradition will continue.”

Dimbleby left the town and ended his time there with these words: “So many traditions, so rich a past, so easily ignored so easily lost!” (An African Journey with Jonathan Dimbleby, 2010).

Here, it is important to note that it is not all about finishing a building or moving into a space to occupy. There is a passion associated with natural building. ‘Homes’ should not be dealt with as by products or projects that have to be accomplished or deadlines that has to be met. They are much more meaningful than that. Gathering and sourcing the material by hand and knowing that what is being built, step by step, will eventually form a house that an individual has helped to build gives people like Kimbaba their sense of ownership, pride, and joy (An African Journey with Jonathan Dimbleby, 2010).

This research will seek to call ecological thinking back to young designers’ minds and provide them with the knowledge and tools needed to expand this quest by utilising the capabilities of ecological design in their discipline.

2.4 Current interior design practices in Kuwait

As mentioned previously sustainable and ecological consciousness is noticeably absent among most designers and stakeholders in Kuwait. This lack of ecological thinking starting from design education to the design practice has not been helpful in achieving a balance between past vernacular life and current modern and technological life. It is crucial that a way be found to reconnect Kuwaiti society with

its natural environment to close the gap that was created by the drastic change to current challenges and practices (Anderson and Al-Bader, 2006).

Architecturally, Kuwait City has gone through a transformation from a medieval Islamic city with open courtyard houses to a modern city with villa-type homes. In 1951 Abulla Alsalim Al-Sabah, the present ruler of Kuwait, commissioned British firms Spencely, Minoprio, and MacFarlane to design a master plan for a new Kuwait to replace the old city and construct new urban cities around it (Al-Jassar, 2009). In 1952 the plan was submitted and became a significant turning point in the Kuwait built environment, one that has had a major effect on every aspect of Kuwaiti society. The government started a program to modernise Kuwait city and to distribute the wealth from oil revenues. Although this might have seemed a good plan to many Kuwaitis at the time, it also resulted in the elimination of the vernacular town, which formed a huge part of Kuwaiti collective memory, history, and identity, along with traditional vernacular and environmental materials and methods of building (Mahgoub, 2007).

Since Kuwaiti housing welfare was established in 1952, building designs have pursued mainly one method of construction that employs reinforced concrete and a modern Western style for all residential and government spaces (Gado, Alazemi, and Hutton, 2012). These designs rely heavily on high energy consumption for air-conditioning and disregard the benefits of traditional building techniques and layouts that are more suited to the local environment. As a result the appearance of entire urban neighbourhoods has been transformed (Gado, Alazemi, and Hutton, 2012).

The typical modern house of Kuwait focuses on the exterior rather than the interior, which is an inversion of the vernacular approach (see Figure 1). The central design of

the open courtyard has been replaced with a monolithic design in the form of a boxed-shaped building. The natural house had greater access to natural light since all of the rooms had recessed windows looking out onto the courtyard. This design offered more access for most of the rooms to have sunlight. At the same time, it was in keeping with the cultural norms of Kuwait, for example in maintaining a level of privacy for the house dwellers (Gado, Alazemi, and Hutton, 2012).

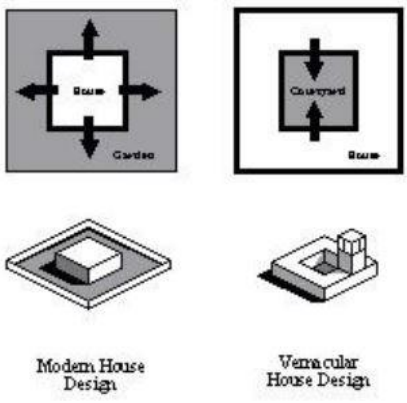


Figure 1: Differences in form and design between typical modern and traditional vernacular buildings

Modern Kuwaiti homes, by contrast, often have massive glass facades, with large windows and openings exposed to extreme sunlight for most of the day. These windows are also distributed around all the sides of the house, thus causing a conflict with the culture and traditions of Kuwait, as it is considered highly offensive to look across to the windows of neighbour's homes. Ironically, the expensive double-glazed windows of modern Kuwaiti homes are generally kept shut and covered by curtains, so that they do not serve any functional purpose. The result is an enveloped house that demands excessive energy for air-conditioning and lighting for many rooms that have no access to natural light. Concrete walls store thermal energy from the sun during the day, and then disperse it to the interior quite quickly. Without air

conditioning, the interior would become as uninhabitable as a furnace (Mahmeed, 2011).

The interior spaces of most houses are full of manufactured and mass-produced materials. Modern techniques made it possible for architects to build houses entirely from concrete in a prompt fashion. However, in most cases, there are few special qualities to the buildings as they require many levels of expensive surfacing, plastering, and covering of the otherwise grey concrete walls with paint and ceramic floors. Many homeowners realise that this practise is not economically feasible and enforces an economic burden while they construct their homes. So, in order to prepare the interior surfaces for painting or ceramic tiling, a series of wet finishings is done after forming the interior and exterior walls with concrete blocks (Sadeq, 2010).

When designing residential buildings in Kuwait, the house often becomes strikingly oversized and over spaced beyond the needs of the occupants (Edwards, 2010). Good proportion has been described as one of the guiding principles of interior design and is defined in terms of size as the relationship of the parts to each other or the part to the whole. However it is not sufficient to define proportion in terms of lengths and angles, because, additionally, certain proportions have been codified by different cultures at various times (Edwards, 2010).

Modern Kuwaiti homes, which may have a very large floor space, require huge amounts of materials to complete. The typical ground floor footprint of a house is approximately 400 to 750 square meters in a building that is 3 to 5 storeys high. If the building has three stories the total building structure will consist of 690 square meters about 80% of its total allocated space (Sadeq, 2010). The ratio of material

consumed to required spaces is always constant: the more spaces are increased, the more materials are used and the more energy is consumed to air-condition the building and run electrical appliances. Therefore a call for resizing houses in a rational way is necessary to achieve sustainable aims.

The high price of both building materials and land had prevented the average family from buying and building a house of their own, forcing them to rely on the government to provide a house (Gado, Alazemi, and Hutton, 2012). In 2009, the housing welfare system managed to provide housing for only 40% of the 93,040 Kuwaiti families who applied for housing. Between 1997 and 2012 the Kuwait housing welfare spent almost £5 billion on housing projects and succeeded in accommodating only a small fraction of Kuwaiti families. Currently, the number of houses available for Kuwaiti families has dropped to less than 25%. This on-going problem is considered to be the biggest concern to families and one of the major obligations that the government has struggled to solve over the years.

The past vernacular homes of Kuwaiti people were built to serve the needs of households internally. One of these needs was providing a well thought-out design that served the strong ties of the extended family, offering a direct access between family members through an open courtyard in a building of one, or at most, two levels. Internal courtyards served many functions in the house (Gado, Alazemi, and Hutton, 2012). However, this has been replaced with residential spaces that are divided by rooms in multi-storey buildings, separating one family member from another, parents from children, and sibling from sibling. Alienating the occupants of the house is something that is certainly not part of the cultural and social nature of Kuwait, nor is it in keeping with concepts of community that arise from ecological

thinking (Hornecker, 2005). Building spaces modify behaviours by providing an environment to encase and foster our living (Mallett, 2004). These confined spaces can control our emotions, moods, and feelings, and the way people interact with each other or members of the family who share the same space (Bechtel, 1997).

Modern Kuwaiti buildings, with their imported design and approaches, reflect a lack of ecological thinking or concern for sustainability. One way to reverse this trend is to integrate full consideration of environmental factors at the design stage. At the same time, it is essential that ecological thinking and effective approaches to sustainability be incorporated into the education of students who will form the next generation of designers.

* Appendix 1 provides an example of the published work that has been put into ecological thinking and techniques in relation to the build environment.

2.5 Conclusion

In conclusion, with regard to the first of the research questions identified in section 1.3 (What is the current context for teaching theory and practice in Kuwait?), it is evident that teaching approaches for interior design students must be enhanced to incorporate ecological thinking in design in Kuwait. Current curriculum and teaching methods are not adequate for developing the kind of environmental consciousness among student that is needed to move toward a sustainable future in the country and beyond. Designers must rediscover older techniques that are more energy efficient, and incorporate vernacular art and appearance, while, at the same time, incorporating green design principles from around the world.

In educating a new generation of designers in Kuwait, a number of hurdles need to be overcome. The most significant of these is that the present education system places too much of an emphasis on didactic teaching in which students are expected to memorise material that the lecturer has prepared rather than creatively developing new designs in a participatory situation in which tutors and students interact and solve problems together. The purpose of this research is to overcome the didactic approach in teaching to help encourage a participatory approach and proposing a new module for interior designers that emphasises sustainability and environmental awareness.

CHAPTER 3

WHAT IS AN APPROPRIATE ECOLOGICAL APPROACH TO TEACHING IN A POST OIL CONTEXT?

3.1 Introduction

The human race faces an existential crisis over the coming decades and centuries as the global ecosystem upon which we depend comes under increasing threat from climate change, species degradation, and resource depletion (Kunstler, 2007). To address this crisis we require a major change in the way people think and act a movement towards ecological thinking and taking the appropriate action (Berkowitz, Ford and Brewer, 2005). This change can be brought about, in part, by changes in education so that, from primary level up, students are taught to habitually consider problems and solutions from an environmental perspective (Colucci-Gray, Camino, Barbiero and Gray, 2006).

Currently, environmental organisations are working closely with educational institutions to reform learning methods so as to develop ecological thinking in students. The United States Environmental Protection Agency (2017) claims that environmental education increases public awareness and knowledge about environmental problems. This is by providing the public with skills that will help them to make informed decisions about the environment so that they take the appropriate action. Environmental education should be taught at all levels as it makes

students more responsible while enhancing their ecological thinking. Forestfoundation.org (2017) maintains that it is important to provide environmental education for students from early primary school to graduate level. This is to teach them the skills that are necessary to face various life challenges and so that informed decisions about the environment can be made. In the recent past, environmental education has been integrated into the school curriculum through Project Learning Tree (PLT) programmes. More than 500,000 teachers have been trained using this multidisciplinary scheme.

This chapter will focus on identifying an appropriate ecological approach to teaching. In addition, it will emphasise that participatory methods such as group work among students and partnership activities in learning are central traits in effective environmental education. Environmental education enhances critical and creative thinking skills enabling students to make connections and helping them to apply their learning in the real world. Environmental education should, therefore, be taught in and instilled into school curricula; this should be done using methods that are appropriate for teaching ecological thinking.

3.2 Participatory methods in teaching ecological thinking

In this section, consideration will be given to various aspects of teaching ecological thinking, with an emphasis on participatory strategies. The section is divided into three parts, the first of which addresses the importance of group work and partnerships. Following this, the roles of students and teachers in effective environmental education are examined. Finally, there is a discussion of two prominent models of ecological thinking that provide a theoretical framework for environmental education.

3.2.1 Partnership in group work

Ecological thinking is enhanced by the use of various participatory methods. Group work and partnerships are complex and multidimensional forms of participatory relationships that go beyond simply linking people in networks between various parties (Eames and Bolstad, 2004). Partnerships in environmental education are critical; they are successful and fruitful when all the partners recognise that they are working together to achieve a goal that they consider to be important. It is assumed that to have productive partners in a group they should share a clear view of why a particular goal is important and how they are going to try to achieve it (Potter, 2009). Although partnerships are viewed in the sense that they increase commitment to a certain group, and its choices, Eames and Bolstad (2004) argue that to work in partnerships participants must negotiate the goals that they want to achieve and the tasks to be taken on by each of the active group members. The process in organising group roles to achieve goals begin with identifying the task. Then assigning certain responsibilities and determining the accountability between members. Finally, organising how power will be arranged among participants (Burdett, 2003). Potential partners in education include students, teachers, other school staff, education advisers, groups and individuals from environmental agencies, and groups or persons from the local community (Palmer, 2002). Partnerships are normally enhanced in various settings such as the classroom, the subject areas, between staff, or even between the school and the local community (Corcoran and Wals, 2004). However, in this study the focus will be on classroom partnerships where the aim is to cooperate in working towards a unified goal of achieving effective environmental education. This includes both teachers educating students and students educating themselves.

3.2.2 Teacher and student roles in environmental education

Eames and Bolstad (2004) maintain that students should be placed centre stage if the stakeholders are to achieve a better environmental education. They believe that the purpose of teaching environmental education is not only for the students to grasp environmental knowledge, or to actively participate in environmental roles such as clean-ups and planting trees, but to take up active roles in a society seeking to achieve sustainable solutions to environmental challenges that threaten the long-standing ecological balance.

The most prominent approach in environmental education as part of a student learning process aims to integrate student engagement. This is by employing some form of action that is primarily aimed at contributing towards a more sustainable environmental future. However, as much as the impact that humans have on the environment can be understood, there is a need to understand that working together as a society is essential to make effective progress in protecting the environment (Neill, 2004). Furthermore, with recent developments in various fields involving education, a theoretical framework suggests that students should, in fact, be involved in participatory action plans and decisions pertaining to environmental education to gain a deeper understanding of their environment.

Eames and Bolstad (2004) argue that it may be difficult to exactly know the extent to which student decision-making principles are practised. However, teachers have a role to play when it comes to boosting environmental education outcomes by taking measures in giving students the freedom to make their own decisions. Indeed, as discussed in the theoretical framework section (3.2.3), rather than wholly depending on their teachers, students can become their own facilitators of education.

Furthermore, students working in an environmentally aware curriculum tend to gain a sense of pride due to their involvement in environmental activities over and above what they would gain from the usual curriculum that does not teach environmental knowledge in classrooms (as discussed in Chapter 7 and Chapter 8).

By teaching environmental education, teachers have developed new pedagogical strategies that are based on collaborative work. These strategies help give the student autonomy so they can make their own decisions; thus they develop a view of themselves as facilitators of student-driven learning, rather than passive subjects of a teacher-led national curriculum provided by the government (Herbert, 1992). It is also true that the benefits of environmental education can be enhanced by integrating environmental studies into the curriculum, rather than by providing a few independent activities in an academic year such as having instructors teach a small group of volunteer learners about the benefits of environmental conservation (Neill, 2004). The head of the institution and relevant staff should be involved so as to most effectively implement group work among students and partnership activities in learning. Further, involving an institution's top management ensures that the ecological approach goes together with the institution's objectives (Guide to the pre-primary curriculum, 2006).

There is a need for educators and students to constantly reform ecological education to achieve the highest learning benefits. This is because the ecological framework will always expand and, as forecast by many researchers in various disciplines, it is going to transform education and educational institutions. Therefore, in teaching ecological thinking, instructors should take into consideration the ability of learners to synthesise information and data that enhances teaching methods. This will make

their institutions more flexible for development, while constantly enhancing their curriculum and avoiding complexities in the learning process (Keni, 2002). It should also be noted that environmental learning is not only about learning issues in the curriculum, but is also related to the methods that are employed by the teacher to teach ecological thinking. This is because, in the recent past, there has been an increase in information load. Therefore, there is a need to change and recreate teaching methods in a way that allows learners to achieve maximum understanding in the learning process (Kostova and Atasoy, 2008).

Several teaching methods can be employed in environmental education. These methods and steps are utilised to make students work in small groups, debate, peer learn, compete, construct concepts, cooperate, work in larger projects, and work around solving complex problems through constant support and motivation (Kostova and Atasoy, 2008).

3.2.3 Theoretical framework for environmental education

There are theories or models that advance teaching of environmental education, such as the systems model and ecological model approach. The systems model defines the relationship between humans and the environment; it includes outdoor education with participants, the group's instructor or teacher, the activity, the programme, and the environment used for participation. This model treats the environment as an ecological system that involves all these elements through a series of interactions. The model emphasises that environmental education frequently focuses more on understanding humans and the systems that they create in influencing the non-human natural systems (Willison, 1993). People influence the environment in which they live in, while the environment communicates to people through a series of changes,

most notably climatic changes; it is this communication that links the environment and the people in it through a constant interactive process (Giddings, Hopwood and O'Brien, 2002).

Another model that provides a theoretical framework for environmental education is an ecological approach to teaching, which utilises an ecological didactic model of student's pedagogical practice. This model views a school as a multilevel and multifunctional environment in that the students (who form the group of trainees) and the teachers (who are the trainers) comprise a significant part of the environment in which they find themselves. It utilises the function of a triad, whereby a university lecturer, who is the supervisor of the pedagogical practice, a student, and a student pedagogical trainer, all interact at a point forming an instructional system and hence an ecological system (Katane, 2007). The ecological approach also develops a student's interest, passion, motivation and creativeness to carry out those activities that interest them, even if those interests are not within their discipline as spelled out in the curriculum (Bajer, 2017). With this kind of approach, the learning process becomes like an ecological system. Just as an ecological system is strengthened by connections, so a learning process and the outcomes of an environmental education are reinforced by the ability to interconnect pieces of information and knowledge (Berkowitz, Ford and Brewer, 2005).

The two described theoretical frameworks offer a basis for teaching environmental education in schools. Students and teachers continually interact in an environment in which a teacher is more than just an instructor or a facilitator of education; further, learners can stimulate their own thinking by being their own facilitators. This ensures that all the participants in a particular setting identify the level of interaction within

their environment and thus influence their interactions in a positive way. As a learning process, especially for an institution that relies on traditional teaching, it is highly recommended that students should reduce their excessive overreliance on their teachers and instead develop their own cognitive ways to assess and handle a given situation (Kostova and Atasoy, 2008). According to this approach, students are empowered to be independent in their undertakings, while teaching environmental education in a participatory approach will boost their personal development and cognitive ability.

Although environmental education is an intervention normally geared towards primary school and high school learners, it is important to also extend it to higher education and the surrounding community (Cortese, 2003). For systemic and ecological models to thrive, educational institutions should also involve the society in the integration and implementation process (Bammer, 2005). The elements of this integration and application aim to solve major societal challenges with the current level of environmental complexity and uncertainty. People tend to be anxious because of negative practices carried out in everyday life resulting in uncertainties. Whether this phenomenon is simple or complex, it should never be ignored.

Kineman and Poli (2014) state that there is a need to achieve a balance between top down and bottom-up models or approaches to learning. Various models of learning involve the processes of either top down or bottom-up models of learning. The learning organisation model, for instance, envisions a student-driven experience, which presents principles of the ecological system as it seeks to employ the bottom-up kind of model in the learning process. The concept of learning organisation was put forth by Senge in his Fifth Discipline model, which addresses the complexity in

today's learning environment. It aims at introducing more creative and participatory methods in learning and the functions of an organisational setup. Kineman and Poli (2014) also proposed a new pedagogical framework for systemic or ecological sustainability that further focuses on enabling all the participants to think sustainably in the humanistic system. They argue that simplistic thinking is no longer working; hence, new ways must be found to tackle complexity in thinking.

3.2.4 Importance of participation in teaching

To understand the importance of teamwork, it is also important to understand the participatory activities that are used in teaching ecological thinking. Participation recognises that all the stakeholders in the learning environment will continue making contributions that will enhance their understanding and influence their decision-making process (Bammer, 2005). Environmental education instructional strategies help integrate academic disciplines, foster leadership skills for students, and boost academic growth and social interactions especially in young people and children who are targeted to benefit the most from this kind of learning **(**Mcnerney, 1996). Health environmental education, for example, helps in providing the relationship between nature and other health risks such as asthma and childhood obesity. This shows that there is also a need to determine the effects of nature on human systems (Neill, 2004).

The decision to select a teaching method should be one that imparts knowledge to the learner in the most appropriate way. Kostov and Atasoy (2008) suggest that while the student is at the centre of the learning process, the responsibility of the teacher is to teach, organise, guide, and direct learners throughout their questioning process to ensure that the learners benefit from this interaction. In this current era, in education

we have progressed to a point where a teacher is not supposed to be a specialist in a subject, but should facilitate the learning process by allowing students to utilise their inquisitive skills. The students should also be able to react to their answers as much as they question events in their learning environment (Kostov and Atasoy, 2008).

Environmental education not only helps in enhancing the relationship between nature and human, it also helps participants develop the critical thinking and relationship skills that are essential in improving leadership qualities in various instructional strategies of environmental education (NEEF, 2017). With this in mind, it is important to focus on the importance of groups and partnerships as teaching strategies.

Teams are necessary to organise interactions; expanding their use during the learning process helps to emphasise cooperative learning, which translates to working in teams with partners. Group work and partnerships for environmental education may develop into highly effective systems of interaction. This is because, during group work, participants interact with each other while they focus on the goal of achieving their set objectives (Eames and Bolstad). These groups work as if they were interconnected to form partnerships, thus making them stronger. Bajer (2017) asserts that, just as in ecological systems, where the end of one process is the beginning of another process, similar or dissimilar, environmental education should, in fact replicate this system. This will ensure that education is not just a learning process, but rather a process involving the ability to learn, think, and interconnect the pieces of knowledge as taught. To achieve such an interconnected process, the teacher should ensure that the student learns while at the same time consciously applying knowledge that has been gained in various disciplines overtime. In this way, by

exposing students to the interconnectedness of their environment, an ecological method is achieved (Bajer, 2017).

Participants included in a group project have the opportunity to understand a concept much better compared to those that are learning individually. Group work promotes discussion and communication. This discussion leads to a topic being dissected further, and certain concepts are discussed in greater depth as each mind in the group presents their understanding of the subject. Group work allows freedom on the part of the students, and it is the role of the teacher to help students build up these interests and the desire to develop oneself.

Teaching students to participate in groups is also important in that it gives them a valuable set of skills in life, which will enable them to find sustainable solutions to real life challenges. By being part of a group, students are able to approach a complex task and divide it into manageable portions among themselves. Each participant focuses on attaining the group's goal or interests as laid down by the members. In the process, students learn how to break down a complex problem into small parts that are easier to deal with. This approach is also well suited for teaching environmental education. This is because the environment is an important and complex subject; indeed, some of the challenges that need to be solved might be too complicated for just one person to handle (Schiola, 2011).

Group work strengthens communication skills between participants (United Nations Environment Programme, 2004). In a situation where the learning involves internalising the information alone, one does not have to communicate with others. However, in a case where the lesson is conducted through group work, communication is a necessary skill, and the participants are forced to build on this.

Communication is a vital skill in life that is needed so that one can articulate ideas and concepts to others. Group work promotes and builds communication skills. The participants are required to get to know and understand each other. Students with poor communication skills have the opportunity to learn from the rest and can build and practice their communication skills; if their communication skills develop and improve then they have a better chance of succeeding in reaching their goal (Baker, 2006).

Students in group work also get a taste of what it feels like to share roles and responsibilities (Oakley, Felder, Brent and Elhajj, 2004). This teaches them how to be accountable for what they were held responsible for. Group work also helps those involved understand how things are carried out in society. Participants learn how to distribute work among themselves equally or at each individual capacity. They acquire an understanding of what responsibility they have at hand. The roles they get are interconnected and if one aspect is not taken care of, the whole group fails. This encourages the students to do their best in order to boost their group performance (Killen, 2006).

Group work creates a platform for students to acquire knowledge from one another and to sharpen their thinking. Also, if students are able to work in a group it nurtures equality and openness; this is not only relevant to them but also to the entire institution. Partnership and group work in learning helps to promote learning. Some of the benefits that students gain from group work include: experiential learning, creative thinking, problem-solving techniques, inquiry learning, and interacting (Australia and Curriculum Corporation (Australia), 2005). Experiential learning enables students to have more experience, which helps ensure that their knowledge,

skills, and values develop systematically. Moreover, inquiry learning in this ecological approach enables students to interact and inquire more about what is being discussed in the groups (Australia and Curriculum Corporation (Australia), 2005).

Environmental education through group work helps students to establish a shared identity with their group members. This group identity will hold values in common including a desire to preserve the environment. This is because environmental education brought the team together. The shared identity gives the students something positive that they can identify themselves with, while the values give them something wholesome to believe (Carson, 2014).

One major concern with regard implementing group work among students and partnership activities in learning is being able to come up with groups that can effectively cooperate to achieve their goal (Guide to the pre-primary curriculum, 2006). Students should have a clear goal to achieve, rather than just sitting down together without a common goal. In addition, to make student group work successful, relevant rules should be formulated that govern each student within the group. For instance, each student should be encouraged to participate actively in all discussions that are presented in their respective groups (So and Brush, 2008). Active participation of students within a group makes them feel relevant. Another benefit of partnerships in an ecological approach is that it makes work easier for teachers, which means that their workload will decrease. This method will ensure that the overall performance of the institution will improve. Working in groups is inevitable and, as such, it seems that the use of group work and partnerships is the most crucial way to bring a society together into doing a common good that aims to attaining environmental awareness (Shepard, 2008).

3.3 Conclusion

Participatory learning is one of the most appropriate approaches for use within environmental education. Indeed, participation ensures that a certain level of focus is achieved; it gives a group of participants an opportunity to articulate their issues so that they might be heard. This idea ensures that all members of a group are equal; hence, depending on their goal interests, they can focus on one common goal set to be achieved by the members of that group (Eames and Bolstad, 2004). The complexities that the environment poses to humans (and vice versa) must be addressed. Most governments and businesses have shifted gears to integrate ecological thinking into institutional frameworks such as schools and universities in order that we might learn and research how we can find sustainable environmental solutions. In this manner, students will be able to synthesise information about their environment and improve their interactions with the environment, while aiming to solve the complexities associated with their ecosystems (Kineman and Poli, 2014).

The environmental challenges and problems that people continue to face such as soil erosion and drought demonstrate the need to take certain measures. Environmental education is a tool for educating the public about the environment they live in and the resulting problems we will suffer from if this issue is not addressed. The most appropriate way to teach environmental education is by integrating it into the curriculum at all educational levels, so that students grow up with appropriate knowledge about their environment. One of the most important methods that environmental education employs, as explained above, is participation between students in group work and partnerships in learning. These techniques should be emphasised to enable environmental educators to achieve the goals of environmental

conservation and so that we can handle environmental problems (Bostick and Anderson, 2009).

One of the most significant benefits of participation in teaching an ecological approach is that it is easy to implement once it is planned appropriately. This ensures that students work efficiently with their colleagues, or other multidisciplinary partners in the long run this makes them feel empowered. For example, with group discussions, the students have the autonomy to make and implement their own decisions. This means that students can view themselves from a different perspective as facilitators of environmental education rather than just receivers of information (Eames and Bolstad, 2004). This is usually the main aim of environmental education: to engage learners in a participatory manner. It might be achieved by using small teams or focus groups as a teaching strategy.

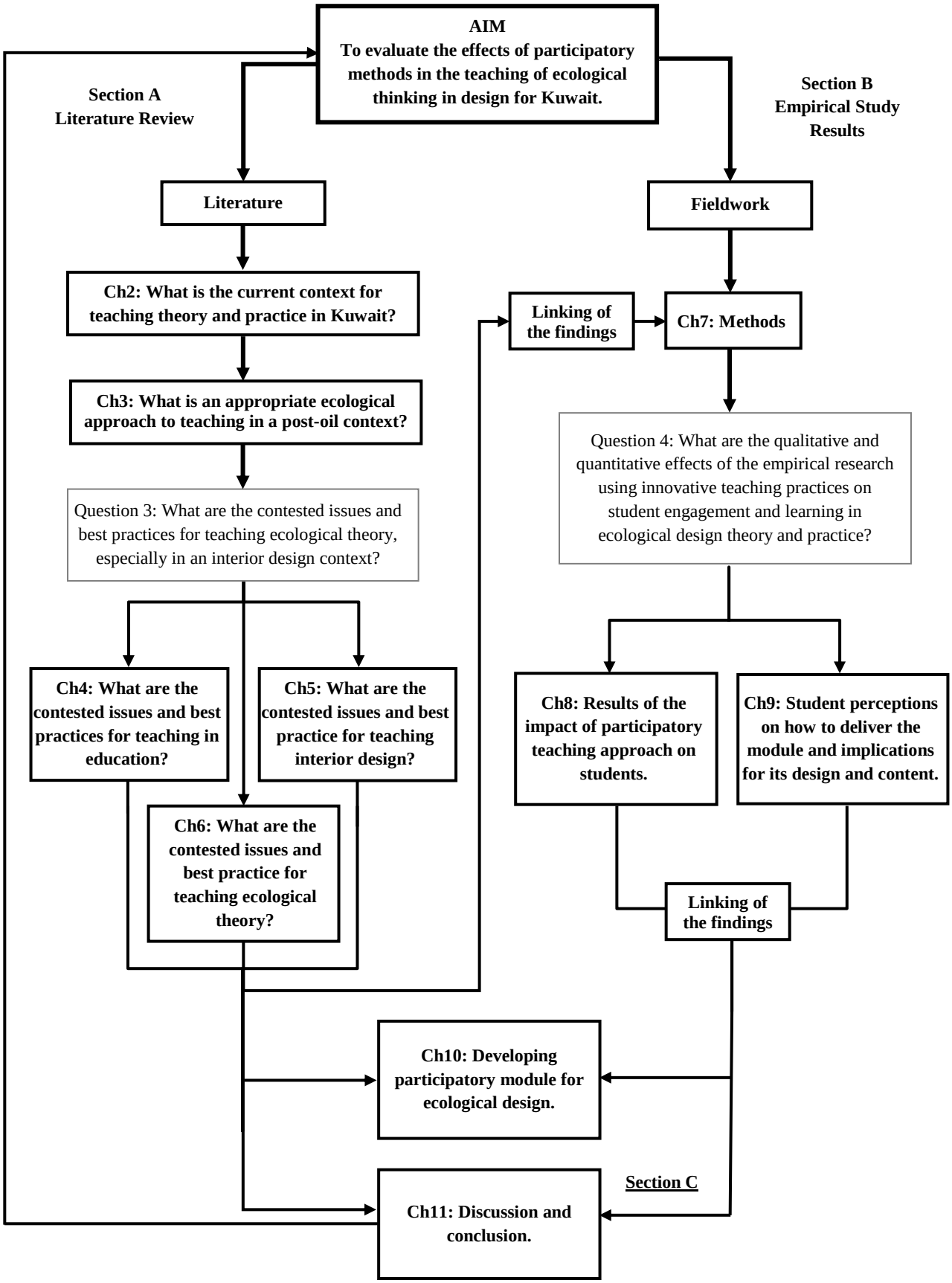
On reflection, ecological awareness must aim to ensure that students and instructors understand the process of critical thinking to break through complexity (Kineman and Poli, 2014). When this is done, students are able to reduce overreliance on their teachers; they start to cultivate a culture of independence that is essential in teaching ecological thinking. Environmental education enhances learning through the use of partnerships and group learning. Partnerships are complex forms available in multidimensional forms of relationships. Therefore, teachers should facilitate students to work among themselves and participate together in tackling environmental complexities.

Next, the literature reviews in chapters 4, 5, and 6 will discuss in detail theories in education, interior design and ecology, to help in developing a successful participatory approach for teaching ecological thinking.

SECTION A-THIRD QUESTION

Having examined the background and context to this research in Chapters 1 and 2, and the appropriate teaching approach for ecological thinking in Chapter 3, the third of the research questions. What are the contested issues and best practices for teaching ecological theory, especially in an interior design context? – will now be addressed. The next three chapters will examine literature that bears upon the use of participatory methods to teach ecological thinking for design in Kuwait. Chapter 4 will present insights from literature that focus on applicable theories of learning and teaching and conclude with recommendations for best practices from teaching. In Chapter 5, the focus will shift towards determining, from the literature, what are the main theories and concepts in ecology and sustainability that should be conveyed, with recommendations on application to interior design. Finally, Chapter 6 will review theories and principles from design education that can usefully inform how to design and develop teaching ecological thinking in an interior design context. The following diagram shows the process that was used in section A in relation to answering the third question of the research.

Addressing the third question in section A in chapter 4, 5 and 6



CHAPTER 4

WHAT ARE THE CONTESTED ISSUES AND BEST PRACTICES FOR TEACHING IN EDUCATION?

4.1 Introduction

In this chapter, various theories of learning and associated methods of teaching are examined with a view to identifying theories that both promote participatory learning and are most appropriate for teaching ecological ideas in a design context. Section 4.2 provides a basic introduction to the concepts of learning, teaching, and student engagement. Section 4.3 discusses the four main categories into which learning theories fall, namely, behaviourism, cognitivism, constructionism, and humanism, together with specific theories of learning, within these categories, to be evaluated in terms of their relevance to inform the new eco-design module. Following this, in section 4.4, is a review of learning and teaching in relation to cultural context – specifically, the culture of Kuwait. Section 4.5 draws together the implications of the chosen theories of learning for the teaching of the new eco-design module in its intended cultural setting. Section 4.6 presents the conclusions of this chapter.

4.2 Learning and teaching

Before looking in some depth at the various theories of learning and methods of teaching that have been advocated over the years, it is important to have a reasonably

clear idea what the terms 'learning' and 'teaching' mean. So broad and complex are these concepts that they have attracted many attempts to define them.

Generally speaking, learning is the acquisition of knowledge or skills (as well as other traits such as behaviours and values) through experience, practice, studying, or being taught (Illeris, 2009). It occurs cumulatively over time, following a learning curve, so that what is learned builds upon previously acquired knowledge, rather than being a mere accumulation of data and procedures (Bransford, Brown, and Cocking, 2000). Different types of learning come about in different ways, for example, through classical conditioning, habituation, enculturation, rote learning (memorisation), formal learning, or play (Olson and Hergenhahn, 2009). Formal learning, in which the learning is directed towards certain goals and objectives, most commonly involves interaction between a student and teacher (Donovan and Bransford, 2005).

Over the past few decades, in Western education particularly, there has been an increased emphasis on the positive benefits to learning of student engagement and participation (Handley et al., 2006). Eco-design and sustainability are among the subjects that require an unusually high degree of innovative thinking on the part of practitioners and thus have been a focus for educational developments in this regard (Castronova, 2002). In particular, co-creation bringing different parties together to work on and produce jointly an outcome has emerged as an important learning tool in design (Sanders and Stappers, 2008).

Methods of teaching have evolved and changed as understanding about how humans learn has progressed (Wilson and Peterson, 2006). Definitions of teaching, as in the case of learning, are numerous because of the breadth and multidisciplinary nature of

the subject. In essence, however, and for the purposes of this research, teaching may be considered to be the imparting of knowledge through a more-or-less organised process that achieves some preconceived objectives or aims (Zisow, 2000).

Different strategies may be applied in teaching depending on such factors as the goals of the process (Urdan, 2006), the subject being taught (Kember and Kwan, 2000), the age and other attributes of the learner (Ramsden, 2003), and the cultural environment in which the teaching takes place (Ziegahn, 2001). Approaches to teaching can be thought of as falling broadly into two categories: teacher-centred, also known as didactic, and student-centred (O'Neill and McMahon, 2005). The former is a more traditional approach and one that remains in widespread use, often in parallel with the latter (Burgan, 2006). In the teacher-centred approach, what is to be learned is disseminated to the student in the form of class instruction, lectures, or demonstrations. It has the strengths of being highly organised, convenient (especially when dealing with large classroom sizes), and predictable in its outcomes, which are measured through some form of scored examination or assessment (Hoyt and Lee, 2002). In teacher-centred approaches the student has a primarily passive role, serving essentially as a receiver of information transmitted by the teacher (Norman, 2003). In contrast, student-centred teaching, in which the teacher acts more as a guide and facilitator, encourages participation and creative thinking (Baeten, Kyndt, Struyven, and Dochy, 2010). Student-centred teaching now figures prominently in the education systems of many countries. However, it has been slow in coming to some nations, often for cultural reasons (Al-Sharaf, 2006). In many non-Western institutions of higher education, the tradition of relying heavily on didactic instruction continues even in subjects for which qualities such as creativity, innovation, and thinking 'outside the box' are extremely important (Al-Sabah, 2001).

A goal of the research described here is to evaluate if, through changes to a more participatory and engaging approach, the subject of environmental thinking in interior design can be more effectively taught at a tertiary level in Kuwait.

There is a vast literature on theories of learning and teaching, embracing such philosophies as behaviourism, constructivism, and cognitivism, and spanning a multitude of models as to how humans learn. Among these models are the multiple intelligences theory of Howard Gardner, the notion that the right- and left-brain learn in different ways, Vygotsky's activity theory, and communities of learners (Wilson and Peterson, 2006). Theories of learning and teaching have evolved and changed over the years and have drawn upon the work not only of educators but also of cognitive theorists, neuroscientists, psychologists, and sociologists (Young and Wasserman, 2005).

How a good teacher teaches, and what are considered to be effective practices in teaching, build upon theories of how people learn. So, although theories of learning and theories of teaching are separate entities, they are strongly related, because the ways in which research indicates that a person learns should inform the ways in which a teacher can best influence a person to learn. Thus teaching becomes a process in which the instructor provides for the student what a given learning theory prescribes as being the most essential elements (Illeris, 2009). In the next section, consideration will be given to the categories into which theories of learning can be grouped, and to specific theories and associated teaching approaches, which the researcher considers relevant in designing the new eco-design module.

4.3 Theories of learning and teaching

4.3.1 Contested issues in relevant theories and implications

Educational researchers have proposed numerous ideas about the processes of learning and teaching (Matheson, 2014). For the purposes of this research, theories and concepts of learning will be considered to fall into four main areas: behaviourism, cognitivism, constructivism, and humanism (Olson and Hergenhahn, 2009). The characteristics of these categories of learning theory, together with associated teaching approaches, are displayed Figure 2.

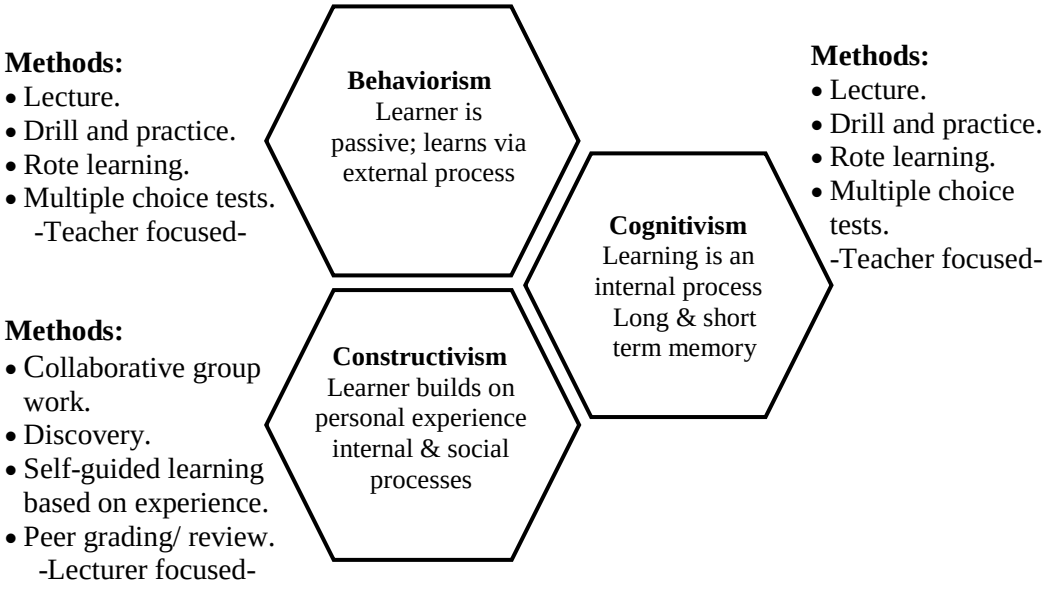


Figure 2: Theories of learning: Teacher and learner focused by Beishuizen, J. and Steffens, K. 2011.

In sections 4.3.2 to 4.3.5, these categories are described along with the specific theories within each of them that the researcher considers warrant further evaluation for the purposes of developing the eco-design module. In Table 1, these specific theories, and the implications of each for teaching the new module, are identified.

Table 1: Theories of learning and their criticism and their implications for the new module.

Theory	Paradigm	Summary	References	Criticism	Implications for teaching
1. Social learning theory	Behaviourism	According to this theory learning takes place through observation and imitation. It includes elements of both behaviourism and cognitivism and references the importance of memory, attention, and motivation.	Bandura, 1977	The most important limitation of social learning theory is that students tend to be passive in a one-way learning process. Thus, learning relies solely on stimuli. Consequently, teachers are required to establish a constructive and creative interaction between teacher and students and among the students themselves. Difficulties arise, however, when an attempt is made to implement the theory in a participatory educational setting. Based on the researcher's experience in Kuwait, although it is sometimes useful, teachers act as the source of knowledge in terms of developing the course and setting the learning environment. However, this concept should not interfere with the goal of providing students independency to think and learn.	Learning is achieved primarily by observing the behaviour of others and the outcome of that behaviour. Applying this theory in practice involves: • Increasing the attention of students by adding sensory elements that trigger their attention. • Adding methods of retention to aid recall by presenting symbolic coding, visual imaging, and systematic diagrams. • Reproducing experiences and observations to consolidate core ideas and promote a clear understanding. • Introducing measures to increase motivation and encourage students to engage and work more with the new topics to help them develop links between those topics and what they already know. This can be done through a variety of incentives.

2. Elaboration theory	Cognitivism	A theory which holds that instructional material should be sequenced in a well-defined order, from simple to complex, in order to maximise learning goals. The learner is also given the ability to control the path they choose in order to assimilate the content and instruction.	Reigeluth, 1999 Reigeluth, 2013	One criticism of much of the literature on elaboration theory is that students have different learning styles and strategies. In addition, elaboration theory doesn't provide room for the prior knowledge of the learners as compared to conceptual structures, which are structured from the category that is most general to the subcategory that is most detailed. In an environment that demands a more intense level of practice, this theory in its general form will almost be certainly difficult to apply.	Start with the simplest version of a concept, principle, or task and then systematically introduce broader, more inclusive elements that build on what has already been learned. Give students the freedom to choose the scope and sequence of concepts, principles, or tasks they want to explore next, thus encouraging self-reliance and motivation. Arrange instructional materials in a way that is holistic and logically interconnected, so as to foster high-order thinking skills. Integrate supplementary and optional problem-solving exercises and other learning tools to motivate the student and facilitate better understanding.
3. Information processing theory	Cognitivism	This is a theory centred on the mechanisms involved in learning, notably the storage and retrieval of memories. The basic idea of it is that information is brought in through the senses and delivered to the brain for storage and processing. Finally, an output is produced in the form of a behavioural response	Winne, 2001 Slavin and Davis, 2006 Pappas, 2014	This theory is limited to three components of sensory memory, long-term memory and working memory. It equates the human brain to a computer rather than the behavioural ideas that humans respond to stimuli. It describes the working of human brain in terms of receiving input, processing, and delivering output explicitly in the form of a behavioural response. Lecturers who fail to provide extra attention when setting the experience of learning to apply recall processes end up relying on memorisation.	Encourage the use of core mental areas (sensory memory, and short- and long-term memory), and the expansion and processing of information in various ways. In this way, the ability to access the information later is enhanced. Stimulate sensory memory, e.g. by using graphics to help conceptualise ideas in classrooms, Employ visualisation techniques such as power point presentations. Reduce reliance on literal memorisation.

4. Situated cognition	Cognitivism	Situated cognition maintains that learning doesn't occur in isolation but comes about through social interaction. Knowledge is acquired through activity and socialisation, and is influenced by context and culture.	Wilson and Myers, 2000 Brown, Collins, and Duguid, 1989 Brill, 2001	The limitation of this theory is that authentic learning only occurs when a novice interacts with an expert and learns from him as an apprentice and that the traditions and methods can only be learnt from the expert. Although this theory teaches breaking big problems into small parts, it requires a skilful teacher to apply the principles of the theory without imposing his own thinking on students.	Use cognitive apprenticeship steps, i.e. to teach someone something, first show them the big picture, then show how this is broken down into smaller pieces. Students practice with the pieces before drawing them together to make bigger entities. In the second phase the teacher provides scaffolding to hold students' ideas together without directly interfering, then takes the scaffolding away slowly by creating an environment for the learner to know where to go for support. Group projects culminate in the showcasing of students' ideas. This method of teaching encourages students to become self-learners.
5. Self-regulated learning	Cognitivism	Self-regulated learning theories focus on the idea of the learner as being an active participant in the processing of acquiring new knowledge by taking control of the processes by which, and environment from which, they learn.	Schunk and Ertmer, 2000 Zimmerman, 2001	Self-regulated learning is an instructional model that is most effective when interlinked with academic content. It is challenging for students to employ self-regulated learning if they have no prior experience to learn and draw feedbacks from. This theory demands motivation by both the lecturer and the students. Failure to take independent initiative will result in a halt in a student's progress.	Goals must be set in advance and attention paid to factors that determine the effectiveness of students' self-regulation, including the commitment of students to what they want to achieve and self-belief in being able to attain their goals. Providing appropriate motivation is a key element to success. Self-regulated learning works by a feedback process. Having established goals, learners put into place a learning plan, track the progress they've made, and change course if what they are doing is not achieving the desired objectives.

6. Anchored instruction	Constructivism	Anchored instructions involve the use of an "anchor" medium or material, usually a video, with the aim of creating a common experience for the student, and a starting point for deeper learning on a certain topic	Lehrer and Chazan, 2012 Wang and Hannafin, 2005 Karagiorgi and Symeou, 2005	The video should only showcase start-up vocabulary terms or essential points of discussion. Students are required to repeatedly watch the video anchor to reinforce the learned information. It is only understandable by learners with an extensive background knowledge about the subject.	Enable learners to become more active in learning by anchoring and situating instructions around a thought-provoking topic using visual media and role play. The learning environments are prepared in a way that stimulates the kinds of thought. Enable the learners to develop a positive attitude and appropriate thinking skills, which in turn may contribute to critical thinking and effective problem-solving skills, e.g., through role play. Emphasise collaborative or group problem solving.
7. Communities of practice	Constructivism	The basis of this theory is that learning takes place predominantly as a result of social interactions between individuals. A community of practice is just a group of people with a common passion or interest. Members of the group learn to do a certain task better as they meet and interact.	Wenger, 2000 Snyder and Wenger, 2010 Wenger, 2010	The model is limited to unintentional learning, which occurs when a group of individuals, with a common passion or concern for something, participate together in finding better ways to do something. Learning through community of practice may not be realised by some members. Hence it may not be a reliable method of planning a classroom setup.	Base teaching sessions around group interaction and the sharing of knowledge among students. Encourage joint discussions.
8. Connectivism	Constructivism	Connectivism is the idea that to learn effectively an individual must become part of a learning community.	Downes, 2008 Dede, 2009 Siemens, 2008 Siemens, 2014	This model maybe ineffective when learners do not have a good knowledge of using the Internet and online platforms as media for learning and sharing information. Some information maybe inadequately shared through such media making it unreliable for education.	Encourage students to network with other learners, collaborate, and share knowledge. Be aware that learning today is built upon rapidly changing foundations and the continual acquisition of new information.

9. Discovery learning	Constructivism	A learning method in which the main content of what is taught is not given out, but in which, instead, students are left to discover independently the principal content of the subject.	Prince and Felder, 2007 Castronova, 2002 Bicknell-Holmes and Hoffman, 2000	Opponents of this theory argue that it builds a cognitive overload on learners. It is a constructivist theory that only focuses on situations of problem solving where the student draws feedback from existing knowledge and past experience in order to discover and learn new truths. The models used may also lead to potential misconceptions. Additionally, discovery learning makes it problematic for tutors to identify any misconceptions or problems.	Encourage students to ask questions, come up with tentative answers to those questions, and discover general principles from experience and practical examples. Include exercises that involve direct participation and physical involvement by active learners. Devise strategies to improve problem-solving skills and the generalisation and integration of knowledge. Provide student-driven activities. Models based on the discovery learning include; simulation based, incidental learning, guided discovery, case based and problem based learning
10. Multiliteracies	Constructivism	Multiliteracies emphasises the importance of engaging a number of literacy methods – visual, linguistic, audio, spatial, gestural, and multimodal – in order to communicate and learn.	Robertson, 2012 Biswas, 2014 Newman, 2002	The fact that the multi-literacies model aims at making classroom teaching inclusive of linguistic, cultural, technological, and communicative diversity is a limitation. This is because it is difficult to incorporate all cultures and languages in one model and apply it in class setup.	Promote higher-order thinking by directing learners to methodical learning processes with techniques and tools, incorporating primary knowledge and solving real life problems
11. Social development theory	Constructivism	This theory maintains that the key to cognitive development is social interaction. It proposes that social interaction, together with social behaviour and socialisation, help elevate an individual's cognition and awareness.	Daniels, 2005 Frank, 2011 Moll, 1992	This theory claims that development is preceded by social interactions while cognition and consciousness are the outcomes of social behaviour and socialisation. This means if the social interaction setting is not planned correctly or is affected by unforeseen negative elements, it may lead to negative social experience affecting cognition.	Emphasise group working and communicating knowledge and cognition with peers. The teacher is required to collaborate with the students. This model makes learning a reciprocated experience for both student and the teacher.

12. Problem based learning	Constructivism	This a student-centred learning approach that uses open-ended problems to engage involve learners in a multidisciplinary and active pedagogic environment. It suggests that problems are specific to contexts and that learning is motivated by open-ended and challenging problems which have no right answer.	Barell, 2007 Biggs, 2003 Harland, 2002 Williams, Macdermid, and Wesse, 2003	Critically, students may not really comprehend the importance of learning, particularly in subjects in which they lack prior experience in evaluation and solution of complicated real-world problems. A teacher employing the PBL method might not cover enough material as in a conventionally based on course. PBL needs a lot of hard work and planning on the part of the tutor.	Engage students in stimulating, relevant, and real-life intellectual inquiry, thereby enabling them to obtain knowledge from life situations. Expose learners to practical problems, thinking independently, interdisciplinary methods, and efficient ways of obtaining information. Foster better communication skills and teamwork.
13. Participatory learning approach (PLA)	Constructivism	Participatory learning approaches engage students in a full life cycle of homework, projects, and examinations. The core idea is that students design the questions or projects, execute them, and then assess and grade their peers' solutions.	Chambers, 1983 Burkey, 1993 Nelson and Wright, 1995 Bieber, Shen, Wu, and Hiltz, 2005	Students typically have pragmatic concerns. They believe that usually, it is the job of an instructor to assess learners and not vice versa as proposed by this theory. They often feel that they are unqualified to assess their peers and usually they have no prior practice or experience in an academic set up. Moreover, quality could be inconsistent when every learner can take the responsibility of self - evaluation in the class.	Encourage students, working individually or in groups, to learn by closely observing what their peers do. Provide effective materials for learning and self- and peer-assessment and a collaborative approach to assignments, with a focus on active participation. Use software, where possible, that helps with the above and reduces the overhead of student and instructor.
14. Facilitation theory	Humanism	Facilitation theory asserts that learning occurs most efficiently if the teacher acts primarily as a facilitator. It supports the notion that teachers should be less protective of their beliefs and constructs than is normally the case.	Elkjaer, 2003 Moon, 2004 Marsick and Watkins, 2001	Teachers who use this theory in learning usually offer less protection to their beliefs and constructs and therefore have the tendency of paying attention to their relations with learners rather than the course content. Facilitative teachers may face some resistance from students and negative consequences for the learners to give up what they hold to be true.	Listen to students, and their values and feelings, and accept both negative and positive feedback. Create an atmosphere in which students feel comfortable about acquiring new ideas and are not distracted by external forces. Guide students toward taking responsibility for their own learning.

4.3.2 Behaviourism

Historically, behaviourist theories of learning were the first to be developed, with roots stretching back to the beginning of the twentieth century. Behaviourism maintains that learning is first and foremost a change in behaviour that arises when an individual responds to stimuli in the environment and thereby acquires and reinforces associations between such stimuli (Nagowah and Nagowah, 2009). The focal point for behaviourists is *measurable* change in behaviour that comes about when a reward of some kind reinforces the response of a learner to some stimulus (or a punishment weakens future responses) and, additionally, when responses are strengthened through repetition. This school of learning leads to the notions that drill and practice, accompanied by reward and punishment, is the best approach to encouraging the optimal outcome for the learner (Ormrod, 2004). Although largely outmoded, behaviourism does offer one theory, known as social learning theory, that has some relevance to the present work.

4.3.2.1 Social learning theory

Social learning theory, first put forward by Albert Bandura in the 1970s, maintains that individuals learn from one another through observation and imitation (Bandura, 1986). It forms a connection between theories of behaviourism and cognitivism by taking account of the role of memory, attention, and motivation, and comes under the same umbrella of theories as that of Lave on situated learning and Vygotsky on social development theory (Bandura, 1997).

Several factors are at play when learning take place social learning theory insists. They are the quality and state of a person's attention, the various ways in which retention happens, the ability to reproduce what has been observed, and being motivated to imitate what has been observed through social interaction.

Implications for teaching

1. The attention of students is enhanced by adding sensory elements and factors.
2. Retention of new knowledge is improved through aids such as visual imaging.
3. Experiences and observations should be reproduced in order to consolidate core ideas and achieve a clear understanding.
4. Measures should be applied to increase motivation and encourage students to engage and work more in the new topics, thus helping them develop links to the new topics.

4.3.3 Cognitivism

Beginning in in the late 1950s, a new school of thought known as cognitive psychology was instrumental in causing behaviourism to fall from favour (Bruning, Schraw, and Ronning, 1999). In cognitive psychology, individuals were regarded not as passive objects merely responding to external stimuli but as active processors of information. It is no coincidence that this shift to an emphasis on the information processing aspects of learning occurred at the same time as the emergence of the electronic computer as a data-handling device and one that appeared, in some ways, analogous to the human brain. Learning, according to the paradigm of cognitive psychology, is an exercise in absorbing information – operating on it through a series of complex mental functions, and then storing the results of this processing in memory for future access. Not surprisingly, the teaching methods regarded as most appropriate for this model of learning, in which the acquisition of information is paramount, are lectures and the study of textbooks (Gagne, Yekovich, and Yekovich, 1993). However, despite this inclination toward a didactic and somewhat rigid

approach, certain learning theories that fall under the umbrella of cognitivism are relevant in the present context.

4.3.3.1 Elaboration theory

According to elaboration theory, tutors should organise their instruction according to an increasing degree of intricacy and complexity (Reigeluth, 2013). Reigeluth (1999) explains that when teaching a new task or fact, it is advisable to start with simple content and then move to deeper and more complicated content at a later stage. When the content is organised sequentially and incrementally in this way, a more effective instructional experience is created because learners can approach the task as a series of stepping-stones – each content stage leading easily and naturally to the next in a rising level of complexity. In each lesson, the tutor should remind students of all the stages that have already been taught.

It is argued that application of this theory results in the creation of a more steady cognitive learner-centred experience, increasing knowledge retention as a result of greater learner motivation. Elaboration theory represents a movement away from teacher-centred learning to that which is focussed on the student. Among its advantages are that it lets students make their own decisions during learning and it can be used where a variety of different concepts need to be taught (Reigeluth, 1999).

Implications for teaching

1. Introduce an elementary version of some idea or concept, then, by stages, introduce more detailed and in-depth elements that flesh out what has come before.

2. Encourage students to take part in deciding the learning material. Enable learners to decide for themselves how to progress to a higher-level understanding of the topic, so that they develop greater self-reliance and motivation.
3. Provide instructional materials that are linked in a logical and hierarchical way, to encourage high-order thinking skills. Integrate supplementary and optional problem-solving exercises, and other learning tools, to help build a deep understanding and motivation in the student.

4.3.3.2 Information processing theory

Information processing theory is based on the idea that, for learning to occur, educators must ensure that new knowledge is processed in a manner that can be stored in long-term memory. This model parallels the way a computer works (Slavin and Davis, 2006). Information is received via the senses, put into temporary storage, and then transferred to long-term memory. This transfer takes place while the information is still in working memory, usually through connecting the novel information to existing knowledge. Finally, the stored knowledge or information is recovered. Depending on how well the information was organised in the encoding stage, the knowledge is retrieved with the appropriate environmental prompts (Winne, 2001).

Pappas (2014) pointed out that, in a learning environment, applying information processing theory is useful in various ways. In a classroom, students continually learn and utilise memory processes with the aim of storing the information offered by the teacher. The student actively retrieves the information necessary for a certain topic. From the teacher's point of view, information processing enables the student to understand the curriculum provided and enhances their respective learning skills.

Implications for teaching

1. Exercise and develop in the student the use of the various cognitive elements: the senses, short- and long-term memory, and expansion and processing of information in various ways.
2. Stimulate sensory memory, by such means as using graphics to help conceptualise ideas encountered in the classroom. Use visualisation techniques such as PowerPoint presentations.
3. Reduce reliance on literal memorisation

4.3.3.3 Situated cognition learning theory

According to Wilson and Myers (2000), situated cognition has provided a key focus of research and conceptualisation in education since its implications for learning were set forth by Brown, Collins, and Duguid (1989). Situated cognition theory marked a major shift from traditional psychological perceptions of learning as individualistic and mechanistic to the notion of learning as social and emergent (Brill, 2001). After observing how knowledge is developed and deployed, these authors concluded that it is inseparable from cognition.

Jonassen and Land (2012) argue that this theory emphasises that the individual's knowledge is created within, and is connected to, the context, culture, and activity in which it was acquired. This implies that learning is primarily a social phenomenon in which individuals learn while interacting with one another, sharing responsibilities and knowledge, discussing problems, and, eventually, solving them. Brill (2001) identified some of the major benefits of situated cognition in the form of a learning and teaching model. She stated that this theory enables students to learn in diverse settings and situations by interacting with one another through common activities and a shared language.

According to this theory, learners are more likely to engage in problem-solving and invention when they are taught, or they learn, in diverse settings and situations. The model also emphasises that learners are able to see the implications of their acquired knowledge. Finally, through application of the theory, learners are given support in structuring knowledge in a way that is appropriate for future use by working with that particular knowledge in context.

Implications for teaching

1. When teaching something new, first present students with a broad picture, then show how this is broken down into smaller pieces. Students practice with the pieces before using them to reconstruct larger entities.
2. Provide scaffolding to hold students' ideas together without directly interfering, and then take the scaffolding away slowly by creating an environment for the learner to know where to go for support.
3. Incorporate group projects that culminate in the showcasing of students' ideas.

4.3.3.4 Self-regulated learning theory

Self- regulated learning theory emphasises that learning which is self-regulated and controlled is essential for effective performance both inside and outside the classroom (Beishuizen and Steffens, 2011). It involves motivation, metacognition, and thinking strategies (Schunk and Ertmer, 2000).

Boekaerts (1999) identified some major components of self-regulation. These are: the capacity to effectively coordinate and choose among various cognitive approaches, the capacity to set learning objectives and to direct self-learning, and the ability to engage in reaching self-formulated goals. Effective self-regulated students

enthusiastically set objectives, identify appropriate strategies, manage their time well, prioritise and organise information and materials, and monitor their learning practices (Puustinen and Pulkkinen, 2001). This theory suggests that self-regulatory capabilities evolve gradually from childhood to adolescence, with self-control competence at first arising out of social sources then changing from self-source much like a traditional apprenticeship.

Zimmerman and Kitsantas (2005) suggest that self-regulated learning has four main stages. In the first of these, students obtain self-regulatory strategies and skills rapidly from social sources – for example, by observing the procedures being modelled, social guidance, verbal description, and feedback. At the second stage the performance of the student rivals that which has been observed. Strategy internalisation follows and is related to the ability of the student to employ the learned strategy independently. In the final stage, learners to systematically integrate the novel strategies into their learning, changing contextual and personal situations. According to Bakracevic, Vukman, and Licardo (2010), a key objective of education ought to be imbuing students with self-regulatory skills.

Implications for teaching

1. Goals should be set in advance and attention paid to factors that determine the effectiveness of students' self-regulation, including the commitment of students to what they are trying to achieve and what they believe with respect to the probable outcomes of their actions and efforts. Providing appropriate motivation is a vital element to.

2. Self-regulated learning involves feedback, so that students define their goals, map out a way to achieve them, keep track of their progress in learning, and modify their approach if it isn't working properly.

4.3.4 Constructivism

In behaviourism and cognitive psychology, the student is portrayed as being a vessel to be filled with information. However, in the 1970s and 1980s, supported by evidence from such theorists as Jean Piaget and Jerome Bruner, the theory of learning known as constructivism emerged. This held that learners play an active role in constructing the knowledge they assimilate by interacting with their environment and reconfiguring their own internal mental structures as a result (Cunningham and Duffy, 1996). The learner is thus regarded not as an uncritical recipient of knowledge but as an interpreter of information and a constructor of knowledge. Common to all forms of constructivism is the acknowledgement that a teacher serves primarily not as a transmitter of knowledge but instead as a guide to the learner's own knowledge acquisition (Duffy and Jonassen, 2013).

Socio-constructivism, which first appeared in the late twentieth century, stresses the importance of social interaction in learning, while criticising the older constructivist view for its focus on information processing (Zembylas, 2005). The notion of situated cognition and learning was given further momentum as a result of prominent contributions by Lev Vygotsky (Kozulin, 2003), together with the work of researchers such as Barbara Rogoff, Jean Lave, and Etienne Wenger from the fields of ethnography and social anthropology (Rogoff, 1990; Lave and Wenger, 1991). By the end of the twentieth century the older constructivist paradigm, in which learning and the acquisition of knowledge were understood in terms of the mind acting in isolation from its environment, had been swept away to be replaced by a viewpoint in

which the learner was regarded as inextricably connected to, and embedded in, their surroundings. Thus knowledge and its assimilation were seen as an outcome of "social negotiation," that is to say, what is learned is taken to be the outcome of an interaction between the individual and the context and culture in which they find themselves (Jonassen and Land, 2012). This led to the notion that learning results from participation.

Modern theories of learning, then, recognise that the acquisition of knowledge is "situated," relational, and of a negotiated character, and that individuals must fully participate in learning activities for these activities to be effective. Authors such as Thomas Sergiovanni have gone further, putting emphasis on the importance to the learning process of communities in which there is mutual cooperation and problem-solving, trust-building, and relationships based on respect (Sergiovanni and Moore, 1989). Academic outcomes improve, Sergiovanni maintains, when classrooms become learning communities and teaching is learner centred.

4.3.4.1 Anchored instruction theory

According to Lehrer and Chazan (2012), although the anchored instruction model is most commonly associated with learning in mathematics and science, it can be applied more generally. The model is characterised by the use of an "anchor" medium or material, usually a video, with the aim of creating a common experience for the student and a starting point for deeper learning on a certain topic (Wang and Hannafin, 2005). The anchored instruction teaching approach is seen as an attempt to enable learners to become more active in learning by anchoring and situating instructions around a thought-provoking topic. The learning environments are prepared in a way that stimulates the kinds of thought that may enable learners to

develop a positive attitude and appropriate thinking skills, which in turn may contribute to critical thinking and effective problem-solving skills.

In anchored instruction, activities designed to promote learning involve a medium, in the form of a story or situation that involves an issue in which the learners have an interest (Karagiorgi and Symeou, 2005). Additionally, the instruction materials should encompass rich resources that learners can explore as they strive to identify various methods that can be used to solve a certain problem. Anchored instruction stresses the need to provide learners with thinking opportunities that enable them to find out the most effective problem-solving approaches. Moreover, it emphasises collaborative or group problem solving, also known as social constructivism.

Implications for teaching

1. Create learning environments that enable students to learners more effectively by anchoring and situating instructions around a thought-provoking topic.
2. Use devices such as role-play to help learners develop a positive attitude and appropriate thinking skills, which in turn may contribute to critical thinking and improved problem-solving skills.
3. Emphasise collaborative or group problem-solving.

4.3.4.2 Communities of practice learning model

Communities of practice are groups of individuals with a common interest or passion for something (Snyder and Wenger, 2010). The members of the group learn to do certain tasks better as they meet and interact regularly. A community of practice is not an isolated body but a component of a more extensive framework of learning (Wenger, 2010). Members of such a group interact and share activities that enable them to share knowledge and information with one another. Examples of such

communities would include, say, a group of artists looking for new ways of to express themselves or a team of engineers working on a shared problem. In pursuing a common goal, members of the group participate in discussions, collective activities, and the sharing of information. The members forge a relationship that enables them to learn from one another (Wenger, 2000).

Implications for teaching

1. Base teaching sessions around group interaction and the sharing of knowledge among students.
2. Encourage joint discussion.

4.3.4.3 Connectivism

Connectivism is an attempt to break down the boundaries of cognitivism, constructivism, and behaviourism (Downes, 2008). It is motivated by the facts that learning today is built on rapidly changing foundations, and that new information is being continually acquired and spread through high-speed networks, so that learning necessitates being able to traverse and make senses of these networks (Downes, 2008). Connectivism is a reflection of the modern situation in which society is complex, connected globally, mediated through technological advancements, and undergoing rapid change.

Connectivism is a theoretical model, in which learning is seen to start when a student connects to a learning community and is thereby fed information. Knowledge is conveyed across information-carrying network and held in any of a variety of digital formats. In connectivism, learning emerges as a collaborative process facilitated and empowered by way of high technology (Dede, 2009).

Connectivism is a learning model in which learning is not individualistic and internal but communal and connected. It takes into account how individuals function and work changes as technology changes, and offers insight into how teaching must adapt in order for students to be able to take full advantage of digital developments (Siemens, 2014).

Implications for teaching

1. Encourage students to network with other learners, collaborate, and share knowledge.
2. Be aware that learning today is built upon rapidly changing foundations and the continual acquisition of new information.
3. Offer insight into the impacts of new teaching and learning and the skills that students needs to have for those new approaches in teaching and learning.

4.3.4.4 Discovery learning theory

In discovery learning theory, learners are encouraged to ask questions, come up with tentative answers to those questions, and discover general principles from experience and practical examples (Prince and Felder, 2007). Some authors contend that discovery learning is a method in which the main content of what is taught is not given out, but in which, instead, students are left to discover for themselves (Castronova, 2002). In addition, the discovery learning model necessitates that learners play a central role in making decisions about how, what, and when a certain topic will be learned. Rather than the teacher dispensing content, students explore the available examples and identify the concepts and principles to be learned for themselves.

Discovery learning focuses on practical activities and student participation. Key elements of it are: problem-solving and exploration; learner-centred activities, the frequency and sequence of which are determined by the student; and activities to help students add new knowledge to what they already know (Bicknell-Holmes and Hoffman, 2000). In this form of learning, students actively take part in problem-solving instead of passively accepting information from their teachers; in other words, in this model, it is the learners not the teachers who most strongly influence the learning process.

Implications for teaching

1. Encourage students to ask questions, come up with tentative answers to those questions, and discover general principles from experience and practical examples.
2. Incorporate strategies that centre on practical learning activities.
3. Devise strategies to improve problem-solving skills and the generalisation and integration of knowledge. Provide student-driven activities.

4.3.4.5 Multiliteracies learning theory

Multiliteracies theory involves the engagement of a number of literacy methods – visual, linguistic, audio, spatial, gestural, and multimodal – in order to communicate and learn (Robertson, 2012). Learning is thus seen as a process of navigating through different understanding methods. Multiliteracies has been regarded as an important strategy for preparing to deal with the challenges of students trying to learn in a fast-evolving technological era (Biswas, 2014).

Multiliteracies teaching may be regarded as having four components: overt instruction, situated practice, transformed action, and critical framing (Newman,

2002). Overt instruction directs learners to methodical learning processes with techniques and tools. Situated practice guides learners toward an expressive learning by incorporating primary knowledge. Transformed action teaches learners how to apply the concept learned in solving real-life problems. Finally, critical framing enables learners to question various perceptions for enhanced learning experiences.

Multiliteracies aims to make learning more inclusive of linguistic, cultural, communicative, and technological diversity. Moreover, it overcomes the shortcomings of traditional teaching approaches by showing how negotiating cultural differences and the multiple linguistic nature of society is important to the civic, working, and private lives of learners.

Implications for teaching

1. Promote higher-order thinking by directing learners to methodical learning processes with techniques and tools, incorporating primary knowledge and solving real life problems.

4.3.4.6 Social development theory

In social development theory, developed by Vygotsky, social interaction is regarded as being crucial to cognition development (Daniels, 2005). Socialisation is seen as having a major effect on the learning process (Frank, 2013). Central in Vygotsky's scheme is the More Knowledgeable Other (MKO), which means that the development of cognition is greater in a group of people than in a single person. It also implies that it occurs best when learners spend much of their time around knowledgeable people, such teachers, and coaches (Moll, 1992).

Implications for teaching

1. Emphasise group working and communicating knowledge and cognition with peers.

4.3.4.7 Problem-based learning (PBL) theory

Problem-based learning (PBL) is based on using problems that are task-based to immerse students in an active, multidisciplinary learning environment. In this way, learners acquire skill in solving open-ended, ambiguous, and poorly-structured questions which will be useful in real-life situations (Barell, 2007). Students are also encouraged to be self-motivated, to collaborate with those around them, and to compare, discuss, debate, and review what they have learned.

The methodology of PBL accentuates peer and self-assessment as well as interpersonal and communication skills. Biggs (2003) argued that PBL sets a premium on deep learning as learners strive to get meaning from what they learn.

PBL increases the confidence of students and enhances their personal growth. It also bolsters a learner's responsibility for their own growth and encourages cooperation with peers (Williams, Macdermid and Wesse, 2003).

Implications for teaching

1. Engage students in stimulating, relevant, and real-life intellectual inquiry, thereby enabling them to obtain knowledge from life situations.
2. Expose learners to activities that are practical and realistic, opportunities for independent work, and projects that are interdisciplinary and encourage information research. Foster collaboration skills and teamwork.

4.3.4.8 Participatory learning approach

Among the major ideas that have come to the forefront of educational thinking and practice over the past two decades is that of learning as a process of active

engagement (Bryson and Hand, 2007). In other words, there has been a movement away from the notion of the learner as an empty vessel, waiting to be filled, to that of the learner as an active agent in creating meaning and developing concepts (Furlong and Christenson, 2008).

In a typical didactic teaching situation, the lecturer or tutor follows the usual pattern of introducing a topic, explaining it, and elaborating upon it. The student, by contrast, is occupied in receiving and assimilating the content, largely through taking notes. His or her role is almost entirely passive and involves no engagement in the process of explaining at all even though, at examination time, this is something the student will be expected to do (Biggs and Tang, 2011). Modern approaches to teaching, while recognising the on-going need for traditional didactic approaches as a means of conveying essential information and guiding students through the basic knowledge that needs to be acquired in a discipline (Burgan, 2006), also emphasise the need for participatory strategies and opportunities (Cahill et al., 2013).

The advantages of student engagement and participatory teaching have been discussed across a range of disciplines, including science (Freeman et al., 2014), geography (Vajoczki, 2008), health sciences (Cahill et al., 2013), medicine (Al-Hazimi, 2004), and design (Sanders and Stappers, 2008). In parallel with the growth in support for increased engagement in teaching have come rapid developments in technology, most notably in the form of high-performance portable computers and networks, including the Internet, giving students almost instantaneous access to vast information resources (Hirumi, 2002). However, effective engagement is not just about giving students an opportunity to interact with each other and the instructor, or enabling access to the technological tools by which new information can be obtained and shared. In surveys of students, common factors cited in good teaching were the

character and attitude of the teacher – whether they were, for example, friendly, humorous, kind, respectful to students, and enthusiastic about their subject (Al-Methen and Wilkinson, 1986; Costa, Van Rensburg, and Rushton, 2007). Having said this, some caution is needed when taking into account student opinion surveys as a gauge of teaching performance and desirable teaching qualities. There is evidence to suggest that such surveys may be misleading if they are not designed or used in accordance with proven questionnaire techniques. In particular, they may lead to a flawed evaluation of a teaching regime if they are the sole measure used, accept student opinions without due consideration of context, and produce data of unknown precision through inadequate testing for validity and reliability (Bedggood and Pollard, 1999).

Another aspect of learning in groups is referred to as co-creation – the participatory process of sharing ideas in a community, such as a class of students and their teacher, and thereby testing the acceptability of those ideas when seen from different points of view, reflecting upon them, and editing and refining them (Gokhale, 1995). Co-creation projects can serve as a source of inspiration, enthusiasm, validation, and new concepts, while also encouraging a spirit of cooperation and free-thinking (Sanders, 2001).

Implications for teaching

1. Enable students, working individually or in groups, to observe and learn from what their peers are doing.
2. Encourage learning of course materials and assessment skills. Help to set up an organised, cooperative approach to assignments and activities, with a focus on participation and self-evaluation. Utilise, if possible, software that

that promotes learning and collaboration and reduces student and teacher overhead

4.3.5 Humanism

Building on the core idea of knowledge acquisition arising from participation by the individual, various theories of experiential learning have been proposed that take social and constructivist paradigms of education a major step further by placing them centrally within the learning process. Experiential theories focus on how individuals are motivated to learn through what happens to them in their daily lives, so that learning is understood primarily to be something that is the outcome of meaningful experiences. A prominent author in the field of experiential learning, Carl Rogers, has argued that learning is most effective when self-initiated and the learner is at the focus of the process (Kirschenbaum and Jourdan, 2005). He maintains that teaching is most effective when it is facilitative, not direct or didactic; moreover, learning is maximised when individuals do not perceive themselves as under threat.

In addition to the theories of learning discussed above are other ideas concerning factors that affect how different individuals acquire knowledge. Most notably, Howard Gardner proposed in 1983 his theory of "multiple intelligences," which runs counter to a basic assumption in the majority of learning theories that acquiring knowledge takes place in the same way, following the same principles, in all individuals. Gardner proposed, controversially, that everyone has a number of distinct intelligences, such as linguistic, spatial, and bodily-kinesthetic (Gardner, 2011). Although speculative, Gardner's theory has been considered useful in widening the conceptual framework of teaching beyond traditional curricula and methods of testing.

4.3.5.1 Facilitation learning theory

The basic premise of facilitation theory is that learning occurs most efficiently if the teacher acts primarily as a facilitator. In other words, teachers are supposed to create an atmosphere in which students feel comfortable about acquiring new ideas and are not scared by external forces. This theory assumes that individuals have a natural enthusiasm to learn new ideas, hold some resistance when asked to give up what they currently believe is true, and that the most effective learning includes altering one's concept of oneself (Elkjaer, 2003).

Moon (2004) argues that under facilitation theory the teachers' role is to guide students in the direction of appropriate knowledge resources. Regarded as facilitators, teachers are required to be less protective of their beliefs and constructs than is normally the case. Teachers are required to be able to listen to students, particularly to their values and feelings, and be inclined to concentrate on their relationship with their students. Notably, teachers should accept both negative and positive feedback from their students. Moreover, teachers should encourage their learners to be responsible for their learning (Marsick and Watkins, 2001).

In this approach, learners should provide input to the learning process that takes place through their experience and insights. Students are encouraged to acknowledge that an essential evaluation is a self-evaluation and that learning requires focus factors that play a crucial role in achieving desired results or in solving significant problems. This theory has been associated with a number of benefits, including better knowledge dissemination, use of advanced thinking levels, constructive self-regard, and an increase in creativity.

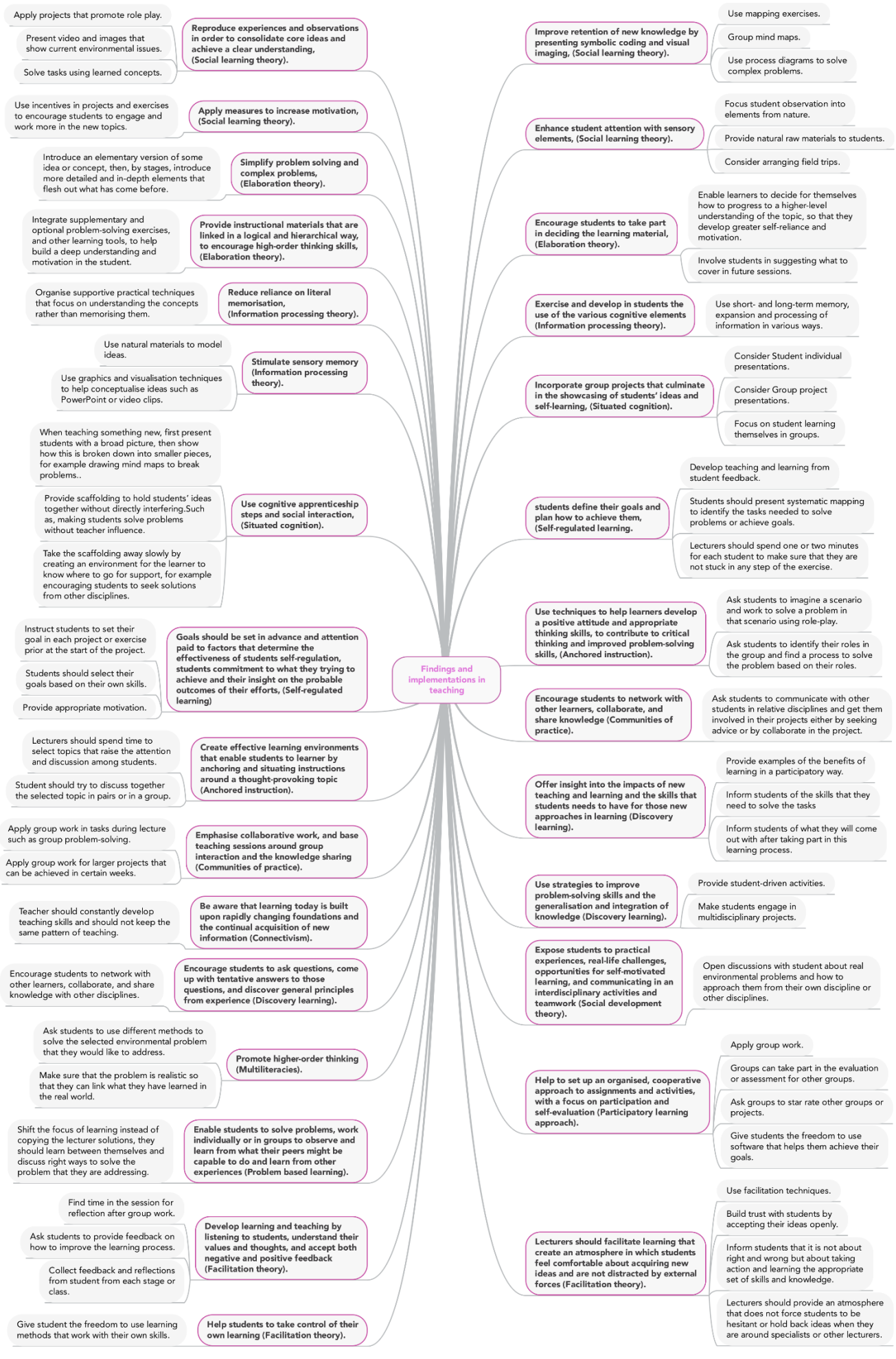
Implications for teaching

1. Listen to students, and their values and feelings, and accept both negative and positive feedback.
2. Create an atmosphere in which students feel comfortable about acquiring new ideas and are not distracted by external forces.
3. Encourage students to take responsible for their own learning.

In the next section, the teaching implications of the various theories of learning considered above will be examined in the context of their applicability to the present research.

4.4 Mapping of the findings

The diagram below summarises the findings and recommendations for teaching derived from the various theories of learning just examined, together with some specific examples of how they can be applied in


Findings and implementations in teaching
Reproduce experiences and observations in order to consolidate core ideas and achieve a clear understanding, (Social learning theory).
Apply projects that promote role play.
Present video and images that show current environmental issues.
Solve tasks using learned concepts.
Apply measures to increase motivation, (Social learning theory).
Use incentives in projects and exercises to encourage students to engage and work more in the new topics.
Simplify problem solving and complex problems, (Elaboration theory).
Introduce an elementary version of some idea or concept, then, by stages, introduce more detailed and in-depth elements that flesh out what has come before.
Provide instructional materials that are linked in a logical and hierarchical way, to encourage high-order thinking skills, (Elaboration theory).
Integrate supplementary and optional problem-solving exercises, and other learning tools, to help build a deep understanding and motivation in the student.
Reduce reliance on literal memorisation, (Information processing theory).
Organise supportive practical techniques that focus on understanding the concepts rather than memorising them.
Stimulate sensory memory (Information processing theory).
Use natural materials to model ideas.
Use graphics and visualisation techniques to help conceptualise ideas such as PowerPoint or video clips.
Use cognitive apprenticeship steps and social interaction, (Situated cognition).
When teaching something new, first present students with a broad picture, then show how this is broken down into smaller pieces, for example drawing mind maps to break problems..
Provide scaffolding to hold students' ideas together without directly interfering.Such as, making students solve problems without teacher influence.
Take the scaffolding away slowly by creating an environment for the learner to know where to go for support, for example encouraging students to seek solutions from other disciplines.
Goals should be set in advance and attention paid to factors that determine the effectiveness of students self-regulation, students commitment to what they trying to achieve and their insight on the probable outcomes of their efforts, (Self-regulated learning)
Instruct students to set their goal in each project or exercise prior at the start of the project.
Students should select their goals based on their own skills.
Provide appropriate motivation.
Create effective learning environments that enable students to learner by anchoring and situating instructions around a thought-provoking topic (Anchored instruction).
Lecturers should spend time to select topics that raise the attention and discussion among students.
Student should try to discuss together the selected topic in pairs or in a group.
Emphasise collaborative work, and base teaching sessions around group interaction and the knowledge sharing (Communities of practice).
Apply group work in tasks during lecture such as group problem-solving.
Apply group work for larger projects that can be achieved in certain weeks.
Be aware that learning today is built upon rapidly changing foundations and the continual acquisition of new information (Connectivism).
Teacher should constantly develop teaching skills and should not keep the same pattern of teaching.
Encourage students to ask questions, come up with tentative answers to those questions, and discover general principles from experience (Discovery learning).
Encourage students to network with other learners, collaborate, and share knowledge with other disciplines.
Promote higher-order thinking (Multiliteracies).
Ask students to use different methods to solve the selected environmental problem that they would like to address.
Make sure that the problem is realistic so that they can link what they have learned in the real world.
Enable students to solve problems, work individually or in groups to observe and learn from what their peers might be capable to do and learn from other experiences (Problem based learning).
Shift the focus of learning instead of copying the lecturer solutions, they should learn between themselves and discuss right ways to solve the problem that they are addressing.
Develop learning and teaching by listening to students, understand their values and thoughts, and accept both negative and positive feedback (Facilitation theory).
Find time in the session for reflection after group work.
Ask students to provide feedback on how to improve the learning process.
Collect feedback and reflections from student from each stage or class.
Help students to take control of their own learning (Facilitation theory).
Give student the freedom to use learning methods that work with their own skills.
Improve retention of new knowledge by presenting symbolic coding and visual imaging, (Social learning theory).
Use mapping exercises.
Group mind maps.
Use process diagrams to solve complex problems.
Enhance student attention with sensory elements, (Social learning theory).
Focus student observation into elements from nature.
Provide natural raw materials to students.
Consider arranging field trips.
Encourage students to take part in deciding the learning material, (Elaboration theory).
Enable learners to decide for themselves how to progress to a higher-level understanding of the topic, so that they develop greater self-reliance and motivation.
Involve students in suggesting what to cover in future sessions.
Exercise and develop in students the use of the various cognitive elements (Information processing theory).
Use short- and long-term memory, expansion and processing of information in various ways.
Incorporate group projects that culminate in the showcasing of students' ideas and self-learning, (Situated cognition).
Consider Student individual presentations.
Consider Group project presentations.
Focus on student learning themselves in groups.
students define their goals and plan how to achieve them, (Self-regulated learning.
Develop teaching and learning from student feedback.
Students should present systematic mapping to identify the tasks needed to solve problems or achieve goals.
Lecturers should spend one or two minutes for each student to make sure that they are not stuck in any step of the exercise.
Use techniques to help learners develop a positive attitude and appropriate thinking skills, to contribute to critical thinking and improved problem-solving skills, (Anchored instruction).
Ask students to imagine a scenario and work to solve a problem in that scenario using role-play.
Ask students to identify their roles in the group and find a process to solve the problem based on their roles.
Encourage students to network with other learners, collaborate, and share knowledge (Communities of practice).
Ask students to communicate with other students in relative disciplines and get them involved in their projects either by seeking advice or by collaborate in the project.
Offer insight into the impacts of new teaching and learning and the skills that students needs to have for those new approaches in learning (Discovery learning).
Provide examples of the benefits of learning in a participatory way.
Inform students of the skills that they need to solve the tasks
Inform students of what they will come out with after taking part in this learning process.
Use strategies to improve problem-solving skills and the generalisation and integration of knowledge (Discovery learning).
Provide student-driven activities.
Make students engage in multidisciplinary projects.
Expose students to practical experiences, real-life challenges, opportunities for self-motivated learning, and communicating in an interdisciplinary activities and teamwork (Social development theory).
Open discussions with student about real environmental problems and how to approach them from their own discipline or other disciplines.
Help to set up an organised, cooperative approach to assignments and activities, with a focus on participation and self-evaluation (Participatory learning approach).
Apply group work.
Groups can take part in the evaluation or assessment for other groups.
Ask groups to star rate other groups or projects.
Give students the freedom to use software that helps them achieve their goals.
Lecturers should facilitate learning that create an atmosphere in which students feel comfortable about acquiring new ideas and are not distracted by external forces (Facilitation theory).
Use facilitation techniques.
Build trust with students by accepting their ideas openly.
Inform students that it is not about right and wrong but about taking action and learning the appropriate set of skills and knowledge.
Lecturers should provide an atmosphere that does not force students to be hesitant or hold back ideas when they are around specialists or other lecturers.

4.5 Discussion

In assessing which of these implications and specific techniques to carry forward into the evaluation of the effects of participatory teaching, it is important to bear in mind the circumstances in which it will be trialled. The Kuwaiti students who will take part in the evaluation have previously experienced an almost exclusively didactic, non-interactive teaching environment. It is therefore important that techniques be introduced progressively and with substantial guidance in order to improve the chances of a successful transition to the new participatory mode. Also, as noted earlier, there is great value in having the learning environment and teaching techniques mirror the subject – ecology and sustainability in design – itself. Just as the natural world involves an interplay of life, materials, energy, and so forth, so students will come to more deeply appreciate these interconnections if they learn about them in cooperating teams engaged in group projects.

The use of high technology, including software, information networks, and digital presentation methods, is also desirable for a number of reasons. First, it is recommended by several of the learning theories considered above. Second, it is attractive to students who are familiar with using such technology in their daily lives. Third, a blending of traditional techniques and modern technology is essential to solving many environmental problems.

In evaluating the effectiveness of participatory teaching in this setting, it is important tool to include elements that require creative thinking. Kuwaiti students are not used to being asked to think creatively as a rule. Yet not only do a number of the learning theories considered emphasise the desirability of independent, self-motivated

exploration, but the ability of think 'outside the box' is crucial in evolving new designs for a sustainable world.

Although a great deal of research since the late twentieth century has emphasised the benefits of participatory, collaborative teaching (Bryson and Hand, 2007), the effective implementation of this approach is not straightforward, especially in an educational institution or environment that has been accustomed to teacher-centred and teacher-directed methods (Ying, 2006). A shift from traditional 'chalk-and-talk' pedagogy, that involves much memorisation and students who are entirely passive, to learning environments that are open-ended and discovery-based, places great demands on the teacher or instructor. It is extremely difficult for lecturers or tutors in a university, for example, who are used to delivering information in a strictly didactic style, and have learned to teach only in this way, to switch to a pedagogical approach that engages the student as an active participant, problem-solver, and divergent thinker (Knight and Wood, 2005). Just because educational theory has moved on to the stage where researchers strongly advocate engagement and exploratory learning in a community environment with tutors acting as guides instead of feeders and controllers of information does not mean that such an approach can be readily adopted, especially in institutions and cultures in which rote-learning and memorisation have long been unchallenged (Ying, 2006).

Much depends on the strength of the teaching staff, their ability to adapt to newer methods, and the resources available. Moreover, it is possible for different educational systems, in different cultural settings, to achieve success using sharply contrasting approaches to education (Mourshed, Chijioke, and Barber, 2010). Two countries or states that have highly ranked educational systems are South Korea and the State of Minas Gerais in Brazil. The former, widely considered to be a world

leader in education, has teachers who are free to teach in whatever pedagogical style they prefer and government-provided funds for action research by teachers, which is then used as input to professional development. By contrast, teachers in Minas Gerais are much less well-versed themselves in educational theory and practise, yet they have brought about a sharp improvement in learning outcomes and student achievement in this region, with little pedagogical freedom and a highly prescriptive approach, through having strong support and good resources for their form of teaching (Mourshed, Chijioke, and Barber, 2010).

Thus, although there has been a marked shift in recent times in developed countries toward participatory forms of teaching and student engagement in the learning process (Brockett and Nichols, 2009), the ability to implement non-didactic methods successfully is constrained somewhat by the cultural setting, resources available, and skill level of the teaching staff. Nations differ greatly in their cultural and societal attitudes to upbringing and education, which affects teacher, and student attitudes toward, and preparedness for, newer approaches to student-centred learning (Li-fang, 2006).

Of interest with respect to this research are those theories discussed above that are particularly relevant in the context of evaluating a new mode of teaching in Kuwait and similar countries. As the typical method of teaching in Kuwait is rigidly didactic, any effort to introduce and trial more participative learning environments needs to be sensitive to this situation and make allowances for the fact that many students are not used to working in a collaborative setting, where their opinions and contributions are sought and valued.

In the following discussion, the strengths and weakness of the various models of teaching will be weighed in the context of evaluating a change of method for training Kuwaiti design students.

Social learning theory (Bandura, 1997) is of relevance here to the extent that it emphasises the importance of observation and learning in a social setting. This is difficult to achieve in an exclusively didactic regime but well-suited to an environment in which teachers and students can observe each other's behaviour when placed on a more equal footing. Weaker students, or those less inclined to take part in group projects, may, according to this theory, learn from their more successful or outspoken peers to fill in gaps in their knowledge or participate more actively in the work going on around them.

Some elements of elaboration theory (Reigeluth, 2013) are a matter common sense. Whether in a didactic or a participatory situation, it is natural for a teacher to start with simple concepts and gradually build on these toward greater detail and sophistication. The advantage of participation, in respect to this theory, is the ability to let students decide, to some extent, for themselves, how to progress toward increased elaboration of the foundational concepts. As mentioned in Table 1, students, while still guided to some extent by the teacher, are encouraged to develop some degree of self-reliance in determining how best to build on their knowledge and understanding of core ideas.

Information processing theory (Winne, 2001) would appear to have little to contribute in terms of any specific measures or approaches to the current evaluation study, except insofar as the teacher should be aware of the importance of stimulating different cognitive areas in students through a variety of techniques, especially visual ones, to stimulate retention and deeper understanding of key concepts.

Situated cognition (Wilson and Meyers, 2000) stresses the importance of social interactions in learning, involving activity and socialisation and also being influenced by context and culture. The theory is quite prescriptive in that the steps it lays down to achieve effective learning, and demands expertise and good organisation on the part of the teacher. It's technique of breaking large problems down into smaller ones, and for the teacher to provide 'scaffolding' to hold related ideas in place until students are sufficiently confident and competent to progress as self-learners, is appropriate to the present evaluation because the students involved in the study are, in many cases, novices at working on their own and without much guidance. The same is true, too, of the applicability of another cognitivism theory, self-centred learning (Shunk and Ertmer, 2000). In this case, however, some caution is needed because the success of this approach depends critically on the commitment and preparedness of both student and teacher. It is not clear that students and teaching staff who are unfamiliar with working a participatory environment would be able to adapt easily to a model that placed such demands on self-belief and self-regulation.

A number of theories of teaching under the umbrella of constructivism are of interest in regard to evaluating a participatory approach. Anchored instruction (Lehrer and Chazan, 2012) is a very specific technique that may appeal to some teachers in conveying certain aspects of a topic. One of its advantages is in training students to become more engaged in learning and develop their critical thinking skills. Communities of practice (Wenger, 2000) necessitates group interaction and the full engagement of all students in order to achieve its aims. Although this may seem an ideal approach to participation, it relies on every member of group joining in and developing new skills and abilities through mutual interaction. In practice, especially with students conditioned to learning in a didactic setting, this may prove

too much of a challenge. Thus, communities of practice may be a goal to aim for rather a method that would be introduced at the start, when a learning institution or a particular course was adapting to a more interactive form of education. Likewise, the application of connectivism (Downes, 2008), which demands proficiency in using the Internet and other online resources, may need to be deferred until the skills are in place to be able to take full advantage of it.

Discovery learning (Price and Felder, 2007) has qualities that warrant its inclusion for parts of even a foundation participatory course, especially in the subjects of ecology and design, since it encourages an open-ended investigative strategy. Although it has a number of advantages, including the promotion of problem-solving skills and creative thinking, it needs careful guidance by teachers and tutors to avoid students basing their research on misconceptions. The multiliteracies model (Roberston, 2012) is also suited to encouraging participation and developing innovative thinking through its use of numerous media to achieve diversity in learning. Elements of social development theory, too, are appropriate, especially because this model underscores the importance of interaction between the teacher and students. When the teacher is seen to be an equal partner in the learning experience, students may be more inclined to become engaged themselves and adopt a collegiate, collaborative approach to tasks.

The participatory learning approach, or PLA (Nelson and Wright, 1995), is based on more than just interaction and cooperation in the classroom and may be a step too far for students with little or no experience of teaching methods beyond purely didactic. It is difficult to see how such students could be equipped, at an early stage, to develop and execute their own projects, and then to assess each other's work, consistently and accurately, even assuming that they desired to do this. This may be a

theory better applied in the future, once a department and its body of staff and students have gained experience in participatory learning environments.

Finally, facilitation theory (Elkjaer, 2003), from the humanism paradigm, suggests a significant element for inclusion in the evaluation: namely, that teachers should not insist upon their own beliefs and opinions but, instead, allow students to comment and criticise and take some responsibility for their own learning.

4.6 Conclusions

A recurrent theme of the theories considered in this chapter is that knowledge and practice are inseparable and that students learn by doing things themselves, as well as by observing their teachers when the latter are demonstrating a new concept or method of solving a problem. Many of the theories reviewed, too, embrace the notion that learning is a social phenomenon that occurs within communities. This contention implies that learning and knowledge arise through the interaction between humans and their environment. Therefore, "learning communities" or "communities of practice" are essential in the acquisition of knowledge. The majority of the theories examined extol the importance of participation in groups, first in the role of observing others who have more expertise and then gradually becoming a full member and participant in the group.

Those teaching implications and techniques, which emerge from the models reviewed and are most suited for inclusion in the evaluation will be selected. These implications and techniques must address the central aim of the research, namely, to evaluate the effects of participatory teaching methods in the teaching of ecological thinking in Kuwait. Therefore, group projects and problems will be at the heart of the course. Specific ideas and approaches for such projects and problems will be drawn

from the exercises and activities listed in the table in section 4.4. These exercises also include the use of specific technologies for finding and presenting information relevant to the projects. Guidance must be available to help and encourage students who have not previously engaged in participatory sessions, so that they are not reticent about putting forward their own ideas or contributing to the group. It is important to cultivate in the students self-confidence and self-motivation, and a sense of freedom to express themselves and be creative. It should be made clear that there is not necessarily a right or wrong answer to every problem, and that, in fact, there may be multiple different solutions, which are worth investigating. Students should also be encouraged to take on roles within the group and to work closely with others to achieve the desired outcome.

The following chapters will look more closely at other aspects of what is to be taught. Chapter 5 will consider the ecological and sustainability issues, which would be most appropriate and useful to include in the evaluation. Chapter 6 considers what should be included from the design point of view.

CHAPTER 5

WHAT ARE THE CONTESTED ISSUES AND BEST PRACTICES FOR TEACHING INTERIOR DESIGN?

5.1 Introduction

This chapter focuses on design: its nature and how it has been variously defined the core elements of which it is comprised, different models and theories of design, and those aspects of the characterisation of design that are appropriate to include in the participative teaching evaluation. In the broadest sense, design involves making a plan for building something, whether it is an object, system, or process. The term is so widely used, and design is applied in so many different disciplines, that there is no universal agreement on how to define "design" or what model best encapsulates its nature (Cross, 2006).

Even within the present thesis, the term "design" is used in two quite different ways and contexts, both pertaining to the combined fields of education and design. Firstly it is used in the context of the education of designers, in others words, the ways in which future professionals in the various fields of design are taught. Secondly it is used in the context of designing a new educational module for designers, with special emphasis on interior design and the incorporation of sustainability elements.

Design is used in fields as diverse as architecture, transportation, communication, computer systems, software, the arts, fashion, and industrial plant (Orr, 2002).

Consideration is given to a number of different models and theories concerning the nature and philosophy of design. However, before this, certain key, common elements of design will be examined.

5.2 Meaning of design

Many authors have sought to explain what design means, and what processes it involves, through a variety of models and theories (Edelson, 2002). The field of design theory is complex and characterised by many different interpretations, simply because design itself is a multidisciplinary and interdisciplinary subject, the details of which are strongly affected by the area in which it is applied.

Design deals with the nature, analysis, approaches to, and techniques employed in design (Aspelung, 2014). Both design and design theory are strongly connected to the context in which they are being applied. In addition, design theory is not a wholly scientific field in that it embraces both art and science (Munari, 2008). Experimental and empirical methods are brought to bear because of the functional aspects of whatever is being designed; however, aesthetic considerations are also often important insomuch as the product of the design must fit pleasingly into a human environment (Palmer and Dodson, 1996). The many variables involved in design, and the many different ways in which it is applied, inevitably mean that much of what has been said about design theory is not universal but rather is relative to particular contexts, goals, and eras.

A prominent subject area for design is architecture, so that a good deal of theory and paradigms in design address issues connected with architectural design (Gellertner, 1995). Academic consideration of this topic goes back to ancient times and the writings of the Roman architect and engineer, Vitruvius, and the development of

ideas about aesthetics by the Greeks and others more than two thousand years ago (Kruft, 1996). In more modern times, the Austrian-Czech architect Adolf Loos, in his essay entitled "Ornament and Crime" (1908) represented an early milestone in contemporary design theory, arguing for a movement away from the elaborate, ornate styling of late Victorian buildings to designs that made use of smooth, clean lines and surfaces. He also insisted that advantage should be taken of new modes of manufacturing and new materials in the design of the built environment. This placed him at odds with the Arts and Crafts movement, which continued to favour the use of traditional materials, simple methods, and ornate styling.

1917 saw the rise of De Stiyl (Dutch for "the style"), an artistic movement that used only straight lines, right angles, and primary colours in its designs for furniture, buildings, and other constructed objects (Doordan, 2013). Functionality was central and the form was reduced to the most geometric shapes. A successor to this approach was the Bauhaus school, which had its heyday from 1919 to 1933, in which the goal was to achieve harmony between form and function without ornamentation. The theories of Bauhaus found their way into both a teaching program and a specific design attitude, and also powerfully influenced the US designer George Nelson who subsequently became one of the founders of American modernism. In the Soviet Union, the inventor and author Genrich Altshuller and his colleagues came up with a "theory of inventive problem-solving", known as TRIZ, which proposed universal rules and approaches to innovation and solving problems that applied across different disciplines. In Germany, in the early 1950s, the Ulm School of Design was set up specifically to educate future designers through a practical combination of theory and practice that emphasised the importance of design that arose first and foremost in

response to practical, everyday needs rather than artistic considerations (Doordan, 2013).

The Conference of Design Methods in 1962 is widely seen as being instrumental in the genesis of design methodology as an organised and distinct subject. It coincided with the rapid rise of advanced technology in the post-War years, including dramatic progress in computers, electronics, and cybernetics, and the origins of operational research, and the development of management decision-making strategies and creativity techniques. Later in the 1960s, the engineer and designer W. H. Mayall championed the relevance of design in industry and technology. This tendency to regard design as being multidisciplinary in scope and underpinned by multiple philosophies and approaches has continued, along with the development of design thinking, design research, and design science. Design thinking is now considered to be intimately connected with developing products, systems, and processes in a wide variety of other disciplines including architecture, engineering, computer science, environmental science, business, social sciences, and the humanities.

5.3 Core components of design

5.3.1 Creativity

Creativity is often referred to as the production new concepts, original approaches, and novel commodities which prove to be useful (Paulus and Nijstad, 2003). The term is very broad but in the present context is taken to mean creativity in design and architecture. Within design disciplines creativity as we know it has been described and utilised in many different ways, and these are often conflicting. Throughout the design disciplines a universal understanding is lacking, as well as how they may apply to teaching and learning experiences (Williams, Ostwald, and Haugen, 2010).

When creativity occurs during the process of design it is frequently marked with an important incident or event, sometimes referred to as a 'creative leap'. Such an event may take the form of an immediate epiphany whereby the designer realises the significance (Sanders and Stappers, 2008). However, often this occurs only once a designer (or whomever may be viewing the design process externally) can point towards the decisive moment in the design process at which a key idea or concept first appeared (Dorst and Cross, 2001). Creativity is an indispensable aspect of design and thus its encouragement and development during the education of future designers is extremely important (Matheson, 2006).

In any design project, a capacity for creativity enables "the attending to unknown or unexplored design solutions" (Casakin, 2007). Creative thinking allows a person designing a project to bypass or move beyond ordinary paradigms or ways of doing things and arrive at innovative solutions that involve new ideas and concepts. It is thus a fundamental and essential attribute of a successful professional in this field. A key issue then becomes how best to educate future designers so that the ability to think creatively, to arrive at solutions that are both innovative and useful, is developed and enhanced (Lindström, 2006).

It has been pointed out that design may involve two fundamental processes, namely: problem solving, in which a clear objective is defined from the outset, and concept generation, in which there is no predetermined goal (Yukari, 2009). Creativity is often viewed and defined solely in terms of problem solution; however, it is also a vital factor when concepts themselves must be identified. A creative influence must be brought to bear as much when a problem is being identified as when a solution is being sought. Various studies have examined the steps involved in creative thinking. In one of these (Sternberg and Lubart, 1999) it is argued that such thinking can be

broken down into three processes of insight. These are: specific organising (seeing what is possibly related to understanding and solving issues); specific comparison (between past and future information), and specific options (looking for matches between relatively connected information). All three of the methods above are predicated upon understanding and awareness of the appropriate field, such as interior design, which raises the important point that creative thinking does not flourish in a vacuum but tends to be most effective when combined with experience and a good understanding of the subject to which it is being applied (Jeffries, 2007).

Not all design work relies heavily upon creativity: much of it is routine and involves merely an extension or variation of work that has already been done. However, the most ground-breaking designs those in which conventions are challenged and something truly original emerges stem from a creative leap. In such bursts of creativity the design variables or rules are changed so that solutions are found that were previously unknown, or new variables are introduced that subsequently lead to entirely new products (Gero and Maher, 1993).

So, what is creativity? Although it may appear to occur spontaneously or 'out of the blue', effective creativity, which combines originality with utility, is grounded in prior knowledge, experience, and rationality (Runco, 2004). Among the first to argue for a strong link between creative inspiration and conscious deliberation was the great Greek philosopher Aristotle, more than two millennia ago (Sawyer, 2006). Aristotle suggested that creativity is based not so much on some rare and natural gift as it was on an understanding of how the world works and an ability to extrapolate beyond that. The popular notion that creativity is a special talent possessed by only a few persisted, however, until the English Renaissance when reason, education, and knowledge came to be regarded as essential prerequisites to meaningful creativity

(Lindström, 2006). This notion that being creative is to be cultivated as well as developed in an individual, by creating a suitable learning location, persists and is prevalent today (Cropley, 1997). If creativity is seen as "formed by the aware, concerned, knowledgeable, discerning mind" (Sawyer, 2006) then it makes sense to adopt a holistic approach to design education that encourages innovative thinking within a rationalist model that also recognises the need to provide a good grounding in the physical principles of good design and the evolution of the subject over time (Lindström, 2006). Yet, despite this conceptual shift away from the notion of creativity being a characteristic of the talented, there continues to be a focus in some educational settings on conformity and didactic approaches that fail to cultivate students' ingenuity (Chamorro-Premuzic, 2006).

Another aspect of importance to design educators is the multidimensionality of creativity, in particular the attributes of the individual engaged in the creative process (specific characteristics, knowledge, foresight, understanding, priorities, inbuilt drive, and abilities) as well as how these interact with the creative environment (outside drive, social interactions, and force placed on the process of creation or those people involved). Looking at older literature, what are often identified as the four P's of being creative person, process, product, and place tend to be treated independently. More recent work on creativity, however, has tended to put emphasis on the interconnectivity of internal and external factors. Portillo (1996), for example, theorised that creativity can be understood only in terms of how the creative person and their traits intercede with process, product, and place. A proper appreciation of creativity, she maintained, requires understanding personality traits and how they link to the process of being creative (artistic taste, the inventive mind, incorporation and intelligence, decision skills, and flexibility), attitudes which drive action and

how they link to the artistic commodity (end-goal-orientation and seeking attention from others regarding creative work), and various personal characteristics and how they relate to place (being unorthodox and challenging societal and cultural norms).

In such contextualist approaches to creativity there is a focus on the adaptation of several variables to boost artistic creation. So-called merging methods in contrast take the societal and cultural environment to be simply one of many factors that contribute to the notion of creativity. An example of a merging theory is that of Csikszenmihalyi's (1999) in which:

"[I]f artistic creation is to retain a useful meaning, it has to link to a developmental method which cumulates to form a finished product that is known by others. The notion of being original, a new perspective, a dynamic thinking ability are all sought after characteristics. However, without any form of external recognition, these notions do not constitute creativity." (Csikszenmihalyi, 1999).

5.3.2 Form and function

A commonly cited principle in architecture and design is "form follows function": in other words the shape of something, such as a building or object, should be based primarily upon its intended purpose or function. The principle has its roots in a statement made by a famous US architect; Louis Sullivan, who described in his essay "The Tall Office Building Artistically Considered" (1896): "form ever follows function."

A renowned principle whereby "form follows function" rose to prominence in the 1930s in reaction to what was seen as excessive ornamentation, or unnecessary detail, in designs of earlier periods. However, it also soon came to be recognised that form cannot slavishly follow function, which would, in many cases, result in an

optimal, or most functionally useful form, for any given type of product, because of the demands of the marketplace and social expectations (Roozenburg and Eekels, 1995).

To some extent, the form versus function debate is one of artistic or aesthetic expression versus scientific or engineering ideal. However, the issue is complicated by the fact that products, living spaces, buildings, and so on, are intended for human use (Tuch et al., 2012). Not only do different people in different places have different opinions about the aesthetic merits of a designed object but the optimal form in terms of functionality may extend well beyond the primary purpose. For example, an interior space that is designed to deliver maximum energy savings may not be ideal in terms of the psychological health of its inhabitants, so that it may be necessary to take a more holistic view of what is needed in the final outcome (Norman, 2002).

A common misconception associated with "form follows function" is that function is always more important than form. In many cases, aesthetic aspects, such as the look, feel, sound, and other sensory characteristics of an object, provide information about function. From this it follows that aesthetic features can be used not only to enhance the beauty of something but also to convey its purpose and potential. It is also a fallacy to assume that everything has just one function. Not only may an object, such as a bowl or table, serve many different practical purposes, but it may also have functionality that is social, cultural, historical, or economic in nature. Finally, as mentioned earlier, it is not the case that for the same function there is always the same optimal form. Variations in form may come about through a variety of factors; for example, for the common function of food consumption both the knife and knife and fork and chopsticks were created. This cultural phenomenon has consequently

played a vital role, and eventually led to various dimensions of a particular notion (Tuch et al., 2012).

5.3.3 Design thinking

To some extent, the thought processes required in design are unique in the sciences and arts. On the one hand, unlike other scientific fields, which deal with the description and analysis of things that already exist, design is involved with the imagination and synthesis of new realities – constructing innovative solutions to problems, or generating new concepts. On the other hand, unlike most (but not all) branches of the creative arts, design "is basically manipulated by the purposes created by humans and is then moved towards the fulfilment of directed processes" (Alexioua, Zamenopoulosa, and Johnson, 2009), so that there is a strong emphasis on addressing end-requirements of the user and producing at outcome that works in practice and solves some problem.

Design straddles the disciplines of science and art, so that the thought processes of the designer must embrace the tension between these two worlds (Jeffries, 2007). There are the physical, practical, and engineering aspects of the final product to be borne in mind alongside the original and artistic elements. The idea that design employs a unique way of thinking was originally expressed in Herbert Simon's book; 'The Sciences of the Artificial' (Simon, 1969) and developed further in Peter Rowe's renowned work, 'Design Thinking' (Rowe, 1987), which analysed approaches and processes used by architects, designers, and urban planners. A subsequent article, titled "Wicked Problems in Design Thinking", proposed this further generalisation thinking creatively to something that can address any difficult or complex problem through design.

Design thinking is a formal approach to practically and creatively resolving problems and creating solutions, with the aim of achieving a better future result (Plattner, Meinel, Leifer, and Larry, 2011). Starting out with a purpose (i.e. a preferable eventuality), it applies a solution-based or solution-focused approach rather than solving a particular problem. By taking into account possible previous and later environments and dimensions of an issue, a variety of different outcomes may ensue which can then be explored. A hallmark of creative thinking is that it notices and later examines both that which is known and those parts which are more ambiguous. These parts of an environment link to hidden parameters and subsequently open different paths which later lead to a goal. Creative thinking is new, and brand new solutions are also possible starting points of different paths, redefining the context of the initial problem. Design thinking stands in contrast with the more familiar scientific method in which solutions are sought only after all the parameters of the problem have been established (Cross, 2006).

Another characteristic of design thinking is its use of both divergent thinking and convergent thinking. The former generates a variety of ideas that gravitate around the same theme while convergent thinking is directed towards finding an optimal or "accepted" solution to any given problem. Designers first apply wider thinking to conceive many outcomes, possible or impossible, and then use diverse thinking to identify the perfect outcome.

In spite of the many uses of design thinking and wide capabilities of this design approach, there is a lack of interpretation of the applications of design thinking in ecological design paradigms. However, it is important to note, as pointed out by many environmentalists, including David Orr (2006), Stephon Kellert (2008), and Janin Benyus (2008) that a relationship between design thinking and ecological

solutions exists in the holistic, dynamic, co-created, cognitive design mind set. These factors are considered to be the essence of design thinking, as will be discussed below (Kellert et al., 2008).

The work of Boland and Collopy (2004) suggests that design is about creating value and integrating the different elements of the value chain. There is no formalised definition of design thinking; however, the works of Cross, Dorst and Roozenburg (1992), and Ehn (2008) have pointed out five characteristics of design thinking to develop a complete understanding of the phenomenon. These characteristics are: human-centred, a holistic viewpoint, research based, iterative prototyping, and collaborative co-created work. This signifies that design thinking places people at the centre of the process, uses qualitative and observational research to support design challenges, views the design problem from a wider frame of reference, using rapid feedback from the end-users for evaluation, and is designed to encourage participation by all stakeholders.

Based on this assessment, it may be presumed that design thinking can be incorporated to tackle all types of problems and challenges. A recent debate within the business community and academia suggests that there is a need to define the limitations, and at the same time expand the scope of, the design and move it "beyond fashion, graphics, products, services, environment, education, transportation, economics and politics" (Ehn, 2008). Similarly, Bauer and Eagan (2008) have stated that design has evolved into a formalised and articulated method to solve the problems related to civil society, as the focus is mainly on human behaviour. However, some aspects of the design process are deemed expensive to pursue. For instance, a holistic perspective is needed; however, it is not feasible to accommodate all of the external factors in the scope of the design thinking process.

Ehn (2008) indicates that design thinking has an important role to play in operations management, as there is a need to design processes to gain a competitive advantage and form a distinctive identity in the process. Earlier, Senge (1990) supported this idea and claimed that design thinking had gained more importance in operations management and other business activities, as compared to other fields, because the various elements of these activities urge one to think along human-centric lines. Bauer and Eagan (2008) cite the example of Apple to reinforce this point, and note that Apple does not focus solely on products but considers other elements, such as people, concepts, and processes. An example of this was Apple's revolutionary decision to open their own retail stores, while other companies mostly rely on distributors to manage that aspect of the value chain. By forward integrating, Apple was able to connect directly with their customers and reap one of the benefits of design thinking.

Education, like politics and business, is a growing concern and needs to remain sustainable. A large body of literature suggests that too much emphasis today is placed on analytical thinking, which is generally reactive and might not lead to the most sustainable solution (Gigliotti, 1993). In order to achieve a sustainable solution, one has to rely on design thinking, for all of the reasons mentioned above. The work of Cross, Dorst, and Roozenburg (1992) suggests that innovation can only be achieved through design thinking and many institutions have realised this and are striving hard to adopt the principles of design thinking (Cross et al., 1992; Gigliotti, 1992).

5.4 Enhancing education through design

Many scholars stress the importance of understanding the processes of learning in order to be able to develop better ways to educate individuals. Research indicates that people learn in two major ways: rationalism and empiricism. In the case of rationalism, individuals learn about new knowledge and ideas through logic or reason. Thus, when people exercise their mind, they attain a mental discipline that helps them more readily master new content (Karpan, 2015). Empiricism, on the other hand, emphasises that people gain new knowledge from their surroundings. Consequently, knowledge is seen as being associative one idea triggering the formation of new knowledge. A prime motivation for seeking to establish how learning occurs is to come up with strategies and approaches that will aid in the learning process. Through understanding the ways in which new knowledge is acquired, educators are able to draft teaching practices that can enhance the student-learning experience (Yazicioglu, 2011).

This concept applies equally well to the education of designers. A set of learning concepts is incorporated by teachers into course materials to help students have better access to knowledge. The tools provided help students' collaboration skills and foster their sustainability thinking. It is imperative that educators draft a conceptual framework that can help enhance education for designers, not least when dealing with the complex entity that is interior design (Nussbaumer, 2011). Interior design is a multifaceted profession that involves many factors, including conceptual development, meaningful interaction with stakeholders, and effective communication skills that will aid in the execution of a design. Therefore, there is a need for implementation of certain strategies and methods to help a designer produce creative work that suits a client's needs. As such, educators need to formulate design theories

that will cover research methods and analysis of effective designs that will help designers change their environment (Brooker, 2013). In what follows, some of the main models and approaches of design, and their framework and concepts, will be examined in a bid to establish how they enhance education for designers.

5.5 Models and approaches in design

Design can lead not only to the production of physical objects but also the production or enhancement of systems using specific design principles. In part it is an artistic process in which the designer shapes a space by manipulating spatial volume and surface treatments. It depends upon individual attention to detail to execute a design that will fit any specific space (Hagen, 2010).

Design educators need to implement a framework, constructed using one or more models of design, in order to ensure that students effectively master the content of the subject so that they can be applied practically. Educators have put into place a number of design learning approaches to foster student-learning processes. This research will discuss nine of them (see Table 4) and highlight their effectiveness in helping students develop creatively (Knacksted, 2008).

Table 2: Relevant design approaches that can assist in creating processes for evaluating the effects of participatory methods for teaching ecological thinking in design.

Design models	*Summary*	*Resource*	*Criticism*	*Implication to teaching*
1. **Dieters Rams's principles**	The ten principles of good design by Rams: Creative, adaptable, artistic, knowledgeable, true, everlasting, neutral, specified, suitable for use out in the environment, good design is little design accurate and detailed	Klemp, 2011 Lovell, 2011 Karpan, 2015	Received a lot of criticisms as it requires full participation from students. Designs that use these principles tend to be not as dynamic and flexible as would be preferred in a learning environment.	Although this concept might be difficult to apply. However, some principles might be of useful to Promote a set of design features and a framework to make designs: (innovative, aesthetic to impact people's wellbeing, structurally understandable, product should be neutral and restrained, Hold meaning for societies heritage and contribute to environmental preservation).
2. **Holistic design**	A strategy used in design that considers the product, which is to be designed, interconnected and form a large part of a higher being.	Owens, 2009 Oakley, 2007 Rusbult, 2007 Karpan, 2015	Works best when the system involved is fairly basic. With more complex systems, understanding becomes difficult, making design less effective.	When dealing with clear designs, designers should consider how the design will appear in a whole setting and identify different ways people can view and interpret it.
3. **Complex/ wicked problems**	Wicked problems display a high-level of interconnectedness. It is a way to approach multileveled problems that needs designers to fully address by taking actions.	Buchanan, 1992 Brooker, 2013 Austin Center for Design	Problems that fall in this category lack a definite solution. They also do not have well-structured permissible operations that can be employed in finding the solutions. This can leave students confused and frustrated, and affect their participation in class.	Participatory learning requires that students understands the concepts that they are being taught in class. Therefore, this theory is not possible to apply as students will struggle to reach clear conclusion on ecological topics and will affect students learning.

4. **Participatory design**	Also known as co-design, an approach that aims to involve all stakeholders in the design process to ensure that the final products create an environment that responds to the user's cultural, spiritual, emotional and practical needs.	Holtzblat, 2009 Simonsen, 2010 Kensing, 2009 Namioka, 2009	Participatory design is time consuming and the assessment and evaluation of students' original contributions can be difficult.	Offers a strategy that motivate responsible designs to students so that each can work on their innovation and creative skills. Also helps designers to form collaborations with developers and researchers in the innovation process. In addition, lecturer should carefully plan class time, and must find creative ways for assessment for each task.
5. **The ADDIE model**	ADDIE is an acronym for analyse, design, develop, implement and evaluate to track the success of a design project	Reigeluth, 2010 Bertlanfy, 2010 Lees-Maffei, 2008 Mareis, 2011 Fry, 2011	This model of learning fails to identify and recognise behavioural changes. Also, although the methods it uses may work well with static content, its application can be restricted when focusing on student creativity and learning outcomes since it uses predetermined end results and assumptions.	Despite its criticism many educators find it to be a useful approach as it helps implement theoretical instructions effectively in a wider learning framework.
6. **ASSURE**	An effective learning design process that stands for analyse, standards and goals, strategy, utilise, requirement and evaluate.	Simon, 2009 Milev, 2013	This model uses equipment such as computers and tablets that may be in limited supply in the school. It is therefore considered as an expensive approach in delivering content to students. Another disadvantage is that some of information obtained from the Internet can be biased or unreliable and therefore give students information that is not accurate.	Offer a framework of new ways in lecturing by provisioning of systematic plan in planning of lessons. It enhances the use of technology in the learning of student and is mainly a step-by-step process.

7. **Kemp instructional design**	An innovative instructional design approach that utilises components to enhance learning. It adopts a circular structure, which represent nine stages that help designers to achieve a desired learning outcome	Morrison, Ross, Kemp & Kalman, 2010 Bertalanf, 2010 Holtzblat, 2009	The cost of materials needed by the instructor to deliver content to the students may be high. Also, a lot of resources must be allocated by the school management for Kemp instructional design to be applied by the staff.	Due to the interrelation between components in this model, the design process becomes cyclical, open to ongoing revisions and adjustments amongst the elements, to achieve the best suited design to the desired learning outcomes of a course.
8. **Dick and Carey design model**	An instructional model that helps instructors to make lesson plan that focus on an effective delivery of content	Jones, 2014 Fry, 2011. Kensing, 2009	A disadvantage of this model that it requires a lot of time and effort that may exceed the course time. Also, a plan devised to implement this approach with one group of students may not work with a new group who have different preconceived ideas and knowledge.	The model figures out the instructional goals of learners in identifies which materials will suit their needs. The model also guides instructional analysis to determine the wants of the students and plan ways to teach them. However, lecturers should acknowledge that constant development is needed for each course and that each group of learners are unique.
9. **C. R. A. P Design theory**	A design theory outlines the graphic design principles and helps students learn to produce desired variables in websites, ads, term papers, graphs and PowerPoint presentations. C. R. A. P. stands for contrast, alignment, repetition and proximity.	Kopec, 2012 Jones, 2014 Bird, 2010 Wilkens, 2009	The use and effectiveness of this approach depends on the skill level of the teacher involved. If a teacher is not properly trained, students may not fully grasp how to use the method.	This theory uses principles of (contrast, repetition, alignment and proximity) that can help students to increasing their skills in presenting the ideas that they produce during group tasks and course projects.

The following sections discuss in detail the theories mentioned in table 4:

5.5.1 Dieter Rams' principles

Dieter Rams is a German industrial designer who has proposed ten principles of good design that would be effective in teaching design learning theories (Klemp, 2011). He insists that a good design should be innovative and original and, in particular, that it use technological development as an opportunity to produce original designs. In addition, he maintains that a good design should satisfy a balance of psychological, functional, and aesthetic criteria thus ensuring its usefulness and value to the consumer (Lovell, 2011). Rams stresses that, in any product, aesthetic quality is integral and should be used in a manner to positively impact people's wellbeing. Additionally, a designer should seek to make their product understandable by clarifying the product structure. Such a strategy helps the product clearly express its function and appeal to people's emotions. He also maintained that a product should be neutral and restrained (Lovell, 2011), while at the same time allowing designers to express themselves by tapping their intuition and reaching to the audience's inner feelings. In this regard, the product design should be both honest and innovative. He made the point that a design does not become more valuable or powerful if it is developed to the stage where it begins to manipulate the consumers with empty promises.

Rams also insisted that a product should be long-lasting and not appear antiquated so that it remains relevant to future society. It should outlive what is currently fashionable and thereby still hold meaning for generations to come. Most significantly, a design should be precise and detailed, leaving nothing arbitrary to chance (Karpan, 2015). In fact, maximum accuracy and care in the design shows maximum respect to the consumer's needs. It is also important that the design be environmentally friendly and contribute to environmental preservation. In particular,

the design should help conserve natural resources and minimise visual and physical pollution, which can occur in the product life cycle. Lastly, Rams asserted that designs should not be more complex than necessary, but rather should contain only those aspects that are necessary to meet functional, environmental, and aesthetic needs (Klemp, 2011).

5.5.2 Holistic design

Holistic design is a strategy used in design that considers the final product to be interconnected and form part of a larger entity (Owens, 2009). It is applied, for example, in architectural design and that of mechanical devices to provide a better layout of space. A holistic approach also embraces sustainability as it attempts to produce designs that reduce environmental impacts. Designers should consider a holistic approach when offering a product that has a strong aesthetic value (Oakley, 2007) because it encourages consideration of how the design will look in a whole setting and the different ways people will be able to view and interpret it. For instance, when a designer is creating a structure, they take into account the environment in which it is built and integrate the structure into the existing environment by first putting it in different angles to see where it is best suited. Such integration provides a consistent look and is a hallmark of this type of design process.

Holistic design is mindful of the need to build spaces that take account of future needs. Such spaces are sufficiently flexible spaces to allow for the changing needs of the user or audience (Rusbult, 2007). This approach to design also considers how designs of the same calibre will fit into a specific place. For example, a holistic designer will locate computer peripherals in a way that they can aesthetically function well in the overall designed system. Some companies establish a reputation

for harmonising their designs in such a way as to help sell their corporate image and make consumers appreciate their product line.

Holistic designs lean heavily toward sustainability, reflecting the fact that as consumers will use designs that promote environmental efficiency. Sometimes, small changes made in the design phase can have significant environmental implications (Karpan, 2015). Holistic design lays emphasis on this factor and requires that a designer consider using products that reduce energy consumption with the aim of reducing the carbon footprint.

5.5.3 Participatory design

A participatory design approach, also referred to as a co-design, is a specific approach that aims to involve many different participants and stakeholders in the creative process to help ensure that the final outcome satisfies their requirements. A designer uses a participatory design approach to help create an environment that responds to the user's cultural, emotional, practical, and spiritual needs (Holtzblat, 2009). In the context of the present study, it can be considered to be a place-making approach utilised by designers to produce innovative products that satisfy clients' needs.

Participatory design has a strong focus on design procedures and processes. It has a political dimension, requiring that designers develop products of democratisation and empowerment. It is also a strategy that helps allocate design responsibility to designers so that each can make use of their innovative and creative skills (Simonsen, 2010).

Participatory design necessitates that designers collaborate with developers and researchers during initial explorations in the innovation process. These co-

participants assist designers in the problem definition stage, helping define a course of action for a product in its development stage. Some research has shown that designers are more likely to come up with innovative ideas and concepts when working in a collaborative environment rather than in isolation (Kensing, 2009). Moreover, such a process helps designers to understand the societal and cultural environment encountered by a consumer and thereby to create a product that will focus on addressing relevant societal solutions (Namioka, 2009). This approach shifts the process and meaning of value by creating a product that incorporates some of a client's particular experience (Noro, 2010).

5.5.4 The ADDIE model

Instructional designers and educators have used the ADDIE model for many years to guide them in effectively tracking the success of a design project. ADDIE is an acronym for Analyse, Develop, Design, Implement, and Evaluate (Reigeluth, 2010). This is not intended, however, to imply a linked linear sequence; rather, each stage provides a clear instruction that stands on its own. Consequently, if, for example, an individual applies ADDIE in the middle of a project, the approach still has value and provides a structure to the whole program. Many educators find ADDIE valuable because it helps implement instructions effectively in a wider learning framework (Bertalanffy, 2010).

The first stage of ADDIE – analysis – links the design to the target audience. This stage ensures that students focus on learning the topics necessary for design exploration. Instructors can apply it to establish their students' level of knowledge and determine what further knowledge they need to complete the course successfully. Textbooks, documents, and Internet materials are among the resources that instructors may use to ensure a thorough analysis (Lees-Maffei, 2008).

The second stage of ADDIE, design, seeks to determine the goals that instructors use to gauge performance and provide a subject matter analysis. A design stage systematic approach ensures everything falls into place within a set of strategies (Perr, 2009). Thus, this stage focuses on the student-learning objective and provides the necessary instruments to help the student execute proper designs.

In the third, development stage, the instructor tests the project methodology. Student designers collect data from the stages beforehand and then this information is used to make a program, which addresses the participants' requirements. The development stage involves putting into action what has been learned in class (Mareis, 2011). It is followed closely by the implementation stage, which ensures that the program is continuously modified so as to produce positive results. In this stage, designers seek to redesign, edit the course of their work, and update it so that it can deliver the desired results. In the final, evaluation stage, the project is meticulously tested. Evaluation is performed with the aid of an instructor to ascertain if the training program is able to solve the problems associated with design (Fry, 2011).

5.5.5 ASSURE

ASSURE is another design model used by educators to aid in effective learning. This acronym stands Analysis, State (standards), Select (strategy), Utilize, Requirement, Evaluate. The first step is analysis, in which the teacher analyses their learners' attributes and focuses on their characteristics (Simon, 2009). The information gathered by the instructor helps them implement effective decision procedures in choosing the resources and strategies that will aid in the learning process. The second stage involves stating the standards and goals or objectives. It is a statement that produces the specification of the result of instruction that will help learners perform a specific task. Having identified the learning objectives of the instruction it becomes

possible to assess the students through a grading process. The learning objectives enable a measurement of behavioural performance and establish to what degree students have mastered content and knowledge. The third letter of the acronym stands for selecting strategy which might, for example, be technology, materials, or media, that will bring learning results (Milev, 2013). It is vital that instructors figure out a delivery method that will be student-centred and help in mastering the knowledge they need. The fourth step directs that the instructor utilise the materials they have selected to ensure that the lessons culminate in the desired results. Next, R stands for requirement whereby the instructor makes plans as to how they should engage students with material taught in class at both an individual and a class level. The last step ensures that the instructor evaluates the impact of the teaching method and its influence on the student learning process.

5.5.6 Kemp instruction design

Kemp instructional design is an innovative approach that utilises natural components to enhance learning. It adopts a circular structure, and incorporates nine stages that help designers to achieve a desired learning outcome (Bertalanff, 2010).

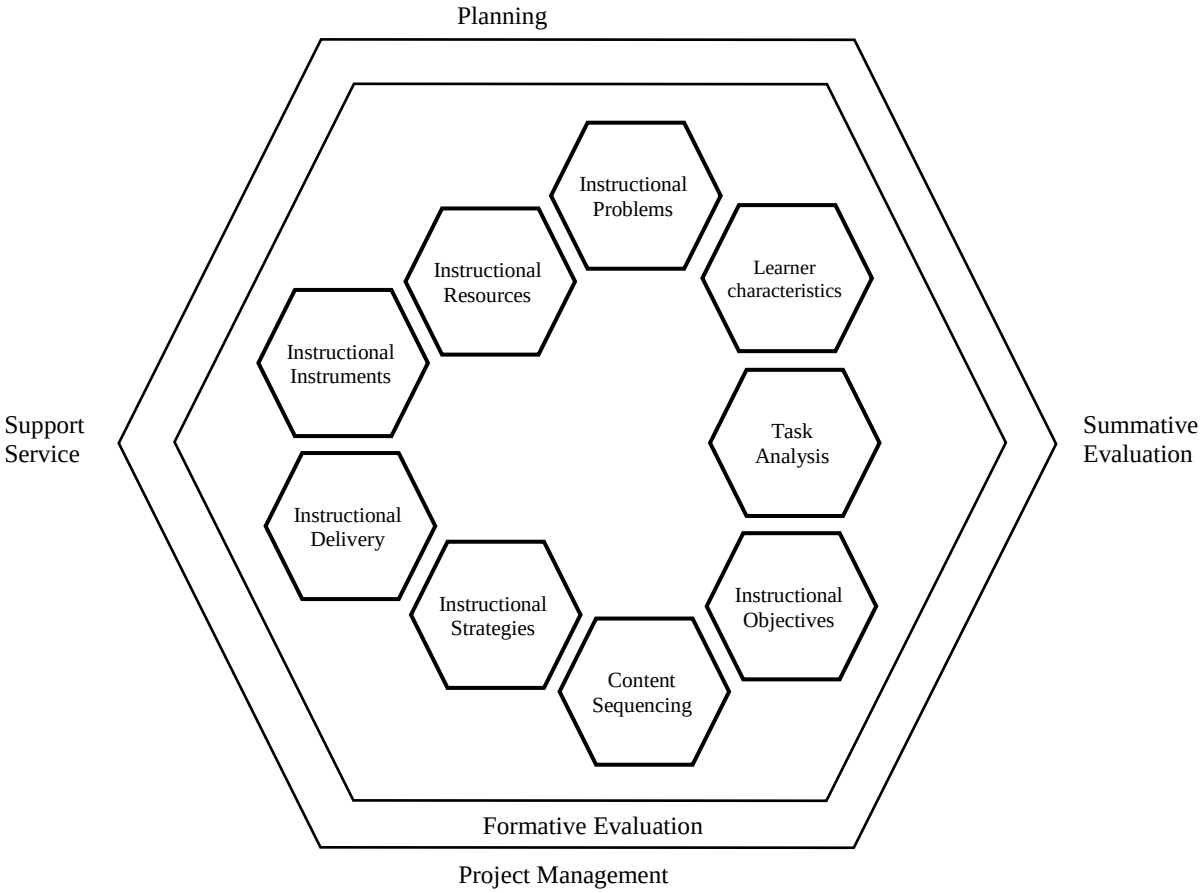


Figure 3: Kemp design model derived from (Holtzblat, 2009).

The Kemp design model, illustrated in Figure 3, was founded by Jerrold Kemp and enhanced by Morrison and Kalman who were all researchers in the field of instructional design. Instructional design came after it was realised that different ways of learning have to have a foundation in research and do not play a role in the creation of that instruction. Morrison explains:

"I think there are two things that are taken for granted by designers. First, you must define the instructional problem. I have seen designers jump in when management has stated there is a problem without a) confirming the problem exists or b) at least doing a goal analysis to obtain agreement on the outcomes which can also disrupt the plans. For example, I observed a case yesterday where the company was pushing

very frequent training to their financial advisors and the advisors were resisting the training. The rationale I received was that the products are continually changing. I am not sure any type of analysis was done. It appears they were doing training because training was probably needed. In reality, a job aid or simply a bulletin might have been more effective and time, resource smart.

Second, when I asked students at the end of the design class which step of the process had little impact on their design and they might skip in future projects, it is almost always the learner analysis step…but what we know about learner analysis and how we treat the analysis in the strategy design, is weak!" (instructionaldesign.org, 2013).

The KEMP design model addresses these issues through a series of nine steps as follows:

1. Choose a program and then determine goals for creating and instructions.

2. Analyse various user personalities that require examination during the planning process.

3. Pick out specific content and then examine the task areas which are linked to various aspirations.

4. Make note of instructional motives for the individual.

5. Match this content within an instructional segment for logical learning.

6. Create strategies so that each creative can master the relevant objectives.

7. Decipher and execute an instructional message and delivery.

8. Expand upon evaluation instruments to assess the outcomes.

9. Point out resources to support various processes and learning activities.

The prototype also assesses the needs of learners so that it can administer instructional resources and contents that will help boost the learners' capability for acquiring new knowledge. Its circular approach guides designers and puts into consideration the learner's needs when incorporating an instructional solution. The key component of the instructional design is to focus on the learner design process and help them achieve their learning outcomes (Holtzblat, 2009).

5.5.7 Dick and Carey design model

This instructional model helps instructors make a lesson plan that focuses on effective delivery of content (Jones, 2014). The first step is to figure out the instructional goals of learners and in addition, identify which materials will suit their needs. The second stage entails that an instructional analysis is performed to determine the wants of the students and plan ways to teach them. Stage three involves the instructor assessing the students' skills from the previous lesson to analyse if they are able to master content (Fry, 2011). This establishes if the students can memorise content: a crucial component in a lesson success. The fourth stage entails that the instructor figures out specific learning objectives that students should attain after a lesson. In the fifth stage the instructor drafts a test that will help reflect the performance objectives of the lesson. Such a test aims to help students understand and master subject content. It is also a checkpoint for the teacher to evaluate what the students failed to understand in class and this helps them improve their instructional methods (Kensing, 2009).

The last stages of this approach help instructors to develop a strategy and use instructional materials that will foster effective learning. As a final step, the instructor performs a formative and summative evaluation to establish if the model worked in realizing the students' needs.

5.5.8 C R A P design theory

C.R.A.P. is an acronym that stands for contrast, alignment, repetition and proximity. C.R.A.P. design theory outlines the graphic design principles and helps students learn to see the world in a new perspective (Kopec, 2012). It is an effective method for visual designs and help students produce desired variables in websites, ads, term papers, graphs, and PowerPoint presentations. The aim of the C.R.A.P. methodology is to produce distinguished publications that are valuable in the public eye.

The contrast principle focuses the students' attention on ways they can highlight important details of a design (Jones, 2014). As such, it enables them to use colours, size, bold type, and images to create contrast in many different ways. For instance, contrast is established when a jeweller displays a diamond piece on a black velvet background to make the jewel stand out.

In addition, repetition is a strategy that helps the student to tie the image and object together. Repetition is established in a text through fonts, styles, and size to put emphasis on a particular trait. In design disciplines, repetition draws imaged and graphic elements together. For instance, one can use repetition with colour through using Kuler, which is a web-based application to choose a colour palette (Bird, 2010). The application conveys a spectacular feature, which enables an individual to upload an image and generates a colour palette that suits the image.

The aim of the third element, proximity, is to help foster a relationship between images and objects. When an artist places objects together, this displays their connectedness and helps focus the audience's attention. For example, when an artist places captions near a page layout, this helps the audience identify the relationship between the images. These principles form the creative aspect of design disciplines and help a design clearly articulate original design, and create clear images for the

audience (Wilkens, 2009). Thus, mastering these principles enable a designer to produce clear creations and make a professional presentation.

5.6 Interior design education

The teaching of interior design has evolved rapidly over time. As the burden of expectation from the discipline has increased, the objectives of learning approaches have changed to meet these demands. This section explores the focus shifts, design process, and the culture of design education in institutions that incorporate this discipline in their programs.

5.6.1 Interior design

Interior design involves finding technical, functional, artistic, and aesthetically-pleasing solutions to the design of built interior environments. It thus combines engineering with art, and practicality with creativity, while at the same time recognising the physical and social context of the project and adhering to any local code and regulatory requirements (Asay and Patton, 2010). In the process of interior design, a systematic and coordinated methodology is applied in which research, analysis, and innovative concepts are integrated in the development of plans for an interior space that meets the goals of the project (Ankerson and Pable, 2008).

At the start of the twentieth century, interior design was concerned almost exclusively with aesthetics and so amounted to little more than interior “decoration”. Today, however, interior designers work on projects in a wide variety of public settings, including commercial, institutional, hospitality, corporate and healthcare, and are required to respond knowledgably and empathically to both local and global social conditions (Gutman, 2007). The increasingly complex and multifaceted nature of the subject has placed corresponding demands on design educators to prepare

entry-level designers who have the necessary qualities and abilities for their job (Guerin and Thompson, 2004).

Interior design education in Western universities now often involves interdisciplinary collaboration: an amalgam of related specialties combined with, at higher levels, real world experience and connection to the professional community (Carmel-Gilfilen and Portillo, 2010). The need and desirability of such experience has led to the establishment of project-based studios in which students from different disciplines are able to collaborate on work that typically leads to a built project, product, or a public exhibit. By working together in this way, students from various academic departments, who are acquiring expertise in diverse fields, are able to fuse their ideas, coming from different direction and disciplines, to come up with creative ways to solve specific design problems (Krikac and Ryan, 2014). Furthermore, this kind of cross-disciplinary environment and fertilisation better prepares students to embark on a career that will inevitably involve leading, or being part of, a team in a collaborative setting (Guerin and Thompson, 2004).

5.6.2 Interior design education and sustainability

Over the past two decades or so there has been an increasing trend for the discipline of interior design to embrace and promote principles of environmental sustainability (Jones, 2008). By 'sustainability' is meant the use of materials and energy in such a way that there is little or no net drain on the Earth's overall resources or detrimental effects to the environment (Jones, 2008). Global initiatives behind this movement include the Talloires Declaration, a ten-point sustainability and environmental literacy action plan announced in 1990, to which over 300 university leaders worldwide committed their institutions (ULSF, 1990) and the United Nations Decade of Education for Sustainable Development, which began in 2005.

Authors have been arguing for some time that the inclusion of sustainability content in interior design programmes (and architecture programmes, in general) helps train the next generation of designers to think more holistically, with not just buildings in mind but also the interaction between buildings and the biosphere.

"Incorporating ecology in education is both possible and essential. Students and design professionals need to understand the whole to improve the parts, [they should be] learning that actions have effects, and that problems can't be solved in isolation". (Bainbridge, 2002).

Sustainability, from the designers point of view, is not just about the use of 'green' materials but also involves consideration of such issues as energy efficiency, longevity of structures over generations, and the ability to think locally as well as globally (Bainbridge, 2002). The goal of sustainable design is to keep environmental impact to a minimum through the application of methods, products, and processes that are mindful of the Earth's life cycles, and that help conserve natural resources for current and future generations (Van Der Ryn and Cowan, 1996). A large number of the interior design courses offered at universities and colleges of developed countries now incorporate sustainability into their teaching. However, for other institutions around the world to follow suit requires not only extending curricula to cover issues related to the environment but also that design educators in these institutions be fluent in sustainable practices in order that the curricula are meaningful and can be taught successfully (Wheeler and Bijur, 2000).

The use of modern technology, especially high-performance computers, is now central to the teaching of interior design in the places of higher learning in developed nations. 3D visualisation technology, for example, plays an increasingly important role in enabling students to construct, digitally, interior spaces and then walk through

these to verify the design and make improvements (Guerin and Thompson, 2004). The design studio is now also seen as a powerful and dynamic medium through which the ramifications and creative potential of the demands of sustainability can be explored by those learning interior design and architecture in general. Working in the studio, students have the opportunity to develop a heightened awareness of sustainability as a multifaceted concept and to try out different approaches to environmentally responsible design (Gürel, 2010). Virtual design studios have also been used since the mid-1990s to allow participants to collaborate on projects, even though they are distributed across space and time (Walpole, 2012). The infusion of digital media into the practice of design and architecture has changed how the design process is carried out, what is designed, and the culture of design education (Reffat, 2007).

Overall there is an on-going need to increase engagement of students within the studio context, through the development of projects that inspire empathic responses to both local and global social conditions. By introducing projects that require research into societal issues that can be improved upon by the design of the built environment, students may empathise and become more engaged on a personal level as a result of increased knowledge and social

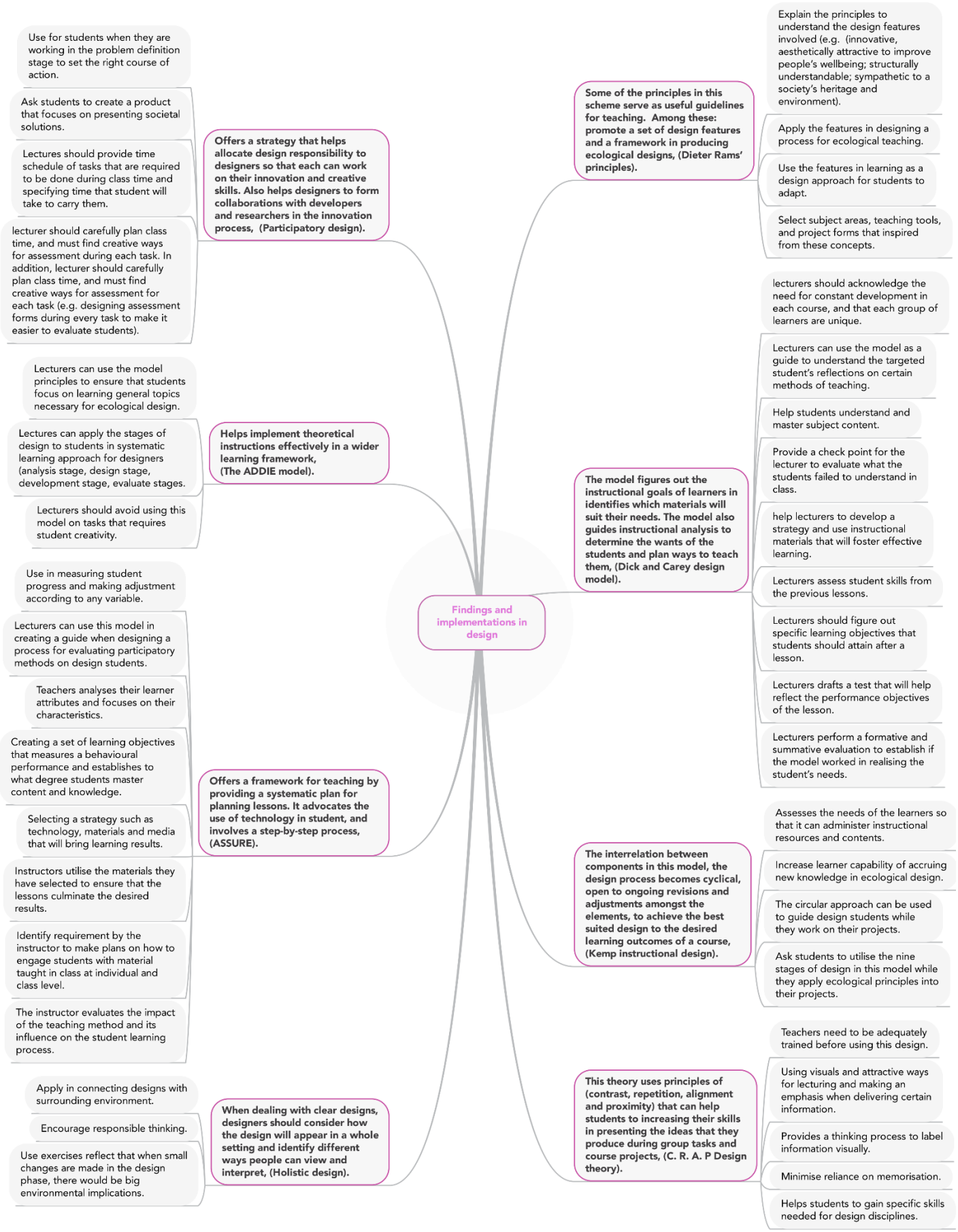
awareness. Empathy inspires a greater investment in the student's commitment to developing more enriched design solutions (Blaser, 2014).

The higher education institutions of developing nations face a dual challenge in modernising their interior design programmes, particularly with regard to environmental issues. Firstly, their education systems, from primary to tertiary level are often still firmly rooted in a teacher-centred didactic model that relies heavily on memorisation and little or no creative input from the student. Secondly, lecturers in

these countries may lack formal education themselves in areas such as sustainability so that it is difficult to incorporate the subject into curricula and teach it effectively (El-Zeney, 2011). However, change is coming. Specifically with regard to Arabic countries, a number of studies have been carried out comparing the effectiveness of the older didactic approaches with more participatory programmes across a range of subjects (for example, Akili, 2002; Al-Hazimi et al., 2004) and there has been a gradual shift over the past decade or so toward more student-centred learning, although progress is still slow and hampered by traditional modes of thinking and long-held cultural traditions (Ahlfeldt, Mehta, and Sellnow, 2005; Said Ali, 2009).

5.7 Mapping of the findings

The table below summarises the implications for teaching and examples of exercise and activities derived from the various models and theories of design just examined, together with some specific examples of how they can be applied in practice.


Findings and implementations in design
Offers a strategy that helps allocate design responsibility to designers so that each can work on their innovation and creative skills. Also helps designers to form collaborations with developers and researchers in the innovation process, (Participatory design).
Use for students when they are working in the problem definition stage to set the right course of action.
Ask students to create a product that focuses on presenting societal solutions.
Lectures should provide time schedule of tasks that are required to be done during class time and specifying time that student will take to carry them.
lecturer should carefully plan class time, and must find creative ways for assessment during each task. In addition, lecturer should carefully plan class time, and must find creative ways for assessment for each task (e.g. designing assessment forms during every task to make it easier to evaluate students).
Helps implement theoretical instructions effectively in a wider learning framework, (The ADDIE model).
Lecturers can use the model principles to ensure that students focus on learning general topics necessary for ecological design.
Lectures can apply the stages of design to students in systematic learning approach for designers (analysis stage, design stage, development stage, evaluate stages.
Lecturers should avoid using this model on tasks that requires student creativity.
Offers a framework for teaching by providing a systematic plan for planning lessons. It advocates the use of technology in student, and involves a step-by-step process, (ASSURE).
Use in measuring student progress and making adjustment according to any variable.
Lecturers can use this model in creating a guide when designing a process for evaluating participatory methods on design students.
Teachers analyses their learner attributes and focuses on their characteristics.
Creating a set of learning objectives that measures a behavioural performance and establishes to what degree students master content and knowledge.
Selecting a strategy such as technology, materials and media that will bring learning results.
Instructors utilise the materials they have selected to ensure that the lessons culminate the desired results.
Identify requirement by the instructor to make plans on how to engage students with material taught in class at individual and class level.
The instructor evaluates the impact of the teaching method and its influence on the student learning process.
When dealing with clear designs, designers should consider how the design will appear in a whole setting and identify different ways people can view and interpret, (Holistic design).
Apply in connecting designs with surrounding environment.
Encourage responsible thinking.
Use exercises reflect that when small changes are made in the design phase, there would be big environmental implications.
Some of the principles in this scheme serve as useful guidelines for teaching. Among these: promote a set of design features and a framework in producing ecological designs, (Dieter Rams' principles).
Explain the principles to understand the design features involved (e.g. (innovative, aesthetically attractive to improve people's wellbeing; structurally understandable; sympathetic to a society's heritage and environment).
Apply the features in designing a process for ecological teaching.
Use the features in learning as a design approach for students to adapt.
Select subject areas, teaching tools, and project forms that inspired from these concepts.
The model figures out the instructional goals of learners in identifies which materials will suit their needs. The model also guides instructional analysis to determine the wants of the students and plan ways to teach them, (Dick and Carey design model).
lecturers should acknowledge the need for constant development in each course, and that each group of learners are unique.
Lecturers can use the model as a guide to understand the targeted student's reflections on certain methods of teaching.
Help students understand and master subject content.
Provide a check point for the lecturer to evaluate what the students failed to understand in class.
help lecturers to develop a strategy and use instructional materials that will foster effective learning.
Lecturers assess student skills from the previous lessons.
Lecturers should figure out specific learning objectives that students should attain after a lesson.
Lecturers drafts a test that will help reflect the performance objectives of the lesson.
Lecturers perform a formative and summative evaluation to establish if the model worked in realising the student's needs.
The interrelation between components in this model, the design process becomes cyclical, open to ongoing revisions and adjustments amongst the elements, to achieve the best suited design to the desired learning outcomes of a course, (Kemp instructional design).
Assesses the needs of the learners so that it can administer instructional resources and contents.
Increase learner capability of accruing new knowledge in ecological design.
The circular approach can be used to guide design students while they work on their projects.
Ask students to utilise the nine stages of design in this model while they apply ecological principles into their projects.
This theory uses principles of (contrast, repetition, alignment and proximity) that can help students to increasing their skills in presenting the ideas that they produce during group tasks and course projects, (C. R. A. P Design theory).
Teachers need to be adequately trained before using this design.
Using visuals and attractive ways for lecturing and making an emphasis when delivering certain information.
Provides a thinking process to label information visually.
Minimise reliance on memorisation.
Helps students to gain specific skills needed for design disciplines.

5.8 Discussion

Having chosen to focus on certain design theories with regard to evaluating a new interior design teaching approach, the question now is to decide which of these theories, or parts of these theories, to include. In making this selection, consideration must be given to the facts that a participatory environment is being evaluated, students may have no, or only an elementary, knowledge of the concepts involved, and there will be other restrictions, such as available resources, time, and teaching skills.

The design principles advocated by Dieter Rams provide a starting basis but only a subset of them could be introduced into practical projects at an undergraduate level or are actually appropriate in the context of sustainability (Klemp, 2011). An underlying theme of his is that designs should be innovative and original and that the opportunity should be taken to apply technological developments to this end. This principle is highly relevant to the present research because innovation is required to tackle the pressing problems posed by environmental pressures and is best achieved when participants are allowed to express themselves and develop their own creativity rather than passively repeat what has been provided to them in a didactic teaching situation. Another of Rams' principles to include would be the need for effective designs to strike a balance between psychological, functional, and aesthetic criteria (Lovell, 2011).

The paradigm of holistic design provides the basis for a general approach to teaching sustainability in design rather than specific exercises (Karpan, 2015). The overall theme of it is to bear in mind the importance of connecting designs with the wider

environment and to understand that what may appear to be even minor changes to a design can have significant environmental implications.

Participatory design theory offers a core approach in the evaluation to be carried out here, because it is not only an important modern design method but a technique which, when applied to students of design, fosters cooperation, innovation, and responsibility for individual tasks (Simonsen, 2010). However, it places heavy demands on the teacher to organise class time and develop ways to accurately and fairly assess students' progress.

Five other design theories or models, described earlier in this chapter, offer elements that may help both students and teachers organise the way they approach design problems. These are the ADDIE (Mareis, 2011), ASSURE (Simon, 2009), Kemp (Morrison, Ross, Kemp, & Kalman, 2010), Dick and Carey (Kensing, 2009), and C.R.A.P. (Wilkens, 2009) theories. To some extent, they overlap in terms of the steps they involve and the implications they have for students and teachers. The researcher, after considering the type of evaluation to be conducted, was able to select a number of procedures and processes from these models to help in organising the steps to guide students through a new design while being careful not to inhibit their creativity or self-expression. In addition, elements of the ASSURE and Dick and Cary models are particularly appropriate to the evaluation of students' progress in a participatory environment. Furthermore, the C.R.A.P. approach offers a strategy for building design skills and confidence without the need for memorisation.

5.9 Conclusions

A number of design approaches and models have been considered in this chapter that are of particular interest in evaluating the effectiveness of participatory teaching with

regard to sustainability in interior design. Again, the emphasis is on bringing together models and concepts that are coherent with the overall strategy of adopting an interactive, cooperative form of learning in which to solve problems students must work together and pool their skills and ideas.

Elements of the holistic approach will be adapted because of this approach's emphasis on designs that incorporate sustainability and minimise environmental impact. The participatory and collaborative format of the new approach of teaching will encourage environmental thinking because the very structure of the workshops, and the interactions between those taking part, both students and staff, is analogous to the interconnectivity and interdependence of components in the biosphere.

The choice of problems is another factor to be evaluated and tested in the new participatory approach in teaching ecological thinking to interior designers in Kuwait. Addressing complex problems, for example, which demand interdisciplinary collaboration, is valuable in helping designers to think outside the box and bring other perspectives to bear in searching for a solution. The concepts and methodologies described earlier suggest ways of presenting material and structuring this teaching approach in a way that is most appropriate to convey sustainable design ideas in a modern educational framework and breaking away from the rigid didactic system of teaching. A participatory design approach, or co-design, for example, engages different parties in the creative process to achieve a satisfactory outcome, just as participatory teaching approach involves a group of students collaborating to reach a set goal.

The researcher has identified those contemporary design approaches for evaluation in the participative teaching study that are most relevant in efforts to incorporate

sustainability and environment awareness in design and, at the same time, mirror elements of participative teaching and group learning itself. This is the same approach to that used in assessing for evaluation which topics in ecology and sustainability to include, and which specific teaching and learning models to build into the evaluation. Thus in this chapter a series of compatible theories, model, and topics have been examined and selected for inclusion in the evaluation of participatory teaching, as will be discussed further in the next chapter.

CHAPTER 6

WHAT ARE THE CONTESTED ISSUES AND BEST PRACTICES FOR TEACHING ECOLOGICAL THEORY?

6.1 Introduction

The purpose of this chapter is to review and discuss what aspects of ecological thinking and ecological design are most appropriate to evaluate from the perspective of participatory teaching. The discussion will centre on some of the key principles, models, and paradigms of ecological theory with a view to their possible application to design and design education. To begin with, the meaning of some basic terms, such as "ecology" and "sustainability," will be considered.

Ecology is an interdisciplinary science concerned with the relationships of organisms to one another and to their environment (Folke, 2006). It deals with the distribution, diversity, biomass, and population of particular organisms, as well as cooperation and competition between organisms, both within and among ecosystems (Keller and Surette, 2006). Due to the fact that the human species is embedded in the environment (Marambio-Jones and Hoek, 2010), ecology is also a human science with many practical applications, including conservation biology, natural resource management, city planning, community health, and human social interaction. Ecology is closely related to the issue of sustainability in that humans have a direct (and often negative) impact on the environment upon which they depend. When in

balance, ecosystems, comprised of living things (including humans) and resources, indefinitely sustain life-supporting functions through a series of complex reactions and feedback mechanisms to control processes that affect living and non-living components of the Earth's biosphere (Schmidt et al, 2011) The term "ecological design" has been defined by Van der Ryn and Cowan (2013) as: "any form of design that minimises environmentally destructive impacts by integrating itself with living processes."

Sustainability is a term used in ecology to refer to the endurance, and ability to regenerate, of biological systems (Faber et al, 2005). Sustainability and its associated principle of sustainable development have become important issues in many fields, including interior design, as a result of concerns about environmental exploitation and deterioration, climate change, greenhouse gas emissions and overconsumption, stemming from population expansion and the rampant pursuit of economic development of a sensitive planetary biosystem outside of an ethical framework (Faunce, 2012). Closely related to sustainability, is the concept of resiliency the ability of an ecosystem to absorb disturbances while preserving the integrity of the system and its function (Alberti, 2005). These disturbances may be natural and stochastic, for example, floods and earthquakes, or the result of human activities, such as deforestation and the introduction of non-native animal or plant species.

Among the key debates in ecology today are those which involve environmental governance and, in particular, how best to manage and preserve the Earth's limited resources and delicately balanced ecosystem, given the pressures of a growing human population. Different political and philosophical systems can be used to organise environmental regulation, each with their strengths and weakness. A

particularly important debate is presently focused on the issue of climate change, around which a scientific consensus has been reached that it is both human-caused and a serious existential threat to the biosphere though the speed and future implications of the phenomenon remain uncertain. In the light of this threat, the subject of sustainable development rose to prominence (Hopwood et al., 2005) and continues to be debated today. One aspect of sustainable development is green design application of environmental principles to the practice of designing products, spaces, buildings, and so on, that are in harmony with the natural environment. By their nature, the subjects of environmental governance, sustainability, and green design are multidisciplinary, as, to be effective, they must be informed by developments across a range of fields, including ecology and environmental science, policy-making and environmental law, regional culture, climate, and landscapes, and innovations in technology (Daniel et al., 2012).

For the remainder of this chapter, the focus will be on ecological theories and concepts that are most relevant in the context of evaluating the teaching of sustainability in a design context. These concepts include ecological literacy, ecological holism, permaculture, and resilience.

6.2 Ecological theories holistic design concepts

It is not an overstatement, based on current scientific evidence, to claim that the very survival of the human race and that of many of our fellow species has been placed in jeopardy by rapid changes to the planetary ecosystem caused by human activities (Chapin et al., 2010). Thus, the importance of incorporating environmental principles and approaches toward sustainability into the classes of those, such as design students, whose future professional work will have an environmental impact is clear

(Vescio, 2008). Ecology is a wide-ranging, multifaceted subject; however, the focus here is on certain aspects of it that are of particular importance in relation to design.

This section refers to an important aspect of ecological research, wherein it seeks to shed light on the main ways and approaches that share a common holistic framework. Coyne (2005) has stressed the importance of holism for designers and architects both in education and in other professional practices. He refers to the South African author Jan Smuts in his 1926 book "Holism and Evolution", in which Smuts defines holism as nature's tendency to create wholes that contain the sum of all its parts. It is a fundamental feature of holism that, although there is a close and interconnected relationship between the whole and its parts, the parts cannot be understood, or even be said to have an independent existence, without a clear consideration of the whole (Andreev, 2008).

Applied to the treatment of an individual for a particular condition, for example, holism would insist that, instead of dealing with the symptoms, it is necessary to understand all of the connected physical, social, and behavioural factors involved. In the case of an ecological system, holism can be adopted as a conceptual framework to overcome a lack of environmental awareness by bringing to attention all of the interconnected parts at play within the system, including biological, physical, technological, social, and cultural (Smit and Wandel, 2006).

A number of holistic approaches aim to fill the gap between the modern built environment and the natural surroundings. These concepts share a common feature of not only achieving sustainable living spaces but also helping develop a self-aware and vibrant society that is in harmony with the natural world.

6.2.1 Ecological literacy

Ecological literacy, or ecoliteracy, refers to an ability to understand and appreciate the interconnections between living organisms and the planetary environment that supports them (Stone and Barlow, 2005). The concept was adapted by David Orr (1992) in his book of the same name, and illustrates the importance of integrating a deep concern for the Earth and its ecosystem within the educational system. The purpose of ecological literacy is to prepare students to have competency and knowledge in tackling complex environmental issues (Puntambeker and Hubscher, 2005).

The strategy behind the concept, as described by Orr, is to shape a sustainable society, which lives in harmony with the natural environment upon which it depends (Hoelscher, 2009). Key factors, including politicians, business leaders, and professionals in a broad spectrum of fields, from architecture to zoology, must have a good understanding of the principles of ecology and systems thinking so as to be to be able to appreciate the world as an integrated whole rather than a collection of disconnected elements.

Researchers have identified five components of ecological literacy. These are: the principles of living systems, systems thinking, design inspired by nature, collaboration and community building, and the ecological paradigm (Kibert, 2016). Living systems, in this context, include not only natural systems, such as forests, human bodies, and rivers, but also manmade organisations, such as schools. Forstner and Wittmann, (2012) suggest that educating students to understand the balance and mutual dependence of living systems will help them develop an understanding of their environment, both local and global, and their relation to it. Teaching systems

thinking develops a holistic view of ecosystems in which the various elements of the environment, such as air, water, plants, and animals are seen to interact. Forman (2014) maintains that, through systems thinking, ecologically-literate students are able to connect otherwise disjointed issues more effectively than their counterparts who have not been exposed to such training.

The third element of ecological thinking design inspired by nature – encompasses an understanding of the various characteristics of living systems, which can then be employed in the design of a sustainable community. Alter (2007) pointed out that the ultimate goal of ecological literacy is to change the way in which humans pursue their livelihoods, consume food, develop energy sources, etc. so that the natural limits of the biosphere are not exceeded. Studying the natural world in more detail encourages the use of designs inspired by nature instead of those that are artificial and disconnected from the environment, and also the use of more environmentally-friendly materials.

Another component of ecological literacy is stimulating collaboration and a sense of community building. This is important as collaboration is perceived as the hallmark of living systems. Alter (2007) stated: "the ability to connect the dots and leverage the knowledge of other individuals is the foundation of eco-literacy and will allow everyone to exhibit sustainability as a routinely followed practice". A possible outcome of greater awareness in this area is that a community works together in using locally-sourced materials from which to build homes rather than relying on imported materials and outside skills and expertise to work with these materials. The final component of ecological literacy, as defined by Alter (2007) and Forman (2014)

is to see the whole concept as an ecological paradigm, from which a scalable model can be established and then replicated in different parts of the world.

Some commentators have criticised the ecological literacy model for being incomplete and, in some cases, missing the point (Jordan et al., 2009, 497). For example, it has been suggested that one of the prime causes of the ecological crisis, especially in the west, is a desire to separate culture from nature (Puk and Stibbards, 2010, 470). Conflicts of interest then arise between human activities with regards to the environment (Mueller, 2008). Indeed, it has increasingly come to be recognised that understanding the source of environmental problems, and finding effective solutions to them, depends on a taking account of human motivations, societal pressures, and how people see themselves in relation to nature. A common complaint against ecological literacy, at least in its original form, is that it was too superficial and that supporters of the concept developed their own vague ideas without citing or acknowledging the work of others (McBride et al., 2013). This vagueness and lack of specificity meant that the model was not in a form suited to being taught in schools and other institutions (Margton, 2007).

In recent years, ecological literacy has matured so that it now takes a more rigorous and scientific approach to subjects such as ecological values, sustainable design, conservationism and even social ecology (McBride et al., 2013). While the significance in teaching ecological literacy is recognised by environmental academics, there is a debate over whether it should be taught as a subject in its own right or integrated into all other courses to encourage a broad new way of thinking and analysing from an eco-centric perspective (Merchant, 2010).

6.2.2 Biophilic design

An important concept in ecological design is biophilic design (Kellert et al., 2011) which derives, in turn, from the concept of biophilia, first discussed by the biologist Edward O. Wilson. Biophilia centres on the idea that humans are predisposed to be attracted to natural systems as a means of optimising health and productivity (Hemsworth, 2010). Sometimes biophilic design is taken to be something as simple as greening a building or adding a plant inside a space to provide an aesthetic element. However, Kellert, Heerwagen, and Mador (2008) argue for a much broader view and that biophilic design is about "humanity's place in nature and the natural world's place in human society, a space where mutuality, respect and an enriching relation can and should exist at all levels and emerge as the norm rather than the exception." In terms of the built environment, they maintain, designers should constantly keep in mind the following questions:

1. How is the built environment affecting the natural environment?
2. What effect does nature have on the human experience and aspirations?
3. How can we achieve exchangeable benefits between the two?

(Kellert, Heerwagen, and Mador, 2008) .

Although biophilic design is often considered today to be an innovative approach, it is, in fact, the way that many buildings have been designed throughout the history of humanity (Lechner, 2014). Traditionally, building in this fashion was carried out by master builders and designers who had a mutual respect for their natural environment. However, it has been argued that, in the modern world, technical and engineering accomplishments have fostered the belief that humans can transcend their nature and genetic structure (Kellert et. al. 2008). This stepping away from a

connection with the surrounding natural ecosystem has resulted in the creation of buildings that have a high amount of wasted energy and resources, bad air quality, a general unhealthy interior environment. In reaction, there has been a widespread movement back to adopting sustainable or green design measures, as exemplified, for example, in the United States, by the establishment of the US Green Building Council Certificate and LEED rating system (Garzone, 2006). However, as good as these measures are for the environment, it has been argued that they will fail to achieve, in themselves, the long-term goal of a sustainable, healthy and well-functioning society (Keller et al., 2008).

The basic deficiency in the current green movement is the focus on minimising the environmental impact, or the footprint as it is now called (low environmental impact design); however, this fails to address the crucial need to eliminate human separation from the environment and also to build within cultural and social domains (Glasson, Therivel, and Chadwick, 2013). True, lasting sustainability, it is argued, must combine a low impact environmental design with biophilic design, leading to what has been termed restorative environmental design (Kellert, 2004).

The reason why biophilic design is significant in the context of the present research is that it suggests multiple features that lead to sustainable interior design for homes. Kellert et al. (2008) have proposed six design elements that relate to biophilic design:

a) Environmental features

b) Natural shapes and forms

c) Light and space

d) Place based relationships

e) Evolved human-nature relationships

These authors suggest that each of these elements consists of a number of attributes, totalling 70 in all, which contribute to a comprehensive sustainable design outcome for any home space. As explained earlier, however, any biophilic design will only be successful if accompanied by the nurturing, educated, and full understanding of the main elements of the concept by its occupants. The biophilic design attributes are identified in Table 2.

Table 3: The six design elements and their attributes, identified by Kellert et al., 2008.

a) Environmental features	**b) Natural shapes and forms**	**c) Natural patterns and process**
Colour	*Botanical motifs*	*Sensory variability*
Water	*Tree and columnar supports*	Information richness
Air	*Animal (mainly vertebrate) motif*	Age, change, and the patina of time
Sunlight	*Shells and spirals*	Growth and efflorescence
Plants	*Egg, oval, and tubular forms*	Central focal point
Animal	*Arches, vaults, domes*	Patterned wholes
Natural material	*Shapes resisting straight lines and right angles*	Bounded spaces
Views and vistas	*Simulation of natural features*	Transitional spaces
Facade greening	*Biography*	Linked series and chains
Geology and landscape	*Geomorphology*	Integration of parts to wholes
Habitat and ecosystem	*Biomimicry*	Complementary contrasts
Fire		Dynamic balance and tension
		Fractals
		Hierarchically organized ratios and scales
d) Light and space	**e) Place-based relationships**	**f) Evolved human-nature relationships**
Natural light	Geographic connection to place	Prospect and refuge
Filtered and diffused light	Historic connection to place	Order and complexity
Light and shadow	Ecological connection to place	Order and complexity

Reflected light	Cultural connection to place	Change and metamorphosis
Light pools	Indigenous materials	Security and protection
Warm light	Landscape orientation	Mastery and control
Light as shape and form	Landscape features that define building form	Affection and attachment
Spaciousness	Landscape ecology	Exploration and discovery
Spaces as shape and form	Integration of culture and ecology	Information and cognition
Spatial harmony	Spirit of place	Fear and awe
Inside and outside spaces	Avoiding placelessness	Reverence and spirituality

A major criticism levelled at biophilic design is the financial cost associated with the planning, construction and implementation of the design, which puts constraints on what types of offices, houses, and other buildings to which it currently be applied. Only individuals and organisations with sufficient wealth can afford to pay for this (Gibbs, 2012) and the designs also typically demand a lot of space. Another criticism of the concept is the level of skill needed to successfully implement biophilic designs. Relatively few contractors and builders have the requisite experience or ability.

There is also a problem in delivering the concept of biophilic design to students. Being a new and emergent, and also complex, field, students may have little familiarity with it and be therefore less inclined to actively participate in during lessons. A lack of knowledge of the subject may inhibit the creativity of students. Even though they may be encouraged to form group discussions and dialogues, the effectiveness of such interactions will be limited since they will rely mostly on the input from the instructor

Set against these downsides is the fact that biophilic design can provide a strong connectivity to the natural environment, and, combined with the use of localised

materials and themes inspired by nature, biophilic buildings can extend the social and cultural heritage of the society around them. As discussed by Kellert et al. (2008), and summarised in the six design elements in table 2, biophilic design provides a practical way to design for that allows, for example, interior designers to incorporate ecological thinking into their discipline.

(Tuch et al., 2012).

6.2.3 Permaculture

To closely related to the fundamental ideas of biophilic design are those of permaculture, which is an approach to agriculture and social design based on observations of how natural ecosystems operate. The term was coined by David Holmgren and Bill Millison, and first described by them as a systematic method in 1978 (Dawborn and Smith, 2011). In a later publication, Holmgren identified what he considered to be 12 essential design principles of permaculture, as follows:

1. Observe and interact

A post-peak world will depend on detailed observation and good design rather than energy intensive solutions.

2. Catch and store energy

Energy passes through our natural systems, and is stored in a variety of ways, in water, trees, plants, soil, seeds and so on.

3. Obtain a yield

Any changes we make ought to be productive, e.g. productive trees in public spaces, edible roof gardens, or urban edible landscaping.

4. Apply self-regulation and accept feedback

A well-designed system using the permaculture principle should be able to self-regulate and require the minimum of intervention and maintenance.

5. Use and value renewable resources and services

Where nature can perform particular functions, if nature can take some of the work off our hands we should let it.

6. Produce no waste

The concept of waste is essentially a reflection of poor design.

7. Design from patterns to details

Keep a clear sense of the wider canvas on which we are painting, and the forces that affect what we are doing.

8. Integrate rather than segregate

Solutions are to be found in integrated holistic solutions rather than increased specialisation and compartmentalization.

9. Use small and slow solutions

Systems should be designed to perform functions on the smallest scale that is practical and energy efficient for that function.

10. Use and value diversity

> *Our towns will be far more able to prosper during energy descent if they have a diversity of small businesses, local currency, food sources, energy sources and so on.*
>
> *11. Use edges and value the marginal*
>
> *The point where two ecosystems meet is often more productive than either of those systems on their own.*
>
> *12. Creatively use and respond to change*
>
> *Natural systems are constantly in flux, holding and growing. The way they respond to shock, such as forest fires, can teach us a great deal" (Holmgren, 2004).*

Another proponent of the philosophy of permaculture, Rob Hopkins, referred to permaculture as: "a design system for the creation of sustainable human settlements" (Hopkins, 2008). He pointed out that the systematic foundations of permaculture were laid down in the 1970s during the oil crisis at that time, as there was a shift to thinking about a more multi-layered system of a "permanent agriculture," in which there was, for example, an integration of the use of trees and plants trees with the built environment (Hopkins, 2008). Since then, he explained, there has been a growing realisation that sustainability cannot occur in isolation from society, food, buildings, energy, and so on. The term "permaculture," he suggests should now be interpreted as "permanent culture," implying a shift towards a culture of permanent sustainability.

Advantages and disadvantages are associated with the application of permaculture. In using this approach in designing buildings it is important to specify a space for

producing foods that are free of artificial chemicals (Neiger, 2016). Energy sources should be renewable, thus avoiding the negative impacts on climate change that arise from fossil fuels, and any material resources used should be continuously recycled in the system (Blackmore, 2015). The environmental advantages associated with the use of organic farming are also related to the application of permaculture. The major downsides to this design are the cost and time taken to realise the results. It may also be that numerous initial adjustments are required to the system in the early stages in order to overcome any unexpected deficiencies.

Opponents of permaculture also point to the lower productivity and limitation of agricultural products in the long run, which is one of the reasons that the use of permaculture designs in buildings for agriculture is sometimes not appreciated. It has been argued, too, that conventional farming results in higher productivity because most implementations of permaculture do not allow the application of artificial fertilizer (Mancebo & De la Fuente, 2016). Moreover, to effectively apply permaculture demands more technical expertise than most users possess.

Some difficulties stand in the way of applying this framework in education. A good participatory teaching program requires students to also participate actively with their instructor. This may be a problem for some students, however, who are required to have a good knowledge of agriculture, as well as their own discipline. In addition, co-sharing of ideas may be very limited due to the complexity of the topic.

6.2.4 Resilience

Also strongly connected with the concept of sustainability is that of resilience (Folke et al., 2002). Resilience has been defined in various ways, but in general refers to the ability or capacity of a system to continue to function in the face of external change

and shocks. In an ecological context, the changes and shocks might include sudden, local events, such as flooding or windstorms, or more gradual global phenomena, such as climate change (Côté and Darling, 2010).

Ecological resilience is tied to a number of elements associated with a system, one of which is diversity. A system may be resilient not only because of the quantity of its components, whether these be species, subsystems, or energy sources, but also the number and complexity of the relationships and functions that occur between its elements (Luria, 2012). An additional factor may be characterised as "modularity" – in other words, the manner in which systems are connected (Walker and Salt, 2006). In a modular structure or system, localised parts may have the capacity to self-organise and thus ameliorate the effects of any shocks or disturbances from the outside shocks.

A further characteristic relevant to resilience is the strength or rapidity of feedback of a system how much and how quickly the results of sudden changes experienced by one part of a system are transmitted elsewhere in the system (Jones and Schmitz, 2007). It has been suggested that more centralised systems may be slower and less effective in responding. By contrast, the less centralised a system, the greater the dependency of its parts there will be, which means a better chance of other parts of the system surviving against disasters (Nelson, Adger, and Brown, 2007). In order to use resilience effectively when designing any system including our dwellings, Hopkins (2008) refers to the need to re-examine what might be best practiced, some examples of which are shown in Table 3.

Table 4: Comparison of some non-resilient and resilient ecological thinking (Hopkins, 2008).

Not adding resilience	Adding resilience
Centralised recycling	Local composting
Ornamental tree planting	Productive tree planting
Sourcing organic food internationally	Local procurement, specifying local production and supporting new industries
Imported 'green building' materials	Specifying local building materials (cob, hemp, etc.)
Low-energy buildings	Local passive houses
Carbon offsetting	Local community investment mechanisms
Ethical investment	Local currencies
Consumerism	Reciprocity

Certain principles of resilience are central in any resilient designs. The latter transcend scale, which means that the approaches used to achieve resilience apply at different levels, including community, individuals, and regional scales of ecosystems (Sassa and Canuti, 2013). It is also known that approaches that improve durability, and systems that are flexible, passive and simple, also enhance resilience. Flexible systems are able to adapt to any adverse condition (Liao and Nguyen, 2016), while manual and passive systems have been known to override conditions that are more resilient (Ruhl, 2011). Redundant and resilient systems support human needs by safeguarding energy, sanitation, lighting, occupant health, food, air quality, and living conditions. Moreover, renewable, reclaimed resources, which are locally available, are demonstrably more resilient than non-renewable resources (Farid, 2014). Communal and social equity contributes positively to resilience. Lastly it is considered that resilience is not wholly absolute (Zhanga and Lin, 2010).

Hopkins has articulated the importance of education and the use of many techniques of engagement in order to re-educate forgotten ideas of resilience (Hopkins, 2008). These learning techniques aim to understand openly about the need for a transition from unsustainable systems to systems that integrate the natural world within themselves.

A major concern associated with resilience is the connection between applications, operationalization, and disaster management (Farid, 2014). Constructing resilient designs can be expensive (Sassa & Canuti, 2013), making their construction especially problematic for communities that have already experienced financial and economic loss (Liao & Nguyen, 2016). The planning, designing, and implementation of resilience buildings make also be beyond the resources of small communities (Zhanga & Lin, 2010).

Insofar as teaching resilience is concerned, there is the problem of conveying the subject accurately and, in particular, making clear the relationship between resilience and vulnerability. It has also been pointed out that resilience may not offer scope for reflective discussion in the class since many students may not be conversant with the basic principles.

6.3 Discussion

In evaluating a new teaching module that incorporates ecological principles certain key elements of sustainability and environmental science need to be conveyed. These are largely contained within four key paradigms, described above: ecological literacy, ecological holism, permaculture, and resilience. Each of these paradigms has its strengths and weaknesses and its own set of challenges when framed in an educational context.

The overarching goal of ecological literacy is to help shape a sustainable society – one that coexists harmoniously with the natural environment around it (Stone and Barlow, 2005). The components of it to be taught are the principles of living systems, systems thinking, design inspired by nature, collaboration and community building, and the ecological paradigm. These are all well suited to being conveyed in participatory classes because then the interaction and cooperation between students, and between students and teachers, mirrors such aspects of ecological literacy as the mutual dependence of living systems, and the collaboration between members of the group echoes the collaboration needed for communities to take environmental action.

Biophilic design is an appropriate choice for inclusion in a module on sustainability for interior design students because this type of approach contain many creative possibilities required in most design disciplines and can be applied to the spaces in which people live and work (Kellert et al., 2011). Not only may such designs help sustainability, for example by being energy efficient, but also they can improve the wellbeing and psychological health of inhabitants when inspired by systems from nature. However, the principles of biophilic design need to be introduced in such a way that students grasp them and can then apply them in their group projects and activities. Certain components of permaculture may be incorporated into the evaluation of new, participatory approaches, though the provider or teacher must be selective in choosing those principles for inclusion that are relevant from an interior design point of view (Dawborn and Smith, 2011).

Finally, given the threat that climate change poses to the planet in general and human habitation in particular, resilience is a key paradigm to be conveyed and understood in order to successfully adapt with rapid environmental crises (Folke et al., 2002).

The challenge is to convey the concepts involved clearly and in a progressive way so that students can assimilate them and then apply them in a group setting.

6.4 Conclusions

Ecology, sustainability, and green issues generally span a broad spectrum of theories, concepts, and opinions. However, certain paradigms and approaches are of particular interest in the context of design education. These areas of interest emphasise the interconnectivity of all the various components of the global and local ecosystem, natural and anthropocentric i.e., the holism of the environment at all levels and the need for humans to live and behave in ways that harmonise with nature. It is important to appreciate that although the Earth has immense resources, these resources are finite and will be exhausted at some point unless sustainability is made central to the thinking and actions of future generations.

This chapter began by asking what aspects of ecological thinking and ecological design are most appropriate to evaluate from the perspective of participatory teaching. To some extent the answer reflects those approaches that figure prominently among the strategies and stances adopted by contemporary environmental scientists. The aspects to be included in the evaluation must also take in to account local environmental, cultural, and historical factors of the region in which the evaluation will take place and should also take advantage of the participatory, group-oriented nature of the teaching process to be applied. In this chapter, certain philosophies and approaches to achieving ecological-sensitivity and sustainability have been considered and will be carried forward into the evaluation stage. Specifically, in evaluating the effects of participatory methods in the teaching of ecological thinking for interior designers in Kuwait, ecological literacy, ecological

holism, biophilic design, permaculture, and resilience have been selected as key philosophies and methodologies for use in the evaluation. In the next part of the thesis, consideration will be given to the practical aspect of implementing the evaluation before analysing the results and putting forward a series of recommendations.

6.5 Linking of the findings from previous chapters

Chapters 4, 5, and 6 were devoted to a literature review of three themes that are central to this research, namely: contested and relevant practices in teaching, interior design, and ecological theory. A summary of the theories and models examined is provided in the tables below. What follows is an overview of the main conclusions used to inform the design of the methods used to evaluate participatory approach.

Elements of a various teaching theories were selected for inclusion in the workshops based on a number of factors, including that most of the students involved had previously been exposed to very little group work. While it was considered important that encouraging cooperation and creativity feature prominently in the workshops, it was also clear that any new approaches be explained clearly and introduced gradually so that students felt comfortable to become engaged and put forward their own ideas and opinions. Moreover, the literature review on this topic pointed to the advantage of having the teaching methods and learning environment reflect, on the one hand, the interconnectivity of the natural world and, on the other, the original thinking required to solved problems in both sustainability and interior design. Any shift to a new educational paradigm, however, we must take into account that teachers, who have throughout their careers used only traditional methods, need time and training to adjust to new strategies. In addition, the adoption of a different

approach, such as more student-centred learning, needs to be sensitive to the local cultural and societal norms. The combination of elements from the review of teaching practices and learning models in Chapter 4 to be applied in the evaluation workshops has been addressed in section 4.4 and also shown in the below table.

Table 5: Findings from the literature review on teaching theories.

Summary of results from Chapter 4			
Section	**Theory**	**Implications from theories and recommendations for teaching**	**Examples of exercises and activities in teaching**
4.3.2.1	Social learning theory	Enhance the attention of students by adding sensory elements.	• Focus student observation into elements from nature. • Provide natural raw materials to students. • Field trips to discover the natural surroundings.
4.3.2.1	Social learning theory	Improve retention of new knowledge by presenting symbolic coding and visual imaging.	• Use process diagrams to solve complex problems. • Use mapping exercises. • Group mind maps.
4.3.2.1	Social learning theory	Reproduce experiences and observations in order to consolidate core ideas and achieve a clear understanding.	• Apply projects that promote role play. • Present video and images that show current environmental issues. • Solve tasks using learned concepts.
4.3.2.1	Social learning theory	Apply measures to increase participation and motivation in learning.	• Use incentives in projects and exercises to encourage students to engage and work more in the new topics.
4.3.3.1	Elaboration theory	Simplify problem solving and complex problems.	• Introduce an elementary version of some idea or concept, then, by stages, introduce more detailed and in-depth elements that flesh out what has come before.

4.3.3.1	Elaboration theory	Encourage students to take part in deciding the learning material.	• Enable learners to decide for themselves how to progress to a higher-level understanding of the topic, so that they develop greater self-reliance and motivation. • Involve students in suggesting what to cover in future sessions.
4.3.3.1	Elaboration theory	Provide instructional materials that are linked in a logical and hierarchical way, to encourage high-order thinking skills.	• Integrate supplementary and optional problem-solving exercises, and other learning tools, to help build a deep understanding and motivation in the student.
4.3.3.2	Information processing theory	Exercise and develop in the student the use of the various cognitive elements.	• Use short- and long-term memory, expansion and processing of information in various ways.
4.3.3.2	Information processing theory	Stimulate sensory memory.	• Use natural materials to model ideas. • Use graphics and visualisation techniques to help conceptualise ideas such as PowerPoint or video clips.
4.3.3.2	Information processing theory	Reduce reliance on literal memorisation.	• Organise supportive practical techniques that focus on understanding the concepts rather than memorising them.
4.3.3.4	Situated cognition	Use cognitive apprenticeship steps and social interaction.	• When teaching something new, first present students with a broad picture, then show how this is broken down into smaller pieces, for example drawing mind maps to break problems. • Provide scaffolding to hold students' ideas together without directly interfering. Such as, making students solve problems without teacher influence. • Take the scaffolding away slowly by creating an environment for the learner to know where to go for support, for example encouraging students to seek solutions from other disciplines.
4.3.3.4	Situated cognition	Incorporate group projects that culminate in the showcasing of students' ideas and self-learning.	• Consider Student individual presentations. • Consider Group project presentations. • Focus on student learning themselves in groups.
4.3.3.4	Self-regulated learning	Goals should be set in advance and attention paid to factors that determine the effectiveness of students' self-regulation, including the commitment of students to what they are trying to achieve and what they believe with respect to the probable outcomes of their actions and efforts.	• Instruct students to set their goal in each project or exercise prior at the start of the project. • Students should select their goals based on their own skills. • Provide appropriate motivation.

4.3.3.4	Self-regulated learning	Students define their goals and plan how to achieve them.	• Develop teaching and learning from student feedback. • Students should present systematic mapping to identify the tasks needed to solve problems or achieve goals. • Lecturers should spend one or two minutes for each student to make sure that they are not stuck in any step of the exercise.
4.3.4.1	Anchored instruction	Create learning environments that enable students to learner more effectively by anchoring and situating instructions around a thought-provoking topic.	• Lecturers should spend time to select topics that raise the attention and discussion among students. • Student should try to discuss together the selected topic in pairs or in a group.
4.3.4.1	Anchored instruction	Use techniques to help learners develop a positive attitude and appropriate thinking skills, which in turn may contribute to critical thinking and improved problem-solving skills.	• Ask students to imagine a scenario and work to solve a problem in that scenario using role-play. • Ask students to identify their roles in the group and find a process to solve the problem based on their roles.
4.3.4.1	Communities of practice	Emphasise collaborative work, and base teaching sessions around group interaction and the knowledge sharing.	• Apply group work in tasks during lecture such as group problem-solving. • Apply group work for larger projects that can be achieved in certain weeks.
4.3.4.1	Communities of practice	Encourage students to network with other learners, collaborate, and share knowledge.	• Ask students to communicate with other students in relative disciplines and get them involved in their projects either by seeking advice or by collaborate in the project.
4.3.4.3	Connectivism	Be aware that learning today is built upon continual acquisition of new information and rapidly changing foundations from individual learning into community learning and the	• Encourage students to network with other learners, collaborate, and share knowledge with other disciplines.
4.3.4.4	Discovery learning	Offer insight into the impacts of new teaching and learning and the skills that students needs to have for those new approaches in learning.	• Provide examples of the benefits of learning in a participatory way. • Inform students of the skills that they need to solve the tasks • Inform students of what they will come out with after taking part in this learning process.
4.3.4.4	Discovery learning	Encourage students to ask questions, come up with tentative answers to those questions, and discover general principles from experience.	• Ask students to take part in project that encourage research and investigation of knowledge.
4.3.4.4	Discovery learning	Use strategies to promote improve problem-solving skills and the generalisation and integration of knowledge	• Provide student-driven activities. • Make students engage in multidisciplinary projects.

4.3.4.5	Multiliteracies	Promote higher-order thinking	• Ask students to use different methods to solve the selected environmental problem that they would like to address. • Make sure that the problem is realistic so that they can link what they have learned in the real world.
4.3.4.6	Social development theory	Expose students to practical experiences, real-life challenges, opportunities for self-motivated learning, and communicating in an interdisciplinary activities and teamwork.	• Open discussions with student about real environmental problems and how to approach them from their own discipline or other disciplines.
4.3.4.7	Problem based learning	Enable students to solve problems, working individually or in groups to observe and learn from what their peers might be capable to do and learn from other experiences.	• Shift the focus of learning for students instead of copying how the lecturer would solve the problem, they should learn between themselves and discuss right ways to solve the problem that they are addressing.
4.3.4.8	Participatory learning approach (PLA)	Help to set up an organised, cooperative approach to assignments and activities, with a focus on participation and self-evaluation.	• Apply group work. • Groups can take part in the evaluation or assessment for other groups. • Ask groups to star rate other groups or projects. • Give students the freedom to use software that helps them achieve their goals.
4.3.5.1	Facilitation theory	Develop learning and teaching by listening to students, understand their values and thoughts, and accept both negative and positive feedback.	• Find time in the session for reflection after group work. • Ask students to provide feedback on how to improve the learning process. • Collect feedback and reflections from student from each stage or class.
4.3.5.1	Facilitation theory	Lecturers should facilitate learning that create an atmosphere in which students feel comfortable about acquiring new ideas and are not distracted by external forces.	• Use facilitation techniques. • Build trust with students by accepting their ideas openly. • Inform students that it is not about right and wrong but about taking action and learning the appropriate set of skills and knowledge. • Lecturers should provide an atmosphere that does not force students to be hesitant or hold back ideas when they are around specialists or other lecturers.
4.3.5.1	Facilitation theory	Help students to take control of their own learning.	• Give student the freedom to use learning methods that work with their own skills.

To a large extent, the same factors above influenced the choice of methods and topics to be taught from the fields of interior design and sustainability. In other words, those approaches were selected which stressed interconnectivity, cultural sensitivity, local environmental

relevance, creative solutions, and adaptation to students who were not familiar and necessarily comfortable with collaborative learning. The combination of elements from the review of design teaching practices and models in Chapter 5 to be applied in evaluating the teaching approach has been addressed in section 5.6 and is summarised in the following table.

Table 6: Findings from the literature review on design teaching models and theories.

Summary of results from Chapter 5			
Section	**Model/ theory**	**Implications from models/ theories and recommendations for teaching**	**Examples of exercises and activities in teaching**
5.4.1	Dieter Rams' principles	Some of the principles in this scheme serve as useful guidelines for teaching. Among these: promote a set of design features and a framework in producing ecological designs.	• Explain the principles to understand the design features involved (e.g. (innovative, aesthetically attractive to improve people's wellbeing; structurally understandable; sympathetic to a society's heritage and environment). • Apply the features in designing a process for ecological teaching. • Use the features in learning as a design approach for students to adapt. • Select subject areas, teaching tools, and project forms that inspired from these concepts.
5.4.2	Holistic design	When dealing with clear designs, designers should consider how the design will appear in a whole setting and identify different ways people can view and interpret.	• Apply in connecting designs with surrounding environment. • Encourage responsible thinking. • Use exercises reflect that when small changes are made in the design phase, there would be big environmental implications.

5.4.3	Participatory design	Offers a strategy that helps allocate design responsibility to designers so that each can work on their innovation and creative skills. Also helps designers to form collaborations with developers and researchers in the innovation process.	• Use for students when they are working in the problem definition stage to set the right course of action. • Ask students to create a product that focuses on presenting societal solutions. • Lectures should provide time schedule of tasks that are required to be done during class time and specifying time that student will take to carry them. • lecturer should carefully plan class time, and must find creative ways for assessment during each task. In addition, lecturer should carefully plan class time, and must find creative ways for assessment for each task (e.g. designing assessment forms during every task to make it easier to evaluate students).
5.4.4	The ADDIE model	Helps implement theoretical instructions effectively in a wider learning framework.	• Lecturers can use the model principles to ensure that students focus on learning general topics necessary for ecological design. • Lectures can apply the stages of design to students in systematic learning approach for designers (analysis stage, design stage, development stage, evaluate stages. • Lecturers should avoid using this model on tasks that requires student creativity.
5.4.5	ASSURE	Offers a framework for teaching by providing a systematic plan for planning lessons. It advocates the use of technology in student, and involves a step-by-step process.	• Use in measuring student progress and making adjustment according to any variable. • Lecturers can use this model in creating a guide when designing a process for evaluating participatory methods on design students. • Teachers analyses their learner attributes and focuses on their characteristics. • Creating a set of learning objectives that measures a behavioural performance and establishes to what degree students master content and knowledge. • Selecting a strategy such as technology, materials and media that will bring learning results. • Instructors utilize the materials they have selected to ensure that the lessons culminate the desired results. • The instructor evaluates the impact of the teaching method and its influence on the student learning process.

5.4.6	Kemp instructional design	The interrelation between components in this model, the design process becomes cyclical, open to ongoing revisions and adjustments amongst the elements, to achieve the best suited design to the desired learning outcomes of a course.	• Assesses the needs of the learners so that it can administer instructional resources and contents. • Increase learner capability of accruing new knowledge in ecological design. • The circular approach can be used to guide design students while they work on their projects. • Ask students to utilise the nine stages of design in this model while they apply ecological principles into their projects.
5.4.7	Dick and Carey design model	The model figures out the instructional goals of learners in identifies which materials will suit their needs. The model also guides instructional analysis to determine the wants of the students and plan ways to teach them.	• lecturers should acknowledge the need for constant development in each course, and that each group of learners are unique. • Lecturers can use the model as a guide to understand the targeted student's reflections on certain methods of teaching. • Help students understand and master subject content. • Provide a check point for the lecturer to evaluate what the students failed to understand in class. • help lecturers to develop a strategy and use instructional materials that will foster effective learning. • Lecturers assess student skills from the previous lessons. • Lecturers should figure out specific learning objectives that students should attain after a lesson. • Lecturers drafts a test that will help reflect the performance objectives of the lesson. • Lecturers perform a formative and summative evaluation to establish if the model worked in realising the student's needs.
5.4.8	C. R. A. P Design theory	This theory uses principles of (contrast, repetition, alignment and proximity) that can help students to increasing their skills in presenting the ideas that they produce during group tasks and course projects.	• Teachers need to be adequately trained before using this design. • Using visuals and attractive ways for lecturing and making an emphasis when delivering certain information. • Provides a thinking process to label information visually. • Minimise reliance on memorisation. • Helps students to gain specific skills needed for design disciplines.

In chapter 6, the following results from ecological models will be applied in the evaluation of a participatory approach for learning ecological design. Comparing the impact of presenting and discussing ecological paradigms in two different teaching

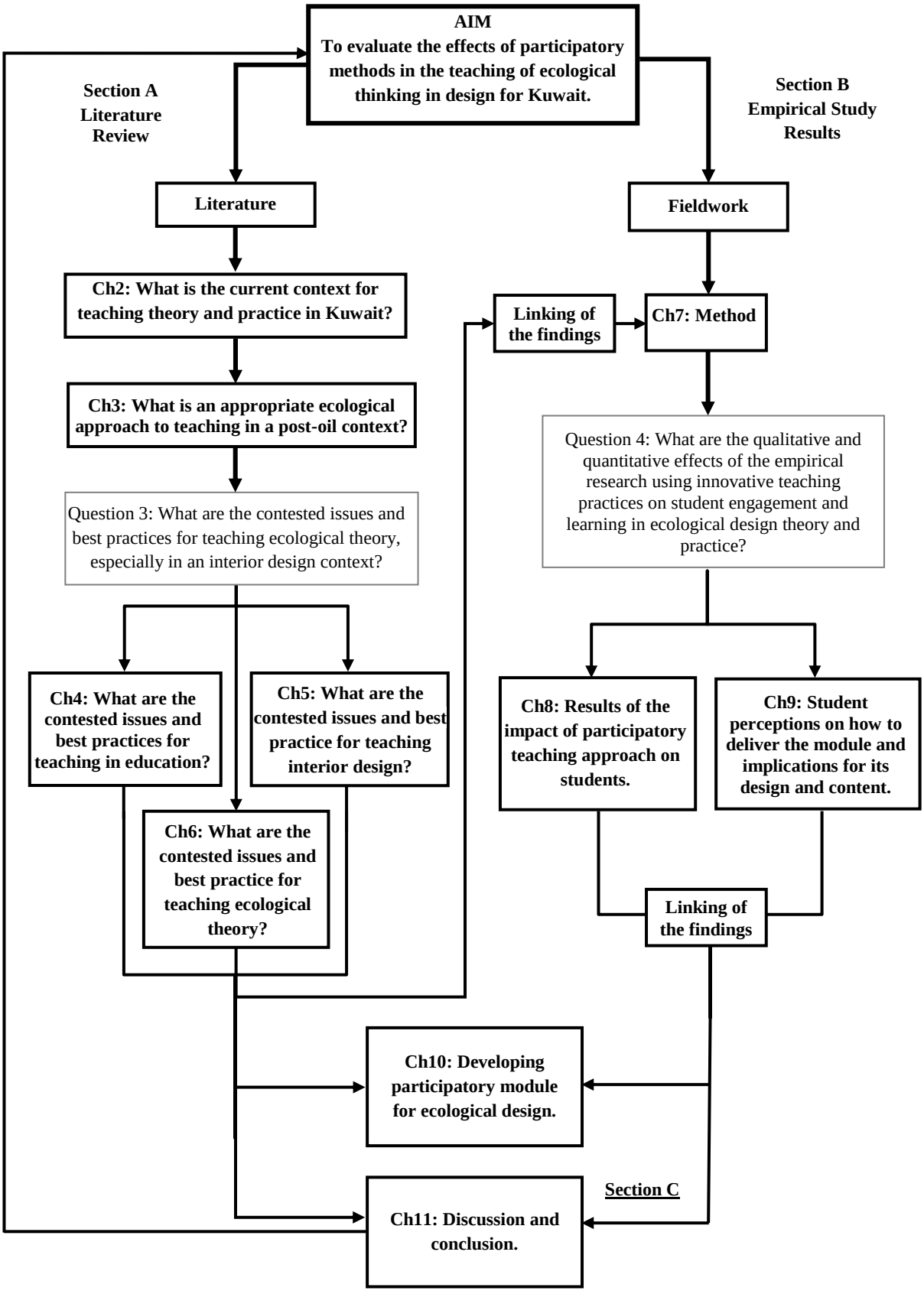
approaches will allow the determination of whether a participatory approach is more effective for KEI students than a didactic approach. These ecological models will be used in the workshop to introduce students to possible ways to apply the models on their practice. Four key paradigms, will be described: ecological literacy, biophilic design, permaculture, and resilience. The reason behind presenting these four paradigms to students is that it will allow them to decide for themselves, based on their personal skills and understanding, which approaches to ecological thinking are most appropriate to adapt in interior design practice.

Ecological literacy is introduced to students to help them appreciate the principles of living systems, systems thinking, design inspired by nature, collaboration and community building, and the ecological paradigm. Biophilic design on the other hand, is an appropriate choice for inclusion in a module on sustainability for interior design students because this type of approach contains many creative possibilities required in most design disciplines and can be applied to the spaces in which people live and work. Students can improve the wellbeing and psychological health by their designs when they use examples from nature as a source of inspiration. Components of permaculture will provide insights to consider when specifying agricultural spaces to be embedded in their designs. Finally, discussing resilience will provide students with some insights to adapt current designs and systems so as to provide ecological solutions to problems such as climate change.

SECTION B

In this second section dealing with the research, the methodology for the fieldwork will first be considered (Chapter 7). This will be followed by a discussion and analysis of the data. Chapter 8 will examine the data that evaluates the impact on students of different teaching approaches. Chapter 9 will analyse and discuss the data that reveal students' opinions on how to deliver and teach participation in ecological design. In addition, an examination of opinions on content of the new module will also be discussed in chapter 9 that were expressed by both students and teachers. Finally, chapter 10 will discuss developing the participatory module as shown in the diagram in section B.

Empirical study and results in section B.



CHAPTER 7

EMPIRICAL STUDY METHODS.

7.1 Introduction

Previous chapters outlined some key areas of earlier research and their implications for incorporating ecological thinking into the teaching of interior design. This chapter considers the methods used to conduct the empirical investigations to gain new insights as to what should be incorporated in the final teaching design and how this material should be taught. Overall, an action research approach was undertaken. Specifically, this involved testing and learning from different approaches to teaching sustainable design. The research compared the impact of using participatory and facilitative methods in some classes with that of didactic methods in other classes. The methodology is divided into three parts: (1) delivery of the action (a teaching intervention), (2) collection of data, and (3) analysis of data. A comparison of the impact of the different teaching approaches is used to evaluate a participatory approach to teach ecological design, including how it should be delivered and what aspects of sustainability it should include. Data collection related to the impact of the teaching intervention was carried out by means of: (1) semi-quantitative surveys before and after the teaching interventions, (2) semi-structured interviews, and (3) qualitative observations of interactions and activities of students in classes.

The next section outlines the general philosophical position that the researcher has taken for this study. It is followed by sections that explain the specific methods used,

including their qualitative and quantitative aspects, and details of the data collection techniques applied. Finally, ethical issues involved in the research, and how these were addressed, are explained.

7.2 Position of researcher

A researcher's theoretical, ontological, and epistemological position influences how the research is conducted and thus the outcomes of what is being investigated (Hofer and Bendixen, 2012). This position includes the underlying philosophy of the researcher, that is, the collection of beliefs and assumptions that the researcher uses to attain a particular perspective of understanding some aspect of the world. Table 5 summarises the position adopted for the purposes of the present study.

Table 7: Research map to the methodology and methods

Position	**Parallels**	
Ontology	Objective	Subjective
	⬇	⬇
Epistemology	Positivist	Action research
	⬇	⬇
	Deductive (testing a theory)	Inductive (building theories)
	⬇	⬇
Approach	Participatory design	
Method Type	Quantitative	Qualitative
	⬇	⬇
Methods	Questionnaire	Interviews, focus groups, observations
Analysis	Mann-Whitney test Wilcoxon test	Grounded theory

7.3 Research design

At the core of the research are two different teaching interventions, both dealing with the subject of sustainability, which were applied to different sets of interior design students. The first type of intervention centred on a traditional, didactic style of teaching. The second was participatory and student-centred and encouraged those taking part to engage with each other and with the hands-on projects suggested by the teacher. Figure 7 provides an overall view of the research design.

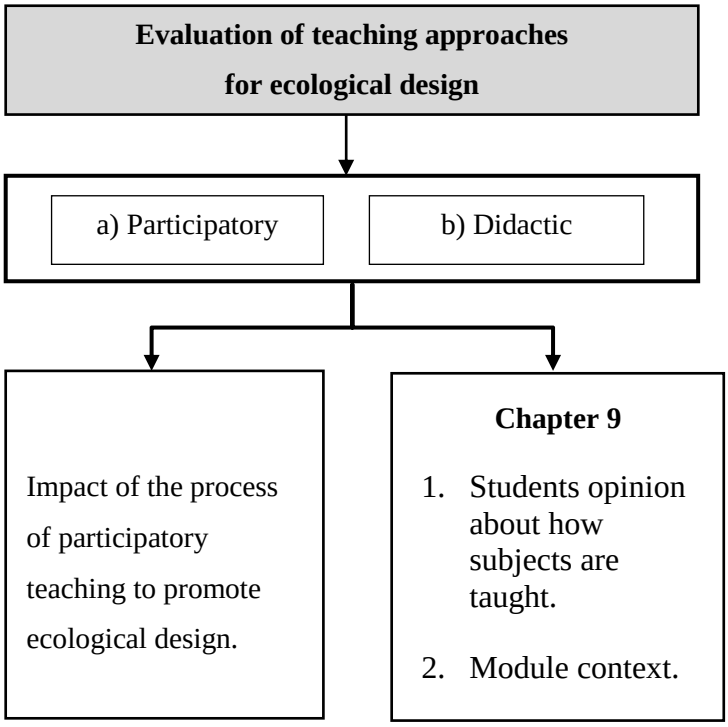


Figure 4: Workshop design and outcome of the teaching approaches

Each type of workshop represents a teaching approach. The participatory workshop is evaluated against the didactic approach in order to establish three main outcomes:

- What are the impacts of the process?

- What are students' perceptions on learning and teaching and what do they say about how subjects are taught?
- What is the context of the proposed sustainable design?

The above outcomes will be discussed in three result chapters (8 and 9). The following section presents the research theoretical results to inform the research methodology.

7.4 Methods used in the teaching intervention

7.4.1 Empirical study process

The next logical process within the research is to decide upon a specific strategy for the initiative being undertaken (Kothari, 2004). The research process shows how information and knowledge flow through the overall study, and how, in this specific instance, the data are collected and applied to evaluate the impact of the teaching interventions so as to inform the appropriate teaching approach of participatory ecological design. Figure 6 illustrates the process involved in this study.

Closely allied to the research process is the study design, which deals with issues regarding the study questions, relevancy of the data, and collection and analysis of the data (Creswell, 2013). Within the research design paradigm, it is important to consider such aspects as why, how, what, how many, and how much (Mackenzie and Knipe, 2006). The questions within the present study are derived from the literature reviews of Chapters 4, 5 and 6, which examined various implantation strategies for the participatory teaching approach, and are influenced by the researcher's own experience and familiarity with the context of the study.

To summarise, this study involves an exploratory approach to the design to evaluate participatory teaching in ecological design to be applied in a new educational module. The research process selected takes into account cultural aspects of its intended place of application, along with individual, technological and organisational factors that may impact the teaching of sustainability in countries like Kuwait.

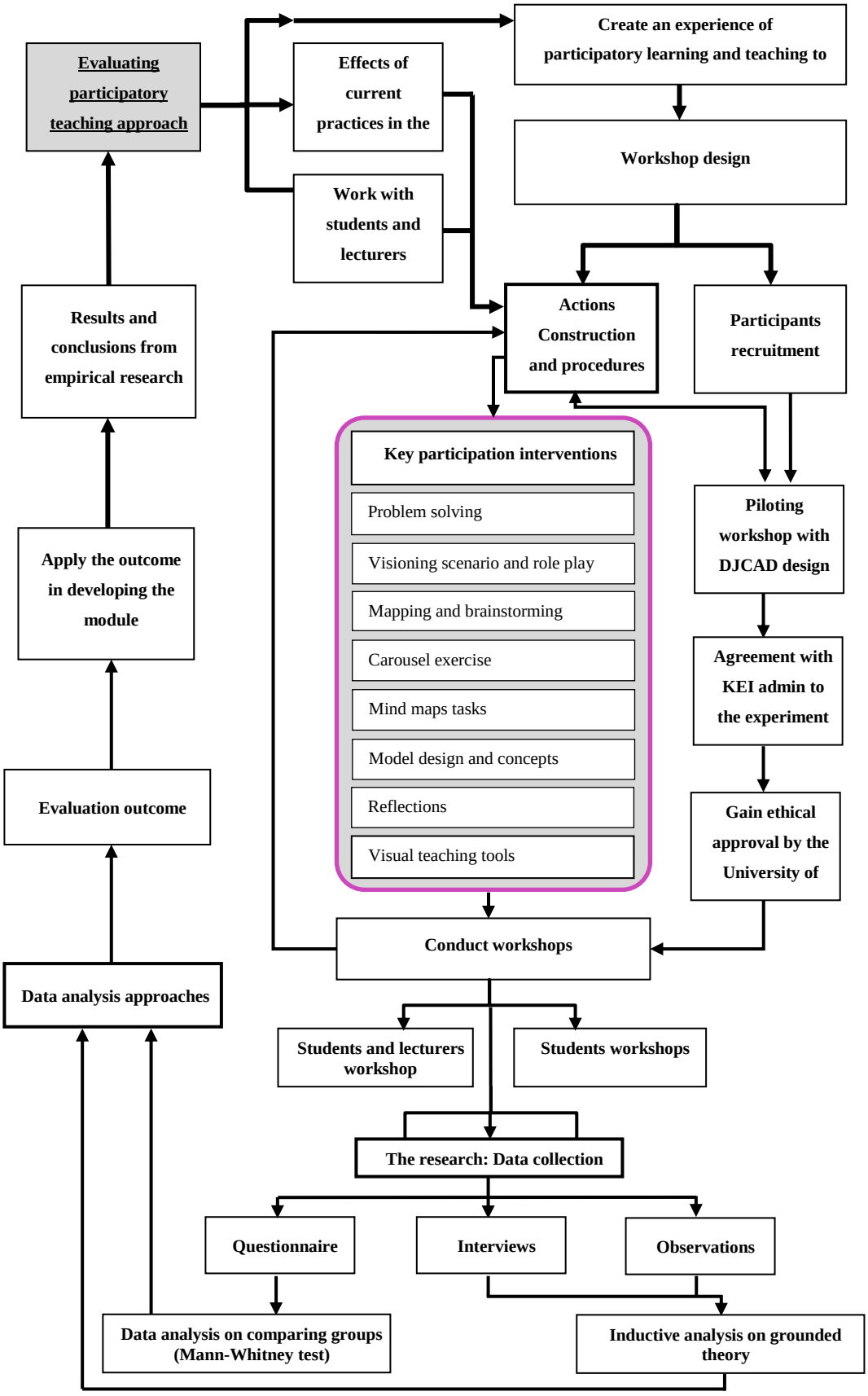


Figure 5: Framework of methods used in the intervention and in the data analysis

The research, aimed at changing the mind-set of students to embrace sustainable thinking (see Figure 6), starts from an examination of the literature to gain insight into various relevant processes of teaching and learning. In order to pursue a successful case study, a closer understanding of some of the factors involved was gained from a data-gathering field trip. The researcher also explored the effects of current practices of interior design teaching at a Kuwaiti higher education institute. He worked with students, as they are the main focus in any place of learning, and also with lecturers, who deliver the learning outcomes. Since the students initially had little knowledge of sustainable thinking, it was important to understand what type of teaching and learning environment would be most effective in helping them develop new skills and environmental knowledge, which they could then apply in interior design.

Both participatory and didactic workshops were provided to evaluate the best teaching approach. These workshops were constructed based on a series of actions and procedures, which will be discussed in detail in the sections that follow.

7.4.2 Workshops facilitation

Further to the discussion in chapter 4 on facilitation theory. Facilitation refers to a mechanism in which an unbiased individual assists a group of people to work together more efficiently. Three key values direct the process of facilitation: legitimate information, open and informed choice, and internal dedication to those choices. Valid information implies that all the participants involved share necessary information that is significant to the research (Kothari, 2004). Open and informed choice implies that the participants are in a position to describe their personal

objectives and the mechanisms of attaining them. Internal dedication means that the group members feel obligated for the choices they make.

Facilitation requires certain skills and techniques in order to be effective. Analytical and strong verbal skills are significant. Other essential techniques comprise redirecting questions and comments, providing positive support, motivating contrasting opinions, and engaging dormant members of a group. Relevant nonverbal skills include attentiveness, appropriate body language, eye contact, enthusiasm, and keeping a constructive attitude. Effective facilitation depends on the facilitator having the ability to read and evaluate group dynamics and to direct the group carry out the research in a productive way (Creswell, 2013).

Facilitation assists students to know each other and understand how to enhance cooperation amongst themselves. Most importantly it establishes an environment to draw ideas and solutions from students and in which they can work together in reaching those solutions. Facilitation helps concentrate the energy and views of different group members on the assignments at hand.

In this research, two types of workshops were facilitated in KEI with students and one type of workshop was held with both students and teacher. The sections below discuss the empirical interventions that were used in the workshops. Followed by detailed timetables of the three types of workshops that were held in KEI.

7.4.2.1 Participatory techniques

The following facilitation techniques were used in the research to ensure that there was full contribution of all the group members during the workshop.

7.4.2.1.1 Problem solving

This method combines generic methods in an organised way with the aim of finding solutions to problems. It is a procedural process that involves identifying the problem statement, diagnosing the problem, and then generating possible alternative solutions, and selecting the best course of action among the given alternative. The research adopted this technique during discussions and solving problems (Kumar and Phrommathed, 2005).

Figure 6: Photo shows the students were asked to discuss a problem affecting the environment, analyse it and come up with ways to solve it.

Students were requested to work together and come up with a problem that they saw affecting the environment from an interior design context or a wider context beyond interior design. They were asked to analyse it, considering all parts involved in this problem, and then think of ways to address it from a sustainable point of view.

7.4.2.1.2 Visioning scenario and role play

A vision statement is an illustration of where the research group intends to be in a specified future time. The research objectives act as the vision to be used by the group to ensure that it works towards fulfilment of these objectives (Kaner, 2014). Students were asked to envision a future scenario, for example: "Imagine a future world, say in 2050, where oil is no longer available, manufactured materials a thing of the past, but you still have to design a space using materials from nature. Try to work with your group members to come up with a design that uses natural materials using the concepts that were discussed earlier." This exercise was used in the workshop to encourage students to think in a new way to promote sustainability.

7.4.2.1.3 Brainstorming

Brainstorming is a creative process that involves gathering available alternatives, analysing the data gathered, and choosing the course of action that seems best to suit the problem. While brainstorming, group members are required to combine informal and logical thinking (Cohen, Manion, and Morrison, 2013).

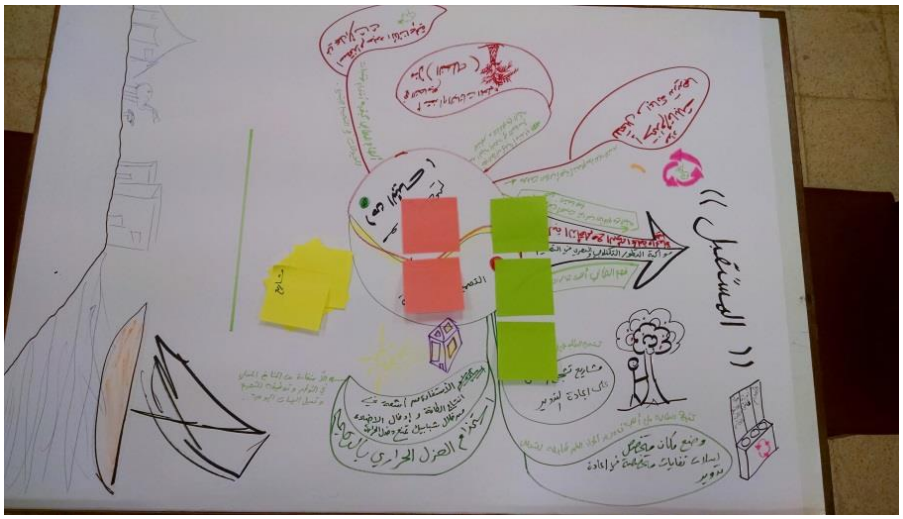


Figure 7: Photo shows group of students from participatory workshops brainstorming ideas for Kuwait enviroment.

Brainstorming encourages group members in the workshop to come up with new ideas and thoughts, and therefore students should avoid criticising each other's ideas despite how crazy or unreasonable they may seem sound at first. Some of these ideas may turn out to be valuable in the long run.

7.4.2.1.4 Carousel

A carousel is a cooperative learning mechanism that engages discussions, movement, and reflection (Escobar, Faulkner, and Rea, 2014). Group members are involved in movements from one place to another in the class, or around the lecture room walls, discussing a research assignments or a task. Stick notes ensure that they don't forget any essential information needed in carrying out the research, by placing their ideas at a specified location in the classroom on A1 sheets.

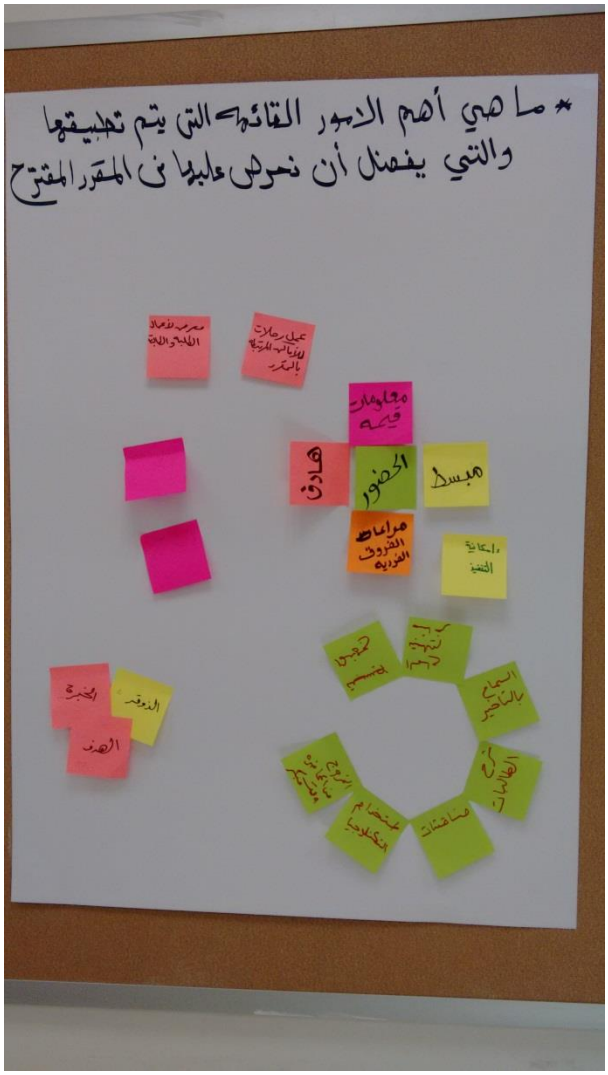


Figure 8: Carousel exercise of student groups providing suggestions toward one of the questions on the sheet.

A carousel is a good way of ensuring that participants discuss and reflect as a group when trying to find solutions to different tasks (Maiden, Manning, Robertson, and Greenwood, 2004).

7.4.2.1.5 Mind maps

A mind map is a diagrammatic representation of how different pieces of information occur in the brain, showing the relationships among the items in a hierarchical manner. Mind maps are created and drawn around a particular concept: the major

ideas are placed closest to the central course of action and the minor ideas are placed in outlying parts of the diagram. Mind mapping helps to improve learning and thinking ability, and facilitates the thinking process (Cohen, Manion, and Morrison, 2013). Students were asked to work in a group and design mind maps around their environmental concepts in order to solve problems that they chose to address. An A1 sheet was provided to each group in order to present their ideas and connected elements.

7.4.2.1.6 Model design concept

This is a type of display that represents a system by showing the different entities and components, their interrelationships, and their importance to the entire system. A model design concept assists the participating group to know of the existence of a system, comprehend how it works, and simulate the relationship between different components of the system (Dorst and Cross, 2001)

Students in the workshop worked together to represent their ideas, which consist of parts and components within a system. This can relate to a real-life system, or a system within a design context. At the end, the students formed a concept model for their idea that all of them managed to construct using simple materials or scaled down and detailed materials to demonstrate the system that they agreed to form. The researcher provided natural raw materials to allow students to imbed their ideas using these materials to connect their ideas with their visual practice and demonstration.

7.4.2.1.7 Reflections

Reflecting on an experience involves the student revisiting what they have learned during their research (Escobar, Faulkner, and Rea, 2014). Reflection helps group member to increase their capacity to think and learn more (Kaner, 2014).

Students were asked to group together and, one by one, to briefly describe their experience if they had learned something new from the workshop. This enabled them to identify and state what was it that had interested them the most and whether they would take it forward and research more about it by themselves.

Figure 9: Photo shows the researcher discussing main ecological concepts during the workshop.

7.4.2.1.8 Visual tools in teaching

PowerPoints and video clips are used to enhance understanding of the issues being investigated. Video clips give a clear visual impression to group members, stimulating further discussion and sharing of opinions (Charmaz, 2014). Short documentaries, for example, presenting the dangers of over-reliance on fossil fuels and the threat from global warming. PowerPoint slides were presented to help discuss sustainable concepts to explain key concepts more clearly.

7.4.3 Worksop details and Interventions timetable

The following detailed tables present the types of workshops that was done and the interventions used in each workshop. The first type of workshop involved student as

participants and it contained participatory intervention (please see appendix A.4.1). The second type of workshop is the didactic workshop and it consist of didactic teaching interventions shown in (appendix A.4.2). The third type consist participants of both students and lecturers who have attended the two workshops and volunteered to participate to take part and contribute into the suggestion of ecological topics that would be discussed in the new module (please see appendix A.4.3).

7.5 Arrangement for the empirical research

7.5.1 The case study

In conducting research with the aid of case studies, the researcher normally evaluates multiple events (Creswell, 2013). General practice dictates that case studies are empirical enquiries evaluating phenomena in a realistic context (Bryman, 2015). As a result, they may incorporate both qualitative and quantitative evidence (Creswell, 2013). In the context of the current initiative, the conclusion to be derived should provide a basis for an environmentally aware culture incorporating multiple factors related to aspects of design processes and related strategies, cultural elements, and aspects of technology.

Case studies incorporate multiple strategies to incorporate diverse sources of evidence (Markauskaite, Freebody, and Irwin, 2010). Utilising data from multiple sources, together with both quantitative and qualitative methodologies, enables significant flexibility. Besides, the use of a variety of methodologies provides further relevance to the conclusions derived from the study conducted and the effort invested in gathering, exploring, and analysing the empirical data concluded from multiple sources. This is associated with aspects of the “what” and “how” elements.

The current research has adopted the case study methodology and applied it to evaluating how teaching and learning is applied within a Kuwaiti higher education institute (Al-Ibrahim and Al-Deen, 2008). The social sciences depend significantly upon case studies since they can enable a deep understanding of the various phenomena under consideration (George and Bennett, 2005).

In this research, the case study involves a higher educational institution in Kuwait that offers a programme in interior design. It will be referred to here simply as Kuwait Educational Institution (KEI). The research utilises and focuses upon an individual case study, since this is the sole publicly funded Kuwaiti vocational institute. Individual case studies can be subject to criticism for not being representative of the entire population (Markauskaite, Freebody, and Irwin, 2010). However, although the research here involves a single case study, it nevertheless incorporates input from multiple sources: different teachers and sets of students. Hence, the overall study incorporates multivariate conditions. Similarities between Kuwait and other countries in the Arabian Peninsula, in terms of social contexts and cultural values, mean that many of the findings of this study may be generalisable for use elsewhere (Berg, 2004).

The researcher is associated with KEI, which enables him to have a good understanding of the institution and its culture. He also belongs to the same culture as the situational parameter under observation enabling him to have a better perspective of the overall paradigm (Yin, 2013). The researcher has benefited from being sponsored by the case study organisation in that it enabled him unhindered access to the archives and methodologies within the institution.

7.5.2 Ethical considerations

The importance of ethical considerations when conducting business or research is well documented (eon Rossouw and Van Vuuren, 2010). They are particularly important whenever participants are involved in a research project (Sales and Folkman, 2000), for example, if they take part in interviews and focus groups, or are studied to understand their attitudes or behaviour. Care must be taken not to harm the feelings of others or cause emotional distress by something that is said or done (Alderson and Morrow, 2004).

Potential participants must be given detailed information about the reason behind the project, how it is being financed, what the findings will be used for, and what measures will be taken to ensure that confidential information is never disclosed (Mandal and Parija, 2014). They are then in a position to give informed consent if they choose to take part in the study. If an individual has any query regarding some aspect of the research, they must be given full and accurate information (Flory and Emanuel, 2004).

Candidates should only take part of their own accord and in no way be persuaded or feel compelled to participate. They must also be given a chance to back out in case they do not want to take part in the study anymore, without affecting their future involvement in the program or relationship with any researcher or research organisation that is part of the study. It is the legal right of anyone to withdraw from a research program at any moment if they feel the need to. They may also do so without giving any explanation and should not be pressured at all to change their mind about withdrawing (Morrow and Richards, 1996). These points where explained to students before their participating in this research.

7.5.3 Research sample and sample size

A sample is called a probability sample if it is representing the population as a whole. Its main advantage is that it can lead to accurate results with a high degree of confidence. There are two kinds of probability sample: random and stratified (Weiss and Weiss, 2012).

A random sample is so-called because the individuals present in the population all stand an equal chance of being selected into the research groups. However, this does not mean that people are randomly selected off the street, but rather that they are selected from some proper selection of random samples (Hinkle, Wiersma, and Jurs, 2003).

A stratified sample is not representative of the entire population. It is formed from a certain subcategory of the population, for example, according to the social class, religion, education level, or gender. This division is characterised by the group or stratum and involves a particular group of people (Hinkle, Wiersma, and Jurs, 2003).

Stratified random sampling is used in cases where the researcher needs to focus on a particular subgroup within the overall population. It can also be applied if there is a need to make comparisons between two or more groups while using the simple random sampling technique (Marshall, 1996).

It provides better statistical accuracy than simple random sampling due to the fact that the variability within the subgroups is lower compared to the variations when working with the entire population. It also helps save time, money, and labour since, because of its accuracy, only a small sample size is required (Marshall, 1996).

During stratified sampling, strata are formed by the researcher by dividing the population into groups. A probability or a random sample is then taken out of each group (Kothari, 2004). The idea behind the population and its sample frame must be clearly understood (Creswell, 2013).

In this study, a stratified random sample is used consisting of students of KEI who have been admitted to the interior design program. Two groups of students are then specified; the participatory group and the didactic group. All are citizens of Kuwait.

Sampling helps the researcher obtain useful results using a comparatively small number of members of the target population. Sampling is the process of selecting a sufficient number of elements from the population, so that a study of the sample and an understanding of its properties or characteristics make it possible to generalise such properties or characteristics to the population elements (Creswell, 2007). To summarise, among the advantages of sampling are (Creswell, 2007):

1- Studies based on samples take less time and give speedier answers.
2- Sampling takes less effort and time since it involves only a small portion of the target population.
3- It is less expensive yet can still provide a great deal of data and a high degree of precision.

The size of the stratified sample used in this research was 45 participants, after taking out the students who did not complete the questionnaire before the workshop ended. Each of the participants filled out one before the workshop and another after the workshop. The total number of questionnaires, therefore, that was completed before and after was 90. All of the participants were undergraduate students in the

department of interior design at KEI and were chosen from the classes of six obligatory modules in the programme.

7.6 The data collection

The collection of data is a central part of any research (Merriam, 1998) and the quality of the outcome depends on the quality of the collection process (Patton, 2005). During it, the ethical considerations of the research must be kept firmly in mind (Sapsford and Jupp, 2008).

The data collection to evaluate participatory teaching in this research utilised exercises in two types of workshops as mentioned in section (7.3). Furthermore, questionnaire, interviews, and observations were also used to collect the data. A detailed description of the types of the data collection is presented below respectively in sections (7.6.1), (7.6.2) and (7.6.3).

Data collection took place at KEI in June 2015. The following table shows the workshop schedule and the available modules used to collect the data from:

Table 8: Workshop schedule at KEI in June 2015

No	Module	Workshop	Number of students in the module	M/F	Time of class	Day
1	Res1	a	29	F	08:00- 11:50	Tuesday- week 1
2	Res1	b	27	F	01:00- 04:50	Sunday- week 2
3	Res1	a	20	M	08:00- 11:50	Monday- week 2
4	Res1	a	33	F	01:00- 04:50	Sunday- week 3
5	Res1	b	29	F	01:00- 04:50	Monday- week 3
6	Res1	b	24	M	01:00- 04:50	Wednesday-week 4

7.6.1 Questionnaire

A questionnaire can serve as an efficient means of data collection when the researcher knows what data are needed and how the relevant variables should be measured (Creswell, 2013). Questionnaires can be disseminated quickly at minimal cost (Tuckman and Harper, 2012), and can take the opinions of a population sample, as it is vital to make certain that the outcomes obtained are statistically significant (Cargan, 2007).

To make sure the objectives are attained and the fieldwork is carried out effectively, the researcher must follow a specific process. The questionnaire should be based on the following guidelines (Oppenheim, 2000):

1. Questions must not be too lengthy.
2. Only relevant questions should be asked.
3. Alternative answers should be included as well.
4. Questions must be simple and clear.
5. The answers must respond to the questions appropriately.
6. The format should be based on a natural logic or order.
7. Double-barrelled questions should be avoided or questions which include two aspects at one time.

Loaded and leading questions should be avoided since the answers may be considered biased.

The researcher collected the data, with the help of research assistants, male and female. Societal and cultural norms and requirements were kept in mind during the process, including segregation of the sexes. The objective was to attain appropriate and relevant responses after clearly stating the objectives of the research along with

the advantages of being associated with it. The participants were assured that their privacy and anonymity would not be compromised.

Two types of question can be included on a questionnaire: open-ended and closed.

7.6.1.1 Open formal questions

In open-ended or open format questionnaires, participants can express their ideas in a free-flowing way. The response options have not been predetermined, so the participants can choose however they want to reply. Open format questions are useful in obtaining more insight and picking up unexpected ideas (Bordens and Abbott, 2002). Often it is advantageous to have an open format question as the last question on the questionnaire, thereby enabling the participant to provide feedback on any matter they choose.

7.6.1.2 Closed formal questions

These are usually multiple-choice questions in which participants have to choose an appropriate answer from the options given. The number of multiple choices is not fixed but is up to the creator of the questionnaire.

The main advantage of closed questions is that they are simple to answer and amenable to quantitative analysis. There are different forms of such questions, including importance questions, bipolar (yes/no) questions, and Likert scale questions (Johnson and Turner, 2003).

7.6.1.3 Structure of the questionnaire

A self- administered questionnaire is a questionnaire that the respondent completes. It can be displayed in either an electronic or paper form (Bourque and Fielder, 2003). In this study, semi-quantitative questionnaires were given to students before and after every teaching intervention. The purpose was to gauge not only their opinions but

how the experience of the intervention had affected them. The questionnaire offered a five-point Likert scale ranging from 1 (strongly disagree) to 5 (strongly agree) for responses.

A total of 18 questions were divided into three categories:

1- Principles in education, in questions from 1-6.

2- Ecological design principles, in questions from 7-12.

3- Education development processes, in questions from 13-18.

The questionnaire used in this research is available in the appendix 2.2.

7.6.2 Interviews

An interview is a conference between a researcher and a participant with the purpose of obtaining certain information (Miller and Salkind, 2002). Any kind of interview, or any strategy for the interview, can be selected by the researcher. A major advantage of this mode of data collection is that it provides direct contact with participants and it is possible to extract first-hand knowledge regarding the research subject, and also to observe their unspoken responses, in terms of body language or emotions. The response level is also superior to that of most other forms of data collection (Doody and Noonan, 2013). During this research, female research assistants conducted the interviews with female students. A variety of questions are possible depending on the format used for interview. For this study, a semi-structured format was chosen to be the most appropriate.

7.6.2.1 Semi-structured interview

A key advantage of a semi-structured interview is that it allows the interviewee to expand on their thoughts and interject with a new topic or a personal story. Structured interviews proceed in a predetermined order. In a semi-structured format,

by contrast, the interviewer has some prepared questions but these serve as a guide for the conversation rather than dictating a rigid question-and-answer session (Scott and Morrison, 2007). The interview follows a generally planned course but the interviewer has the ability to change the course of it if the guidelines he has prepared and the direction of the conversation do not coincide (Galletta, 2013).

In this research, both students and lecturers were chosen as interviewees due to their direct involvement in the learning and teaching, respectively. The following general guidelines were followed (Rubin and Rubin, 2011):

The location was appropriate in terms of silence and comfort.

The objective of the research along with the participant's rights were made clear before the interview started.

The interview time was convenient for the participants.

Before initiating the interview, the audio recorder was tested.

Before ending the interview, participants were allowed to state any suggestions or comments relevant to the research topic.

The perspective of the researcher was not forced upon the participants and they were given the chance to offer their own opinions through appropriate questions.

Questions were friendly and appropriate to make sure the interviewees were able to present their responses without feeling under pressure.

Table 9: Design of interviews that are assigned for each type of teaching approach.

Number of the workshop	Workshop category	Module attendees used in W.S.	Type of participant	Gender	No. of participatory workshop interviews	No. of didactic workshop interviews	Lec.
1	Participatory	Residential design1 - 1	Student	Female	3		
2	Participatory	Residential design1 - 2	Student	Female	3		
3	Participatory	Residential design1 - 1	Student	Male	3		
4	Didactic	Residential design1 - 1	Student	Female		3	
5	Didactic	Residential design1 - 2	Student	Female		3	
6	Didactic	Residential design1 - 1	Student	Male		3	
7	Mixed student and lecturer		Mixed	Female	1	1	
		-	Lecturer				1
8	Mixed student and lecturer		Mixed	Male	1	1	
		-	Lecturer				1
Total					11	11	26

Table 8 shows the interview design for both types of workshop: participatory and didactic. The workshops were held during two types of modules in the department of residential design.

7.6.3 Observation

Participant observation is a hallmark of both anthropological and sociological studies (Schwandt, 2015). This approach was used to collect additional data about how students responded to the different kinds of teaching intervention. An assistant was employed to keep notes on the process during the intervention. This allowed the researcher to focus on the delivery of the intervention and helped maintain a degree of impartiality, which is an important factor in a good facilitation.

Observation methods are useful to researchers in a variety of ways. They provide researchers with ways to check for nonverbal expression of feelings, determine who interacts with whom, grasp how participants communicate with each other, and check for how much time is spent on various activities (Driscoll, 2011). Participant observation allows researchers to check definitions of terms that participants use in interviews, observe events that informants may be unable or unwilling to share when doing so would be impolite or insensitive, and observe situations that informants have described in interviews, thereby making the researcher aware of any discrepancies in the description provided by those informants (Edwards and Holland, 2013). Participant observation can be used as a way to increase the validity of the study, as observations may help the researcher have a better understanding of the context and phenomenon under investigation (Baxter and Jack, 2008).

Three aspects of participant observation can be identified (Shapiro, 2013). The first is descriptive observation, in which essentially anything and everything is observed, which suffers from the disadvantage that it can lead to the collection of minutiae that may or may not be relevant to the study. The second type, focused observation, emphasises observation supported by interviews, in which the participants' insights guide the researcher's decisions about what to observe. The third type of observation, selective observation, involves the researcher focusing on different types of activities to help delineate the differences in those activities (Shapiro, 2013).

Other researchers have taken a different approach in recommending how to conduct observations. Baker (2006) developed and used an observational guide to compile various elements to be recorded in the field notes. The first of these elements includes the physical environment. This involves observing the surroundings of the

setting and providing a written description of the context. Next, the participants are described in detail, and then a record made of the activities and interactions that occur in the setting, including the frequency and duration of those activities and other factors, such as informal, unplanned activities, and nonverbal communication. Merriam (1998) adds such elements as observing the conversation in terms of content, who speaks to whom, who listens, who is silent, and how the researcher's own behaviour affects those being observed.

Notes were taking by an assistant working with the researcher as he was observing the dynamic taking placing in the workshop among the students. Their reaction, enthusiasm, or lack of energy was noted. Also, a record was made if there were particular questions being asked and whether students kept asking the facilitator or had the confidence to solve their exercises individually. Having an assistant to record observation while the researcher focused on facilitating the workshop helped the researcher not to lose track of workshop tasks. Other notes were taken by the facilitator as the workshop ended, to record any incidents or observations that he noticed during the session.

7.6.4 Pilot study

To make sure the research instrument is appropriate; a pilot study should be conducted on a small group of participants before carrying out the main study. This has the following advantages (Van Teijlingen and Hundley, 2002):

1. Future issues can be discovered as well as avoided.
2. The researcher can use it as practice before conducting the final research.
3. Respondents may provide feedback regarding the research instrument.

4. If any ambiguous questions or statements are present in the research, they can be removed or changed.

Conducting a pilot study improves the chances of success of the main research, since it brings to light any unforeseen problems, which can then be avoided (Lancaster, Dodd, and Williamson, 2004). Through a pilot study, the participants are exposed to a suitable experience and the researcher can prepare himself for the main research. The participants provide comments and suggestions that can be used to improve the final version of the questionnaire and other aspects of data selection. The pilot study using the questionnaire was the first step in attaining valuable primary research data. The second step was to pilot the activities and tasks to be included in the workshop to help understand if the participants clearly and thoroughly understood the tasks needed from them while running the workshop. The questionnaire and the workshop tasks could then be modified based on the feedback attained from the pilot study participants (Kezar, 2000).

In April 2014, a pilot test was conducted with students from Duncan Jordanstone College of Art and Design at the University of Dundee (DJCAD). They were invited to participate during a design show held within the university where graduated students from interior design present their final year work to all design students and to the local community interested in design and architecture as shown in Appendix 3.1. Table 8 shows the number of participants in the pilot workshop:

Table 10: Pilot study sample

Higher education	Gender		Total
	Male	Female	

DJCAD	2	10	12

Following the pilot study of the workshop, the participants were asked to fill out a questionnaire. As a result of the feedback from this it became clear that a few aspects needed clarification these are identified in Table 9.

Table 11: Addressed issues from the pilot workshop

No	Issue	Original issue	Suggestion	Action to be taken
1	General information about the participants	Age: [ ] less than 20 [ ] 20-28 [ ] Older than 28	Age of 20 is overlapped and mentioned in two criteria, some students also suggested to add in more age criteria	Corrected age overlapping and added more choices for age criteria
2	The power point slides and video clip	Need more examples to be provided for ecological ideas during the power point presentation	Maybe include more examples of existing ideas/ products/buildings that demonstrate these themes. Even the futuristic technological areas. They're really inspiring.	Revise the examples of ecological designs and add a new video clip that discusses ecological concepts in design discipline. This also suggested to provide the examples at the very end of the workshop to prevent restricting students thinking
3	Terms that were unclear in the questions	Students indicated sentences included terms that were new and very technique to them about the environment ecology and sustainability.	Rephrase and re-word the indicated terms	Indicated terms were researched in the dictionary to be replaced with easier synonyms. Other terms were removed
4	Spelling mistakes	Students marked spelling mistakes in the questionnaire	Students corrected these mistakes on the questionnaire	The suggestions were included in the questionnaire
5	Students were taking time to change from one task to another	Students were pausing and seemed to be confused after they were requested to start working on certain tasks. "It might be helpful for the workshop if the exercises are being a bit structured"	Maybe present some detailed explanation and examples about the tasks to get people into that mind set	workshops programme has been printed on an A1 sheet to be placed in front of students to refer back to it during workshop activities

6	Speed of presenting the slides and explaining their content	Students indicated that they are receiving the information very quickly during the PowerPoint slides.	It is better if to speak slowly and not rush the explaining the information on the PowerPoint slides	Speaking clearly and in moderate past. Asking if anyone have a question while moving through slides.

After receiving feedback from the pilot study, some minor changes were made to the questionnaire. These changes were mostly related to the wording used, the workshop structure, and PowerPoint presentation material. The pilot indicated that the DJCAD students were having some issues in comprehending the concepts related to sustainability in interior design. This misunderstanding can be attributed to the fact that they had not experienced applying design concepts with an aim solely dedicated to environmental contexts.

Additionally, DJCAD students indicated that several terms were unclear and there were a number of spelling mistakes in the questionnaire, which is why they took longer to comprehend the questions. They were interested in the topic and the activities included in the workshop programme. One of the students commented: “It would be really useful to have this kind of workshop throughout the year. It was a very interesting and informative workshop and was great to work within a small team of design students”.

At the workshop, refreshments were served and the students seemed motivated and focused to participate. It was found that regularly providing such refreshments for the workshops in Kuwait helped to keep the students focused and energised.

Additionally, through the pilot questionnaire, the researcher was able to gain experience, when asked to explain parts in the questionnaire to the students, in as

neutral a manner as possible. He did this by using simple terms and reminding participants that their answers are just to show their opinion and that there are no wrong or right replies.

For the PowerPoint presentation, students offered comments about the speed of presentation the content. They suggested that it would be better to speak more slowly without rushing the slides. More care was therefore taken in the main study when presenting PowerPoint slides to speak in a clear and in moderate way and ask if anyone had questions while moving through slides.

The instructions for the tasks were followed appropriately in each activity of the programme, however DJCAD students took time to change from one task to another, paused, and had questions about the nature of the tasks and what they were required to do. The workshop program plan was modified, after receiving the student feedback, to include more details of what to do. After the pilot study, a plan of the programme was printed for the Kuwaiti workshops on an A1 sheet and placed in the corner of the lecture hall so that students could refer to it as required during the workshop activities. The main research final questionnaire draft, as well as the PowerPoint slides, are included in the Appendix 2.2.

The pilot research not only helped refine the questionnaire and conduct the workshop activities but also provided the researcher with valuable experience before the actual study was conducted. For researchers who do not have prior experience in facilitating and running workshops, piloting their study will enable them to run workshops, present ideas, concepts and enhance their presentation skills.

7.6.5 Translating the questionnaire

The questionnaire was developed in English and Arabic. A professional translator was used to ensure that the two versions matched, word for word, and had exactly the same meaning before circulation. Piloting the questionnaire by handing it to academic faculty members at KEI was part of the second phase. The instructions, information present on the cover page, and the questionnaire's layout was included. The final version of the questionnaire emerged after several iterations.

7.6.6 Revision of the questionnaire

The questionnaire was translated and presented to the department of research and research methods in KEI, since the staff there assist in validating the work of all researchers within the institution. Two staff members in the department helped revise the questionnaire. Both of them attended a meeting with the researcher in order to understand the research and its aims. They checked that the language would be clear to students. They also pointed out some spelling mistakes and revised the cover page attached to the questionnaire. This extra step was beneficial in providing a clear document that students could successfully fill out.

7.7 Methods used for the data analysis

7.7.1 Triangulation

Triangulation can enhance the validation of data collected through observations, interviews, and questionnaires by cross verifying it (Johnson and Wichem, 2014). Triangulation examines the consistency of results obtained through various facilitation tools and enables the use of more than one procedure to comprehend the phenomenon being studied. It is used in this research to test the consistency and

reliability of outcomes from the questionnaires, interview, and observations. Its application will be presented in detail in Chapter 8.

7.7.2 Analysis of the questionnaire

The statistical data analysis was used to describe and compare data set in terms of some data characteristics.

7.7.2.1 Descriptive analysis

Mainly frequencies and means were used for some of the study characteristics data, including workshops, gender, age, work experience, and qualification place, to know the direction and the tendency of the response of participants towards the research designed questions.

7.7.2.2 Comparison tests

Appropriate non-parametric tests were used to test the hypotheses by examining the difference in the study underlying questions between two groups or more. The reason for using non-parametric tests is that the data variables were measured on five Likert scales, which were not numeric. The Mann-Whitney test for independent groups (Lehmann and Erich, 2006) was used to evaluate the role of the type of workshop, gender, age, experience, and place of qualification and its impact on the 18 statements used to evaluate workshops. The Wilcoxon test (Lehmann and Erich, 2006) was applied to test dependent groups (before and after intervention) for each workshop.

7.7.2.2.1 Mann Whitney test

This test is applied to compare the means of two populations that are obtained from a similar population. It is also used to check if the two population means are equivalent to each other or not (Smith, 2015). The Mann-Whitney test makes no assumptions

about distribution because it is mostly non-parametric. However, the following are some of the assumptions that it does make:

- The sample obtained from the population is random

- There is independence in the samples

- There is an ordinal measurement scale

In this research, the Mann-Whitney test is used to test for any significant differences in the outcomes from the didactic and participatory groups.

7.7.2.2.2 Wilcoxon test

This test enables a comparison of the mean of two dependent samples and is a substitute for the t-test. It involves working with ratio data that is ranked. This research uses the Wilcoxon test to give a ranking of the observable variations noted between two measurements that are dependent. Specifically, it applies the Wilcoxon test to compare before and after significance for questions for each section in the questionnaire by referring to standard normal distributed z-values (Yadley, 2008).

7.7.3 Analysis of interviews and observations

7.7.3.1 Grounded theory

Grounded theory is a qualitative research strategy used by researchers to derive abstract theories of interactions or processes based on views of the participants in the study. The aim of grounded theory in this research is to help generate hypotheses from the interview data (Cohen, Manion, and Morrison, 2013). This is achieved by reflective reading of the interview transcripts and the application of analytic codes to those transcripts (Patton, 2005).

7.7.3.1.1 Theoretical sampling

The data analysis and data collection progress together. In data analysis, development or explanation of theories begins that shows further cases to be sampled. These are used to define and enhance other emerging theoretical groups (Langdridge, 2007).

7.7.3.1.2 Series of stages

Regarding the coding of transcripts and notes from field observations, this can be considered in three sequential stages: open coding, axial coding, and selective coding (Corbin and Strauss, 2014). Open coding involves establishing groups of information and is the part of the analysis used to identify, name, describe, and categorise a phenomenon that is found in the form of text. It is an important part of the research as it defines each sentence, paragraph, line, and word by answering repeated questions of a single text (O'Kane, 2000). Most of the answers will entail questions such as what? why? when? And such like.

In axial coding words are used and in what action is taken are emphasised. This means that the focus should be on what people are doing, what they are trying to achieve, and their strategies (Glaser and Strauss, 2009). Psychological processes and social behaviour should also be taken into account. The coding process should be iterative and build gradually, based on early coding (Yin, 2013). Axial coding involves interconnecting the categories that have been found. The last stage is followed by selective coding in which a story is created that connects the categories, providing a set of theoretical propositions that assists in the discussion (Jackson, 2014). This process was used in its three stages to analyse the responses of students during the interviews.

7.8 Conclusions

This chapter has introduced the overall philosophy and strategy of the research, and details of the chosen methodology. The research is essentially a single case study design, as it focuses on just one institution, KEI, and, additionally, there were some cultural issues related to gender separation that meant the workshops could not be mixed gender. A mixture of methods, using both qualitative and quantitative approaches, was adopted to answer the research questions and to fulfil the aims and objectives of the investigation.

Questionnaires, interviews, and observations were the selected methods for data capture and each was designed to avoid ambiguity. The researcher worked carefully to avoid being biased and measures were taken in terms of providing adequate assistance and, in the facilitative workshops, to avoid over-explaining when asked any question.

Analysis of the data, and the results of this analysis, will be discussed in the chapters that follow. Chapter 8 will address the outcome to do with the impact of the different types of intervention, and specifically issues connected with the optimal approach to teaching sustainability in interior design. Chapter 9 will focus on what the content of the proposed participatory teaching should be, based on the data collected from students and lecturers at KEI.

CHAPTER 8

RESULTS OF THE IMPACT OF DIFFERENT TEACHING APPROACHES ON STUDENTS.

8.1 Introduction

This chapter presents the quantitative and qualitative data collected that bear upon the impact that the different teaching approaches – didactic and participatory – had on students, and an analysis of this data. The first part of the chapter deals with the quantitative results of the impact of interventions in teaching approach as they apply in three areas: principles of education, sustainability, and process. In each of these areas, a statistical analysis is carried out. The findings of the quantitative analyses are then discussed. The second part of the chapter presents the qualitative data obtained from interviews with students relevant to the impact of teaching approach. The chapter closes with a summary of the findings and conclusions of the main outcomes of the quantitative analysis and interview responses.

8.2 Quantitative analysis of participatory and didactic workshops

Quantitative data were collected from participants in the didactic and participatory workshops, then reviewed and prepared for entry into SPSS. Codes were used to transcribe the data from the questionnaire. Data entry mistakes were checked and missing data were removed from the analysis.

The data took the form of Likert scale responses to a number of questions on the impact of different teaching approaches. Likert scores were interpreted as follows: 1 = strongly disagree, 2 = moderately disagree, 3 = neither agree nor disagree (neutral), 4 = moderately agree, and 5 = strongly agree.

To determine the length of the five cells of Likert scale (both low and high limits), the extensity was 5 (strongly agree)-1 (strongly disagree) = 4, and then divided by the number of cells of the scale in order to obtain the proper length of the cell, which is (4/5 = 0.80). Then, this 0.80 was added to the least value in the scale (or the beginning of the scale that is a whole one) to determine the maximum limit of this cell, and thus the length of the cells for each phrase became as follows:

- From 1 to 1.80 represents (strongly disagree).
- From 1.81 to 2.60 represents (disagree).
- From 2.61 to 3.40 a (neutral.
- From 3.41 to 4.20 represents (agree).
- From 4.21 to 5.00 represents (strongly agree).

Median can be used in ordinal data measured on the Likert scale. However, median is only obtained from middle observations, which can sometimes make it difficult to see the relative difference when comparison is the objective. Weighted mean is based on averaging the observations. In practice, researchers can treat ordinal variables with 5 or more categories as continuous, and there is some evidence to suggest this is not likely to result in much practical impact on results (Coakes and Steed, 2001). Mean was used to rank to what extent the participants agreed with the statements.

The Likert scale data were analysed in two different ways. The first, involving the responses from the two groups of workshops, such as gender, obtained after/before

the interventions, used the Mann-Whitney U test. This is a nonparametric test appropriate when comparing differences between two independent groups, as in the case of those taking part in the two types of workshop (Corder and Foreman, 2014). The second analysis examined the changes in Likert scores before and after the workshops using the Wilcoxon test (Corder and Foreman, 2014). The data and outcomes from both analyses will be presented for each of the three main areas. Following this, in section 8.3, differences in responses by male and female students and according to age are presented and analysed. Then, in section 8.4, the findings of the quantitative analyses are discussed and possible interpretations put forward.

8.2.1 Reliability

Cronbach's alpha was used to measure the reliability of the questionnaire in order to ensure the consistency (Hair et al., 2010). Table 10 shows the coefficients of the stability in the three factors of the study.

Table 12: Cronbach's alpha for measuring the reliability of the study questionnaire.

Factor	Number of statements	Cronbach's alpha
Principles in education	6	.716
Ecological design principles	6	.820
Education development processes	6	.741

It can be seen that, in each case, the coefficient of Cronbach's alpha exceeds .60, indicating that the questionnaire reached a degree of consistency that can be relied upon in the application field of the study.

8.2.2 Descriptive statistics

The composition of the didactic and participatory workshop is shown in Table 11 and Figures 10 and 11.

Table 13: Attendance of the workshops, participatory and didactic

Variable		**Didactic group**	**Participatory group**
Gender	Male	13	7
	Female	41	29
Total Number		54	36

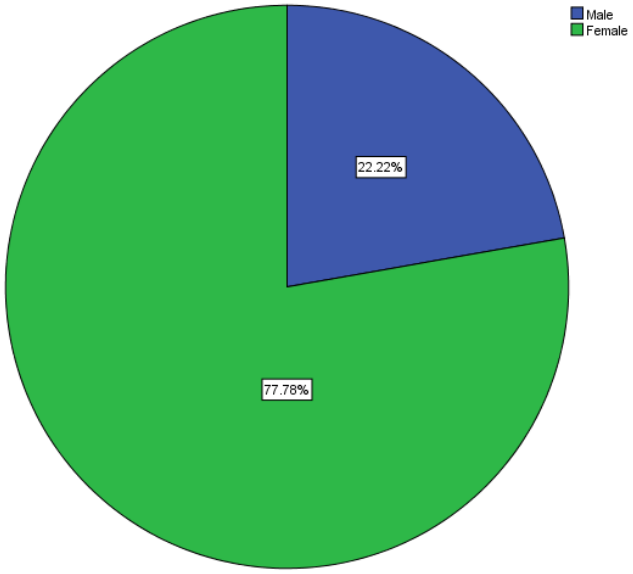


Figure 10: Total percentage of male and female students

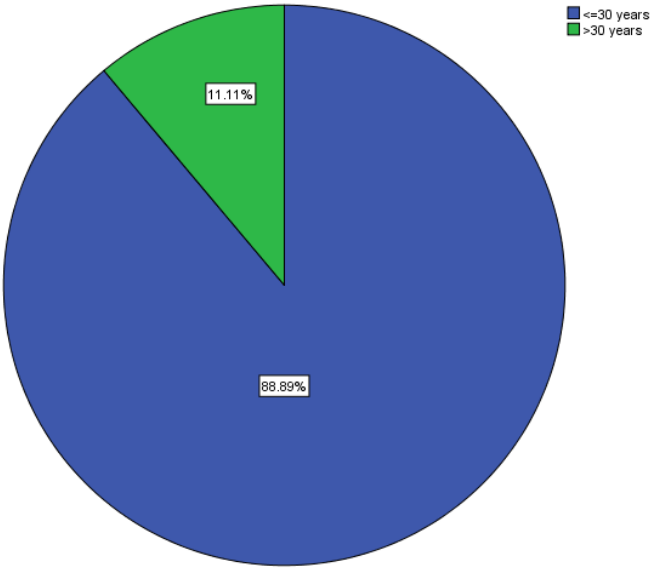


Figure 11: Total percentage of student age (<= 30 years, >30 years).

8.2.3 Response frequencies distribution according to workshop before intervention

8.2.3.1 Didactic workshop

Table 14: Responces frequencies before didactic workshop.

Questions	Strongly disagree (1)	Disagree (2)	Neutral (3)	Agree (4)	Strongly agree (5)
Statement 1	10%	11.1%	5.6%	36.1%	47.2%
Statement 2	5.6%	2.8%	13.9%	33.3%	44.4%
Statement 3	2.8%	2.8%	8.3%	36.1%	50%
Statement 4	2.8%	11.1%	38.9%	22.2%	25%
Statement 5	0	0	5.6%	33.3%	61.1%
Statement 6	8.3%	55.6%	19.4%	13.6%	2.8%
Statement 7	16.7%	55.6%	19.4%	5.6%	2.8%
Statement 8	0	2.8%	8.3%	38.9%	50%
Statement 9	2.8%	2.8%	5.6%	41.7%	47.2%
Statement 10	2.8%	0	22.2%	47.2%	27.8%
Statement 11	0	2.9%	5.6%	61.1%	30.6%
Statement 12	0	0	19.4%	22.2%	58.3%
Statement 13	0	2.8%	5.6%	38.9%	52.8%
Statement 14	0%	2.8%	11.1%	30.6%	55.6%
Statement 15	8.3%	44.4%	11.1%	36.1%	0%
Statement 16	0	2.8%	5.6%	44.4%	47.2%
Statement 17	0	0	2.8%	33.3%	63.9%
Statement 18	0	0	5.6%	50%	44.4%

8.2.3.2 Participatory workshop

Table 15: Responses frequencies before participatory workshop.

Question	Strongly disagree (1)	Disagree (2)	Neutral (3)	Agree (4)	Strongly agree (5)
Statement 1	0	0	0	3.7%	96.3%
Statement 2	1.9%	3.7%	3.7%	9.3%	81.5%
Statement 3	1.9%	1.9%	0	9.3%	87%
Statement 4	5.6%	9.3%	3.7%	3.7%	77.8%
Statement 5	0	0	0	7.4%	92.6%
Statement 6	16.7%	46.3%	13.0%	18.5%	5.6%
Statement 7	20.4%	42.6%	20.4%	13%	3.7%
Statement 8	1.9%	3.7%	0	14.8%	79.6%
Statement 9	1.9%	7.4%	9.3%	14.8%	66.7%
Statement 10	0	11.1%	5.6%	9.3%	74.1%
Statement 11	0	1.9%	3.7%	13%	81.5%
Statement 12	0	3.7%	1.9%	9.3%	85.2%
Statement 13	0	0	1.9%	18.5%	79.6%
Statement 14	0	0	0	22.2%	77.8%
Statement 15	3.7%	44.4%	18.5%	29.6%	3.7%
Statement 16	0	0	1.9%	11.1%	87%
Statement 17	0	0	0	11.1%	88.9%
Statement 18	0	1.9%	0	16.7%	81.5%

8.2.4 Response frequencies distribution according to workshop after intervention

8.2.4.1 Didactic workshop

Table 16: Responses frequencies after didactic workshop.

Question	Strongly disagree (1)	Disagree (2)	Neutral (3)	Agree (4)	Strongly agree (5)
Statement 1	0	11.1%	5.6%	52.8%	30.6%
Statement 2	2.8%	19.4%	8.3%	52.8%	16.7%
Statement 3	2.8%	5.6%	2.8%	41.7%	47.2%
Statement 4	11.1%	55.6%	8.3%	13.9%	11.1%
Statement 5	2.8%	2.8%	0	47.2%	47.2%
Statement 6	50%	30.6%	13.9%	2.8%	2.8%
Statement 7	38.9%	41.7%	11.1%	5.6%	2.8%
Statement 8	2.8%	2.8%	11.1%	52.8%	30.6%
Statement 9	2.8%	11.1%	11.1%	52.8%	22.2%
Statement 10	5.6%	22.2%	11.1%	50%	11.1%
Statement 11	0	5.6%	8.3%	61.1%	25%
Statement 12	2.8%	25%	22.2%	36.1%	13.9%
Statement 13	2.8%	2.8%	5.6%	52.8%	36.1%
Statement 14	0	11.1%	5.6%	55.6%	27.8%
Statement 15	47.2%	33.2%	16.7%	2.8%	0
Statement 16	2.8%	0	11.1%	55.6%	30.6%
Statement 17	2.8%	0	2.8%	55.6%	38.9%
Statement 18	0	2.8%	16.7%	55.6%	25%

8.2.4.2 Participatory workshop

Table 17: Responses frequencies after participatory workshop.

Question	Strongly disagree (1)	Disagree (2)	Neutral (3)	Agree (4)	Strongly agree (5)
Statement 1	0	0	1.9%	57.4%	40.7%
Statement 2	1.9%	13%	9.3%	42.6%	33.3%
Statement 3	1.9%	5.6%	5.6%	38.9%	48.1%
Statement 4	20.4%	50%	7.4%	13%	9.3%
Statement 5	0	0	5.6%	33.3%	61.1%
Statement 6	81.5%	5.6%	11.1%	1.9%	0
Statement 7	72%	16.9%	5.6%	5.6%	0
Statement 8	0	0	9.3%	66.7%	24.1%
Statement 9	3.7%	11.1%	7.4%	40.7%	37%
Statement 10	16.7%	25.9%	16.7%	35.2%	5.6%
Statement 11	1.9%	5.6%	14.8%	50%	27.8%
Statement 12	3.7%	27.8%	22.2%	35.2%	11.1%
Statement 13	0	3.7%	7.4%	48.1%	40.7%
Statement 14	0	3.7%	5.6%	59.3%	31.5%
Statement 15	72.2%	9.3%	5.6%	11.1%	1.9%
Statement 16	0	0	11.1%	57.8%	31.5%
Statement 17	0	5.6%	7.4%	42.6%	44.4%
Statement 18	0	1.9%	9.3%	59.3%	29.6%

8.2.5 Principles in education

The following analysis concerns the first category of statements on the questionnaire, namely, those pertaining to principles in education. Student opinions, from the participatory and didactic workshops, were evaluated in this area using six different statements. The responses were analysed by carrying out a statistical comparison of the median/mean Likert scores before and after the participatory and didactic workshops interventions.

8.2.5.1 Comparison of participatory and didactic workshops in terms of principles in education after intervention

Table 2 shows the median/mean Likert scores of the responses to statements 1 to 6, which relate to the delivery and adequacy of provision of design education. The first column shows the mean Likert score (i.e. the total of the scores divided by the number of participants) for the response to each statement by students after attending the participatory workshops. The second column does the same in the case of the didactic workshops. The third column shows the p-values arising from application of the Mann-Whitney test. The lower the p-value the more statistically significant is the difference in the mean Likert scores between the participatory and didactic workshop students. For the purposes of this research, the difference is considered to be statistically significant if $p < 0.05$, and highly significant < 0.05, and highly significant if $p < 0.01$.

Table 18: Comparison of participatory and didactic workshops in terms of principles of education after intervention.

Statement	Median/ Mean Likert scores after interventions (principles of education)				
	Participatory workshop		Didactic workshop		Mann-Whitney (p-value)
1. Preparing educational modules in interior design should be done only by the teacher.	5	4.96	4	4.19	<.001
2. Assessing student work during the course should be done only by teachers.	5	4.64	4	4.08	.001
3. Group work assists students to develop skills that are necessary in the discipline of interior design.	5	4.77	4.5	4.27	<.001
4. Good designers need only have expertise in their own discipline and do not need to be familiar with other disciplines to be effective.	5	4.38	3	3.55	<.001
5. Good designers need to have effective social and cultural skills to communicate with a particular audience or society.	5	4.92	5	4.55	<.001
6. I am satisfied with what I have received, in terms of learning materials and teaching methods, from the existing programme.	1	1.33	3	1.77	.004

In general, the data in this section shows that those who attended the participatory workshops tended to give higher Likert scores (indicating greater agreement with the given statement) than those who attended the didactic workshops, by statistically significant amounts. With the exception of the responses to statement 6 and the didactic workshop attendees' response to statement 4, all the median/mean Likert

scores are in the range 4–5 (“agree” to strongly agree”). Some comments and conclusions now follow concerning the responses received to each of the statements 1 through 6.

1. *Preparing educational modules in interior design should be done only by the teacher*.

Students attending both types of workshop registered strong agreement for this statement. A possible reason for this is these students are used to being taught by traditional, rigidly didactic: they are rarely asked for their opinions and are not confident in giving them. Thus, it is their expectation that teachers always determine the content of their courses and are best equipped to do so. The mean Likert score of the participatory workshop attendees was higher than that of the didactic workshops by a very statistically significant degree. This could be because the former, having enjoyed the benefits of participatory teaching were confident that their providers could bring innovative techniques to bear without any student involvement. However, an outcome of further exposure to participatory teaching methods could be to give students the confidence and experience to suggest changes and improvements to teaching.

2. *Assessing student work during the course should be done only by teachers*.

The responses to this question from both groups were similar to those for statement 1, and probably for a similar reason, i.e. students did not feel they had the necessary skills or experience to assess the work of others. A potential benefit of a participatory environment, again, may be to empower students in the future so that they can take on some of this role and this should indeed be encouraged through the way the new teaching approach is designed.

3. *Group work assists students to develop skills that are necessary in the discipline of interior design.*

Both groups, those who attended the participatory and didactic sessions, strongly agreed with this statement. A statistically significant higher level of agreement came from students who experienced the participatory workshops. However, the fact that even those who attended the didactic session thought group work was important in developing design skills indicates a pre-existing desire for this change to take place. This outcome is therefore strongly in favour of moving ahead with the participatory approach.

4. *Good designers need only have expertise in their own discipline and do not need to be familiar with other disciplines to be effective.*

Both groups agreed with this statement, though the agreement was very significantly stronger in the case of those who attended the participatory workshops. The results can be interpreted as meaning that students were aware that good ability and knowledge in their own field is crucial to their professional success, and that (a) they do not feel that the current programme is preparing them well enough and (b) they feel reticent about taking on the extra work needed to become competent in other areas. These interpretations, though open to question, are supported by some assertions made in section 8.3, which discusses the qualitative results. In teaching the new participatory approach, therefore, it will be important to continually link concepts in sustainability with design, through exercises that help students to see the close connection between design and environmental issues.

5. *Good designers need to have effective social and cultural skills to communicate with a particular audience or society.*

Both groups strongly agreed with this, and, perhaps because of their previous lack of experience in interacting with others on design projects, feel that they are lacking in these skills. It is therefore important that exercises be incorporated into the new teaching approach aimed at developing communication skills through group work.

6. *I am satisfied with what I received, in terms of learning materials and teaching methods, from the existing programme.*

Both groups indicated strong disagreement with this statement and therefore dissatisfaction with the programme currently being taught. The disagreement was greatest in the case of those who had attended the participatory sessions. This dissatisfaction was also reflected in comments made during interviews with students, as discussed in sections 8.3 and 8.5. It is clear that students are keen to see sweeping changes in the way they are taught, including a move away from exclusively formal, didactic approaches to more modern methods that include group interaction and collaborative exercises.

8.2.5.2 Comparison of scores before and after the workshops

Table 17 shows the median/mean of responses to statements 1 through 6 by participatory workshop attendees before (first column) and after (second column) the sessions. In every case, except statement 6, the mean score rose by a statistically highly significant amount, indicating a marked change to stronger agreement with the statement.

Table 19: Comparison of the responses of participatory workshop attendees, in terms of principles of education, before and after intervention.

Statements	Median/ Mean Likert score of participatory workshop (principles of education)				
	Before workshop		After workshop		Wilcoxon test (p-value)
1. Preparing educational modules in interior design should be done only by the teacher.	4	4.38	5	4.96	<.001
2. Assessing student work during the course should be done only by teachers.	4	3.92	5	4.64	<.001
3. Group work assists students to develop skills that are necessary in the discipline of interior design.	4	4.25	5	4.77	<.001
4. Good designers need only have expertise in their own discipline and do not need to be familiar with other disciplines to be effective.	2	2.40	5	4.38	<.001
5. Good designers need to have effective social and cultural skills to communicate with a particular audience or society.	5	4.55	5	4.92	<.001
6. I am satisfied with what I have received, in terms of learning materials and teaching methods, from the existing programme.	2	2.50	1	1.33	<.001

1. *Preparing educational modules in interior design should be done only by the teacher*.

There was a highly significant (statistically speaking) rise in the strength of agreement with this statement after the intervention. This could be interpreted as meaning that students were satisfied by the workshop and felt that the teacher was

the best person to prepare future teaching approaches or exercises within the existing module. However, it could also indicate a lack of confidence in making suggestions that would be worthwhile. The new teaching approach should encourage self-belief and attempt to build confidence in students to express their opinions.

2. *Assessing student work during the course should be done only by teachers*.

Again, there was a marked rise in agreement with this statement following the session and, it seems likely, for the same reasons as suggested above. Encouraging some degree of self-assessment would be a positive feature of teaching the new participatory approach.

3. *Group work assists students to develop skills that are necessary in the discipline of interior design.*

An already strong agreement with this statement became even stronger after the intervention, suggesting that the students found their experience of group work in a design context valuable. Again, this is in line with the idea that the new teaching approach should be participatory in nature.

4. *Good designers need only have expertise in their own discipline and do not need to be familiar with other disciplines to be effective.*

This statement produced a very interesting result and one that, in some ways, is unexpected. The agreement rose from marginal before the intervention to very strong afterwards. It is clear from other responses on the questionnaire, and from the results of the interviews, that students widely recognise the importance of sustainability in design, yet they felt after the session more strongly persuaded that they did not need familiarity with other disciplines – though, presumably these are other than

sustainability. The teaching approach should allow students to explore possible connections between their field and others in order to reach an informed view on this issue.

5. *Good designers need to have effective social and cultural skills to communicate with a particular audience or society.*

Agreement was strong both before and after the intervention but rising by a highly significant amount, presumably as a result of exposure to the benefits of group work and interaction. The new teaching approach should emphasise the development of communication skills.

6. *I am satisfied with what I received, in terms of learning materials and teaching methods, from the existing programme.*

The level of agreement with this statement fell from moderate disagreement at the start of the session to strong disagreement at the end. This can be interpreted as meaning that students, having been exposed to a participatory learning environment grew in their dissatisfaction with the traditional chalk-and-talk method of dispensing information. The new participatory approach should introduce not only a new teaching style but also a variety of new materials and technologies to facilitate learning.

As shown in Table 4, in the case of every statement except statement 6, the median/mean Likert score rose after the didactic intervention but by a highly significant amount for only two statements (2 and 4). In the case of statement 6, the level of disagreement increased.

Table 20: Comparison of didactic workshop in terms of principles in education before and after intervention.

Statements	Median/ Mean Likert score of didactic workshop (principles in education)				
	Before workshop		After workshop		Wilcoxon test (p-value)
1. Preparing educational modules in interior design should be done only by the teacher.	4	4.02	4	4.19	.034
2. Assessing student work during the course should be done only by teachers.	4	3.61	4	4.08	<.001
3. Group work assists students to develop skills that are necessary in the discipline in interior design.	4	4.25	4.5	4.27	.796
4. Good designers need only have expertise in their own discipline and do not need to be familiar with other disciplines to be effective.	2	2.58	3	3.55	<.001
5. Good designers need to have effective social and cultural skills to communicate with a particular audience or society.	4	4.33	5	4.55	.021
6. I am satisfied with what I have received, in terms of learning materials and teaching methods, from the existing programme.	2	2.47	1.5	1.77	<.001

1. *Preparing educational modules in interior design should be done only by the teacher.*

There was a small but significant increase in agreement with this statement after the didactic intervention. Both before and after the intervention, however, the agreement was strong indicating perhaps, as it the case of the participatory workshops, the

students did not feel sufficiently confident or knowledgeable to make suggestions about what should be taught or how.

2. *Assessing student work during the course should be done only by teachers*.

The level of agreement with this statement rose by a highly significant degree after the intervention. Again, it can be concluded that, because students have previously had so little experience of expressing their own opinions and have confidence in their abilities, they shy away from this type of involvement. The new teaching approach should encourage such self-expression and decision-making through group exercises and student presentations.

3. *Group work assists students to develop skills that are necessary in the discipline of interior design.*

The didactic workshop students agreed with this statement but did not significantly change in their level of agreement as a result of the intervention. This is not surprising since the workshop used a traditional style of teaching in which group work was not encouraged so that those attending did not experience any benefits from it. However, it is clear that the feeling from the outset among students at this institute was that group work is an important factor in their professional development so that it should be a central feature of the new participatory approach.

4. *Good designers need only have expertise in their own discipline and do not need to be familiar with other disciplines to be effective.*

A similar change of response, from neutral to strong agreement, was observed in this case as in the participatory intervention. The researcher is therefore inclined to draw a similar conclusion as before and propose that the participatory approach should

allow students to explore possible connections between their field and others in order to reach an informed view on this issue.

5. *Good designers need to have effective social and cultural skills to communicate with a particular audience or society.*

Agreement was strong both before and after the intervention, however the level did not increase by as significant amount as in the case of the participatory intervention. This result reinforces the view that taking part in group work exercises reveals the strength and importance of interpersonal communication when carrying out design-related tasks and that such exercise should feature prominently in the new participatory approach.

6. *I am satisfied with what I received, in terms of learning materials and teaching methods, from the existing programme.*

An increase in level of disagreement with this statement was observed after the intervention but not to the same extent as in the participatory workshops. Both sets of students ended by giving median/mean Likert scores that indicated they were unhappy with the current teaching arrangements and would like to say a change in teaching method and learning materials.

Boxplot

Figure 12 illustrates, in the form of a boxplot, the change in median Likert scores for both kinds of intervention. The chart indicates that there is little difference in the scores before the workshops took place, but a much bigger difference between before and after scores in the case of the participatory interventions, and especially with

regard to the median scores. Following the participatory intervention, the median is close to 5 whereas in the didactic case the median Likert score is about 4.2.

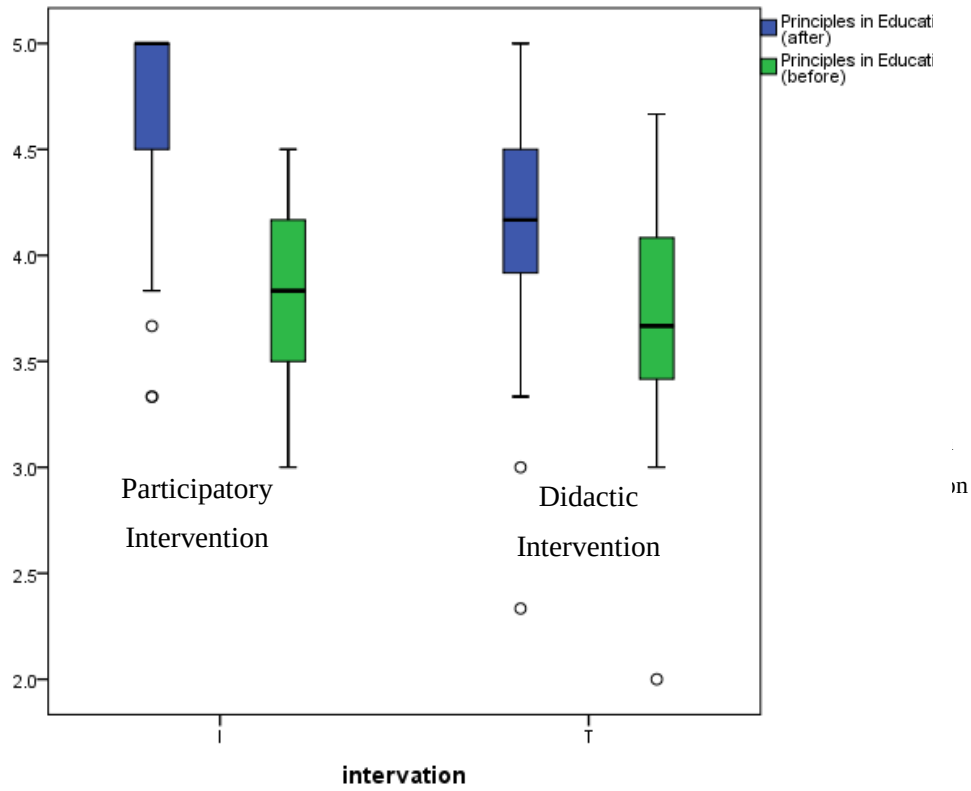


Figure 12: Boxplot of mean Likert scores for "principles of education" statements before and after participatory and didactic interventions.

Recommendations from responses to statements on principles of education

The following is a summary of recommendations concerning the evaluation of participatory teaching approach based on the responses to "principles of education" statements:

- Lecturers should bring innovative ways of teaching such as the ones found in the participatory teaching.

- Lecturers should work to build students' confidence and empower them by gradually allowing them to suggest future improvements to the participatory teaching approach and to experience assessing other students.

- Group work should be used and integrated in the teaching approach.
- Exercises should be included that develop communication skills, which can be established through group work.

- Sustainability concepts should constantly be linked with exercises that help students to implement in their own discipline without any reliance on memorisation as a method of teaching.

- Lecturers should encourage students to have the confidence to give their opinions without being concerned about any consequences, by constantly asserting to students that their opinions and thoughts are an important part of the learning process. This can be achieved through reflective exercises.

8.2.6 Ecological design principles

The following analysis concerns the second category of statements on the questionnaire – those pertaining to the relevance of sustainability in interior design. Student opinions, from the participatory and didactic workshops, were evaluated in this area using six different statements. The responses were analysed by carrying out a statistical comparison of the mean Likert scores before and after the participatory and didactic workshops interventions.

Table 19 shows the median/mean Likert scores of the responses to questionnaire statements 7 to 12, which relate to environmental and cultural influences in design education. With one exception, the differences between the mean responses of attendees at the participatory workshops on the one hand and the didactic workshops

on the other were highly significant. The Mann-Whitney test gave a p-value of 0.22 for the differences in the case of statement 9, which is statistically insignificant. As in the case of the responses to the statements pertaining to principles of education, all the mean Likert scores, with one exception (statement 7), fell in the "agree" to strongly agree" range and, for every statement, the mean score given by the attendees of the participatory workshops was higher than the corresponding score of the didactic workshop students.

8.2.6.1 Comparison of participatory and didactic workshops in terms of ecological principles after intervention

Table 21: Comparison of participatory and didactic workshops in terms of ecological design principles after intervention

Statement	Median/Mean Likert score after interventions (ecological design principles)				
	Participatory workshop		Didactic workshop		Mann-Whitney (p-value)
1. The subject material provided by the present programme gives enough information on how to design using environmentally sustainable methods.	1	1.44	2	1.61	.004
2. Designs should be appropriate to the surrounding environment and ecology.	5	4.66	4.5	4.36	.005
3. Designs should be appropriate to the cultural or traditional elements in any society.	5	4.37	4	4.27	.220
4. Designers should be members of the societies for which they are designing and be familiar with its history, culture and, environment.	5	4.46	4	3.97	.001
5. One of the elements of a good designer is to know the relationship between culture and environment.	5	4.74	4	4.19	<.001
6. Designs should be inspired by nature.	5	4.75	5	4.38	.005

7. *The subject material provided by the present programme gives enough information on how to design using environmentally sustainable methods.*

Both sets of students, those who attended the participatory workshops and those who attended the didactic ones, disagreed with this statement, the former group slightly more. The new teaching approach should address this deficiency and allow students to explore how sustainability and design can work hand in hand.

8. *Designs should be appropriate to the surrounding environment and ecology.*

Strong agreement was expressed by both groups with this statement, though somewhat stronger in the case of the participatory workshop attendees. The participatory teaching approach should reflect and build upon this understanding by students of the importance of designs that are compatible with the local environmental conditions.

9. *Designs should be appropriate to the cultural or traditional elements in any society.*

Again, there was strong agreement with the statement from both groups, and this strength of belief in the importance of design reflecting culture was also expressed in a number of the interviews conducted with students and lecturers. The participatory teaching approach should pay close attention to cultural and traditional influences on design, especially those that are compatible with sustainability.

10. *Designers should be members of the societies for which they are designing and be familiar with its history, culture and, environment.*

Both sets of students agreed with this statement, but the agreement was stronger by a highly significant amount in the case of those who attended the participatory workshops. This outcome may have been influenced by the fact that the students were able to interact more closely with the researcher, himself a Kuwaiti, during the participatory sessions and therefore formed the opinion that local knowledge and understanding is especially important in appreciating the subject in depth. The new teaching approach should allow for students to discuss this topic and be able to make informed decisions about the statement.

11. *One of the elements of a good designer is to know the relationship between culture and environment.*

Strong agreement, once more, was shown by both groups, but it was stronger by a highly significant amount in the case of students who had attended the participatory sessions. These students may have come to better appreciate the ties between culture, environment, and design as a result of the activities and demonstrations provided in the participatory workshops. The participatory teaching approach should allow students to experience fully the synergy between design and local cultural and environmental factors.

12. *Designs should be inspired by nature.*

There was strong agreement with this statement, too, by both groups, with participatory workshop attendees indicating the stronger agreement of the two, perhaps in part due to the material to which they were exposed in the workshops. Exercises to explore how nature can inform successful sustainable design should be incorporated into the participatory teaching approach.

8.2.6.2 Comparison before and after workshops scores

Table 20 presents the median/mean Likert scores of student responses to questionnaire statements 7 to 12 before and after attending the participatory workshops. For five out of the six statements in this category, the mean score rose by a statistically highly significant amount as measured by the Wilcoxon test. In the case of statement 9, the change was not as great (p = .021) but still statistically significant.

Table 22: Comparison of participatory workshop in terms of ecological design principles before and after intervention.

Statement	Median/Mean Likert score of participatory workshop (ecological design principles)				
	Before workshop		After workshop		Wilcoxon test (p-value)
7. The subject material provided by the present programme gives enough information on how to design using environmentally sustainable methods.	2	2.37	1	1.44	<.001
8. Designs should be appropriate to the surrounding environment and ecology.	4	4.14	5	4.66	<.001
9. Designs should be appropriate to the cultural or traditional elements in any society.	3	3.96	5	4.37	.021
10. Designers should be members of the societies for which they are designing and be familiar with its history, culture and, environment.	3	2.87	5	4.46	<.001
11. One of the elements of a good designer is to know the relationship between culture and environment.	4	3.96	5	4.74	<.001
12. Designs should be inspired by nature.	3.5	3.22	5	4.75	<.001

7. *The subject material provided by the present programme gives enough information on how to design using environmentally sustainable methods.*

Before the workshops, students were fairly neutral in their responses to this question. Having attended the participatory sessions, they changed their responses to disagree. A reasonable assumption is that their exposure to exercises and demonstrations showing the importance of incorporating principles of sustainability in modern design revealed to them some of the deficiencies in this area in the programme they had been following.

8. *Designs should be appropriate to the surrounding environment and ecology.*

Agreement with this statement shifted from moderate to strong in the wake of the intervention, again, it may be, due to exposure in a participatory setting to material that the students at not previously encountered. The participatory teaching approach should explore how design can benefit from environmental considerations and vice versa.

9. *Designs should be appropriate to the cultural or traditional elements in any society.*

There was a strengthening of agreement with this statement, by a statistically significant amount, following the intervention. Actively engaging students in the close links between culture, tradition, and sustainability in design will build on a nascent understanding that already exists.

10. *Designers should be members of the societies for which they are designing and be familiar with its history, culture and, environment.*

There was a highly significant rise in the level of agreement with this statement, from nearly neutral to strong agreement, following the intervention. This may reflect an increase in appreciation of the fact that local knowledge and upbringing contribute to

a deeper understanding of design issues related to culture and the natural environment. The participatory teaching approach should help students explore these connections in more detail.

11. *One of the elements of a good designer is to know the relationship between culture and environment.*

A rise from moderate to strong agreement was observed following the participatory workshops. Although students may have held positive views on this statement before the intervention, it seems that the material provided enhanced this opinion. The participatory teaching approach for ecological design should encourage an exploration of how environment influences culture, and to what extent culture, in turn, creates designs that informed by environmental conditions.

12. *Designs should be inspired by nature.*

Having been exposed to the intervention, students indicated a much higher level of agreement with this statement than at the start. The participatory teaching approach should include exercises and projects that investigate, from a sustainability point of view, how design in nature can inform human-designed objects and spaces.

Table 21 presents the median/mean Likert scores of student responses to questionnaire statements 7 to 12 before and after attending the didactic workshops. For four out of the six statements in this category, the mean score rose by a statistically highly significant amount. In the case of one statement (7) the level of agreement fell by a marginally significant amount, and in the case of one other (11), there was no statistically no significant change.

Table 23: Comparison of didactic workshop in terms of in terms of ecological design principles after and after intervention.

Statements	Median/Mean Likert score of didactic workshop (ecological design principles)				
	Before workshop		After workshop		Wilcoxon test (p-value)
7. The subject material provided by the present programme gives enough information on how to design using environmentally sustainable methods.	2	2.22	2	1.91	.058
8. Designs should be appropriate to the surrounding environment and ecology.	4	4.05	4.5	4.36	.001
9. Designs should be appropriate to the cultural or traditional elements in any society.	4	3.80	4	4.27	.001
10. Designers should be members of the societies for which they are designing and be familiar with its history, culture and, environment.	4	3.38	4	3.97	.001
11. One of the elements of a good designer is to know the relationship between culture and environment.	4	4.05	4	4.19	.244
12. Designs should be inspired by nature.	3.5	3.33	5	4.38	<.001

7. *The subject material provided by the present programme gives enough information on how to design using environmentally sustainable methods.*

The change in level of disagreement with this statement was negligible, statistically speaking. Compared with the change measured in response by participatory workshop attendees to the same statement, this indicates that the participatory sessions had a greater effect on changing the opinions of students.

8. *Designs should be appropriate to the surrounding environment and ecology.*

There was a highly significant rise in the level agreement, indicating that for this question it was exposure to new concepts in sustainability that influenced the

students' evaluation rather than necessarily the method by which they were conveyed (participatory or didactic).

9. *Designs should be appropriate to the cultural or traditional elements in any society.*

The same comment applies here as for statement 8 above.

10. *Designers should be members of the societies for which they are designing and be familiar with its history, culture and, environment.*

The same comment applies here as for statement 8 above.

11. *One of the elements of a good designer is to know the relationship between culture and environment.*

There was no significant change from the Likert score, just above 4, before the intervention to after. It may be, as regards this particular issue, group work and self-guided exploration are the best means to gain a deeper understanding of the relationships involved.

12. *Designs should be inspired by nature.*

The same comment applies here as for statement 8 above.

Boxplot

A boxplot summary of the changes in median Likert scores, between before and after the interventions for both kinds of workshop is shown in Figure 13. It can be seen that there was an overall rise in scores, i.e. a move toward greater agreement with the questionnaire statements in both participatory and didactic interventions; however, the rise is much more noticeable in the case of the participatory workshops,

suggesting that the effect of these, on the opinions of students with regard to ecological and cultural issues, was more pronounced.

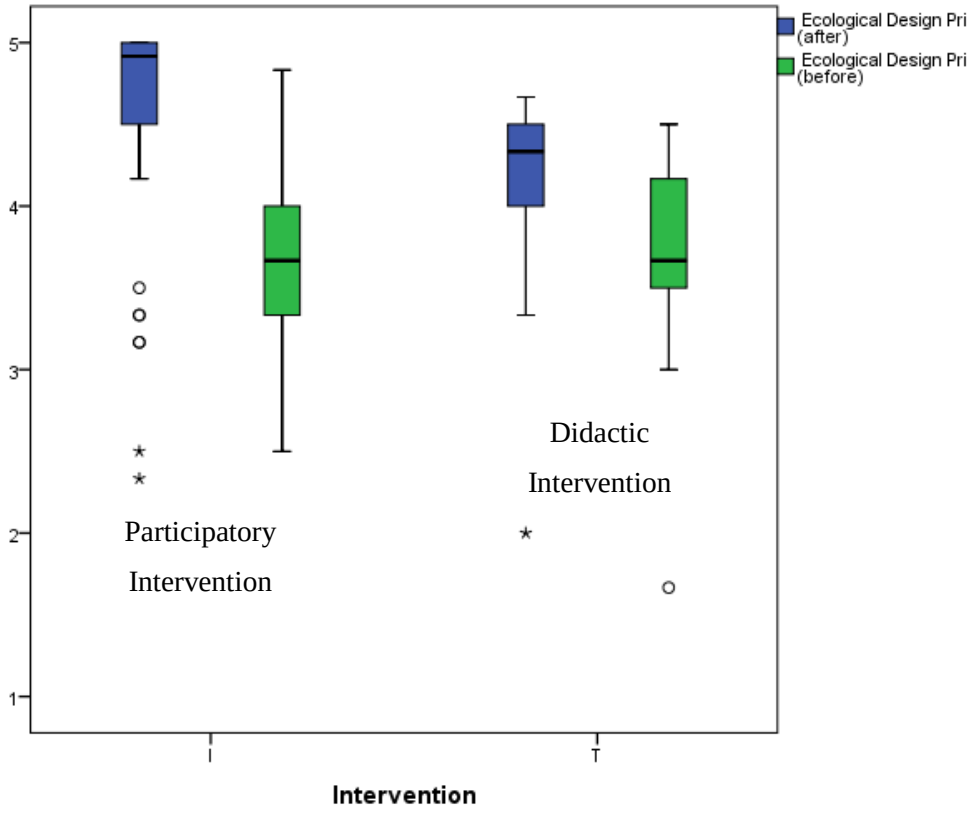


Figure 13: Boxplot of mean Likert scores for "ecological design principles" before and after participatory and didactic interventions.

Recommendations from responses to statements on ecological design principles

The following is a summary of recommendations concerning the evaluation of participatory teaching approach based on the responses to "principles of ecological design" statements:

- Concepts in sustainability and other ecological principles should be introduced gradually with no assumptions of prior knowledge.

- Exercises, projects, and demonstrations should be provided that allows students to explore for themselves the relationship between design and local culture and tradition.
- Students should be given the opportunity to investigate design in nature and how this might inform the design of objects and living spaces that are in balance and harmony with the environment.

8.2.7 Education development processes

The following analysis concerns the third category of statements on the questionnaire – those pertaining to education development processes. Student opinions, from the participatory and didactic workshops, were evaluated in this area using six different statements. The responses were analysed by carrying out a statistical comparison of the mean Likert scores before and after the participatory and didactic workshops interventions.

Table 22 presents the median/mean Likert scores of responses to statements 13 to 18, which bear upon the subject of education processes in design. In the case of all the statements except 15, the median/mean Likert scores of participatory workshop attendees were higher than those who attended to the didactic sessions. For statements 13, 16, 17, and 18 the differences were highly significant based on the p-values, for statement 14 ($p = 0.012$) the difference was significant, and in the remaining case, statement 15, it was insignificant.

8.2.7.1 Comparison of participatory and didactic workshop in terms of education development process after intervention

Table 24: Comparison of participatory and didactic workshop in terms of education development processes after intervention.

Statement	Median/Mean Likert score after interventions (education development processes)				
	Participatory workshop		Didactic workshop		Mann-Whitney (p-value)
13. Design students need more field and training courses to enhance their personal and professional skills.	5	4.77	5	4.41	.006
14. Design students need a number of workshops/ seminars outside their field or area of study.	5	4.77	5	4.38	.012
15. Programme modules and training courses that students receive during their undergraduate studies are enough to develop sustainable and ecological awareness.	1	1.61	2	1.75	.086
16. Workshops or general training courses provided during study are important in developing additional skills for the designer.	5	4.85	4	4.36	<.001
17. Design students should develop communication and persuasion skills to present their designs.	5	4.88	5	4.61	.004
18. Design students need to study subjects that develop exploratory and reasoning skills.	5	4.77	4	4.38	<.001

13. *Design students need more field and training courses to enhance their personal and professional skills.*

Both groups were strongly in agreement with this statement but the agreement was greater in the case of the participatory students by a significant amount, possibly as a result of being exposed to a different learning environment from that with which they were familiar. In any event, there is general agreement that more fieldwork and training courses to supplement work done by students.

14. *Design students need a number of workshops/ seminars outside their field or area of study.*

There was moderate to strong agreement with this statement from both groups of students, though somewhat stronger from participatory workshop attendees. The median/mean Likert scores were considerably higher than those elicited to a similar statement from earlier in the questionnaire (statement 4), namely: "Good designers need only have expertise in their own discipline and do not need to be familiar with other disciplines to be effective." It may be that students would prefer to engage with other subjects if they were presented in the form of special workshops and seminars that were separate from their core discipline in design.

15. *Programme modules and training courses that students receive during their undergraduate studies are enough to develop sustainable and ecological awareness.*

Students from both groups, participatory and didactic, disagreed with this statement – a result in line with earlier observations, which indicated dissatisfaction with the content of the current programme.

16. *Workshops or general training courses provided during study are important in developing additional skills for the designer.*

The response to this, from both groups, was very much in line with those to statements 13 and 14. The agreement was strong in both cases but particularly strong as expressed by the participatory session attendees. There is clearly an appetite for more workshops and courses to broaden out the skills base of student designers so that they are well-equipped to enter the profession successfully.

17. *Design students should develop communication and persuasion skills to present their designs.*

Again, strong agreement was shown by both groups, but especially so by the participatory students who had been given a taste of being able to communicate much more freely in class and had been encouraged to express their opinions.

18. *Design students need to study subjects that develop exploratory and reasoning skills.*

Similar results were obtained to those for statement 17 and, it can be presumed, for similar reasons. Both groups were keen to see a programme that emphasised development of these skills, the level agreement being even greater in the case of those who had attended the participatory workshops.

As Table 23 reveals, there was a highly significant shift toward greater agreement with all the statements in this category, with the exception of statement, as measured by the before and after mean Likert scores, in the case of participatory workshop attendees. In the case of statement 15 there was a marked change toward disagreement.

8.2.7.2 Comparison of participatory and didactic workshop in terms of education development process before and after intervention

Table 25: Comparison of participatory workshop in terms of education development processes before and after intervention.

Statement	Median/Mean Likert score participatory workshop (education development processes)				
	Before workshop		After workshop		Wilcoxon test (p-value)
13. Design students need more field and training courses to enhance their personal and professional skills.	4	4.25	5	4.77	<.001
14. Design students need a number of workshops/ seminars outside their field or area of study.	3	4.18	5	4.77	<.001
15. Programme modules and training courses that students receive during their undergraduate studies are enough to develop sustainable and ecological awareness.	3	3.14	1	1.61	<.001
16. Workshops or general training courses provided during study are important in developing additional skills for the designer.	4	4.20	5	4.85	<.001
17. Design students should develop communication and persuasion skills to present their designs.	4	4.25	5	4.88	<.001
18. Design students need to study subjects that develop exploratory and reasoning skills.	4	4.16	5	4.77	<.001

13. *Design students need more field and training courses to enhance their personal and professional skills.*

Having attended the participatory sessions, students overall more strongly agree with this statement. However, the same was true of the didactic workshops (as shown in Table 24 below), so this effect cannot be attributed purely to the method of teaching. It may instead be due to exposure to new ideas in sustainability, which make students want to learn more about subjects related to design that have not been taught before, especially those related to the environment. Such opportunities should be provided to accompany the new participatory teaching approach.

14. *Design students need a number of workshops/ seminars outside their field or area of study.*

Similar results, in terms of Likert scores, were obtained to this statement and similar comments to those on statement 13 apply. Some responses on the questionnaire are ambiguous, for example those to statement 4, about the desire to see more provision of learning experiences outside of design. However, on balance, it seems that students view such provision as a positive thing. The new participatory teaching approach therefore should seek to include some workshops, seminars, etc., that provide some knowledge and skills in peripheral areas peripheral to design.

15. *Programme modules and training courses that students receive during their undergraduate studies are enough to develop sustainable and ecological awareness.*

The mean response to this statement changed from neutral to disagreement following attendance at the participatory workshop. However, a similar change occurred following the didactic workshop, so it seems the factor involved here was not the style of the intervention but its content. In other words, being exposed to new concepts of sustainability made students realise the inadequacy of provision in their existing programme.

16. *Workshops or general training courses provided during study are important in developing additional skills for the designer.*

The level of agreement with this statement, already strong at the intervention, rose by a highly significant amount at the end. This suggests that students feel they benefitted from the workshops in terms of the design skills they gained, or believed they could potentially do so, by more such exposure.

17. *Design students should develop communication and persuasion skills to present their designs.*

There was agreement with this statement at the outset and a strengthening of agreement following the intervention. There is clearly a desire by students to develop these skills as part of their professional training and a need to include to emphasise their development in the new participatory teaching approach.

18. *Design students need to study subjects that develop exploratory and reasoning skills.*

A similar pattern of agreement at the start, rising in strength after the intervention, was seen in the case of this statement. Such skills are best developed through students working in groups or in a self-guided fashion with only occasional guidance and encouragement from the facilitator. It is important that the participatory teaching approach for ecological design instil a scientific, questioning, and open-minded attitude in the minds of students.

As shown in Table 24, the mean Likert scores in response to all statements, except one (15), rose by a highly significant amount after students attended the didactic workshops. In the case of statement of 15, the level of agreement.

Table 26: Comparison of the didactic workshop in terms of education development processes before and after intervention.

Statements	Median/ Mean Likert score didactic workshop (education development processes)				
	Before workshop		After workshop		Wilcoxon test (p-value)
13. Design students need more field and training courses to enhance their personal and professional skills.	4	4.166	5	4.41	<.001
14. Design student need a number of workshops/ seminars outside their field or area of study.	2	4.00	5	4.38	<.001
15. Programme modules and training courses that students receive during their undergraduate studies are enough to develop sustainable and ecological awareness.	4	3.25	1	1.75	.007
16. Workshops or general training courses provided during study are important in developing additional skills for the designer.	4	4.11	5	4.36	.003
17. Design students should develop communication and persuasion skills to present their designs.	4	4.27	5	4.61	<.001
18. Design students need to study subjects that develop exploratory and reasoning skills.	4	4.02	5	4.38	<.001

13. *Design students need more field and training courses to enhance their personal and professional skills.*

The level of agreement with this statement rose by a highly significant degree, as it did in the case of participatory workshop attendees, which suggests that the change was due more to the content than the style of presentation. Students became aware of some deficiencies in their knowledge of sustainability and therefore felt they needed additional training outside the classroom.

14. *Design students need a number of workshops/ seminars outside their field or area of study.*

Similar results were obtained to this statement as the previous one, and broadly similar conclusions may be drawn.

15. *Programme modules and training courses that students receive during their undergraduate studies are enough to develop sustainable and ecological awareness.*

There was disagreement with this statement at the outset, rising to stronger disagreement after the intervention although not quite the level expressed by attendees of the participatory sessions. Evidently, students realised that their previous provision in this area was inadequate and more exposure to the topic was needed.

16. *Workshops or general training courses provided during study are important in developing additional skills for the designer.*

A similar pattern is seen here, with initial agreement rising significantly after the intervention. A possible implication, again, is that having received new insights on the relationship between sustainability and design, students have become more aware that they need further training in this and other design-related fields.

17. *Design students should develop communication and persuasion skills to present their designs.*

There was agreement with this statement at the outset and a strengthening of agreement following the intervention. There is clearly a desire by students to develop these skills as part of their professional training and a therefore a need to consider this when teaching participatory ecological design to give students the opportunity to improve and practice their communication ability.

18. *Design students need to study subjects that develop exploratory and reasoning skills.*

There was agreement with this statement at the outset and a strengthening of agreement following the intervention. However, the change in Likert score was not as pronounced as in the case of the participatory workshop attendees, possibly because the latter had the chance to experience the benefits of exploratory exercises and could therefore appreciate better the effect that more such exposure might have.

Boxplot

From Figure 14 it is clear that the spread of median Likert scores before intervention was similar in the case of both the participatory and didactic workshops. After the inventions, the spread of mean scores rose in both cases; however, it is evident from the boxplot that the rise in scores (i.e. toward stronger agreement with the questionnaire statements) was considerably greater following the participatory sessions.

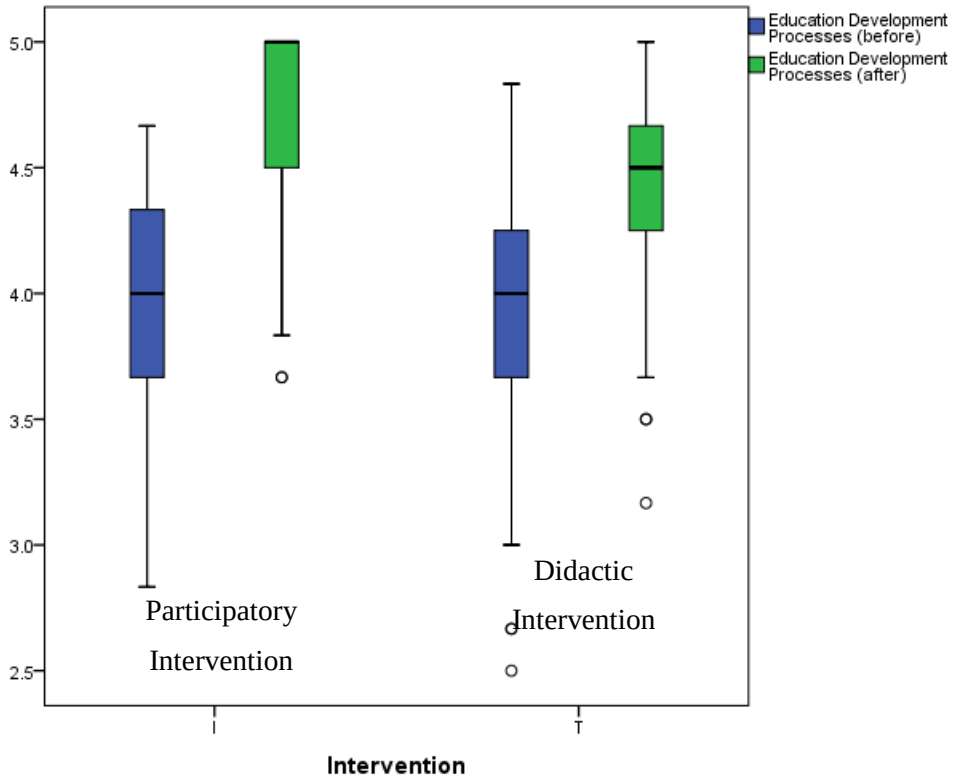


Figure 14: Boxplot of mean Likert scores for "education development processes" before and after participatory and didactic interventions.

Recommendations

- Field trips, seminars, and special workshops should be offered as part of, or as a supplement to, the new participatory teaching approach on sustainability in design.

- Exercises to improve and practice communication skills should feature prominently in the participatory teaching approach.

- Exercises and projects to develop exploratory skills should also form an important part of the participatory teaching approach.

8.2.8 Influence of other factor opinions

8.2.8.1 Gender comparison

Table 25 compares the median/mean Likert scores of all the statements on the questionnaire given by males, on the one hand, and females, on the other, who attended the participatory and didactic workshops.

Table 27: Comparison of responses by gender the after interventions.

Statements	Participatory workshop					Didactic workshop				
	Male		Female		Mann-Whitney test (p-value)	Male		Female		Mann-Whitney test (p-value)
Principles in education	Median/ Mean Likert score					Median/ Mean Likert score				
1. Preparing educational modules in interior design should be done only by the teacher.	5	5.00	5	4.95	.421	5	4.71	4	4.06	.056
2. Assessing student work during the course should be done only by teachers.	5	4.53	5	4.68	.869	4	4.00	4	4.10	.966
3. Group work assists students to develop skills that are necessary in the discipline of interior design.	5	4.61	5	4.82	.716	5	4.28	4	4.27	.356
4. Good designers need only have expertise in their own discipline and do not need to be familiar with other disciplines to be effective.	5	4.38	5	4.39	.933	3	3.57	3	3.55	.950
5. Good designers need to have effective social and cultural skills to communicate with a particular audience or society.	5	4.84	5	4.95	.212	4	4.28	5	4.62	.225
6. I am satisfied with what I have received, in terms of learning materials and teaching methods, from the existing programme.	1	1.23	1	1.36	.686	1	2<.001	2	1.724	.983
Ecological design principles										

7. The subject material provided by the present programme gives enough information on how to design using environmentally sustainable methods.	1	1.38	1	1.46	.375	2	2.46	2	2.34	.847
8. Designs should be appropriate to the surrounding environment and ecology.	5	4.84	5	4.60	.554	4	4.00	5	4.44	.376
9. Designs should be appropriate to the cultural or traditional elements in any society.	5	4.07	5	4.46	.461	4	3.71	4	4.41	.415
10. Designers should be members of the societies for which they are designing and be familiar with its history, culture and, environment.	5	4.76	5	4.36	.269	4	3.42	4	4.10	.169
11. One of the elements of a good designer is to know the relationship between culture and environment.	5	4.84	5	4.70	.675	4	3.85	4	4.27	.247
12. Designs should be inspired by nature.	5	4.84	5	4.73	.974	4	4.00	5	4.48	.206
Education development processes										
13. Design students need more field and training courses to enhance their personal and professional skills.	5	4.84	5	4.75	.592	4	4.00	5	4.51	.282
14. Design student need a number of workshops/ seminars outside their field or area of study.	5	4.76	5	4.78	.933	5	4.42	5	4.37	.655
15. Programme modules and training courses that students receive during their undergraduate studies are enough to develop sustainable and ecological awareness.	1	1.54	1	1.63	.710	2	4.00	2	4.31	.574
16. Workshops or general training courses provided during study are important in developing additional skills for the designer.	5	5.00	5	4.80	.114	4	3.00	5	3.20	.130

17. Design students should develop communication and persuasion skills to present their designs.	5	4.84	5	4.90	.577	5	4.71	5	4.58	.617
18. Design students need to study subjects that develop exploratory and reasoning skills.	5	4.84	5	4.75	.719	4	4.00	5	4.48	.059

The boxplots in Figures 15, 16 and 17 emphasise that little difference was found in the responses between males and females who attended the same kind of workshop, but noticeable differences in the responses between both males and females when comparing those who attended the participatory workshops, on the one hand, and the didactic workshops, on the other. Generally, the participatory workshop attendees gave higher Likert scores (stronger agreement) for the questionnaire statements than did those who attended the didactic sessions.

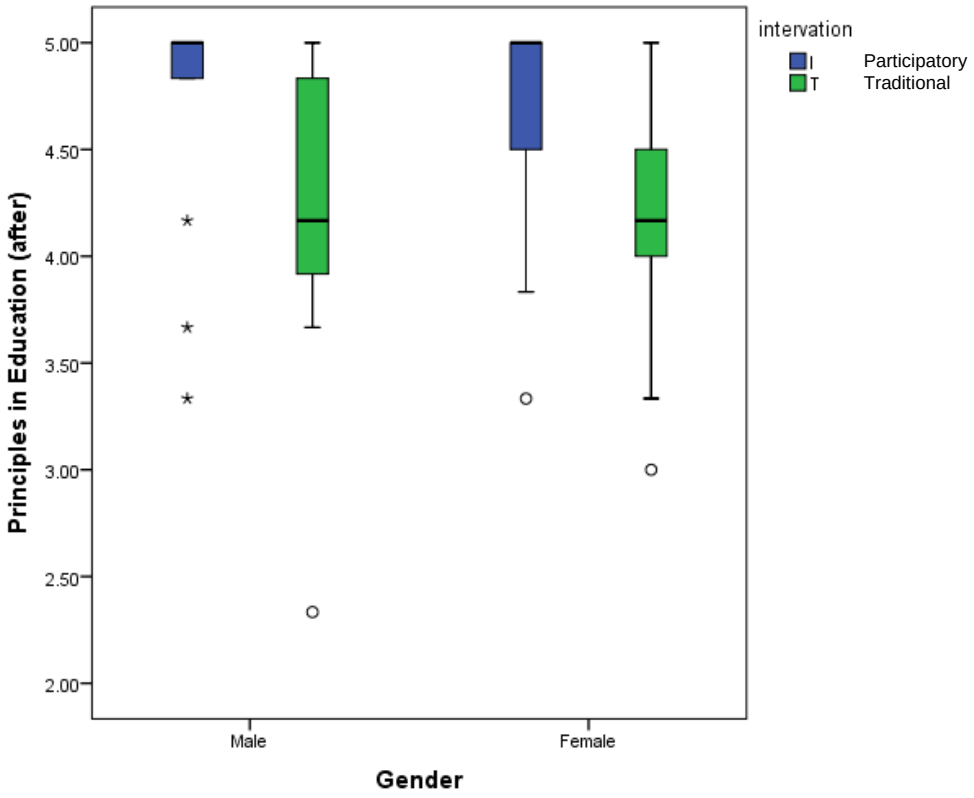


Figure 15: Responses by gender to "principles in education" statements after the participatory and didactic workshops.

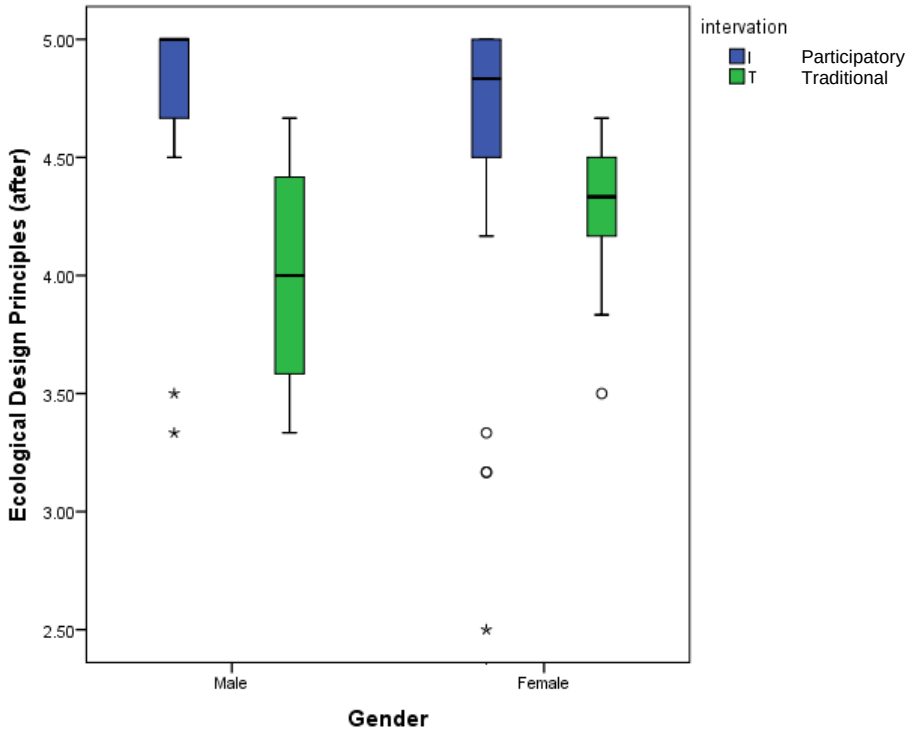


Figure 16: Responses by gender to "ecological design principles" statements after the participatory and didactic workshops.

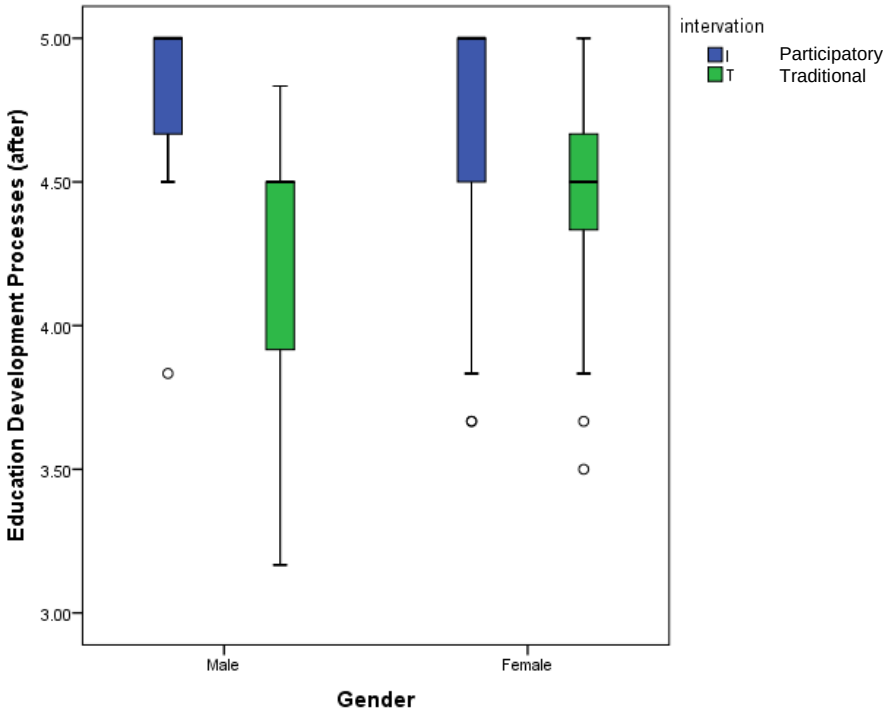


Figure 17: Responses by gender to "education development processes" statements after the participatory and didactic workshops.

The findings of this study suggest that the gender of the students had little influence on their attitude towards the workshop. The differences between female and males did not reach statistical significant value.

8.2.8.2 Age comparison

Table 26 compares the median/mean Likert scores of all the statements on the questionnaire given by students according to age, 30 or younger, on the one hand, and more than 30, on the other, who attended the two kinds of workshop. Again, as in the case of gender, there was no statistically significance difference between the responses of the two age groups.

Table 28: Comparison of age after intervention workshop.

Statements	Participatory workshop					Didactic workshop				
	Age ≤ 30		Age > 30		Mann-Whitney test (p-value)	Age ≤ 30		Age > 30		Mann-Whitney test (p-value)
Principles in education	Median/Mean Likert score					Median/Mean Likert score				
1. Preparing educational modules in interior design should be done only by the teacher.	5	4.95	5	5.00	.614	4	4.12	4	4.75	.208
2. Assessing student work during the course should be done only by teachers.	5	4.62	5	4.83	.823	4	4.03	4	4.50	.518
3. Group work assists students to develop skills that are necessary in the discipline of interior design.	5	4.75	5	5.00	.322	4	4.21	4.5	4.75	.257
4. Good designers need only have expertise in their own discipline and do not need to be familiar with other disciplines to be effective.	5	4.31	5	5.00	.173	3	3.53	3	3.75	.752
5. Good designers need to have effective social and cultural skills to communicate with a particular audience or society.	5	4.91	5	5.00	.467	5	4.53	5	4.75	.518
6. I am satisfied with what I have received, in terms of learning materials and teaching methods, from the existing programme.	1	1.31	1	1.50	.382	1	2.41	1	1.41	.956
Ecological design principles										
7. The subject material provided by the present programme gives enough information on how to design using environmentally sustainable methods.	1	1.41	2	1.66	.074	2	2.39	2	2.16	.978

8. Designs should be appropriate to the surrounding environment and ecology.	5	4.64	5	4.83	.769	5	4.40	4	4.00	.253
9. Designs should be appropriate to the cultural or traditional elements in any society.	5	4.37	4	4.33	.543	4	4.25	4	4.50	.739
10. Designers should be members of the societies for which they are designing and be familiar with its history, culture and, environment.	5	4.41	5	4.83	.485	4	3.90	4	4.50	.176
11. One of the elements of a good designer is to know the relationship between culture and environment.	5	4.72	5	4.83	.855	4	4.18	4	4.25	.977
12. Designs should be inspired by nature.	5	4.72	5	5.00	.285	5	4.34	5	4.75	.378
Education development processes										
13. Design students need more field and training courses to enhance their personal and professional skills.	5	4.77	5	4.83	.074	5	4.77	5	4.40	.955
14. Design student need a number of workshops/ seminars outside their field or area of study.	5	4.77	5	4.83	.769	4	4.77	5	4.31	.072
15. Programme modules and training courses that students receive during their undergraduate studies are enough to develop sustainable and ecological awareness.	1	1.58	1	1.83	.543	2	3.14	2	3.16	.200
16. Workshops or general training courses provided during study are important in developing additional skills for the designer.	5	4.83	5	5.00	.485	4	4.85	4	4.31	.228

17. Design students should develop communication and persuasion skills to present their designs.	5	4.87	5	5.00	.855	5	4.88	5	4.59	.610
18. Design students need to study subjects that develop exploratory and reasoning skills.	5	4.81	4	4.50	.285	4	4.77	4	4.34	.192

For statements 6, 7, and 15 there was disagreement in the attitude for both age groups with no significant difference.

The boxplots in Figures 18, 19, and 20 underscore the finding, already mentioned, that little difference was found between responses from students in different age groups attending the same type of workshop, although in the case of statements bearing on the "educational development processes" category, Figure 20 reveals a generally higher agreement with statements among over-thirties than the younger group.

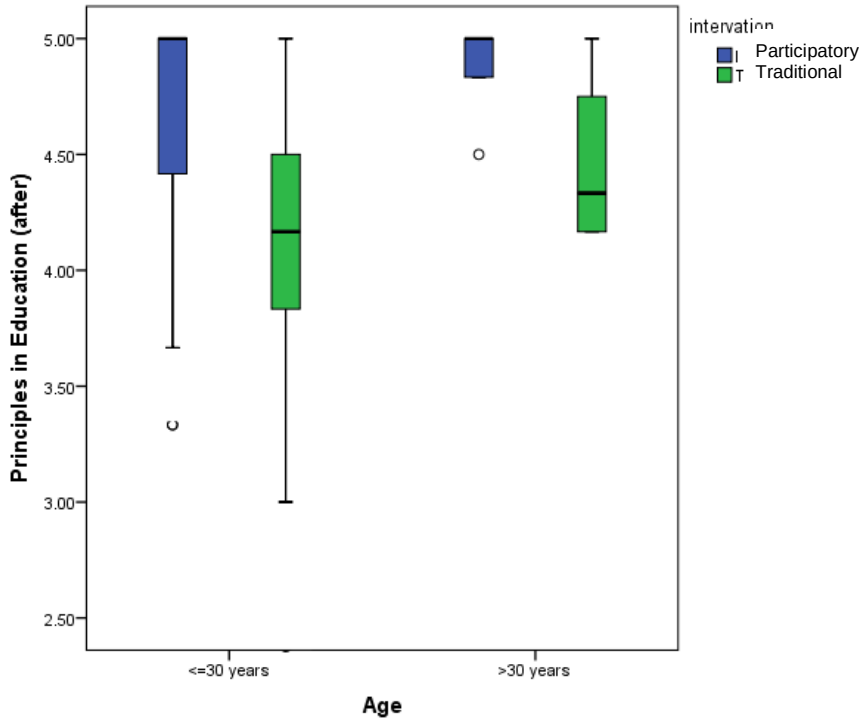


Figure 18: Responses by age group to "principles in education" statements after the participatory and didactic workshops.

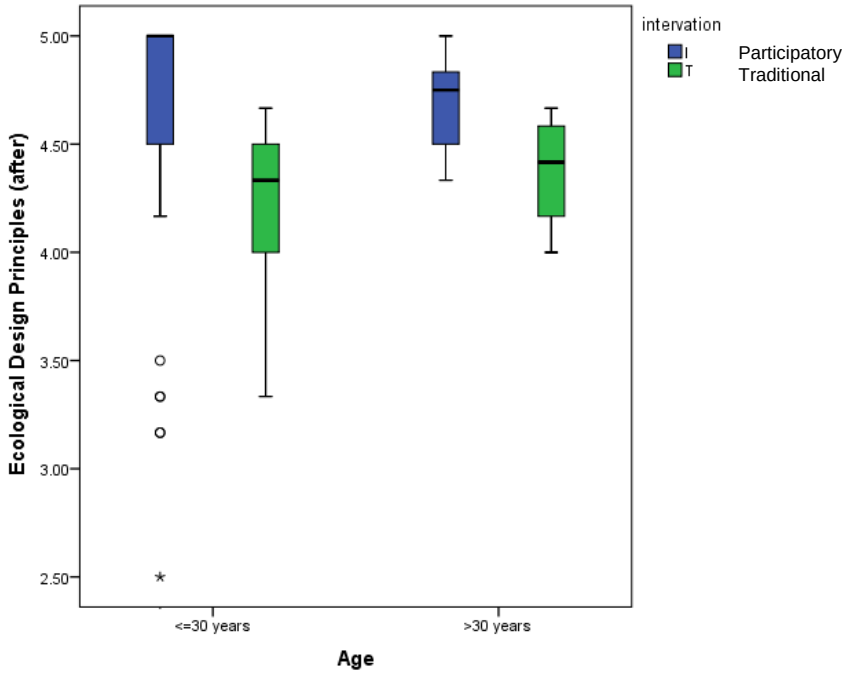


Figure 19: Responses by gender to "ecological design principles" statements after the participatory and didactic workshops.

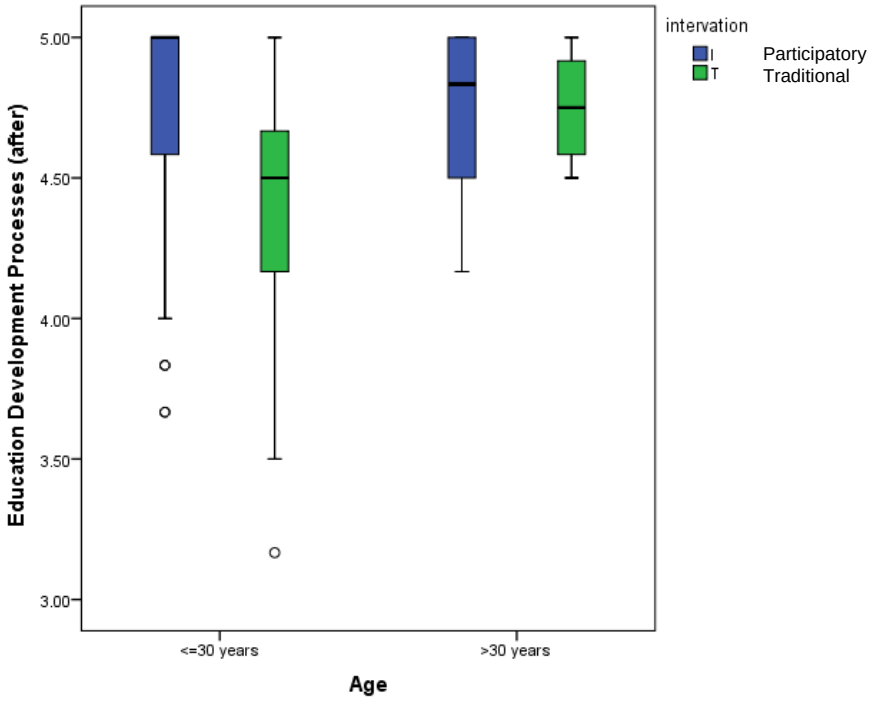


Figure 20: Responses by age group to "education development processes" statements after the participatory and didactic workshops.

From the findings, it appears that age is unlikely to have an impact on student's preference of a method of teaching over the other. Therefore, for the participatory teaching approach for ecological concepts age as a factor shouldn't be given much attention.

8.2.8.3 Lecturer experience

Data was classified into two categories of experience (1-10 years and >10 years) in order to examine any differences in responses toward the statements on the basis of teacher experience. From Table 27, it can be seen that for the participatory workshop the majority of lecturers (75.9%) had more than 10 years of experience. In contrast, for the didactic workshop, the majority of lecturers (80.6%) had 10 years or less experience.

Table 29: Distribution of experience of lecturers

Intervention		Frequency	Percent
Participatory	≤ 10 years	13	24.1
	> 10 years	41	75.9
Didactic	≤ 10 years	29	80.6
	> 10 years	7	19.4

For the principles in education category, after the participatory workshop both experience categories elicited a high positive attitude, with a slight advantage in favour of experience of > 15 years for the majority of statements, see Table 13 and Figure 10. Statistically, using the Mann-Whitney test, the attitude towards all the statements for both experience groups was the same (p-value > .05).

For the didactic workshop, both experience categories showed high positive attitude for the majority of statements and overall principles in education (see Table 28). Statistically, using the Mann-Whitney test, the attitude towards all the statements for both experience groups was the same (p-value > .05).

For participatory and didactic workshops, there was disagreement in the attitude for statement 6 between both experience groups but with no significant difference.

Table 30: Comparison of experience of lecturers after intervention workshop

Statements	Participatory workshop					Didactic workshop				
	Experience ≤ 10		Experience > 10		Mann-Whitney test (p-value)	Experience ≤ 10		Experience > 10		Mann-Whitney test (p-value)
Principles in education	Median/Mean Likert score					Median/Mean Likert score				
1. Preparing educational modules in interior design should be done only by the teacher.	5	4.35	5	4.91	.421	4	4.06	4	4.71	.056
2. Assessing student work during the course should be done only by teachers.	5	4.23	5	4.58	.869	4	4.10	4	4.00	.966
3. Group work assists students to develop skills that are necessary in the discipline of interior design.	5	4.38	5	4.75	.716	4	4.27	4.5	4.28	.356
4. Good designers need only have expertise in their own discipline and do not need to be familiar with other disciplines to be effective.	5	3.80	5	4.27	.933	3	3.55	3	3.57	.950
5. Good designers need to have effective social and cultural skills to communicate with a particular audience or society.	5	4.42	5	4.50	.212	5	4.37	5	4.14	.225
6. I am satisfied with what I have received, in terms of learning materials and teaching methods, from the existing programme.	1	1.23	1	1.00	.686	2	1.72	1.5	2.00	.983
Ecological design principles										
7. The subject material provided by the present programme gives enough information on how to design using environmentally sustainable methods.	1	3.5	1	3.6	.375	2	1.86	2	2.14	.847
8. Designs should be appropriate to the surrounding environment and ecology.	5	4.84	5	4.60	.554	5	4.44	4.5	4.00	.376

9. Designs should be appropriate to the cultural or traditional elements in any society.	5	4.07	5	4.46	.461	4	4.41	4	3.71	.415
10. Designers should be members of the societies for which they are designing and be familiar with its history, culture and, environment.	5	4.76	5	4.36	.269	4	4.10	4	3.42	.169
11. One of the elements of a good designer is to know the relationship between culture and environment.	5	4.84	5	4.70	.675	4	4.27	4	3.85	.247
12. Designs should be inspired by nature.	5	4.84	5	4.73	.974	5	4.48	5	4.00	.206
Education development processes										
13. Design students need more field and training courses to enhance their personal and professional skills.	5	4.84	5	4.75	.592	5	4.51	5	4.00	.282
14. Design student need a number of workshops/ seminars outside their field or area of study.	5	4.76	5	4.78	.933	5	4.37	5	4.42	.655
15. Programme modules and training courses that students receive during their undergraduate studies are enough to develop sustainable and ecological awareness.	1	1.53	1	1.00	.710	2	1.69	2	2.00	.574
16. Workshops or general training courses provided during study are important in developing additional skills for the designer.	5	5.00	5	4.80	.114	5	4.44	4	4.00	.130
17. Design students should develop communication and persuasion skills to present their designs.	5	4.84	5	4.90	.577	5	4.58	5	4.71	.617

18. Design students need to study subjects that develop exploratory and reasoning skills.	5	4.84	5	4.75	.719	5	4.48	4	4.00	.059

Regarding ecological design principles, after the participatory workshop the attitude for both experience groups was positively high, for all statements, as shown in Table 28 and Figure 22. Based on the Mann-Whitney test, the attitude towards all the statements between both experience groups was statistically non-significant (p-value > .05).

Similarly, after the didactic workshop, all the statements seemed to elicit a highly positive response (see Table 28 and Figure 21). Based on the Mann-Whitney test, the attitude towards all the statements for both experience groups were statistically the same (p-value > .05). For the participatory and didactic workshops, there was disagreement in the attitude for statement 6 in regard to the existing provided material in the teaching approach between both experience groups with no significant difference.

Within the education development processes category, after the participatory workshop, the attitude for both experience groups were positively high, as shown in Table 28 and Figure 23. Using the Mann-Whitney test, the attitude towards all the statements between both experience groups was statistically the same (p-value > .05).

Similarly, after the didactic workshop, both experience groups showed high positive attitudes in this category (see Table 28 and Figure 23). Based on the Mann-Whitney test, the attitude towards all the statements for both experience groups were statistically the same (p-value > .05).

For the participatory and didactic workshops, there was disagreement in the attitude for statement 15 between both experience groups with no significant difference.

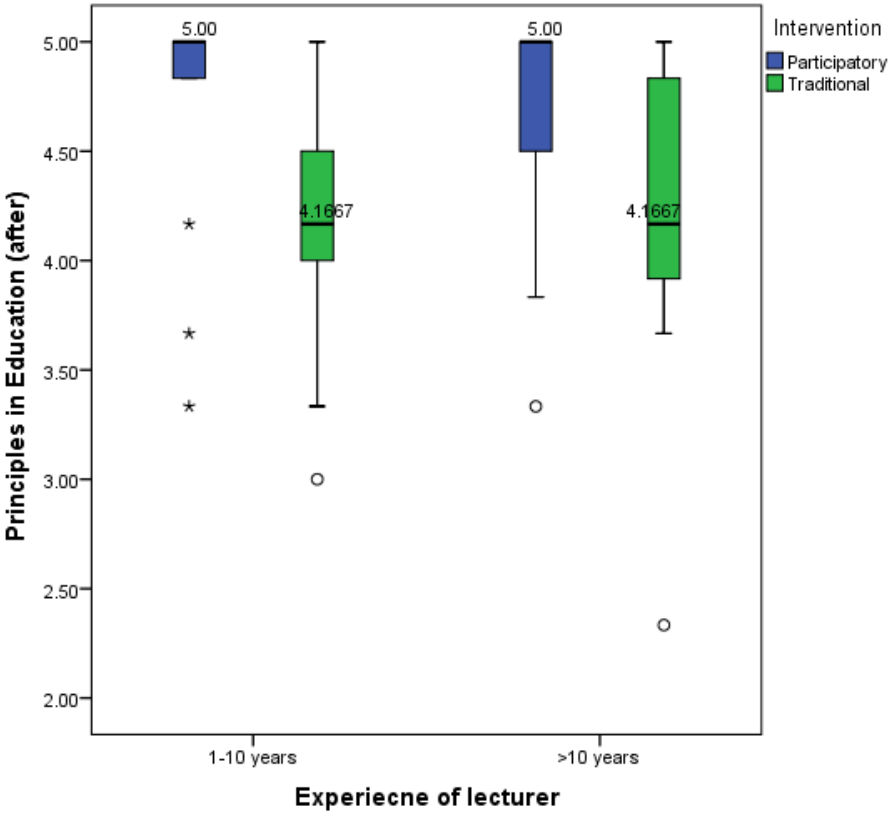


Figure 21: Principles in education between experience groups after participatory and didactic workshop.

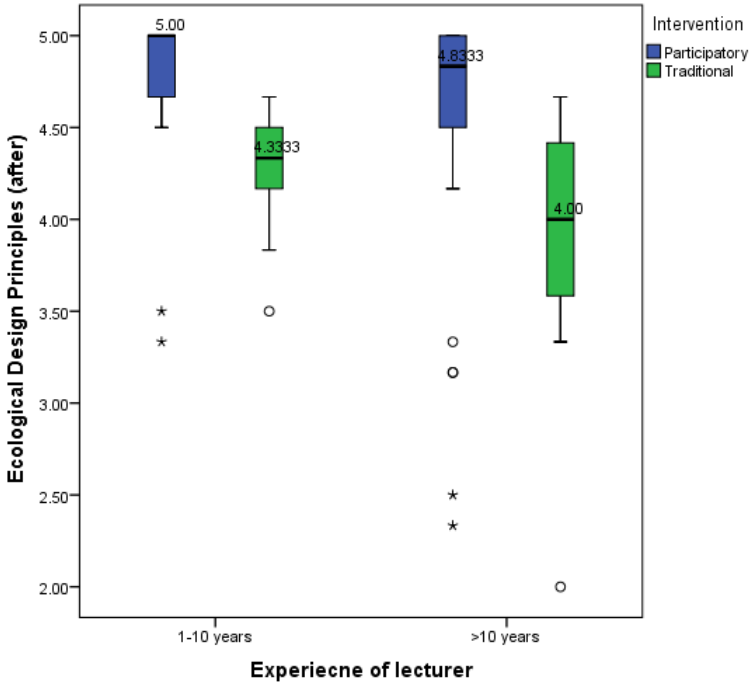


Figure 22: Ecological design principles between experience groups after participatory and didactic workshop.

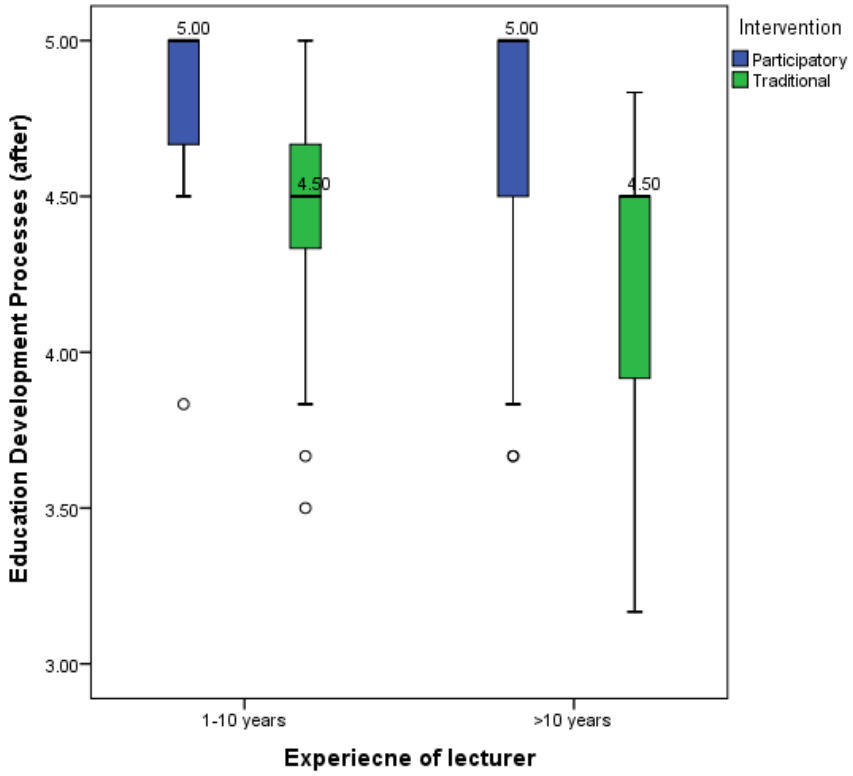


Figure 23: Education development processes between experience groups after participatory and didactic workshop

8.2.8.4 Teacher qualification location

The data was classified according to the location of the teacher's qualification. From Table 29, it can be seen that, in the case of the participatory workshops, the majority of qualifications were from Egypt (75.9%), while just 24.1% were from the west. For the didactic workshop, the majority of qualifications were from the west (80.6%), while just 19.4% were from Egypt.

Table 31: Distribution of teacher qualification location

Intervention		Frequency	Percent
Participatory	Egypt	41	75.9
	West	13	24.1
Didactic	Egypt	7	19.4

West	29	80.6

For the principles in education, after the participatory workshop, the two places of qualification showed high positive attitude, as shown in Table 30 and Figure 24. Statistically, using the Mann-Whitney test, the attitude towards all the statements for the two places of qualification was the same (p-value > .05). Likewise, for the didactic workshop, the two places of qualification showed high positive attitude for the majority of statements, see Table 30 and Figure 24. Statistically, using the Mann-Whitney test, the attitude towards all the statements for both qualification places was the same (p-value > .05).

For the participatory and didactic workshops, there was strong disagreement towards statement 6 between both qualification places with no significant difference.

Regarding the statements on ecological design principles, after the participatory workshop, the two places of qualification showed high positive attitude, especially statements 8, 11 and 12 (see Table 30 and Figure 24). Statistically, using the Mann-Whitney test, the attitude towards all the statements for the two places of qualification was the same (p-value > .05). Likewise, for the didactic workshop, the two places of qualification showed high positive attitude for the majority of statements. Statistically, using the Mann-Whitney test, the attitude towards all the statements for both qualification places was the same (p-value > .05).

For the participatory and didactic workshops, there were low-score responses to statement 7 between both qualification places with no significant difference.

Table 32: Comparison of teacher qualification location after intervention workshop

Statements	Participatory workshop	Didactic workshop

Principles in education	Egypt		West		Mann-Whitney test (p-value)	Egypt		West		Mann-Whitney test (p-value)
	Median/Mean Likert score					Median/Mean Likert score				
1. Preparing educational modules in interior design should be done only by the teacher.	5	4.95	5	5.00	.421	5	4.71	4	4.06	.056
2. Assessing student work during the course should be done only by teachers.	5	4.68	5	4.53	.869	4	4.00	4	4.10	.966
3. Group work assists students to develop skills that are necessary in the discipline of interior design.	5	4.82	5	4.61	.716	5	4.28	4.5	4.27	.356
4. Good designers need only have expertise in their own discipline and do not need to be familiar with other disciplines to be effective.	5	4.39	5	4.38	.933	3	3.57	3	3.55	.950
5. Good designers need to have effective social and cultural skills to communicate with a particular audience or society.	5	4.95	5	4.84	.212	4	4.28	5	4.62	.225
6. I am satisfied with what I have received, in terms of learning materials and teaching methods, from the existing programme.	1	1.36	1	1.23	.686	2	2.00	1.5	1.72	.983
Ecological design principles										
7. The subject material provided by the present programme gives enough information on how to design using environmentally sustainable methods.	1	1.46	1	1.38	.375	2	2.14	2	1.86	.847
8. Designs should be appropriate to the surrounding environment and ecology.	5	4.60	5	4.84	.554	5	4.00	4.5	4.44	.376

9. Designs should be appropriate to the cultural or traditional elements in any society.	5	4.46	5	4.07	.461	4	3.71	4	4.41	.415
10. Designers should be members of the societies for which they are designing and be familiar with its history, culture and, environment.	5	4.36	5	4.76	.269	4	3.42	4	4.10	.169
11. One of the elements of a good designer is to know the relationship between culture and environment.	5	4.70	5	4.84	.675	4	3.85	4	4.27	.247
12. Designs should be inspired by nature.	5	4.73	5	4.84	.974	5	4.00	5	4.48	.206
Education development processes										
13. Design students need more field and training courses to enhance their personal and professional skills.	5	4.75	5	4.84	.592	5	4.00	5	4.51	.282
14. Design student need a number of workshops/ seminars outside their field or area of study.	5	4.78	5	4.76	.933	5	4.42	5	4.37	.655
15. Programme modules and training courses that students receive during their undergraduate studies are enough to develop sustainable and ecological awareness.	1	1.63	1	1.53	.710	2	2.00	2	1.68	.574
16. Workshops or general training courses provided during study are important in developing additional skills for the designer.	5	4.80	5	5.00	.114	5	4.00	4	4.44	.130
17. Design students should develop communication and persuasion skills to present their designs.	5	4.90	5	4.84	.577	5	4.71	5	4.58	.617

18. Design students need to study subjects that develop exploratory and reasoning skills.	5	4.75	5	4.84	.719	5	4.00	4	4.48	.059

For the education development processes category, after the participatory workshop, the two places of qualification elicited very highly positive responses for all the statements (see Table 30 and Figure 26). Statistically, using the Mann-Whitney test, the attitude towards all the statements for the two places of qualification was the same (p-value > .05). Likewise, for the didactic workshop, the two places of qualification resulted in a high positive attitude for the majority of statements. Statistically, using the Mann-Whitney test, the attitude towards all the statements for both qualification places was the same (p-value > .05).

For the participatory and didactic workshops, there was low attitude towards statement 15 between both qualification places with no significant difference.

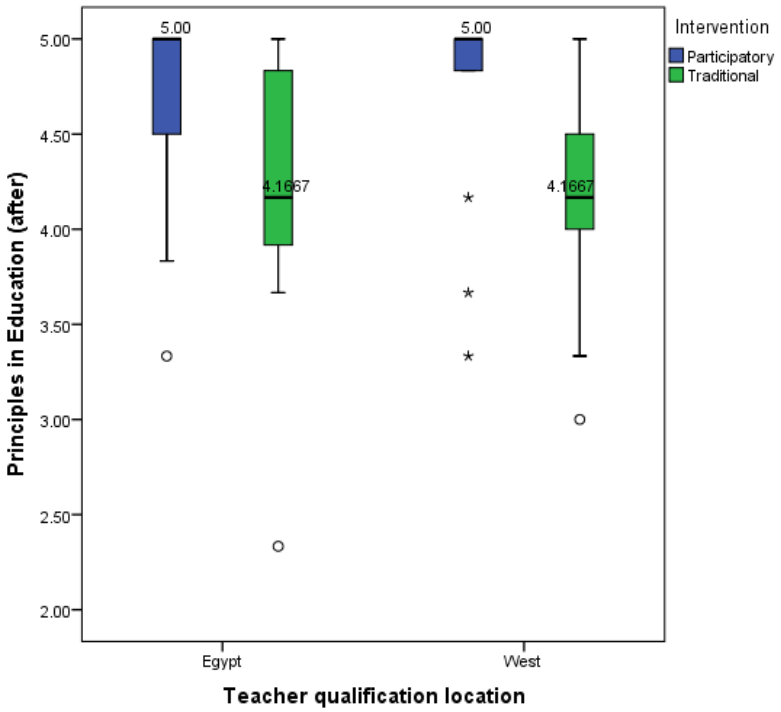


Figure 24: Principles in education between location groups after participatory and didactic workshop.

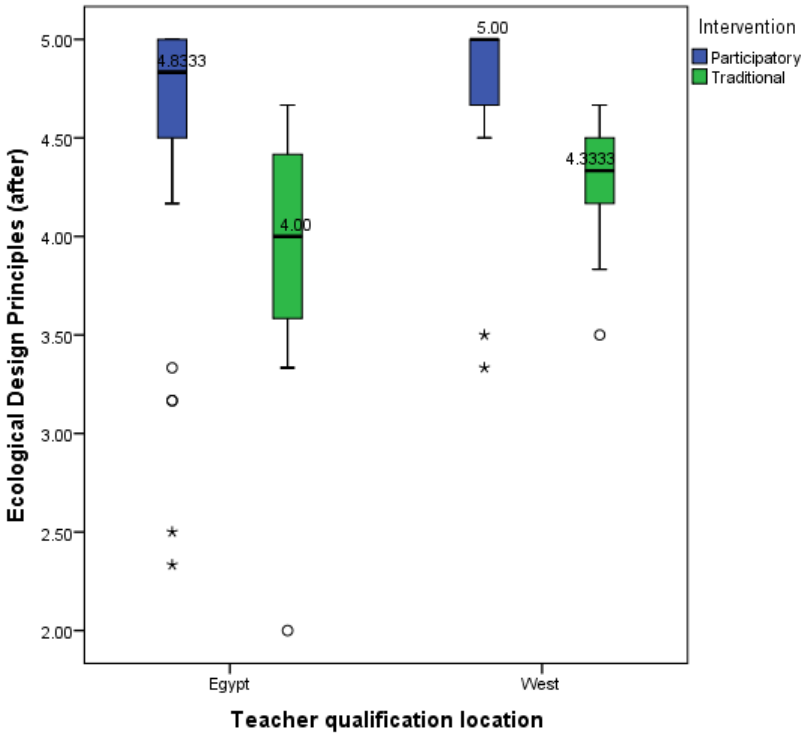


Figure 25: Ecological design principles between location groups after participatory and didactic workshop.

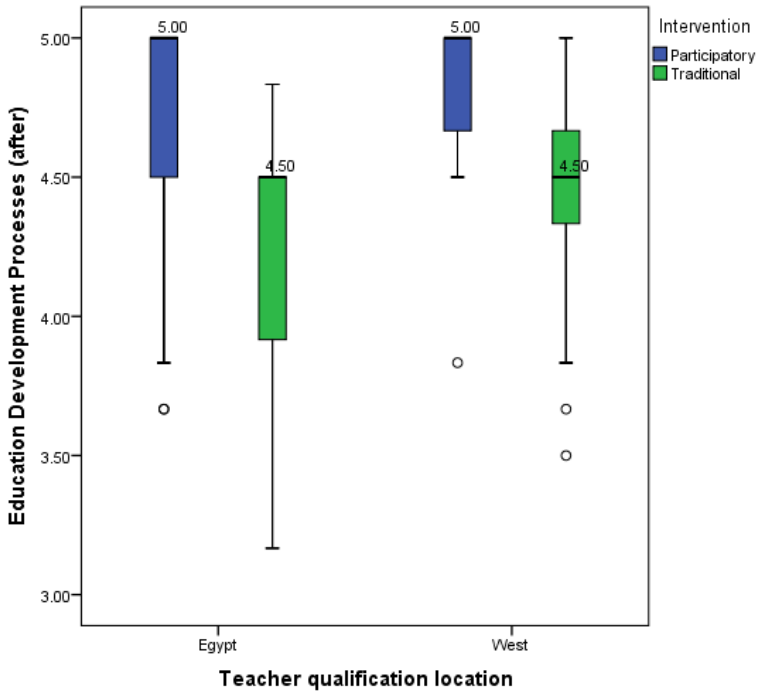


Figure 26: Education development processes between location groups after participatory and didactic workshop.

8.3 Qualitative results from interview responses

As explained in the discussion of the methodology (Chapter 7), interviews were conducted with a number of male and female students who attended the two types of workshops run by the researcher: didactic and participatory. The main purpose of this was to gain greater insight into what students feel about their present program and what changes and improvements they hope to see in the future. The researcher used the interviews to allow students greater freedom and scope to express their views and to follow up on experiences that might be pertinent to developing participatory teaching approach for ecological design. The interviews consisted of five semi-structured questions; the results of three of which questions 1a, 1b, 3, and 5 will be considered and discussed in section 8.3.1, section 8.3.2, and section 8.3.3.

8.3.1 Responses related to learning and teaching

This section addresses the responses to the first question of the interview, which is in two parts: 1a. "What do you think learning is, i.e. how do people learn?" and 1b. "How does this relate to teaching? What is good teaching?"

A broad range of responses was elicited by this question. Some students believed that effective teaching and learning should include techniques and resources that go beyond the boundaries of what is traditionally available in educational institutions in Kuwait (Al-Sharaf, 2006), such as use of the Internet and other media formats – for example, television programs and magazines. Others expressed the opinion that learning occurs only when lecturers show a genuine interest and passion in their teaching.

For example, one respondent stated:

> *"It depends on the teacher – how he or she conveys their message to their students… When teachers are willing to teach with all of their heart then students will like studying."* [Student 1WS1E]

This indication that the student-teacher relationship and the lecturer's style of teaching and expression of compassion and excitement can affect the student's willingness to learn is supported by another student's comment:

> *"Some professors only care about the grades and getting the right answers…. Others make the effort to teach and make the students understand the material fully in an interesting way."* [Student 2WS1E]

A third student pointed to a major difference between her experience in the participatory workshop and the traditional teaching approach to which she had been exposed:

> *"Unlike what we had in the [facilitative] workshop, other teachers are quite the opposite: they just dump the information on the students with no interaction."* [Student 3WS1E]

Many of the respondents shared this view: that the current style of didactic teaching of lecturers, to which they were accustomed, limited the freedom of students to express their own ideas (Marsick and Watkins, 2001). The following is a typical response along these lines:

> *"Some teachers always stick to their imagination and not to reality…. For example, the teachers will not let us design a house based on what we see or how we see it in reality but design it according to his own imagination."* [Student 10WS4E]

Such responses demonstrate that the students were able to compare and contrast between what they experienced in the participatory workshops and the type of teaching they normally received during lectures, delivered in a traditional didactic style, by department staff. In particular, as the quotes from students 3WS1E and 10WS4E reveal, it was felt that students are not given enough freedom for personal expression and opinions in their design work. On the contrary, current lecturers, it was felt, influenced the students to believe that the responsibility of learning falls on the teacher instead of being a shared responsibility and experience between the teacher and student.

> *"Most of our lectures keep referring to subjects that they have recently known, or used to study, or worked on long time ago. I always take note of these information and try to incorporate it in my work so that I get a better mark"* [Student 13WS5D]

The latter approach makes the student highly dependent on the teacher's ideas and way of thinking, and tends to nullify any attempt on the part of the student to come up with creative solutions on their own (Castronova, 2002).

In conclusion, students generally felt that learning occurs most effectively when the environment is encouraging and welcoming, and students are allowed to take an active part in the educational process. Good teachers were considered to be those who were passionate about their work and showed enthusiasm toward both their subject and their students. Enabling participation by, and interaction with, students were cited as a key ingredient of good teaching practice (Moon, 2004) in contradistinction to a purely didactic approach in which imagination and independent thinking is stifled.

<u>Implications for the participatory teaching approach</u>

- Students should be given more freedom to express their opinions and evolve their own designs based on principles of design and sustainability that have been imparted to them and their own experience and imagination.
- As students have had little or no experience of working in this way, they should be introduced to it gradually through a series of carefully-planned exercises and also encouraged to present their ideas with confidence.
- The facilitator should be friendly and welcoming while, at the same time, avoiding giving too much help and guidance, as the students must learn to think for themselves.

8.3.2 Responses related to impacts on change in thinking

This section deals with the responses to question 3 of the interview: "How did the sessions affect your understanding of teaching?" This was an inquiry into the most significant factors that changed the students' thinking about teaching as a result of the participatory workshops. Many respondents expressed excitement and enjoyment after taking part in the workshops, and indicated that they had gained new experiences as a result of engaging in the new techniques and tasks. One respondent stated:

> *"It was very good because we were a whole group of female students who participated in the session where we shared different experiences from each other and have learned from each other's opinions and situations. We were able to learn how to answer and solve different problems and situations."* [Student 1WS1E]

This student felt that the diversity of those taking part was an important advantage of participatory over didactic teaching sessions:

> *"Group work should be continued because we have different backgrounds, which can help to solve any problem."* [Student 1WS1E]

Another student responded:

> *"It's my first time to attend a workshop session, and it was quite different from my other classes and very interesting."* [Student 3WS1E] When asked to be specific about how it was different, he said: *"It made me and my group mates think out loud about the future, and we were discussing our ideas and thoughts."* [Student 3WS1E]

Yet another, commenting on the impact of the facilitative workshop experience, said:

> *"We did not feel the time; it passed very quickly because we were involved and participated in the discussion, and the video that you showed us was very good."* [Student 2WS1E]

One student went so far as to state that she was considering taking the experience of the facilitative workshop techniques forward into her own career:

> *"I'm even thinking of implementing it into my skills as a teacher when I graduate with my students."* [Student 11WS4E]

Previously, students had been used to working, thinking, and designing individually. The workshop experience introduced to them a different style of problem-solving and new skills that come hand in hand with participatory thinking.

However, this new participatory experience also meant that students had to face some challenges. One student voiced her concern about this new approach as follows:

> *"The downside of it is that some students did not want to share their information and kept it to themselves, to have credit for themselves only."* [Student 10WS4E]

This student used the word "steal" to express her concerns about the ownership of her ideas. Some students, she felt, believed that once they had contributed their work to the group, the lecturer would not be aware of their personal efforts and thus they would not receive credit for them. This fear may stem from experiences with the usual, traditional way of teaching in which the student is expected to memorise the lecturer's notes and directions in order to achieve a good assessment; the student is thus rewarded by the lecturer or tutor for their personal efforts in replicating what they are told.

This brings up the issue of the powerful effect that assessment has on learning. The indication from student comments is that the culture of learning presently in place in the Kuwaiti system does not encourage independent or creative thinking, puts too much pressure on students to conform to the lecturers' expectations and demands, and leads to counter-productive behaviours such as non-cooperation with other students. An aim of the participatory teaching approach for ecological design should be to change this negative culture of learning by promoting the sharing of ideas (for example, through group work) and creating an environment in which students enjoy the learning activities and are motivated towards a more creative and participatory approach.

Students were also aware of the drawbacks of the traditional didactic approach, one of which is that they may be penalised for doing things that differed from the teacher's expectations and strict modus operandi. For example, one student commented:

> *"If the lecturer told us not to put that there, when we clearly can see that he is mistaken, we don't dare to question him because he will assess us, for example in not placing it in the first place, and we don't know why?! We just know that it came from his own idea."* [Student 10WS4E]

Students tended to believe that they had to stand out among their peers to prove to some lecturers that they were worthy of a high mark. Again, this suggests a culture where there is an expectation on the part of the students that marks are rewarded relative to the achievements and scores of their peers. By comparison, in the UK, for example, individuals get credit for their own work, no matter what the quality of work from other students. It is important that the participatory teaching approach address this deficiency in the existing system so that students do not feel they have to hide their work from others in order achieve better scores in their assessments. On the contrary students who cooperate and contribute fully to participatory sessions should be rewarded for their participation and creative input to group work.

The interviewed students explained that because lecturers adapted their teaching through following very strict and specific directions set by the tutor to complete their design projects or tasks, the students tried to submit their work exactly as directed by the lecturer and according to the tutor's own preferences in order to get full mark. Students sense that lecturers do not know them personally because all of the students are submitting more or less the same work and they might risk getting an unfair assessment if they do something different.

> *"For example, some good lecturers can tell if I have helped my friend in the project. The tutor knows that she did not do it and will … say: "You don't know this thing? How did you do it, surely your friend helped you!" Therefore,*

> *although all of us did the same exercise, each one of us has her own touch."*
> [Student 10WS4E]

Here, again, there is an indication that better constructive alignment is needed between desired learning outcome and assessment. At present, judging by the student responses, tutors are expecting certain responses – essentially a regurgitation of facts that are dispensed in lectures. Reward is given to conformity. In the developing participatory teaching approach, there should be a greater emphasis on reward for individuality and creative expression, and a removal of the fear and pressure that comes from an expectation of the need to reproduce certain outcomes (Baeten, Kyndt, Struyven, and Dochy, 2010).

A problem has arisen whereby some students approach craft shops to do the design project for them, in the manner prescribed by the lecturer, and then getting higher marks than the students who have done their own original work:

> *"Our discipline demands working in details and to be creative and when they overwhelm us with a lot of work, without adequate time to execute it, the result is that many students go to crafts shops and ask them to do the work instead."*
> [Student 10WS4E]

The implication here is that students are not being taught to think creatively and, at the same time, pressured to produce something that matches a specific, preconceived design. participatory teaching approach for ecological design should involve assessments that encourage students to think outside the box and produce designs that are innovative.

Students feel disappointed by the unfairness of the present system and at the same time very concerned to meet the lecturer's strict demands. When one of the students was asked about working in the current teaching environment, they remarked:

> *"I feel stressed and anxious. Therefore, it makes it hard to focus and adjust my thoughts about what is required by the lecturer."* [Student 12WS4E]

When confronted with an unfamiliar experience, students tended to be sceptical about engaging in the workshop activity; however, this attitude soon changed dramatically. One student commented:

> *"When I received the questionnaire and was asked whether I would prefer group work, my answer was "No"; then after we were finished I was happy and encouraged to do group work because I felt that it was fun and the efforts were spread among our group members."* [Student 11WS4E]

When one of the students was asked about their experiences with the traditional teaching methods that do not encourage participation, he pointed to the pressure he encountered:

> *"I feel stressed and anxious when working alone … making it hard to focus and adjust my thoughts about what is required by the lecturer. But in groups it's less stressful because tasks are distributed to each student which results in finishing the project on time."* He added: *"My lectures feel boring. I feel we could utilise the four hours we have in each lecture to produce great workshops and complete more projects as a group."* [Student 12WS4E]

By contrast, in the didactic workshops the students did not feel there was any substantial difference from the way they were normally taught. One of the respondents commented: *"Nothing has changed"* [Student 17WS6D]. Another said:

> *"Slightly, because I found in being yesterday's workshop took me off the routine of the lecture."* When asked why so, he replied: *"The current teaching is very basic, stupid, bureaucratic, more like a cage: I can't be creative in it!"* He also said: *"Although I have learned a new topic I have not heard about it before, the teaching method was normal as I have experienced it before."* [Student 18WS6D].

Student dissatisfaction with the present high-pressure didactic system, which is built upon spoon-feeding of information and exact regurgitation of predetermined outcomes in projects and exams, is clear from the results of the interviews. Exposure to participatory workshops in which there is a relaxed, welcoming atmosphere and an encouragement to work cooperatively and freely express one's ideas elicited a highly positive response. Participatory teaching approach should address the deficiencies in the present method of teaching by including assessments that reward cooperation and innovative ideas, in addition to a sound understanding of design principles. The attitude of the teacher was deemed to be highly significant. Students expressed the view that being guided and taught by someone who was caring, interested in the student's contributions, passionate about their subject and could convey this enthusiasm provided a superior learning experience.

<u>Implications for the participatory teaching approach</u>

- The new teaching approach should aim to be challenging but at the same fun and engaging. Students will learn more if they are relaxed and enjoying the material rather than if they feel under pressure.
- However, students will need guidance in adjusting to this new way of learning. participatory teaching approach should assist in weaning them off the rigidly didactic methods to which they are accustomed, by emphasising

that it is beneficial to them to share ideas and cooperate on the evolution of a new design.

- The assessment system of participatory teaching for ecological design should be set up so as to reward cooperative work, research conducted independently of the facilitator, and innovative thinking that nevertheless operates within sound principles of design and sustainability.

8.3.3 Responses related to impact on learning

This section deals with the responses to the question 5 of the interview, namely: "Does the way in which a subject is taught affect your learning?" This question bears on whether the workshops had an impact on the students and, if so, to what extent. Many students had similar views on the effects of the participatory workshop on their learning. One student commented as follows:

> *"From the beginning the way to teach students must encourage the student to learn. If teaching from beginning was not exciting and the topics were not relevant and too hard, the student will be discouraged to learn."* [Student 11WS4E] The student elaborated further on the importance of delivering a topic and its effects on learning: *"If I understand a topic in detail that does not mean another person will understand it. That's why the way [in which] … a topic is dealt with matter."* [Student 11WS4E]

Another student responded:

> *"Changing the teaching methods to suit each topic will be beneficial as it will eliminate subjects that are not understood, [or] that are irrelevant to the real world, which do not add any value at all to my career."* [Student 12WS4E]

Yet another student reflected on the traditional way in which subjects were taught at the institution:

> *"The usual way of teaching for me is the worst thing, because most modules rely on good memory to pass and I am weak on memorisation. That is why I have decided to study interior design because I thought that we won't be needing to memorise our subjects since drawing and sketching is a big part of the programme. But I came to realise that even within this are of study you need to memorise heavily the lecturer's directions."* He added: *"However, this is not the case when I take some modules with certain tutors… who use a variety of ways of teaching, like using PowerPoint, and are fun to work with, always considerate, and not very strict."* [Student 1WS1E]

In general, the students believed that the methods and techniques of teaching directly affect the way they learn. Thus, the more advanced and versatile these techniques are, the better students develop their learning skills and understanding of the different topics they have to study. The reactions of students to the didactic workshops also shared some commonalities. One respondent explained:

> *"During my four-year time in the programme, unfortunately I have rarely found a lecturer who thoroughly explains and teaches us in a straightforward way, just a number of orders that he requests and we must provide, otherwise we will fail in the module."* [Student 18WS6D].

The current mode of teaching, it was felt, creates such pressure on students that they feel compelled to cheat or copy the work of others to pass exams. Assessment in participatory teaching should avoid this by making the material to be learned more

interesting and accessible, and by making students full participants in the learning process,

Another significant issue to emerge from, and an impact of, the facilitative workshop, was the respondents' realisation of the importance of self-learning, interest in research, and urge to learn independently of information provided by the lecturer. When one participant was asked about whether better education depended on the educational institution or the student, the student replied:

> *"On the person themselves and the educational facility; they have to give good material that interest the students and make them want to go out there and learn."* [Student 11WS4E]. This student continued: *"From the beginning the way to teach students must encourage the student to learn. If teaching from beginning was not exciting and the topics were not relevant and too hard, the student will be discouraged to learn.*"

Another student reflected on how the workshop provided motivation to continue to seek new information:

> *"After yesterday's workshop, when I went home I actually did a bit of research on the Internet to read about the subject and found that there is a vast [amount of] information out there that I never knew before, and this has made [me] excited in coming today."* [Student 12WS4E]

In terms of implications for the participatory teaching of ecological design, the interview responses indicate that the teaching approach should be stimulating, exciting, and as such to foster a spirit of inquiry on the part of students. The new material should avoid the need for rote learning and memorisation, but instead, place

emphasis on original thinking, self-motivation, and engagement with the subject of what is being learned.

Implications for developing participatory teaching approach

- The new teaching approach should reward understanding and application of knowledge rather than memorisation.
- Participatory teaching approach for ecological design should emphasise real world situations and problems, and supply materials and activities that the students can see are relevant to practical, real-world design applications.
- Pparticipatory teaching should aim to motivate students continue learning and researching topics on their own and of their own volition.

8.4 Discussion of finding of quantitative analyses

One of the most striking features of the responses overall to the questionnaire statements is the general high level of agreement with them. The great majority of the mean Likert scores in response to the statements, whatever the category, type of workshop, gender, or age category, are in the 4 to 5 ("strongly agree") range. Quite possibly this is, to a large extent, a cultural issue. In the researcher's experience, as a native Kuwaiti, students in his home country are less likely to give responses that challenge the prevailing system, than would, say, equivalent students in western countries, such as the UK. They are, in public at least, less outspoken and critical of the status quo. For this reason, the qualitative results, to be discussed in section 8.5, are highly relevant because this part of the study, involving, one-on-one interviews, provided the opportunity for individuals to speak their mind more freely and in greater depth. Because the majority of Likert scores fall within a relatively narrow range, differences between scores, whether between participatory and didactic

workshops, before and after comparisons of the same type of workshop, or other factors are less pronounced than they might otherwise be (for example, if the study had been conducted in a British university). Nevertheless, the statistical analyses, using the Mann-Whitney test (to compare participatory and didactic responses) and Wilcoxon test (to compare before and after scores in the case of each type of workshop) have brought to light some interesting differences and a few unexpected anomalies.

One feature of the results that is not easy to explain is why the mean Likert scores of the students attending the didactic workshops are consistently lower than those who took part in the participatory workshops. In the case of all 18 statements on the questionnaire this is true. It is believed that part of this can be explained by the greater impact of the participatory workshops, which may have given students a more positive view toward the importance of factors such as working cooperatively and sound ecological principles. However, the effect of some degree of bias – i.e. the particular attendees in the participatory groups were just more inclined to give higher scores – cannot be discounted.

The mean Likert scores shown in both Table 1 and Table 2 for statements 1 and 2 reveal one of the anomalies just mentioned. Having taken part in the participatory workshops, students agreed more strongly than their counterparts in the didactic workshops (also more strongly than they did in advance of the workshop), with the statements that “preparing educational modules in interior design should only be done by the teacher” and “assessing student work during the course should be done only by teachers.” On the face it, it may seem that the effect of the participatory workshop has been to strengthen the view that teachers should maintain their

traditional role of dictating what and how the student learns. However, an alternative suggestion, which the researcher suggests based on experience of teaching in this native country, is that Kuwaiti students are acutely aware of the need to be well qualified in their field and that the new methods to which they were exposed in the participatory workshops strengthened their desire to be taught by the latest methods by teachers who understood and were able to implement these methods.

The differences in the responses to statement 3 ("group work assists students to develop skills that are necessary in his discipline in interior design"), given by students as a result of attending the two different types of workshop, are telling. Attendees of participatory sessions increased their level of agreement with this statement by a highly significant amount, whereas those who took part in the didactic sessions did not change in their attitude. Similarly, participatory workshop students more strongly agreed with statement 5 ("good designers need to have effective social and cultural skills to communicate with a particular audience or society") to a highly significant extent after attendance at the session.

As shown in Tables 5 and 6, on the subject of ecological principles in design, students indicated stronger agreement with a number of statements in this category after attending both types of workshops. These statements include 8 ("designs should be suitable to the surrounding environment and ecology"), 10 ("designers should be members of the societies for which they are designing and be familiar with its history, culture and environment"), 11 ("one of the elements of a good designer is to know the relationship between culture and environment"), and 12 ("designs should be inspired by nature"). The increase in agreement is not surprising in view of the

fact that the importance of incorporating ecological and sustainability principles into design was a central message of both types of workshop.

With respect to the responses to statements in the third category, education development processes, students attending both types of workshop indicated a stronger agreement with the statements after their participation. These include statements 13 (“Design students need more field and training courses to enhance their personal and professional skills”), 14 (“Design student need a number of workshops/ seminars outside their field or area of study”), 15 (“Programme modules and training courses that students receive during their undergraduate studies are enough to develop sustainable and ecological awareness”), 16 (“Workshops or general training courses provided during study are important in developing additional skills for the designer”), 17 (“Design students should develop communication and persuasion skills to present their designs”), and 18 (“Design students need to study subjects that develop exploratory and reasoning skills”).

8.5 Qualitative study from observations

A technique that was used to assess the process impact of the facilitative and didactic workshops was observation of the participants, independently by the researcher and his assistant, both of whom made notes during the workshops. It is worth reiterating that the facilitative style of teaching, involving teamwork, creative thinking, and open-ended outcomes, was unfamiliar to students at this institution, and contrasted sharply with the usual approach based on a linear, lecturer-dictated educational path supported only by texts, hand-outs, and assignments that are meant to be followed precisely.

Four key themes were of special interest with regard to observations of the workshops by the researcher and his assistant. They were:

- Behaviour toward the new experience and the facilitator.
- Dynamics between the students themselves.
- Understanding the topics and their outcomes
- The level of willingness to participate in other tasks and workshops.

Observations made in each of these categories are discussed below.

8.5.1 Behaviour toward the new experience and the facilitation

These observations have to do with interactions between the students and (a) the researcher and (b) the environment of the workshop, whether participatory or didactic (i.e. the teaching style and the tasks set). In both types of workshop, the facilitator and the assistant noted that the students asked many questions about what was expected of them, and were anxious and concerned about being able to complete the tasks in hand, whether these were individual tasks, as in the didactic workshop, or group tasks, as in the facilitative workshop (Ying, 2006). These reactions occurred despite the fact that the tasks were explained carefully and kept simple to ease their execution, and that the students were told they could give their answers in any way they liked and that there was no right or wrong way of producing their outcome. Nevertheless, students showed stress concerning how the researcher wanted the task to be done. At first, some students were noticed asking their peers questions such as: “How can we do this?” or commenting: “We don’t know.” Then questions were directed to the facilitator like: “Can you give us examples?”, “Can you tell us exactly what to do?”, and “How would you like us to do it”.

The assistant noticed while the facilitator was walking around the students and checking on their progress, many of them revealed anxiety about their performance, asking: “Is that what you want?” or stopping to see the reaction on the facilitator’s face. Students appeared to lack self-confidence and kept pushing the facilitator for directions, who, however, avoided giving his own opinions, preferences or thoughts in solving the tasks. It was evident that the students were outside their comfort zone and not used to this type of independency. This appeared to be an echo of the comments made by some of the students during the interviews in which they spoke about not having the freedom to give their own opinions or preferences but, instead, being dictated by the lecturers directions and thoughts.

Given the observations made in this area, it is clear that, in making the transition from the older didactic style to a participative approach that students will need a considerable amount of guidance in how to adjust. Present students have become habituated to being fed information in class, with no engagement of them expected or invited, memorising the information and procedures dispensed by the lecturer, and then repeating this material in exams. Exposed to a more open environment in which they are encouraged to interact with each other and the teacher, and come up with their own ideas and plans, they appear initially to be at a loss. The participatory teaching approach should allow for a gentle introduction to new styles of teaching, for example, by using simple exercises so that students gradually become familiar with independent and original thinking, and conducting their own research.

To summarise, the implications for participatory teaching approach from observations of student interaction with the lecturer and the different workshop experiences are as follows:

- Students will need time to adjust to the nature of the new teaching approach, in particular the freedom it offers to students to be players in the action rather than mere bystanders. It must be remembered that students in countries such as Kuwait are used to being told what to do down to the smallest detail. Although they are keen to work in an environment where they can make their own decisions, the transition to this new way of learning will take a period of adjustment. Moreover, the adaptation will come more easily to some students than others.
- The exercises and projects in participatory teaching for ecological design should be progressive so that students become gradually acclimatised to working independently. They should be allowed to make mistakes early on, without penalty, to encourage self-reliance and confidence.

8.5.2 Dynamic between students

Students were observed to have different reactions between themselves depending on the workshop type involved. In the case of the didactic workshops, in which students were working individually from the worksheet given to them, the facilitator noticed that some students were trying to look at the progress of other students who they perceived to be more advanced and were giving a lot of information and feedback on the task sheets. The assistant also observed that students who were uncertain tried to copy the work, or ask questions, if any of their fellows whom they saw had been praised or reassured by the facilitator with comments such as “Don’t worry you are doing fine,” “Good job,” or “Keep it up”. Effectively, they were using the overheard comments as if these directions or preferences, expressed by the facilitator, had been given to them directly. This is more evidence of a failed culture of learning in which the didactic approach has become so ingrained that students continued to employ the

same tactics to try to succeed – copying, competing with and emulating their peers, and avoiding any form of self-expression which they perceive to run counter to what the teacher expects of them.

In the case of the facilitated workshops, the situation was completely different in that students were expected to work together, and, indeed, had no choice as there was only one worksheet per group. Most groups rapidly assigned a group leader or selected one member to write the collective thoughts of everyone involved on the work sheet. During the facilitative workshop the atmosphere was very relaxed, and the students were smiling and laughing while they are solving their tasks. This was in sharp contrast to the quiet and tense atmosphere that was observed by the assistant in the didactic workshop where he noted that: "reactions between students is very limited, with a sense of pressure and competitiveness among students". It must be a goal of participatory teaching for ecological design to engender improved learning and original thought in a relaxed environment where students feel at ease and in a place where their opinions and ideas will not be criticised.

An implication for the design of the new module from observations of student dynamics is as follows:

- Establishing roles within groups is important but the facilitator should encourage students to take on different roles from time to time to avoid the same people always being chosen as leader or some other stereotype.

8.5.3 Understanding the topics and the workshops outcomes

After the workshops, students reported contrasting levels of understanding of topics to which they had been exposed for the first time. Many students from the didactic workshops felt that they had not benefited from the material that had been covered.

When asked if the workshop had had an impact on them, their comments included "nothing changed" or "little was learned". On the other hand, students who attended the facilitative workshops displayed considerable interest in the content of the sessions and were enthusiastic about their experience.

An implication for the design of participatory teaching from observations of understanding topics and workshop outcomes is as follows:

- Although participatory teaching for ecological design should emphasise group collaboration, freedom of expression, and a relaxed atmosphere, its outcomes must still be accurately and regularly assessed in a systematic way. It is particularly important that the assessment be able to recognise the contributions and progress of individual students even though, for the most part, they have been involved in group exercises.

8.5.4 Enthusiasm and willingness to participate in other tasks and workshops

Both the facilitator and the assistant noted how students seemed energised by the facilitative workshops and showed a keenness to move on to the next task. By contrast, those in the didactic workshops often struggled to finish each task before moving on. A few students in the didactic sessions were even observed by the assistant to fall asleep during the PowerPoint presentation, which used only bullet points in the same way as used by some of current lecturers in the college. On the other hand the assistant in the facilitative workshops noted that students paid a lot of attention to the PowerPoint presentation given by researcher, which included a variety of pictures and video clips. In the didactic workshops students gave many different excuses to leave the workshop and do other things. However, attendance

throughout the facilitative workshops was good and students were observed to maintain a good level of engagement and enthusiasm right through to the end.

In terms of asking for volunteers to take part in interviews or attend the final workshop, didactic workshop students were very hesitant to put themselves forward take part and did not express any intention to attend. The assistant noted a complete silence from the students when the invitation was made to participate in these events. The facilitator had to seek help from the lecturer in obtaining volunteers, and in some cases the offer was made of a bonus mark as an incentive to those who agreed to participate. In the facilitative workshops, there was no need for an incentive: many students came forward to take part in the interviews and the number of volunteers for the final workshop exceeded the number requested. This observation provides confirmation of the effectiveness of a participatory approach in helping students to become more cooperative and open-minded, and less fearful of stating their views.

An implication for the developing the participatory teaching for ecological design from observations of the level of enthusiasm and willingness to take part in other is as follows:

- Carefully plan activities and presentation of material so that each new topic is preceded by a discussion or, for example, PowerPoint show to go over the basic background knowledge and principles.
- Ensure that all students actively participate and that projects, presentations, and so on are not dominated by the same individuals who are more confident in their abilities.

8.6 Conclusions

The analyses of the quantitative data suggest an increased positive attitude toward facilitative teaching methods as a result of exposure to the participatory workshops. However, students strongly believed that the preparation of courses and teaching materials, and also the assessment of students' work, should be the exclusive tasks of the teacher. This may, in part, be due to a lack of confidence and self-belief of students to express their own opinions as a result of having been spoon-fed information by traditional teaching methods for so long. A significant strengthening of the view that group work can lead to the development of skills important in interior design was observed as a result of attendance at the participatory workshops.

The general view that consideration of the local environment, ecology, and culture is important in design strengthened as a result of exposure to both types of workshop. There was a particularly significant jump from a neutral position to strong agreement with the statement that "designers should be members of the societies for which they are designing and be familiar with its history, culture and environment" in students who attended the participatory sessions. It was evident that students had an inherent pride in their culture and traditions before the interventions and were therefore keen, from the outset, to apply these factors into design, and explore how such cultural and historical wisdom could be applied to modern problems of sustainability and environmental protection. It is important that participatory teaching toward ecological design build on this innate support for preserving and reintroducing traditional values and knowledge into contemporary designs.

With regard to developing the educational system to improve its efficacy in training designers, there was widespread agreement that more field courses and workshops would be beneficial, including those that enhance skills and knowledge of students

outside their specific field. There was also broad, strong agreement for the proposition that design students need to acquire good communications skills to present their work and also develop effective exploratory and reasoning skills.

Moderate to strong disagreement with statements such as, "I am satisfied with what I receive/ required to provide from existing programme materials and teaching methods" and "Programme modules and training courses that students receive during their undergraduate studies are enough to develop sustainable and ecological awareness" indicate a desire for radical change and improvement to how students are currently taught. The low mean Likert scores in response to these for statements tie in with other results from the quantitative study, which express a belief that more needs to be done to improve the provision of new teaching methods and approaches, including more group work and interactivity among students and between students and teachers.

The results of the qualitative investigations support the view that students are unhappy with the excessive and impersonal didactic approach that is the normal fare of their university education. The researcher found that students were open in their criticism of the prevailing system of provision of design teaching in one-on-one interviews. The interviews indicated a high level of dissatisfaction with current teaching methods and, in those who attended the participatory sessions, a high level of approval for the approaches and activities in which they were engaged. The observations made by the researcher and his assistant confirmed the benefits that the participatory workshops seemed to bring, including a high level of enthusiasm among attendees for the tasks they were asked to perform.

As far as developing participatory teaching is concerned, there are several lessons to be learned from the quantitative and qualitative analyses regarding the most

appropriate teaching approaches. From the quantitative investigation, it emerged that students are strongly in favour of a shift to facilitative teaching and increased levels of group work. They believe that such a learning environment will foster the skills needed of good designers, including the ability to reason well and think creatively. However, it is clear from the interviews and observations that the introduction of this new, interactive approach to learning must be done gently and gradually, in recognition of the fact that students in Kuwait are not used to working in such a communal and cooperative way. Moving to a participatory teaching approach for ecological design must allow for a period of adjustment to this radically different culture of learning, and provide exercises and projects to help students in making the transition. The assessment process of participatory teaching should avoid the negative consequences of the old, rigid didactic approach. It should seek to avoid the need for memorisation of irrelevant facts, and instead reward students for creativity, innovation, and originality.

CHAPTER 9

PERCEPTIONS ON HOW TO DELIVER THE MODULE AND IMPLICATIONS FOR ITS DESIGN

9.1 Introduction

The results to be discussed in this chapter bear upon what kind of teaching that participants, both students and staff, think is needed in an ecological module for design students. The quantitative data pertinent to this issue were presented in Chapter 8, and their implications for design of the new module will be discussed later in this chapter. Qualitative data were collected by three methods interviews, a carousel, responses to some of the questions on the questionnaire.

Section 9.2 considers the responses of students to questions in the semi-structured interviews that bear upon teaching methods and strategies. Section 9.3 examines the differences in responses between students who attended the didactic and participatory workshops on the subject of teaching methods. Section 9.4 does the same with respect to teaching strategies and techniques. Section 9.5 summarises the results from the design context and process context sections of the student questionnaire that relate to the delivery and content of what is being taught. The results of the carousel for students are discussed in section 9.6, and the evaluation by lecturers of both types of workshop is presented in section 9.7. A summary of student and staff opinions on the content of a future ecological module for design classes is given in section 9.8. Finally, the chapter closes with a discussion of all the results

obtained on delivery of the new module and a set of conclusions. The data collected will be used to help determine what module content might be most appropriate in the kind of cultural setting found in Kuwait.

9.2 Interviews

Three questions asked during the interviews with students attending both the participatory and didactic workshops are related to actual and ideal teaching methods and strategies as identified by the participants. These questions are:

- What is good teaching?
- How did the sessions affect your understanding of teaching?
- Does the way in which a subject is taught affect your learning?

In their replies to these questions, students often went on to describe ways in which their learning experience was, or could be, enhanced. Four main themes emerged:

- Qualities of the lecturer
- Relationship between student and lecturer
- Teaching techniques
- Strategies in teaching

9.2.1 Qualities of lecturer

Many participants, when asked about the kind of teaching they thought was most suitable for the new module, gave high priority to the qualities of the lecturer and often started talking about this first. Directly or indirectly they made it clear that these desired qualities were often lacking in the teaching in the classes they currently attended. One student, when asked about the effects of the personality and teaching

approach of a lecturer, pointed out that it could have strongly negative consequences for the class. She said:

> "Yes, we are absolutely aware. It's something we ask for before registering the module with the tutor, and even many times we have to do our best to avoid that teacher or be creative in finding ways on how to cheat in order to pass this subject, because it's impossible to be bookish or to memorize a book by heart." [Student f13WS5D].

This admission, that students will actively avoid certain lecturers or, if necessary, cheat because of the extreme demands by traditional teachers to simply memorise large blocks of text, points to the need for change in both the style of teaching and the expectations placed on students. The aim should be to encourage and motivate students, while at the same time striking the right balance in terms of the level of difficulty of the work. Providing challenging material may be good in helping students become proficient in their subject but not if it leads to cheating or disengagement (Wood and Tanner, 2012).

9.2.2 Personality

The importance of the teacher's personality was frequently stressed by respondents. Referring to her current lecturers, one student said:

> "It's all about mentality and personality. Some have a dictatorial personality that doesn't accept anything else rather than his ideas and thoughts doesn't accept any criticism or any opinion." [Student f 13WS5D].

Another described how both the attitudes and methods of exposition of teachers differed and how this had a marked effect from the student's point of view. She mentioned:

> "[T]utors who are different from the rest of the lecturers, and who use a variety of ways of teaching like PowerPoint, and are fun to work with, always considerate us and not very strict." [Student f1WS1E].

With reference to one particular teacher, she commented:

> "Lecturers, such as Dr… He is amazing in teaching where he elaborates in explaining everything and doesn't mind repeating the materials till we understand it fully, and he uses different learning tools such as Data Show, not like other professors who use only traditional learning tools such as paper hand-outs." [Student f 1WS1E].

A student who attended the participative workshop, referred to the researcher's own delivery in the session in a positive way:

> "As for your teaching style, it was very simple and easy. You made us feel very comfortable and it felt like our older brother advising us and teaching us the material in a very humble way. I am not just saying that because you are here but this is what I truly believe: your interaction and follow up with the students were very important during the time at the workshop." [Student f3WS1E].

The inference is that effectiveness of the learning experience is tied to the attitude and demeanour of the teacher. Students in Kuwait are accustomed to their lecturers and professors being remote and disengaged from their students, whereas what they desire are teachers who are approachable, prepared to go over topics in different

ways so that they are understood, and can empathise with the needs of those they are instructing (Laurillard, 2013).

9.2.3 Passionate teaching

Although students differed to some extent when expressing the ideal teaching approach they felt was needed, they often commented on the benefit of a "teacher's willingness to teach"; in other words, a good teaching experience tended to come when lecturers were willing to put effort into their teaching. When asked about the various ways of teaching she had come across, one student said:

> "Some professors only care about the grades and getting the right answers, like Dr. T, while others make the effort to teach and make the students understand the material fully in an interesting way. So it depends on the teachers themselves." [Student f2WS1E].

When asked about teaching qualities and their effects on understanding, the same student remarked:

> "If the student feels that the teacher is giving all of his efforts in teaching, then this will encourage the student to do the same and work even harder to understand everything related to the material given to him and vice versa." [Student f2WS1E].

Other participants described additional qualities of effective lecturers, for example:

> "He or she must love their profession, or love what he is doing. He must be patient. He must have the ability to repeat the information more than once. These characteristics must be in a good teacher…. A teacher must be a guide to the student. He must be an understanding person and he must help students in all the ways to succeed… A

> teacher must make the education process easy and be flexible." [Student f13WS5D].

Passion and enthusiasm for their subject were seen as strongly positive qualities in teachers. It was felt that these qualities would transmit themselves to the class and help motivate students (Carbonneau, Vallerand, Fernet, and Guay, 2008).

9.2.4 Other factors

Other factors that might possibly affect the teaching approach and style of a lecturer are the individual's nationality, place of obtaining his or her degree, and age. Some students indicated that when working with lecturers from different a nationality they tend to be more relaxed while working with them. On the other hand when working with Kuwaiti national lecturers they tend to be more reserved, cautious and inclined to hold back. However, some indicated that working with non-Kuwaiti lecturers they felt sometimes that they needed to clarify things more to understand a point made by a lecturer.

When one student was asked about whether she preferred a teacher who was young or old, she replied:

"It depends on the teacher. I have seen professors who were young in age yet so complicated, and we can communicate much better with an older teacher, and some older teachers I found full of enthusiasm and life. At the same time there were some teachers, regardless of age, who were careless and did not convey their message properly. I felt that they were putting no effort into teaching. They just use repeated examples and exercises and copied them during the period of the course." [Student f1WS1E].

9.2.4.1 Relationship between student and lecturer

Some students talked about the effectiveness of current teaching in terms of the relationship between the student and the lecturer. When asked about where the responsibility in teaching lay, one student replied:

> "Students also play a role too. Some students do not make the effort to understand and fully absorb the material. Other students ask and do their best to communicate with the teacher to enhance their understanding, but [this is] no use with many teachers." [Student f2WS1E].

One of the drawbacks of the traditional teaching approach, which was expressed during the interviews, is the belief that learning only comes from the teacher and not from the student as a partner in the learning experience. When students were asked about the main source of information in learning, one of them replied:

> "Of course the teacher, because this is his/her job to deliver the information to the learner…. I believe the teacher holds the most important role in this matter. The teacher can influence the students or can make them even hate the education or the subject itself." [Student f13WS5D].

Engaging students in the learning process and helping them to become independent and autonomous learners is a key challenge for the new module (Crome, Farrar, and O'Connor, 2009). There is plenty of research to suggest methods to do this, including factors already discussed such as enthusiasm and encouragement on the part of the teacher, participative workshops, the introduction of new material on a gradual, accessible, and stepwise basis, and rewarding innovative and original work (Reeve and Jang, 2006).

Some students reported that they were hesitant at the start of the participatory workshop because of the lack of step-by-step guidance from the lecturer. According to one:

> "In the beginning, I was a bit shy because I wasn't sure that I had the right answers and we expected that the professor would answer all the questions since he is a professor and of course older than us. But as time went by we forgot that we had a professor and started to have group discussions where everyone shared their opinions and thoughts." [Student f21 WS8mix].

This uncertainty on the part of the student can be seen as an effect of the traditional didactic teaching approach in which lecturers effectively spoon-feed information, making students highly reliant on them when faced with new learning situations and also dependent on memorization.

Some students pointed to personnel differences and concerns about their experiences in the participatory workshop. One female student remarked:

> "I'm a quiet person in nature, so I had a bit of difficulty getting my voice heard." [Student f22 WS8mix].

She went on:

> "One of my colleagues in the group had very strong opinions and wanted her voice to be [the] only [one] heard, but having the professor in the group allowed us all [to] share our information equally, regardless of how loud your voice was." [Student f22 WS8mix].

This suggests that a significant advantage of having a lecturer as part of the team is to reduce or eliminate any potential conflict during group work.

Students found that working with a faculty member of staff offered a unique experience. One of the students commented:

> "I have never been in a workshop of such a nature. It was so much fun and informative when we teamed up with a professor to suggest ecological solutions." [Student m19 WS7mix].

Another student said:

> "It's the first time we formed teams in our design major and on top of that a professor joined us to be part of our group." [Student f21 WS8mix].

A third student expressed the enthusiasm felt by the group when engaged in this kind of participatory environment, contrasting it with the reaction to the formal didactic setting:

> "We were competing with each other and so excited to finish first and write down all of our answers on the sticky notes on the board. So we never felt the time, unlike usual classes where one hour feels like eternity and most of us feel so bored after five minutes of the class." [Student m20 WS7mix].

Yet another student said:

> "I think if there are more workshops like your workshop, students will have an exciting learning experience" [Student f22 WS8mix].

There was a widespread feeling among those taking part that this new experience of working with lecturers, hand in hand in a productive atmosphere, was a welcome departure from the old style of following exactly what the teacher said, memorisation, and absence of student input and participation. The learning

experience in the participatory workshop was generally found to be more interesting, fruitful, and enjoyable.

> "It was so much fun because I felt that we were playing a game and, along with this game, we were sharing experiences and information, and it did not have a lot of lecturing or only listening to the teacher" [Student f22 WS8mix].

The students felt that, because of the more relaxed and pleasant atmosphere in which they were working, they tended to be more productive and fully engaged with their lecturer.

Co-working as equal partners with lecturers also empowered students and helped them to engage more in what was going on and to think for themselves. Students felt that this kind of dynamic teaching made them more interested in learning, something that they have never experienced from the traditional teaching methods with which they were familiar. One student uses the term "being alive" to describe his experience:

> "We were alive and participating in the discussion" [Student f21 WS8mix].

Another student spoke of the advantage of working alongside the lecturer:

> "Having a teacher in our group minimized the gap between the teacher and the students, and such workshops can break the boring routine which a classic lecture can have but it also depends on the teacher" [Student m19 WS7mix].

The strong indication then is that positioning the student as an equal partner in the learning experience enhances enthusiasm and makes this an effective teaching method even in the case of students who are not used to such participation.

Still on the subject of the student-lecturer relationship, students were asked how they would like to see this develop in future teachers. One student opined:

> "They must be a guide and a real teacher… not be afraid of sharing their subject, because students can never take their places, so [they do] not [need] to fear for their positions. It's not a challenge to fail. I don't think that there is such personality abroad, only here in our country, I think." [Student f13WS5D].

This implies that some students are so reliant on the lecturer that they actually believe that the latter is withholding information from them, so that even in an age when technology and information from the Internet is readily accessible by everyone, the teacher is held to have a position of superiority.

Another student described the relationship between teachers and students in this way:

> "Some teachers go down to the student's level to deliver the information easily. This type of teacher you find them humble, kind, and understanding. The information delivered by this teacher will be absorbed like a sponge by the students and will be engraved in the student's mind forever because they like the teacher. Like what we had in the workshop. Other teachers are quite the opposite: they just dump the information on the students with no interaction whatsoever with the students. Basically it depends on the student's luck!" [Student f3WS1E].

Thus respondents saw a good student-teacher relationship as being crucial in raising the level of interest and the willingness of the student to learn, and thereby achieving a better understanding of the topic. It was also regarded as important that the relationship between student and teacher be based on respect and tolerance (Cornelius-White, 2007). When asked about the different teaching styles that student had during their time in college, one respondent said:

> "Again, it depends on the student's luck. [M]ost of our work is projects where we have to use our hands. As an A student I go after the teacher and try my best to get his help to achieve the required work. It is a teamwork between the teacher and the students. But some teachers, when I ask for help, get mad and sometimes they even shout at us. On the other hand, there are some students do not want to work at all or even try." [Student f3WS1E].

Another student commented:

> "So the correct communication would break the fear factor_of the student to bond with the teacher. Unfortunately, some professors do not explain well and leave us without understanding our discipline, although we are the future teachers and this cannot prepare us to deal with our future students." [Student f1WS1E].

From these remarks, it is clear that the temperament and attitude of the teacher is considered very significant in the learning process. Students value qualities such as empathy, patience, and good communication skills in those who are teaching them, irrespective of the format of the delivery (Entwhistle, 2013).

9.3 Teaching techniques

When comparing the respondents' feedback on teaching techniques and style used in the participatory and didactic workshops, some differences became apparent. A student from the participatory workshop remarked:

> "Honestly, I really enjoyed the workshop because you used different approaches in it. I liked your presentation using PowerPoint, and the group discussions, exercise, and activities." [Student f3WS1E].

On the other hand, a student from the didactic workshop, when asked if she had learned something new or if she had been stimulated by any of the teaching methods, commented:

> "Like I said it was a regular lecture that didn't affect me and I wasn't interested, honestly." [Student f13WS5D].

Students made many suggestions for teaching techniques that could be used for the new module. One of the concerns repeatedly expressed to the researcher was the emphasis placed, in traditional teaching, on memorisation, even in a discipline such as interior design that is supposed to encourage student creativity. Restructuring the module around multiple teaching methods can help avoid this problem, as explained by this student:

> "I meant that the usual way of teaching for me is the worst thing, because most modules rely on good memory to pass and I am weak in memorisation. That is why I decided to study interior design because I thought that we wouldn't need to memorise our subjects since drawing and sketching is a big part of the programme. But I came to realise that even within this area of study you need to memorise. However, this is

> not the case when I take some modules with certain tutors who use different techniques of explaining the points of the subject." [Student f1WS1E].

Another student expressed the drawbacks of traditional teaching techniques that rely on memorisation and students to avoid teachers who are known to use this approach:

> "I still remember one of the professors who used to be very bookish…. and he used to teach this subject [his way] and no one else's…. and we had to [do it his way] in order to graduate. It was a dilemma, for example some teachers give you information and ask you to memorise it their way, and say it or mention it in the test [this] way. And they are very well known, these personalities, even before we enrol with [them]." [Student f13WS5D].

On the other hand, to some students in the participation workshop there are challenges in having the teacher present on an equal footing. One made the comment:

> "When Dr. D was with us, we were embarrassed to share our opinions because we might be wrong. But Dr. D encouraged us to speak up and talk till we forgot that she was a teacher and we were all on the same level when we answered the questions." [Student f21 WS8mix].

This emphasises the importance of having a lecturer with the ability to reassure students, give them confidence to interact freely within the group, and guide them through this new experience. With regard to the effectiveness of the lecturer, one student remarked:

> "It depends on the nature of the teacher. For example, if the teacher was rigid in his dealings with the students, similar workshops wouldn't be so successful because the students would not cooperate with the teacher due to lack of interest. But if the teacher was enthusiastic in his teaching and shared his love of the material with the students then similar workshops would be a great and vital tool to deliver … the information to the students" [Student m20 WS7mix].

Students pointed to a number of teaching techniques that they felt were valuable. One of these was using simple tools such as post-it notes. Said one participant:

> "Using post-it stickers on the board was my first time I have ever used this approach in school. It kind-of made some action between us: we started challenging and daring each other who can write the most on the board and who has the best handwriting, etc." [Student f21 WS8mix].

Other exercises that were recommended included using games and challenges, group discussions, group tasks, and using multimedia in presenting their work. One student spoke about:

> "Using different tools to deliver the information, whether to extract the information from the student in group discussions, having a teamwork exercise to share the different students' experiences and backgrounds, using projectors and videos, or even playing different games and challenges" [Student f22 WS8mix].

Another student emphasised the advantage of using a variety of teaching techniques and approaches:

> "having different approaches and styles every once in a while, and not having the same repetitive boring … classes" [Student m20 WS7mix].

Some students commented on how using new and different teaching techniques might not be effective without having a passionate lecturer who is able to push and assist student to use this new approach. One student also felt that the key to a successful learning environment was:

> "having multiple teaching tools, more exciting assignments, having an enthusiastic teachers, encouraging the students to participate more using spot gifts, such as extra credit or simply by round of applause" [Student f22 WS8mix].

Students also recommended that lecturers be careful and thoughtful in their choice of assignments. Said one:

"Teachers should not use the same repetitive assignment for each class, but the assignment should be compatible with the students' level of understanding and the students' different interests. For example, teachers should have open communication channels with the students to ask them and understand what do they need to learn and what to focus on based on the students' needs and competencies" [Student f21 WS8mix].

9.3.1 Use of multiple techniques

When asked about whether the way material is presented affects the learning process, one respondent said:

> "Yes, indeed, if the PowerPoint presentation is not well planned, then the information would not be conveyed correctly and the student would not understand the material." [Student f1WS1E].

When asked what is the best learning tool that teachers can use in class, one student said:

> "The best learning tool is using PowerPoint, explaining in detail the steps of doing any assignment. Then we can apply what we learn to any project given to us, or any application, while we are in the class, so the teacher can help us, like Dr. S who is using this method. But other professors give us the assignment without PowerPoint and just explain the steps theoretically and ask us to conduct the work at home. The result [is] that almost none of us would do the assignment correctly." [Student f2WS1E].

Also another student said this about the best teaching techniques:

> "A professor who is using multiple teaching tools, such as PowerPoint, group exercises, and even humour in a straightforward teaching style, means [that] the teacher has to pay attention to the personal differences of each student, using different tools that serve the purpose of the material whether by having a presentation, having a projector, playing a video, or even going out on a field trip." [Student 3WS1E].

The above statements indicate that students are likely to understand the subject of the module better if a number of teaching techniques are used. Some of these techniques may be technological, such as using special software packages to deliver the learning outcome, others may involve exercises designed to be solved by students individually or in groups, or the use of teaching skills such as teaching in a fun atmosphere by having a sense of humour to draw students' attention to certain subjects.

9.3.2 Group work techniques

Students from the participatory workshop were excited when working in groups. One student made the following comments about her experience:

> "I like when you made us work in groups and the same time you asked each person to list what she did so the workload would be distributed evenly." [Student f2WS1E].

Another student from the participatory workshop, when asked if there was no interaction between students among themselves and the lecturer in the class would they think that the information would be delivered successfully to the students, replied:

> "Absolutely not. For example, in the workshop, when you used to visit each group you used to ask us and guide us if we were stuck, so we can create the idea by ourselves instead of just stuffing our heads with information." [Student 3WS1E].

Students expressed the view that group work provided them with a good experience and new skills that they had never tried before. The designed module should have as one of its central features a variety of group tasks and exercises. In addition, having groups take part in assessing other groups of students could provide a valuable opportunity to encourage students to accept critique from their peers and develop new skills in discussing and defending their ideas.

Figure 27: Photo shows the students working in group and discussing their ideas openly

9.3.3 Up-to-date techniques

Students expressed a desire to have new and up-to-date techniques that meet their expectations and raise their enthusiasm to learn. One student, when asked about what she thought was the ideal teaching method or the ideal teacher, replied:

"Education must be up-to-date and modern because it's a whole science that has a lot of theories, so the teacher must know his field and how to teach and the science of teaching." [Student f13WS5D].

9.3.4 Simplicity of the lesson techniques

Students stressed that simplicity, a straightforward approach, and joyful learning were important in achieving a better understanding. When asked if the way of explaining or elaborating the information by the teacher affected their understanding, and how, one student replied:

> "Some of the teachers simplify the lesson, whereas others make it even more difficult. And it depends on the personality of the

> teachers… some teachers are traditional and some of them are professional and creative." [Student f13WS5D].

Such comments suggest that lecturers should focus on maintaining simple and creative ways of teaching. Giving thought to the provision of examples, or to the timing of this provision, can simplify the process by which students come to understand a subject. Although maintaining a certain level of complex cognitive thinking is important for students to be able to grasp a wide range of ecological topics and real life challenges, this complexity should not be apparent in the teaching itself. Therefore, when devising ways of teaching and assessing the sustainability module it is important to adopt the simplest and clearest measures.

9.4 Activities and strategies in teaching

Some detailed recommendations have emerged from the respondents that describe the coursework needed and the activities and new strategies that should be developed and incorporated in the new module.

9.4.1 Variety of tasks and supportive strategies to motivate research

When asked about the strategy of teaching that her current lecturer used when requesting course exercises, one student replied:

> "She usually gives multiple exercises but due to pressing time, she gave us one exercise." [Student f1WS1E].

This lack of flexibility was referred to in many cases with regard to traditional teaching methods. The above response indicates the need to avoid using just one type of assignment to assess students. Furthermore, lecturers should appreciate that students can be more creative when more than one type of assessment is used. In

light of this, the new module should allow for multiple forms of student assignments and exercises.

The use of other supportive activities that give students the ability to choose what is suitable for them, and freedom that allows them to meet the course requirement without being restrained by the lecturer choices, was also considered important. When, in regard to assignments, one student was asked what she thought was the best way to enhance the learning experience, she replied:

> "I prefer giving different choices to the students depending on their personal skills and preferences. For example, I hate writing essays and prefer doing research projects, so the teacher can give different options to the students and the students can choose depending on their personal differences." [Student f3WS1E].

Another student said:

> "Instead of having a test that is 100 out of 100, the mark should have a space to provide students with bonus marks between projects, activities, or researches so that student can collect some marks to balance out the subjects that they did not understand." [Student f13WS5D].

The above responses indicate the need to use extra marks and bonuses to stimulate student engagement in the module. Furthermore, lecturers should understand individual differences between students and that each student can be more creative when several bonuses are used during assessments and group work. The design of the new module should incorporate the possibility of awarding extra marks to

motivate and encourage students, for example if a student, of their own initiative conducts further research into a subject.

9.4.2 Length and delivery of assignments

Students indicated that the length of assignments, and the limited time given in which to complete them, can have an impact on learning. One student commented:

> "What I hate the most is long assignments and that we have to finish at home without practicing it during the class time with no teacher support." [Student f2WS1E].

In designing the module, thought should be given to balancing out the length of the assignment or project to be completed. There should be a focus on what the student needs to gain from each exercise, keep exercises to a manageable number and length, and every effort made to ensure that learning outcomes are achieved in class rather than leaving students to struggle with them on their own.

9.4.3 Gradual exercise strategies

Some students raised the notion of understanding subjects through developing building blocks to create a secure foundation for the module. This can be implemented by starting with small exercises then expanding in accordance with the time and resources available. When discussing with a student which approach would benefit the learning if the assignments were made shorter and greater in number, rather than having currently one or two long assignments, one student replied:

> "You have to know that it's a short semester. Dr. D did a great job where she built for us strong basics of understanding the material. We started designing one room then we started designing a whole apartment like this. So I prefer having one long assignment but in short

> segments, to just one long project or multiple different short assignments." [Student f3WS1E].

The above statement suggests that assignments and projects that students are expected to complete should match their capabilities in order to align the assessment with learning outcome of the module. Students tend to have an intense semester, with many assignments and assessments from different modules, as a consequence of which they might lose focus on what they are expected to learn from the module. Therefore, when designing the module, assignments and projects should be arranged in segments and progressed through gradually. By dealing with projects that grow and develop step by step, students may achieve a better understanding and be able to assimilate new ecological concepts more easily.

9.5 Questionnaire

Ten of the propositions on the questionnaire, the results of which were presented along with all the other quantitative data in Chapter 8, bear upon the subject of this chapter.

Five of these propositions are from the design context section of the questionnaire, namely:

1. Preparing educational modules in interior design should only be done by the teacher.

2. Assessing student work during the course should be done only by teachers.

3. Group work assists students to develop skills that are necessary in his discipline in interior design.

4. Good designers must excel in only needed expertise from their own discipline and do not need to be familiar with other disciplines to be effective.

5. Good designers need to have effective social and cultural skills to communicate with a particular audience or society.

Five propositions are from the process context section:

13. Design students need more field and training courses to enhance their personal and professional skills.

14. Design student need a number of workshops/ seminars outside their field or area of study.

16. Workshops or general training courses provided during study are important in developing additional skills for the designer.

17. Design students should develop communications and persuasion skills to present their designs.

18. Design students need to study subjects that develop explorational and reasoning.

The significance of the responses, in the form of mean Likert scores, elicited from students who attended both the didactic and participative workshops will be discussed along with the outcomes from the qualitative will be examined in the discussion (section 8.8) below.

9.6 Carousel

The carousel consisted of a series of questions on A1 sheets, concerning ways to improve teaching and student engagement, to which participants were asked to reply

in the form of suggestions written on sticky notes. The questions are shown below together with the responses received.

> Q1: What are the possibilities for exciting and innovative ways to increase students' engagement to help learn required topics?

Female participants made the following suggestions with regard to this question: add training courses (5), use a variety of teaching techniques (3), use media and signposts (3), bring more fun into teaching (2), work in groups (2), encourage competition in teams (2), use the Internet and videos, offer workshops, create models, use new teaching methods, create design shows, allow time to reflect, bring in role-play learning for students, offer prizes, allow students to take part in evaluating work, provide time to relax, ensure good teaching preparation, link exercises with reality, and prepare an adequate teaching location. Male participants suggested the following: employ more activities and challenges (2), use documentary videos, use new approaches to create design models, include exercises that emphasise culture and heritage, make lectures less formal, plan field trips, ask stimulating questions, have activities that involve using social media, include discussion sessions among student while the lecturer attends, allow for participation of the lecturer with the students in joint work, and develop students' ideas in different design disciplines.

> Q2: What can be done to break down traditional relationships between the teacher and the learner?

In response to this, female participants made the following suggestions: allow freedom in discussion and offering opinions, enable participation in the work, allow freedom to choose what to work on and the tools to use, teach with modesty, consideration, and humour, use fun teaching techniques, avoid showing contempt

toward students, encourage students not to be shy, and give students the chance to teach to increase self-confidence. Males posted the following comments: include more group work, respect students' ideas, enable better communication between teacher and student, reduce the theoretical side of topics, give students a chance to show their abilities, remove the fear to discuss with lecturers concerns about getting low grades, provide activities between students and lecturers, take advantage of the college camping site, encourage social networking between students and teachers, plan more field trips, facilitate communication with teachers outside lecture time, listen to students, accept the opinions of others, and visit places outside the college.

Q3: What would be the best kind of place to work on these topics?

Females suggested the following: cultural locations (2), open spaces (2), coastal areas (2), cultural exhibitions, gardens, in class, workshops in other colleges, museums, workshop space, Kuwait Towers, coffee shops, mosques' gardens, desert, scientific centres, art galleries, an aquarium, and calm places. Male respondents suggested: art galleries, lectures outside the class, visiting involved organisations, visiting protected natural areas, visiting handcraft galleries, shops that sell natural products and those that don't, and factories that manufacture building materials, parks, the desert places that are environmentally damaged, art galleries, museums, and historical sites.

Q4: What are the things that are already being done that we should make sure to keep or build upon?

Female respondents offered the following suggestions: maintain goals (2), student design shows, field trips related to the module, keeping things simple, increased participation, understanding individual differences, enhanced use of technology,

discussions by students, encourage discussion between students, simplify the module topics, accept late submissions, relaxed attendance for students to enter class, ability to leave class once finished, increasing experience and individual skills, and the importance of culture. Male participants responded with the following: more field trips (3), design models, use of the Internet, use of PowerPoint presentations in teaching, reviewing previously discussed information before introducing new information, emphasis of the importance of culture, national identity, and Islamic culture, modesty of teacher toward the student, and increased use of communication using social media between the teacher and students.

Q5: What kind of assessment would encourage students to work better and improve learning?

Females responded with the following suggestions: bonus grades to encourage students (3), use of teams and group work (2), detailed grades to make student aware of their level, discussion by students of their work publicly to prove their understanding of their projects, student design shows, exercises that involve the students' families, and student self-assessment and assessment of others. Males provided the following responses: encouraging students to hold exhibitions (2), design shows each semester and assessments of the work, making the assessment criteria clear for students, open discussion between the lecturer and students for about the assessments of work, creation of activities that encourage students to work outside classrooms, incorporation of activities and challenges, and encouragement of students to do presentations so that they fully understand their work.

9.7 Evaluation during mixed workshop

For this workshop two different lecturers, one for each gender, attended and participated with students. Their experiences were generally very positive as reflected in the comments of the lecturer. One said:

> "Of course it was useful, and students had fruitful experience with mental and knowledgeable skills" [Dr. D., Mix F].

The other commented:

> "It helped to remove the barrier that is between the doctor and the students, which resulted in students being more productive and outgoing" [Dr. A., Mix F].

Lecturers pointed out a number of strengths and weaknesses of the workshop. As to the former, Dr. D. commented:

> "I found the points of strength lay in the movement and the dynamic of the workshop, significance of the subjects, the speed in changing the tasks, the use of fun and the avoidance of boredom, arranging the discussion and topics in a logical order, the materials used were adequate to the tasks."

On the downside, she said:

> "I see a weakness that is beyond the responsibility of the researcher which is the late attendance by students, as they were coming from other lectures" [Dr. D., Mix F].

Dr. A. saw strengths of the workshop are in the use of group techniques and activities, along with the application of simple methods such as brainstorming and the use of sticky notes. He also highlighted a couple of weaknesses:

> "Group activities take some time, because of the side discussions that might delay the work. I also noticed that not all of the group were participating together" [Dr. A., Mix F].

Dr. K. emphasised the value of the workshop in conveying ideas in sustainability:

> "Knowing natural materials and how to benefit from them as well as knowing the importance of ecological design for the student is a real strength of this workshop" [Dr. K., Mix M]

He also pointed out weaknesses as being

> "lack of time and in presenting images" [Dr. K., Mix M]

Dr. A. [Mixed F] pointed to what he believed to be the most effective of the techniques and methods used:

1. Brain-storming method (group sketch).
2. Group work.
3. Group assessment by students.

A summary of the feedback from students when asked about the strengths of the workshop is provided in the following table:

Table 33: Students comments and feedback of workshop

Q2 Workshop strength	
Student	**Feedback**
1 mix f	Time management which resulted in pushing us to innovate and engage with anything in hand.
2 mix f	The type of topics that were discussed. Engagement and collaboration between students.
3 mix f	Group work and activities. Lecturer participation with student. There are no weaknesses!
4 mix f	Full of details. Inclusive to all of our suggestions. Lecturer participation.
5 mix f	Communication between students and lecturers. Reaching agreement between students and lecturers. Solving any difficulties.
6 mix f	Challenge and discussion, fun and breaking the routine.
7 mix f	Challenge. Encouragement. Topic order. Student excitement.
8 mix f	Giving honest opinions.
9 mix f	Ideas are linked.
10 mix f	Work spirit and collaboration.
11 mix f	Speed of understanding the topics. Group work.
12 mix f	Collaboration. Fun and enjoyment.
13 mix f	Creating a simple prise for the winning team.
1 mix m	Creating groups and a challenge between them.
2 mix m	Number of groups to create a challenge between them.

3 mix m	The way of running the workshop helps on showing all the ideas out of the student. Excellent.
5 mix m	The questions had a clear and a simple way. It was something new to us and very useful.

When asked to suggest three key elements to be included in the new module, students responded as shown in the following table:

Table 34: Students response to three key elements that they suggested to be included in the new module

Q3 Key points	
Student	**Feedback**
1 mix f	Group interaction Preparing student for subjects Lecturers should be as group members
2 mix f	Lecturers should be flexible and easy to understand. Lecturers should consider individual output. Lecturers should make topics much simpler.
3 mix f	Designs should consider culture and traditions. Using nature as a source of inspiration.
4 mix f	Giving students freedom to design. Ways in recycling natural waste in the design (new idea to society). Placing a coffee machine near the class
5 mix f	Producing a simplified module. The module should be realistic and considerate to students capabilities. Group work.

	Fun atmosphere.
6 mix f	Collaboration. Closeness between students and lecturers. Tasks and exercises similar to the group brain storming
7 mix f	Teaching the right materials and how to use them. Uses of natural materials. Learning new ways in designs.
8 mix f	Constant movement. Joyful exercises. Giving freedom for honest opinions.
9 mix f	Subject idea. Participation of thoughts. Connecting to reality.
10 mix f	Choosing designs with a purpose. Craft works. Capability in selecting modern and technological designs that suits their interest and age. Freedom to choose different learning spaces and not only the class room.
11 mix f	Information should be useful. Considering individual differences. Simplified approach.
12 mix f	Groups. Collaboration. Spirit for challenge Freedom of opinion and choice
13 mix f	Group work. Giving time.

	Designs and projects should be realistic.
1 mix m	Communicating with students. Using simple ways to deliver information's in different methods. Discussion after finishing tasks.
3 mix m	Giving examples then explaining the material with the aid of images and visuals. At least making three visits to sites in Kuwait that consist of ecological design philosophy. Keeping things simple because the module might consist of small and detailed parts that might be difficult to understand.
5 mix m	Lecturer should use power point. Giving students incentives and encouragements. Communication between student and lecturer so that the students likes the module.

9.8 Student and staff opinions on the content of the new module

9.8.1 Interviews

Participants at this stage of the study had gained experience from attending the first didactic or participatory workshop. When asked what they felt were the most important or pertinent topics to be included in the ecology module, some mentioned recycling and the use of this approach in all aspects of ecological thinking. One student remarked: "The most vital concept is to include recycling in our ecological design in its all phases." [Student f21 WS8mix]. Another student stated: "We should incorporate the recycling plan in designing different units in houses and apartments like in the kitchens to segregate the garbage." [Student m20 WS7mix].

A third student emphasised the importance to the environment of their cultural heritage: “I learned how we should focus on designing green buildings in accordance with the heritage and ecological environment to make a harmony between the building and the surroundings.” [Student f22 WS8mix].

9.8.2 Topic suggestions

Students attending the workshops were asked to identify specific topics they would like to see included in the new module, as well as broad ecological and design topic areas that they would wish to be covered. The responses from male and female participants with regard to specific topics is summarised in Table 33.

Table 35: Responses from male and female participants to specific topics

Female workshop	Male workshop
Inspiration for design elements from the environment	Definition of the natural environment
Topics related to the sea, desert, and local vegetation	Use of materials found in Kuwaiti environment
Use of materials and tools friendly to the environment	Use of natural materials and knowledge of how to extract and use them
Influence of Islamic and other local culture influence on design (in patterns, geometric forms, etc.)	Insulation from heat and cold using natural techniques
Cultural handcrafts and their relation to design	Waste and general recycling
Design influences of the different settings of men, women, and children	Use of designs compatible with the natural environment.
Incorporation of ecological environmental elements into interior design	Use of colours found in nature
Use of abstract elements from nature and culture in design	Use organic materials
Use of environmentally friendly materials	Design sensitive to the local cultural environment
Design of windows and openings appropriate to the environment	Use of local materials, e.g., palm trees, mud, rocks, sand
Recycling of old and salvaged materials (textile, wood, metals, etc.) and their incorporation in design	Energy saving

Fusing of artistic design with ecology	Use of vernacular (local and natural) design
Preservation with regard to materials, culture, and designs	Use of solar energy
Use of local materials	Use and reuse of wood and metals
Use of natural materials in furniture, such as wool and leather	Recycling of clay works and sculptures.
Use of colours that relate to the environment	Understanding of childrens' art in order to communicate with the younger generation
Us of patterns from plants and organic materials in design	Use of software to design to minimise use of materials
Orientation of the design direction to maximise use of natural light	
Use of patterns from plants and organic materials	
Considerations of circulation and movement with regard to the culture and traditions	
Use of interior gardens	
Solar energy as a power source	
Addition of water fountains to cool spaces without using air conditioning.	
Placement of recycling bins in the design layout	
Using of fish tanks as a design feature to serve a natural aesthetic and functional element	
Creation of wallpapers with ecological elements or patterns	

Table 34 shows the ecological and design topic areas that students indicated as being important to include in the module. The first five in each case were suggested by the researcher in order that participants would understand what was being asked of them.

Table 36: Responses on both ecological and design topics

Topic areas	
Ecological topic areas	**Design topic areas**
Recycling	Furniture
Energy	Colours
Plants	Form
Living creatures	Decorations
Natural material	Materials
Air quality	Patterns
Thriftiness	Tools
Economic	Lines

Natural light	Accessories
Insolation	Sculptures
Inspiration from nature	Spaces
Harmony	Layout
Comfort	Touch
Carbon emissions	Light
Manufacturing	Geometric forms
Natural material	Fashion
Wood works	Textiles
Natural environment	Decoupage art on furniture
Raw materials, rocks and wood	Cultural crafts
Desert environment	Women patterns
Costal environment	Men patterns
Religion and believes	Culture
Local and regional culture	Shadows
Female culture	Minerals
Male culture	Wood
Natural inspired colours	Choosing an effective design philosophy
Organic patterns	Local design
Gardening	Technology in the design
Pollution	
Cleansing and filtration	
Green planes	
Indoor plants	
Deforestation	
Water recycling	
Desert life	
Not relying on oil	
Emphasising culture and religion	
Green buildings	
Information and policies	
Surroundings	

9.8.3 Workshop evaluation

Teaching staff in the department of design at KEI, whose students took part in the workshops and who attended these workshops themselves, were asked to identify

three key points that they would wish to see included in the new ecological module. Several of the staff members made suggestions that were to do with content (as distinct from teaching style or approach).

Dr. D. [mixed female group] responded as follows: "1. The influence of Islamic heritage on the design elements. 2. The use of local geometric and organic (natural) elements in abstract art components. 3. The foundations of design and its relation to local culture." Dr. K. [mixed male group] gave priority to: states the following "1. Identifying green architecture and its importance. 2. Familiarisation with worldwide case studies on sustainable designs. 3. Learning the philosophy behind environmental design." Finally, Dr. A. [mixed male group] listed as his key items: "1. The importance of connecting interior design with the natural environment. 2. Ways to design and consider recycling materials or waste. 3. Utilisation of natural elements in all of our designs."

9.9 Discussion

Certain features of what students considered to be important in an effective teacher or an effective teaching module emerged from the various forms of data collection – interview, questionnaire, and carousel – used as input to the central question of this chapter (What kind of teaching do participants think is needed in the new module?). Significant among these was the personality and approach of the lecturer: whether they encouraged interaction with, and expression of opinions by, the students, and whether they were traditionally didactic to the extent of insisting on learning by memorisation and by repeating, in examinations, exactly what was taught in class (Biggs, 2011). A number of students commented in sections 9.2, 9.3, and 9.6 that they did not like this method of teaching, did not feel that they learned well by it, and

would actively avoid teachers who were regarded as too bookish or dictatorial. There was a preference for classes in which students were allowed to express themselves and in which they were engaged and stimulated through the use of a variety of teaching methods. Among the personal characteristics of teachers valued by students were patience, a willingness to go over topics that were not understood, a passion for the subject, and a sense of humour (Kneipp, Kelly, Biscoe, and Richard, 2010).

Students emphasised the importance of using multiple methods of teaching, including PowerPoint presentations, videos, and group tasks (Wingfield and Black, 2005). It was also said, during the interviews, that it would be preferable for long projects to broken down into a series of small tasks or exercises.

The results of the questionnaire demonstrated that, although students valued a good relationship with their teachers and wanted to be engaged and creatively challenged through participatory workshops, they felt quite strongly that preparing educational modules and assessing work was exclusively the responsibility of the teacher. It was also felt that group work was important in developing the skills needed by an interior designer, and that to be successful designers needed to be able to communicate well. This response was compatible with the high mean Likert scores for proposition Q13 (Design students need more field and training courses to enhance their personal and professional skills). On the other hand, although, based on the responses to Q4, students were fairly neutral about whether or not it was important for interior designers to be familiar with disciplines outside their own, there was moderate to strong agreement with Q14 (Design students need a number of workshops or seminars outside their field or area of study). Likewise, there was moderate to strong agreement for propositions Q16, Q17, and Q18 concerning the importance of design

students developing communication, persuasion, and other skills to convey the merits of their work to others, and also of developing explorational and reasoning skills.

The carousel proved to be a particularly effective tool for brainstorming ideas that students thought would help increase the effectiveness of the teaching process and the modules delivered by lecturers. Many of these ideas revolved around the themes of greater openness and flexibility on the part of the lecturer, and greater scope for self-expression and engagement on the part of the student.

A number of points emerged from the interviews conducted with lecturers following workshops. The feedback concerning the participatory workshops was generally positive. Advantages were seen in being able to switch between topics quickly, and encouraging students to be more engaged and expressive. On the downside, it was felt that participatory classes were more time-consuming to prepare and could result in time being wasted if students strayed off topic, for example, by engaging in side discussions. It was also noticed that the level of participation varied considerably between students. However, this last point could be partly explained by the fact that most of the students involved were new to this type of teaching and, in some cases, might be reluctant to put forward their own ideas and opinions.

9.10 Conclusions

Participants in both types of workshops, didactic and participatory, when questioned about teaching style and techniques, were emphatic in their preference for a move away from the traditional, dictatorial method of teaching in which students are compelled to memorise exactly what they are told or handed out, to a more open, relaxed, engaging format in which self-expression and group projects are emphasised along with a variety of modern teaching techniques. The data collected through the

interviews, questionnaires, and carousel, were broadly consistent with a desire that any future teaching module should be delivered using a panoply of up-to-date methods, including PowerPoint, videos, greater use of the Internet, group exercises, creating models, and design shows. There was a desire for teachers to be more approachable, patient, respectful of student's ideas, interactive with students, and informal.

On some issues, there was ambiguity. For example, the results of the questionnaire tended to suggest that respondents felt that developing teaching modules and assessing student's work should be done exclusively by the lecturer, whereas in the interviews and some comments posted to the carousel, there were suggestions that students should be consulted about the content of future modules and be able to do some self and group assessment.

Overall, students were enthusiastic about being allowed more scope for creativity, active participation, exploration of novel ideas, and the opportunity to express their views in class and to display their work in the form of shows. The didactic approach was seen as being alien to the nature of the subject, and the old-style forming of teaching unhelpful to the learning process.

A diversity of opinions and suggestions emerged from the qualitative data collection bearing on the issue of the new module's content. A recurrent theme was the embedding of ecological and sustainability considerations in a local context, with regard to the natural environment, biological and non-biological, and the cultural and religious heritage. It was widely felt that design should be sympathetic with the surroundings, both in form and function, and also with the Islamic and other historical traditions of the country. Local geometric and organic influences should be adopted where appropriate, and buildings and their components, including interiors,

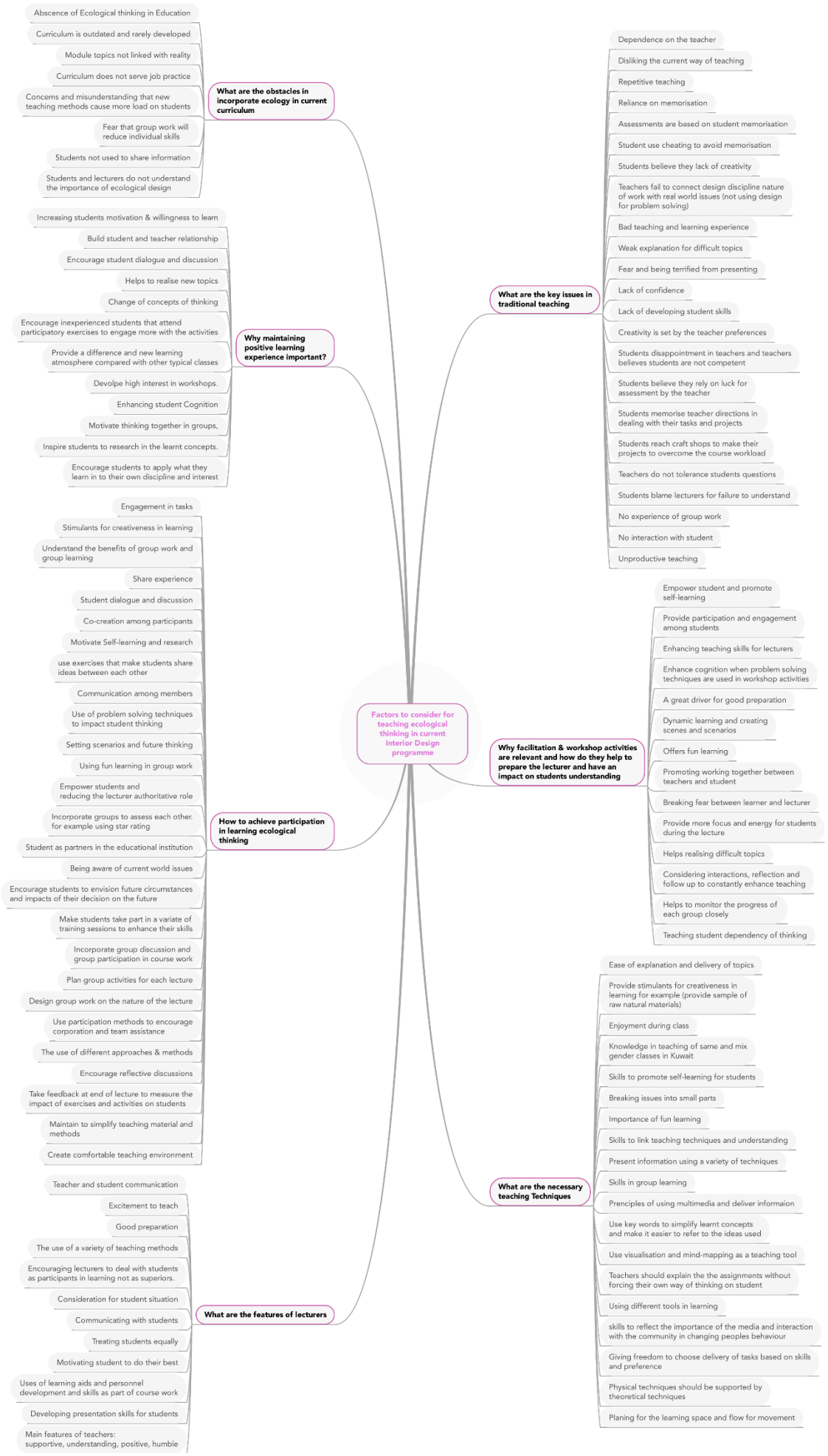
designed so as to take advantages of natural resources for purposes such lighting, cooling, and heating.

A greater understanding of green principles, including cases studies of sustainability and green architecture, was considered to be very significant. Students and staff pointed to the importance of increased awareness of recycling and re-use of resources, the intelligent use of local natural materials, and drawing inspiration from nature when designing for improved sustainability and harmonising with the surroundings.

Teachers generally reacted positively to the participatory form of delivery. Some possible disadvantages were seen in that such classes involved more preparation and organisation to be effective, and there was unevenness in the level of engagement from one student to the next. However, it was felt that the participatory workshops helped to remove the barrier between teacher and student, which resulted in a better working environment and greater enjoyment on the part of students.

9.11 Linking of the findings from previous chapters

After discussing the empirical research from chapter 7 and chapter 8 the following diagram shows a mapping of the key results of both chapters in relation to the results of previous chapters. In addition, the diagram highlights the key issues that was discussed from the literature review chapters in section A. This mapping of the findings will be used as a guide to develop a participatory module to help embed ecological thinking for interior design students in KEI.


Factors to consider for teaching ecological thinking in current Interior Design programme
What are the obstacles in incorporate ecology in current curriculum
Abscence of Ecological thinking in Education
Curriculum is outdated and rarely developed
Module topics not linked with reality
Curriculum does not serve job practice
Concerns and misunderstanding that new teaching methods cause more load on students
Fear that group work will reduce individual skills
Students not used to share information
Students and lecturers do not understand the importance of ecological design
Why maintaining positive learning experience important?
Increasing students motivation & willingness to learn
Build student and teacher relationship
Encourage student dialogue and discussion
Helps to realise new topics
Change of concepts of thinking
Encourage inexperienced students that attend participatory exercises to engage more with the activities
Provide a difference and new learning atmosphere compared with other typical classes
Devolpe high interest in workshops.
Enhancing student Cognition
Motivate thinking together in groups,
Inspire students to research in the learnt concepts.
Encourage students to apply what they learn in to their own discipline and interest
How to achieve participation in learning ecological thinking
Engagement in tasks
Stimulants for creativeness in learning
Understand the benefits of group work and group learning
Share experience
Student dialogue and discussion
Co-creation among participants
Motivate Self-learning and research
use exercises that make students share ideas between each other
Communication among members
Use of problem solving techniques to impact student thinking
Setting scenarios and future thinking
Using fun learning in group work
Empower students and reducing the lecturer authoritative role
Incorporate groups to assess each other. for example using star rating
Student as partners in the educational institution
Being aware of current world issues
Encourage students to envision future circumstances and impacts of their decision on the future
Make students take part in a variate of training sessions to enhance their skills
Incorporate group discussion and group participation in course work
Plan group activities for each lecture
Design group work on the nature of the lecture
Use participation methods to encourage corporation and team assistance
The use of different approaches & methods
Encourage reflective discussions
Take feedback at end of lecture to measure the impact of exercises and activities on students
Maintain to simplify teaching material and methods
Create comfortable teaching environment
What are the features of lecturers
Teacher and student communication
Excitement to teach
Good preparation
The use of a variety of teaching methods
Encouraging lecturers to deal with students as participants in learning not as superiors.
Consideration for student situation
Communicating with students
Treating students equally
Motivating student to do their best
Uses of learning aids and personnel development and skills as part of course work
Developing presentation skills for students
Main features of teachers: supportive, understanding, positive, humble
What are the key issues in traditional teaching
Dependence on the teacher
Disliking the current way of teaching
Repetitive teaching
Reliance on memorisation
Assessments are based on student memorisation
Student use cheating to avoid memorisation
Students believe they lack of creativity
Teachers fail to connect design discipline nature of work with real world issues (not using design for problem solving)
Bad teaching and learning experience
Weak explanation for difficult topics
Fear and being terrified from presenting
Lack of confidence
Lack of developing student skills
Creativity is set by the teacher preferences
Students disappointment in teachers and teachers believes students are not competent
Students believe they rely on luck for assessment by the teacher
Students memorise teacher directions in dealing with their tasks and projects
Students reach craft shops to make their projects to overcome the course workload
Teachers do not tolerance students questions
Students blame lecturers for failure to understand
No experience of group work
No interaction with student
Unproductive teaching
Why facilitation & workshop activities are relevant and how do they help to prepare the lecturer and have an impact on students understanding
Empower student and promote self-learning
Provide participation and engagement among students
Enhancing teaching skills for lecturers
Enhance cognition when problem solving techniques are used in workshop activities
A great driver for good preparation
Dynamic learning and creating scenes and scenarios
Offers fun learning
Promoting working together between teachers and student
Breaking fear between learner and lecturer
Provide more focus and energy for students during the lecture
Helps realising difficult topics
Considering interactions, reflection and follow up to constantly enhance teaching
Helps to monitor the progress of each group closely
Teaching student dependency of thinking
What are the necessary teaching Techniques
Ease of explanation and delivery of topics
Provide stimulants for creativeness in learning for example (provide sample of raw natural materials)
Enjoyment during class
Knowledge in teaching of same and mix gender classes in Kuwait
Skills to promote self-learning for students
Breaking issues into small parts
Importance of fun learning
Skills to link teaching techniques and understanding
Present information using a variety of techniques
Skills in group learning
Prencicples of using multimedia and deliver informaion
Use key words to simplify learnt concepts and make it easier to refer to the ideas used
Use visualisation and mind-mapping as a teaching tool
Teachers should explain the the assignments without forcing their own way of thinking on student
Using different tools in learning
skills to reflect the importance of the media and interaction with the community in changing peoples behaviour
Giving freedom to choose delivery of tasks based on skills and preference
Physical techniques should be supported by theoretical techniques
Planing for the learning space and flow for movement

CHAPTER 10

DEVELOPING PARTICIPATORY MODULE FOR ECOLOGICAL DESIGN

10.1 Introduction

Over the past six decades, education has witnessed expansion and diversification to meet the formidable demands and expectations that have been placed on learning institutions. This pressure has come because of changes within student bodies, as well as additional administrative workload in terms of procedures and results. Academic staff are faced with heavier teaching workloads, increased administrative and reporting requirements, and the need to develop and ensure that their research profiles are strong.

In the specific case of design, it has been argued that resources are generally insufficient to support instructors' current learning programs in academic institutions (Knight, 2002). As a result, it has been suggested that there is a need for teachers to be advised on how to develop new programs (Knight, 2002). The modules within these programs should not be developed in isolation but, instead, within a course structure the process of which is informed by national qualifications guidelines and the requirements of professional bodies (Donnelly & Fitzmaurice, 2005, p. 3).

This chapter explores and develops in more detail the essential elements of a new participatory ecological design module, to be taught to interior design students at tertiary level in Kuwait and beyond. The sections that follow discuss the ways and

means to be used in constructing the module. An outline of the structure of the new module will be presented which includes the aims and central components that the participatory module will encapsulate. An explanation of how to run the sessions of the participatory module will be given. Finally, learning outcomes (LOs) will identified, and the assessment of these learning outcomes discussed.

10.2 Approach for constructing the participatory the module

As discussed in section 9.11 in linking the findings from previous chapters, the mapping was used as a guide in developing the participatory module. The overall approach used in constructing the new module follows an outcome-based strategy in which there are clearly defined aims, learning outcomes, and assessments (Williamson, 2014). Students will be informed by the lecturer what they are expected to have learned at the end of the participatory design module. A key design feature of the participatory module is its emphasis on student-focused learning rather than teacher-focused learning, an approach that seeks to promote "ownership" by students of what they have learned, rather than leaving students with the belief that the knowledge gained has come primarily from someone else. The participatory module follows the trend, adopted in many Western design courses, in which there has been a movement away from the traditional teaching curriculum with its didactic focus to a curriculum that is more student-centred (McKimm, 2003). Developing such a module requires time, dedication, and a well-conceived, systematic strategy (Donnelly and Fitzmaurice, 2005, p. 3).

A way to achieve this new approach is not to focus, as other programmes in educational institutions in Kuwait tend to do, on *what to deliver*. Rather, the approach to be taken in this participatory module is that students should learn about

ecological design as they are practicing it. As a result, it is important to consider both external and internal factors when planning how to construct a learning module. Additionally, there is the need to plan for an integrated approach to the designing process with the focus being the students' learning experience. To begin the process, it is advisable for teaching staff to concentrate not on the contents of the course or their intended teaching approach. Instead, they should focus on the quality of learning that it is possible for students to accomplish (Donnelly & Fitzmaurice, 2005, p. 3).

It is important for lecturers to incorporate certain factors in their module to help maximise the chance of establishing a deep strategy for learning. These factors are as follows: 1. Maintain a continuous connection between content and the student. 2. Create a link between fresh ideas and what was learnt previously (Donnelly & Fitzmaurice, 2005, p. 8). 3. Provide clear explanations as well as explicit knowledge to learners. 4. Provide students with a well-structured and reasonable workload. 5. Give learners the opportunity to pursue topics in more depth to help them understand the content for themselves and ensure that they are subjected to right summative and formative assessment approaches (Sadik & Shazia, 2014, p. 105). Building these ideas into the participatory module will have a positive influence on both students' choices of learning and teachers' teaching approaches and the manner in which they assess the learning (Donnelly & Fitzmaurice, 2005, p. 8).

In designing the participatory module, certain core elements will be built and shaped, starting from a statement of the module's central aim. Once this is set out, the next step is to understand the present status of the interior design programme in this educational institution in order to know how students are currently taught and the details of the programme that is being delivered. This will lead to identifying the

learning outcomes (LOs), which are the main objectives for students to achieve from the module, and an assessment process to determine if the LOs have in fact been reached. The facilitation techniques to be used in delivering the participatory module for ecological design will be explained, along with the key ecological concepts to be conveyed.

Diagram 28 shows the stages of the module design and its elements.

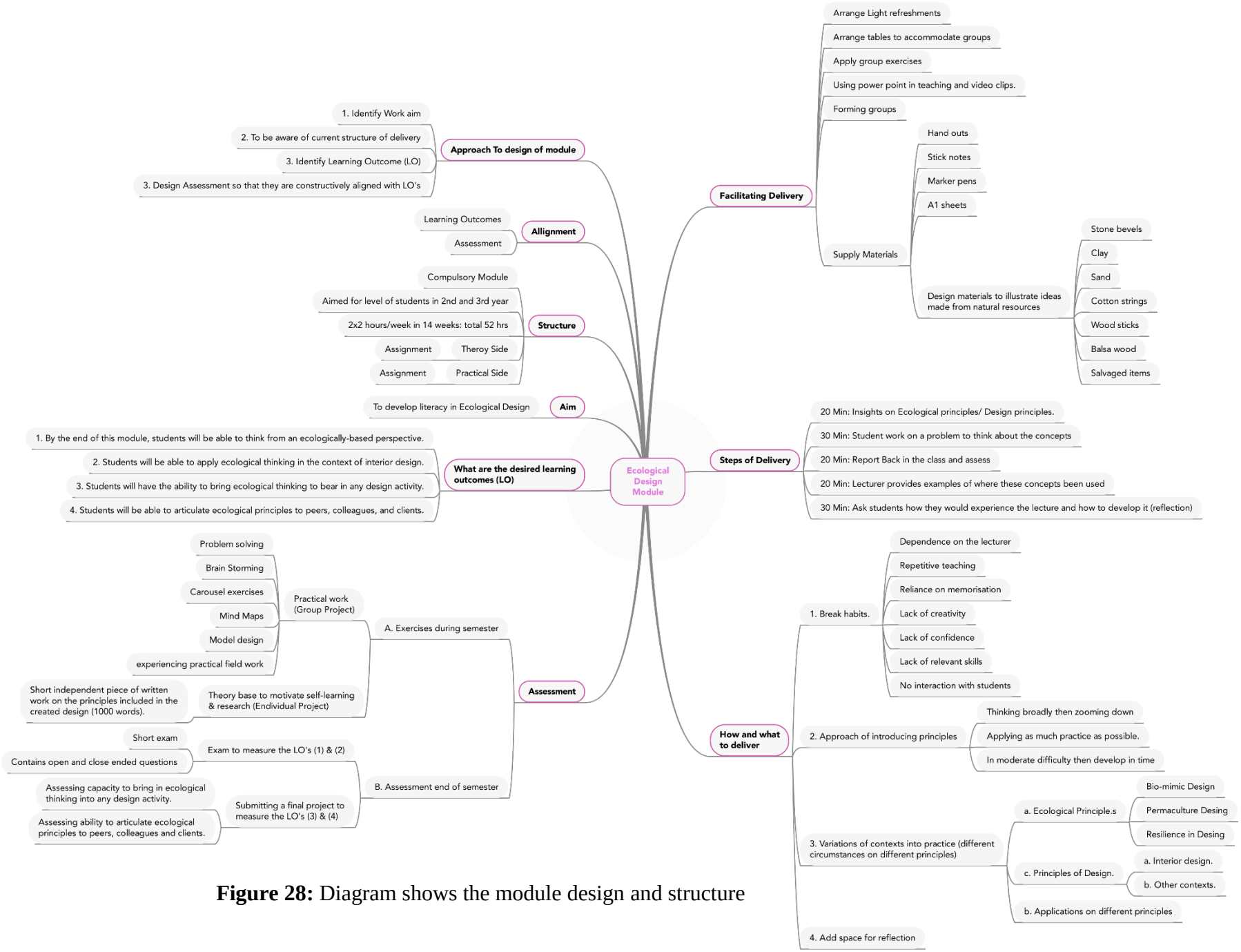


Figure 28: Diagram shows the module design and structure

10.3 Structure of the participatory module

10.3.1 Aim

Before designing the module, it is important that the module's aim be stated clearly. Clarifying the aim is necessary in order to be able to plan effectively the steps needed to apply the module. The aim of the module in this research is as follows:

To develop literacy in ecological design among the students of the In.D. programme.

Developing ecologic literacy is essential for students who have never been provided with knowledge in an ecological context. It will help them gain a new perspective on, and approach to, design, as well as a better awareness of ecological subjects. The participatory module will also guide them in adopting a responsible approach to sustainability when they come to produce their own designs.

10.3.2 Structure

It is important to have a clear insight into the structure and organisation of the system being developed to incorporate ecological thinking. The modules that are currently offered in the department of interior design at KEI are categorised into two types: compulsory and elective. To ensure that all students have the opportunity to benefit from the new module it is suggested that it be added to the curriculum as a compulsory module. Compulsory modules in the department of interior design at this educational institution are taught 4 hours per week in a course that spans 14 weeks, giving a total duration of 52 hours. The new participatory module of ecological design will be taught twice a week in two-hour sessions.

In addition, the module will be delivered into two parallel modes, theoretical and practical. Both of these modes of teaching are presented equally in the participatory

module throughout the course. The theoretical and practical aspects of the course will each contain different assignments and assessments that the students need to cover during the course of the module.

Furthermore, in order to ensure that students are able to carry out basic higher-level tasks and to understand the complexity of knowledge and skills needed in ecological thinking, the participatory module can be presented to students in their early to mid-years of a four-year programme of study. The module is primarily designed for the level of students in their second and third year. However, students from the second half of first year will be able to take this module once they complete the foundation modules and have established ground rules in design discipline.

Refer to the above diagram for more details of the overall structure of the participatory module.

10.4 Identifying the desired learning outcomes (LOs)

The introduction of new knowledge in ecological thinking to this educational institution in the interior design programme requires that the nature of this additional material be thoroughly clarified in the form of learning outcomes. The learning outcomes serve as the essence of what the teaching and learning materials are attempting to achieve. They also clarify what route to take in order to deliver the ecological information that the student needs to acquire. LOs are also important in the design of the assessment procedure, and, in particular, selecting the right assessments to measure student knowledge.

There exists a complex relationship between competence and learning outcomes. In broad terms, competence refers to factors such as understanding, skills, proficiency, aptitude, and capability. A competent teacher is one who has sufficient knowledge,

skills, and level of required abilities. Students can also possess competence, which can be assessed through demonstrations (Adam, 2006, p. 1) to show that learning outcomes have been achieved. It is important that instructors support their learners by developing a module that results in the maximum achievement of learning outcomes (Home, et al., n.d.). Various factors such as administrative issues, which involve teacher and student scheduling, teaching activities as well as assessment time and resources for the module, should be factored in during the designing preparation. This is because a large number of modules are characterized as overly ambitious and thus demand far more time from students to complete than is logically required. Consequently, careful planning in terms of resources allocation should be engaged.

During the creation of learning outcomes, instructors should be able to integrate the 1979 Bloom's taxonomy of cognitive ability levels in a student (Fry, et al., 2008, p. 45). This means that they should consider factors such as knowledge, understanding, application, analysis, and synthesis through assessing students. In the knowledge aspect, instructors should focus on defining what they expect their learners to know. In this facet, verbs such as define, record, present, outline, and identify are used. The comprehension or understanding aspect, on the other hand, covers the ability of learners to communicate what they have learnt and understood (Kraiger, et al., 1993, p. 313). Therefore, when identifying a module's learning outcomes, instructors should consider the students' ability to interpret what they have learnt, as well as the extrapolation of the new ideas from existing knowledge. Terms such as discuss, summarise, contrast, and review can be used during assessments. Another aspect to be considered when designing the learning outcomes is that of students' ability to apply learnt information in more practical situations. Instructors should assess the ability of learners to link the relevance of ideas taught in classrooms to situations

presented in real life or in exams (Sadik & Shazia, 2014, p. 104). Verbs such as apply, demonstrate, and classify could be applied during the assessment.

It is also important for teachers to assess students' ability to break down ideas into smaller constituent parts that create a pattern, indicating how they relate to each other as well as the manner in which they are organised. Hence, when designing a curriculum, instructors should consider a students' ability to analyse elements in a given unit of study. Verbs such as analyse, distinguish, and appraise could be used in an assessment (Fry, et al., 2008, p. 46). Synthesis and evaluation are other elements that should be considered during the designing of learning outcomes of a module (McKimm, 2003). In synthesis, instructors should consider the ability of learners to manipulate elements as well as combine them in a manner that yields a structure that was not there previously. Questions revolving around the ability of learners to produce distinct communication in given units and capacity to develop a set of proposed operations, as well as their ability to derive sets of abstract links, should be considered (Kraiger, et al., 1993, p. 313). Thus, verbs such as organise, assemble, develop, and formulate should be used in assessments. The consideration of evaluation, on the other hand, covers the ability of learners to create arguments, compare them, and make judgments. Teachers should consider the ability of students to make judgments grounded on external and internal evidence.

This participatory module then uses many active verbs from all levels of Bloom's taxonomy, in order to assist students to clarify what is expected from them in the module. The main levels used from the taxonomy drawn respectively in the learning outcome are within (Comprehension, Application, Synthesis and Evaluate).

The LO's selected for the participatory module of ecological thinking are as follows:

1. By the end of this module, students will be able to think from an ecologically-based perspective.
2. Students will be able to apply ecological thinking in the context of interior design.
3. Students will have the ability to bring ecological thinking to bear in any design activity.
4. Students will be able to articulate ecological principles to peers, colleagues, and clients.

Once students think from an ecological perspective, the information learned will impact on their behaviour and attitude and on the way they perceive their daily life (Leiserowitz, Kates, and Parris, 2006). Moreover, what they acquire from the participatory module will help them to apply ecological thinking routinely in their own discipline of interior design. They will have the knowledge to incorporate ecological ideas when they design interior spaces, including interior layouts, space distribution and flow, and interior design elements such as furniture, lighting, and finishings. Students will also be able to utilise ecological knowledge in related, interdisciplinary fields and areas of interest. Once they absorb what they have learned they will have the right ecological experience to enable them to solve design problems and challenges that they might face in their practice. The participatory learning styles used in this ecological module will enable students to gain a new approach to communication which they have never used before, to work closely together with peers, colleagues, and clients, and articulate what they have learned.

10.5 Alignment between learning outcomes and assessment

Before discussing the assessment, it is worth stressing the importance of keeping a balance between the module learning outcomes and the assessments. By aligning the LO's with the assessments, students will benefit from the module ecological topics and be able to relate what they have learned to their own practice and other activities. Assessment should be appropriate to the level of the students and the credit weighting of the module, thus ensuring that the LO's are achievable by students. If assessments are not appropriate then students will not make any effort to get involved in what they have learned about ecological concepts. The aim that the participatory module creates in pushing students to learn and research into the proposed ecological concepts will be lost as a result. Assessments should be challenging and appropriate.

Constructive orientation is a strategy of module design that helps capitalize on the environment for quality learning through ensuring that all throughout the module design process there is a continuous alignment from the creation of learning outcomes and methods of teaching preferred through to the evaluation (Biggs, 1999, p. 25). For the participatory module to be aligned constructively, certain elements have to be involved. The first is determining the expected learning outcomes and selecting the learning and teaching approaches that will help achieve the planned outcomes (Butcher, et al., 2006, p. 55). Another key element is the assessment of students to determine if the learning outcomes have been achieved (Lawson, 2011). To set up such a system effectively takes time and critical thinking on the part of the designer. In particular, aligning the participatory module is important in order that there be a good relationship between the elements just mentioned. Accurate alignment provides motivation to students and a greater willingness to engage with

the content and work together with the lecturer to put into practice what they have learned. A carefully planned alignment between the learning outcome and the assessment helps ensure the success of the participatory module and will have a positive impact on the students' learning experience.

In designing the participatory module to embed ecological thinking, another important feature is to use an approach that enables movement back and forth between abstract and concrete topics (Moon, 2002). This is because it is normally easier to focus successfully on abstract topics, such as values, after more concrete topics, like module content and teaching and learning approaches, have been thought about. It is important that a rationale be developed for the participatory module, which will help serve a wide spectrum of value systems meant for learning within a given curriculum (Marton & Saljo, 1976, p. 6). The aims of the participatory module for ecological design need to be clearly identified and written in form of instructors' teaching intentions (Declan, 2011, p. 5). Another element that should be carefully considered is teaching for learning. This refers to the wide variety of teaching methods, individual or combined, that can help achieve a constructive relationship with learning activities, which then result in comprehension (Ramsden, 1992). Teaching for learning is important because it helps motivate and support students to meet the learning outcomes (Toohey, 1999, p. 152).

10.6 Assessing the learning outcomes

As discussed earlier, vital to the success of the participatory module for ecological designs is that assessment approaches are in alignment with the learning outcomes of the module and also have the capacity to incorporate an in-depth strategy of learning (Lindholm, 2010, p. 9). In assessment, the evaluations may take the form of either a

summative or formative approach. A summative assessment is one aimed at grading learners at the end of a program or module (Kennedy, 2006, p. 23). A formative assessment approach, on the other hand, is used to help inform both the learner and instructor on the progress of the student. The feedback given by teachers to learners is an integral part of the process and should be used to improve both the teaching practice and the learning of students (Heritage, 2010). The formative assessment could also be used to contribute to the final grade through continuous evaluation. However, to provide optimal opportunities to students, instructors should include a formative assessment option that does not have any relationship with the learner's final grade (Shepard, 2009, p. 34). In spite of the various assessment methods available, the manner in which students are typically examined is extremely limited and 80 percent of it is in the form of exams, reports, and essays (Brown, 1999, p. 8). Donnelly and Fitzmaurice (2005, p. 14) indicate that it is advisable for instructors to consider a wide scope of other possible ways to assess students.

In assessing the learning outcomes, it is crucial that the assessment methods selected should have a clear relationship with the outcomes (Adam, 2006, p. 2). Since there is seldom one particular method that satisfies all expected learning outcomes, it is important for teachers to devise their own assessment strategies with a variety of approaches included. Moreover, module developers should also take into account the manner in which modularity may influence assessment practices as well as consider various pitfalls that are linked to assessment in modular developments. Hence, during modular developing, it is essential to keep in mind which parameters of assessment are needed and which can be left out. Caution is needed to avoid over-assessing students on units in a study (Adam, 2006, p. 2).

The assessment used should help to achieve the overarching aim of the participatory module in developing literacy in ecological design among the students of the In.D. programme. The main aim of the assessment is to measure the level of knowledge that the student has reached. In addition, exercises and graded tests will help to identify the weaknesses and strengths of students. Their performance in these exercises can highlight to the lecturer any weak points that need to be addressed during teaching sessions. In other words, the assessments can help to enhance the style of teaching and the delivery of information. However, the assessments need to be designed in such a way that they do not promote competition between students or put undue pressure on them, as indicated by the responses of some students, during interviews, which were reported in Chapter 8. It is important to reiterate that unaligned assessments may also lead to using the wrong teaching style and content, which in turn may cause some students to cheat or seek help from craft shops to successfully pass. In addition, as mentioned earlier, the assessments should work in tandem with the learning outcomes so that they help students to see for themselves where their strengths and weaknesses in ecological knowledge lie so that they can build on their strengths and overcome their weaknesses.

10.6.1 Exercises during the semester

Students need to take exercises, during the semester, in order to ensure that they cover the requisite LO's. What is most important is to critique and feedback and feedforward between students and the lecturer. These exercises cover both types of delivery, theoretical and practical, and are as follows:

10.6.1.1 Practical work and group projects

Practical work focuses on group activities and projects, which are exercises used to gauge how well students participate and engage with each other in forming their

ideas and finding solutions to any challenges created. Group activities also seek to develop communication skills by involving the articulation of ecological principles to peers and sharing knowledge formed from different experiences. The following methods can be used in group activities:

1. Problem solving.
2. Brain storming.
3. Carousel exercises.
4. Mind maps.
5. Model design.
6. Experiencing practical field work.

The following are examples of group tasks that may be given to students using methods 1 to 4.

- In the light of what has been presented regarding these ecological concepts, discuss with your group members ways to implement the concepts into your design.
- What kind of solutions would you suggest to enhance the built environment in an ecological way?
- Think of some unsustainable techniques and design elements used in indoor spaces, and then try to redesign using ecological measures from what was discussed.
- How can we promote ecological design in the community? Discuss with your group members a design project that can be presented to the community.
- Try to illustrate design ideas using materials made from natural or recyclable resources.

Exercises with these types of questions are carried out using assessment sheets. Assessment sheets are used to help the lecturer give feedback to students' performance in terms of the following:

- Application of the concept learned.
- Indication of group participation.
- Details in presenting the ideas.

Another benefit of using assessment sheets is that they can be used by students to assess their own work. Self-assessment gives students the opportunity to assess their peers and thus provide them with a sense of ownership with the module. It also removes the pressure and influence caused if the lecturer marks the exercises. Students can use their own judgement and are not constrained by the lecturer's thoughts when applying the assessment criteria.

Evidence from the data collection suggests that students tend to rely on a lecturer's directions on certain tasks during class and how to solve them, which is against the approach of this research. In the new participatory module for ecological designs, it is extremely important that the lecturer should not direct students on how to carry out tasks. Even if students seek the lecturer's help or clarification, the lecturer's feedback should be minimal and aimed at reassuring the students that the important thing is to show what their thoughts on the subject are. This will build the confidence of the students to self-learn and research into any subject that interests them.

When practical fieldwork has been carried out, this should be followed up with design tasks based on what has been seen and experienced. The purpose of this is to teach students how to turn what they have learned from the module into a reality, thus helping students gain experience and practical knowledge in ecological design.

The lecturer can arrange a field trip any time during the semester to an outdoor area, and request students to work on tasks that require solving through group work (Tal, 2001). Some examples of tasks that might be given are as follows:

- Try to use a combination of ideas from the concepts that you have learned to make use of any natural or salvaged material found from this area.
- Work together to construct a designed object made from natural materials.
- Construct together a space using ecological techniques and suggest how to apply natural interior finishing on the walls and floor.

10.6.1.2 Theory-based assessments

Theory-based assessments are intended to motivate self-learning and research. They are performed by students individually and carried out in order that students can build on their knowledge of ecological concepts based on their personal interests. They also allow new information and techniques to be researched that were not discussed in lectures. These assessments seek to incorporate reflections from students about the journey they have experienced while attending the module. They will also assist the lecturer to enhance the module and make any modifications on the teaching techniques applied or the module content. Some examples are as follows:

- Write a short, independent piece of work on the principles discussed or included from your design (1000 words).
  - ➢ This can be requested twice during the semester.
- Write a short report reflecting on what ecological design is from your own understanding; you can build it from your diary notes, which are written after each session (1000 words).
  - ➢ Can be requested once or twice during the semester.

The second example refers to reflections by students on design based on what they have experienced outside of the lectures. This step will be discussed in the section dealing with the steps of delivery.

10.6.2 Assessment at the end of the semester

This method is broadly used in many modules and serves the purpose of measuring what students have learned and achieved with respect to the learning outcomes. For the participatory module for ecological thinking, however, it should be designed carefully so as to avoid putting pressure on students or making their experience of the module unpleasant. The main object of it is to keep students engaged with topics learned from ecological designs during the semester and to assess if they have managed to develop their knowledge so that it can be applied beyond the module.

There are two parts of the final assessments as follows:

10.6.2.1 Exam to measure LO's(1) and (2)

A final exam should be presented to students at the end of the semester. This should measure students' knowledge for the first and second learning outcomes, which are:

1. Be able to think from an ecologically-based perspective.
2. Be able to apply ecological thinking in interior design.

It is best to make this exam short and not exhausting on students. It should also include a combination of open-ended and closed questions. Some examples of such questions are shown below:

- What are the best ecological ways with the least manufacturing processes to design an indoor space for a residential design?
- Suggest ecological solutions and techniques in order to reduce thermal heat in interior spaces that are located in hot climates.
- What are the best natural ways to construct interior walls and ecological paints?

10.6.2.2 Submitting a final project to measure LO's (3) and (4)

This part of the assessment is to check if learning outcomes three and four have been achieved. The assessment is submitted in the form of a project that the students have worked on as a group during the semester. Students in each group should prepare a presentation to discuss their project and provide an overview of the process and concepts they have used in their project to the class. The learning outcomes to be assessed are as follows:

1. Have the ability to bring ecological thinking into any design activity.
2. Be able to articulate ecological principles to peers, colleagues, and clients.

The lecturer will be able to assess each group as they present their work by considering the way the ideas are showcased to the class. In addition, each student's individual effort will be assessable from a report prepared by the student describing the role they had within the group. Since this module involves a new approach of teaching in this educational institution in Kuwait, by involving group work, there is the possibility that miscommunication or conflict may arise. Therefore, students will

be informed during the semester that they are free to report to the lecturer in the event of any problems occurring while working in groups. As an incentive, an extra mark will be awarded to any group that maintains the same members throughout and manages to work harmoniously.

Students will also be given the opportunity to star rate each project that is presented. The project with the most number of stars should have the highest mark. This will encourage students to be independent and try their best to reach out and satisfy all members in the presentation.

10.7 Facilitating delivery

Facilitation is a powerful method to arrange the mind-set of participants so as to engage and participate in the learning process. Evidence was presented in chapter 8 and Chapter 9, based on observation and empirical work, that students who participated in workshops with facilitative techniques had a better rapport and engagement with the lecturer and the topic that was being discussed. Workshops with no facilitative techniques resulted in less focus and response from students, and there was less enthusiasm to take part in them. Participants in these workshops were observed to be drowsier and their performance in the workshop exercises was poor, indicating that they did not fully understand the topics that had been discussed.

10.7.1 Provision of refreshments

One of the facilitative methods that can be used to encourage students to participate more in the module is to arrange light refreshments. The lecturer is advised to provide snacks and refreshments, such as biscuits and coffee, on one side of the room. In the participatory workshops of this research, Arabic coffee and baskets were provided and students were asked to feel free to have what was provided at any

time they liked. They were also told this is provided to them so that they can be fully energetic and awake. To start with, students were reluctant to have any refreshments; however, later in the workshop, once they had begun working in groups around a table, they began to help themselves to the coffee and biscuits. Students expressed that these small arrangements and indications of informality helped them feel more relaxed and encouraged to work: something that they had never experienced from the traditional ways of teaching in this educational institution. Refreshments need not be provided for every session but are worth considering for big and important assignments where students need to work especially hard.

10.7.2 Arrangement of tables to accommodate groups

It is important that the lecturer thinks about the arrangement of tables in the classroom in order to accommodate students in groups. Students in this interior design department of this educational institution use A1 drafting tables with adjustable angle for the desktop to help them draw and sketch their designs. These tables can be used to accommodate groups of two students when only a few have registered for the module. However, in larger classes of more than 15, it is advisable to have two tables attached together so as to be able to accommodate four or five students in a group. Lecturers are advised to go to the classroom and check on its size and table arrangements before the start of the lecture so as to minimise time lost in setting up. It is also a good idea to go through the attendance sheet and arrange the tables based on the total number of students registered. After allocating the groups to their tables, it is best to keep a generous distance between each group so that they do not influence each other's work. Another useful procedure is to keep a clear passage around the room by placing the desks away from the walls so that students can move

around more easily and also have access to the walls for posting sticky notes, for example, or hanging up A1 sheets that may form part of certain group exercises.

10.7.3 Forming groups

Because the participatory module uses facilitation techniques, the lecturer needs to help in the initial formation of groups. Many students expressed enthusiasm about not being confined to their desks but instead able to move around the class and be active throughout the workshop. It is crucial that the lecturer should think about ways to form the groups.

There are two types of groups. The first are short-term groups that work on exercises during the lecture. These can be formed quite simply and need not consist of the same members who work together on longer projects. Among the methods that can be used in selecting students in short-term groups are to ask students to partner with those closest to them, or put together students who share the same age range, colour preference, etc. If any students are still left out of a group the lecturer can step in to assign them to one. The lecturer also needs ensure the number of students in each group is the same, as far as possible.

The second type of group is the long-term group, which will work to finish the final assessment at the end of each semester. It is important that group members work harmoniously and therefore a good idea to let students choose for themselves the composition of each group. The lecturer then needs to inform everyone to keep a log of his or her work and for each student to identify their role within the group to the lecturer.

Because students in Kuwait typically have little experience of group work, there is a chance that problems might arise between group members. The lecturer needs to

explain to all groups that in case of any confusion and conflicts between members, they should report back to him. Also, as an incentive the lecturer should advise students that groups who maintain their own group members and work together will be awarded a bonus grade. This step should encourage them to work together to solve any problem that they might face.

10.7.4 Apply group exercises

Group exercises are the most important feature of participatory learning. In order to make students independent thinkers and not rely heavily on directions from the lecturer, groups should be encouraged to solve their tasks independently. It is essential that the lecturer take on the role of facilitator and not influence students' decisions or the outcomes they reach when solving a task. As discussed in Chapter 8, while holding both types of workshops, students constantly asked for help and for detailed directions on how to go about solving every task given to them. This behaviour is believed to be a result of the didactic teaching approach to which they have previously been exposed. This new participatory module steers away from this approach, and adopts the stance that, through working independently or together on group exercises, students will not only be empowered in the learning process but will learn how to seek out knowledge together, without external help. Evidence from the data collected in this research indicates that students who experienced group work during the participatory workshop managed to understand the topics discussed more so than the students from traditional workshops. Students have expressed their enthusiasm about being able to work together and think together in solving many problems. Some students expressed how they felt really interested and engaged with the topics, and that it was the first opportunity they had had to see the ideas of their peers and have a chance to build together on those ideas. This was in contrast to the

students in the traditional workshops who showed through their performance in the workshop exercises that they had not properly understood the ecological topics discussed. Group exercises are a powerful tool to help students learn independently without the lecturer's influence. They also boost students' confidence and help them engage with their colleagues and peers in solving complex problems. The key here, however, is that the lecturer should not influence their thinking or learning when giving them directions in solving the exercises.

10.7.5 Presentations techniques in teaching

Lectures in this type of participatory teaching can also be enhanced by using digital skills either partially of wholly. Consequently, the use of digital technologies may influence the logistical elements of a lecture (Achar, 2016, p. 462). Using visuals and video presentations, in the form of PowerPoint slides, had a tremendous effect on students attending participatory workshops. Students were observed to be much more focused and fully engaged by the information that was discussed. One of the video clips shown to the students was from a documentary discussing the seriousness of the problem facing Kuwait as a result of its reliance on fossil fuel. The video clip also discussed the repercussions for Kuwait's future in a world that is depleting oil. Some students expressed that they were deeply shocked and affected by the information in the video, and it was not something they had previously been aware of from the media around them. They understood quickly other videos clips that explained ecological concepts and managed to have a successful discussion about the topics they have gone through after the workshop. It is very important that the lecturer thinks carefully about how to design and arrange the PowerPoint presentation.

10.7.6 Materials

It is necessary that the lecturer be well-prepared and organised in terms of the materials to be used in the exercises to ensure a session that runs smoothly and in a timely fashion. A variety of materials may be used in different types of exercise, however the materials described below will be used commonly in many of the sessions associated with the new participatory module.

10.7.6.1 Hand outs

Handouts are distributed for exercises that require certain feedback or information. They may be used to get feedback from students or provided feedback and directions to students. They might also be used to give students information on new ecological concepts or theories that need to be understood during the module. Printed handouts will not necessarily be provided in every lecture but it is useful to arrange them and plan for their distribution beforehand. Some of the handouts will be in the typical size of A4; however, for tasks that use a more visual representation, for example if the task is to "work with your group members to show the links between your design elements and the ecological environment" or "show your ideas as a group, to address an environmental challenge through a design model," then larger size handouts, such as A3 or A2, may be more appropriate. Normally, large size papers are provided for interior design students in the department as they use them for sketching and drawing their designs.

10.7.6.2 Stick notes

Stick notes are an effective tool when used in exercises that include getting suggestions or feedback from students. They can be used in most of the exercises that were mentioned earlier (Section 10.6.1), particularly in tasks that aim to generate ideas and apply brain-storming techniques. They can also be used in exercises that

include a way to rank suggestions, where ideas with the most stick notes used will have the best vote from students, and so on. There are many opportunities for using sticky notes and they are an excellent vehicle for engaging students with activities.

10.7.6.3 Marker pens

A supply of marker pens will help students in group exercises that use stick notes or sheets to illustrate sketches and write ideas. To reduce the number of markers pens used, it is advisable to hand one or two marker pens in different colours to each group and assign one group member to take all the ideas and suggestions from the group. It was noticed from the field work that an advantage in assigning one person to write the group suggestions was to force group members to focus on generating ideas and discussions together during their group exercises. Having just one writer, eliminates any un-agreed-upon information that is placed on the sheet from individual students who placed their ideas without getting the consent of other group members. However, for other types of exercises that request that each student come up with their own ideas or reflections, such as for example "mention the top three elements that you have learned in this concept" or "write down the best elements in the design," then everyone should be provided with the means to record their own ideas.

10.7.6.4 A1 sheets

A1 sheets can be used in exercises that require suggestions from a number of students, such as those associated with the carousel mentioned earlier in Section 10.6.1.1 and also in Chapter 8 and Chapter 9. The lecturer hangs a number of these sheets on the walls in the class and asks students to write directly to them or use stick notes on them. Students as individuals or as groups can go around and visit each sheet to write their ideas. If a series of such exercises is planned throughout the

module then the sheets may be reused and students asked to write their ideas only on stick notes. This will help minimise the costs and resources in providing A1 sheets and encourage students to think sustainably.

10.7.6.5 Design materials to illustrate ideas made natural resources or recyclable resources

The materials used currently in the department of interior design by which students can illustrate their designs and projects consist of acrylic or polystyrene sheets and other manufactured materials. In order to underscore the ecological aspects of the module, the lecturer must direct students to deliver their ideas and present them using natural materials. This step is important in showing student that they are not only required to think in an ecological way but to act so by using alternative substitute materials. The lecturer can explain to students the importance to adapt ecological ways and work accordingly when they need to illustrate their work and present their projects. If students think in this pattern then they can take it forward and apply it in their designs and practice. Students cannot be expected to change their thinking or adapt ecological approaches if the lecturers are doing the opposite in the learning process. Some of these natural materials may be simply available in the environment, and others may be collected and supplied from art or craft shops. Examples of natural materials that can be used to replace current materials in presenting students' projects are as follows:

1. Stone bevels
2. Clay
3. Sand
4. Cotton strings
5. Wood sticks

6. Balsa wood
7. Salvaged items (e.g., glass, wood panels, metal pieces).

After meeting with lecturers and discussing the process they go through in disposing of design projects after they receive them from students at the end of the semester, many replied that they simply bin them. The majority of the lecturers in the department follow this way at the end of the semester for each individual student project. When making the field trip to the educational institution in Kuwait, many rooms were filled with piles of designs and artworks that are ready to be discarded. Thus, these design models are in fact impacting the environment. When using natural materials in design projects and illustrations, these materials can be used again in other lectures by dismantling the model and taking the materials out. Even if these design projects, made of sustainable materials, are eventually discarded they will cause minimal damage to the environment and can decay naturally and harmlessly.

10.8 How and what to deliver

This stage explains further how and what to deliver in the participatory module. This section begins with a discussion of the current habits, practices, and behaviours that students fall into as a result of the traditional teaching approaches used in many modules. Then it identifies the approach to be used in delivering the information and concepts in the participatory module and how this information should be delivered. This is followed by an explanation of how a number of key concepts in sustainability will be covered in a variety of contexts throughout the semester. Finally, it will discuss why is it important to include reflection steps in constructing the participatory module to embed ecological module.

10.8.1 Break habits

The lecturer needs to break certain habits that are currently present in many modules in the Kuwaiti institution. It is necessary to eliminate these so that students can discover how to learn independently, and escape from current learning and teaching methods in the institution. These habits will now be identified individually.

10.8.1.1 Dependence on the lecturer

Interior design students in the educational institution in Kuwait are highly dependent on the teacher. Evidence has been provided from the data and from the interviews with students that they tend to rely on the teacher directions when learning. They do not have the ability to discover information outside the scope that is set by the lecturer. Students also believe that if they do not follow texts literally they will fail in the module. This resulted in students only focusing on what the lecturer delivered, without knowing why or what is the use in learning that information in the first place.

10.8.1.2 Repetitive teaching

Most students questioned expressed the opinion that lecturers follow one type of teaching style in which topics are explained from the teacher's point of view, and students are then shown how to reproduce this material in the examination and assessments. Lecturers tend to deliver the information to students verbally or use a white board to write and show students the information and topics to be discussed. In this educational institution and in the majority of university and colleges in Kuwait, lecturers follow the same pattern of showing students what kind of problems they will have in their examinations or design projects. Then they show students how to solve these problems and exactly what they expect them to do in these examinations and projects. Some lecturers take the same information that they write on the board

and transfer it into transparent slides using projectors or PowerPoint slides; however, the same style of teaching is implemented in spoon-feeding the information to students. This lecturer-centred teaching style fails to give students a space in which to develop their understanding of the information and build on it what they have understood individually.

10.8.1.3 Reliance on memorization

As explained above, and also in Chapter 8, the current teaching style leads many students to rely on memorisation. Once students are forced to perform their tasks as the lecturer desires and sees fit, students start to ignore their personal views and understanding and concentrate instead on how the lecturer would solve or design any idea that they study. As a result, they memorise the steps and information that are presented by the lecturer. As mentioned in Chapter 8, students tend to use different ways of cheating to copy information in their exams or they use craft shops to help them construct their design in the highest quality possible to satisfy the lecturer when assessing their work.

10.8.1.4 Lack of creativity

Many interior design students have limited knowledge of experimenting with new ways and methods into their design. Students said that they have developed the habit of copying from students who have received positive feedback from the lecturer on their work. They strongly believe that when they develop any design concept that does not match the lecturer's expectation and criteria that he has set, they would receive a low mark when they are assessed. Many of them take notes of the example that the lecturer gave them at the start of the topic so that they can imitate it exactly to guarantee a good mark. Students also refer back to the lecturer for advice even for selecting the colours to use in their designs.

10.8.1.5 Lack of confidence

Under the current teaching method, when students start to implement their design exercises, they tend to ask the lecturer if he is pleased with their work. This is done almost in every step they make while working in the lecture. Many lecturers have expressed that they feel students are not being explorative and do not try to finish their design projects on their own. Many of those lecturers have expressed their disappointment in students and that they felt they are not qualified to study the many subjects in interior design. They linked the students' performance with the teaching approach that they are adapting.

10.8.1.6 Lack of relevant skills

The data showed that students feel it is important for them that the curriculum should work to enhance the skills they need in their relevant field or fields. They think that they need to have presentation skills and skills that promote how to engage with the stakeholders and community members that they might work with once they graduate. Students from the facilitative workshop also stated that they never realised that working in groups could be so productive and that problems could be solved easier working together. They used to think that exposing any idea that they had to other students might result in it being stolen and copied, and this made them overly protective of their work. In addition, many students felt that they lacked basic financial and budget skills to design more realistic projects. They also believed that they needed special workshops and seminars to help them design using digital techniques.

10.8.1.7 No interaction with students

The final habit that the lecturer in this participatory module needs to break is that students feel that the lecturer is not interacting with them. Some students expressed

after attending the facilitative workshop that the lecturer does not attempt to level his knowledge with their level of knowledge as they feel that lecturers always react with them formally. They think it is important for them to call their lecturer by "Dr." instead of their name as they think that the lecturer will be insulted when they are called by their name. Also, many lecturers tend to explain the material in a very rigid way, and students said they thought the best lecturers were those who used humour and with whom they could interact in a friendly manner.

10.8.2 Approach to introducing principles

The approach to delivering ecological information and concepts used in this participatory module is important in addressing and breaking the habits just discussed which resulted from the current approach of teaching. The lecturer should follow a certain way of delivery to ensure that these concepts are introduced to the students in the optimum way. As the module contains a number of concepts that help student develop ecological awareness, students need to be encouraged and inspired at the same time to take themselves out of their comfort zone where they are used to having the role of a receiver without engaging or interacting with other students.

10.8.2.1 Thinking broadly then zooming down

This module, as discussed earlier, should work differently from traditional modules. The lecturer should focus on finding common ground between the students' knowledge and interests and what the module contains in the form of ecological paradigms, so that students can pick up and take forward these new ideas as they work in their discipline. Empowering students to take on interactive roles and develop their own understanding and thinking is a crucial approach in this participatory module to promote ecological thinking. The lecturer needs to discuss these new concepts in ecology and sustainability broadly to the students and let the

students think and implement these concepts in a way that suits their level of expertise. This is done when the lecturer gives the opportunity to students to think by themselves without over controlling the way they understand or by informing them how to apply these concepts in solving problems that the lecturer sees important. In the next stage the lecturer needs to provoke their minds into putting what they have understood into practice. Then these ideas are discussed with their peers and suggestions made on how to use these ideas on their exercise. At this point the lecturer can zoom in and show the students realistic examples to link what they have learned from these concepts with what they can do with this ecological approach in the real world.

10.8.2.2 Apply as much practice as possible

Students need to practice working with the new concepts as much as possible. It is important that they practice any new concept they receive in order to ensure they understand it instead of just memorising the new ecological ideas. The more they put into practice what they have learned, the more they develop experience in solving any ecological challenges that they face. By this means students will gain high-order thinking when they deal with complex issues that influence our environment. The students are transformed from static learners into active learners who embrace practical ways to address the challenges that our world is facing.

10.8.2.3 Difficulty (moderate difficulty then developed in time)

Lecturers need to be aware of the level of complexity and difficultly when they present these ecological concepts to the students. The last thing that the lecturer wants is to cause discouragement to students in the process of learning. It is essential that the lecturer introduce these concepts in the simplest way to students. The lecturer should not attempt to dive in without making sure that the students have

some basic knowledge that will allow them to discuss new levels of information from each concept. The best way to approach students with these concepts is to introduce some basic knowledge then develop it gradually as the students practice working with them.

10.9 Key principles and application

There various existing ways to design and develop modules for courses in learning institutions (Toohey, 1999). However, when designing a module, it is important to ensure that there should be links that are logical and educationally sound between the needs of students, aims of the module, resources available, learning outcomes, learning and teaching approaches, and assessment and evaluation criteria (Toohey, 1999). Another important element that should be considered at the outset of the participatory module is the application of a relevant theory to help explicitly examine the fundamental psychological changing aspects of events that are associated to learning (Donnelly & Fitzmaurice, 2005, p. 7). Every individual dynamic is grounded in varying assumptions concerning the state of learning. Therefore, it is advisable for instructors to identify their preferred theory of learning due to the high possibility that approaches that an individual may utilize to enhance learning may be rooted in their individual orientation (Diamond, 1989). Whether the theory is either stated consciously or understood in what the instructors engage in, it has potential implications on the manner in which learners learn (Wright, 2011, p. 95).

Additionally, apart from taking into consideration the importance of various learning theories, it is important to recognise that there is no universal approach to learning. There exist different learning strategies for students with different needs (Brown & Atkins, 1991). So, it is important for instructors to be familiar with both “learning-

for-knowledge" and "learning-for-understanding" alignments (Donnelly & Fitzmaurice, 2005, p. 7). This is because learning is a continuous process of growth that oscillates back and forth between the two orientations. Therefore, when designing participatory modules, it is important for instructors to be conscious of concepts that have developed deep strategies of learning. According to research conducted by Biggs (1999), there is a relationship between modules and the strategies that students engage in their learning which have implications for the module development.

The literature review chapters, 4, 5, and 6, cover the key principles to be included in the module. These will now be discussed with application to interior design.

10.9.1 Add in variation of principles

The best approach in introducing students to these concepts is to show them in different variations. The lecturer should present different circumstances of problems in different contexts. The more the lecturer uses these variations, the better chance students will have in successfully addressing problems in different ways. Thus, students will gain the skills and knowledge needed to reach the learning outcomes of this participatory module when they come to complete it. The following are types of contexts and principles that the lecturer should discuss throughout the module. The module should contain three contexts and applications for each one (ecological, design, and other of relevance). Associated with the ecological context are three principles: biophilic design, permaculture, and resilience. Each of these principles are discussed in detail in Chapter 6. The second context is the design context, which includes the Dick and Carey design model, C. R. A. P design theory, participatory design, and complex/ wicked problems with others), as discussed in Chapter 5. The third context (other of relevance) includes elaboration theory, information processing

theory, communities of practice, multiliteracies, social development theory, and problem-based learning and others, as described in Chapter 4.

Each of these contexts consists of a number of exercises that the lecturer can use to apply a variety of circumstances to students. Students can apply many contexts on any circumstances that they deal with. This method in orchestrating what and how students should address and use the concepts they learn will help them achieve the learning outcomes of the participatory module to promote ecological thinking by the end of the semester.

10.10 Steps of delivery

It is clear, from what has been said already, that the participatory module should work in a different direction than that of many current modules in terms of empowering students to develop their own understanding about ecological concepts. Having gained this understanding, students can then discuss what they have learned with their peers. At this point the lecturer can provide students with a series of examples to link to what they have learned from the concepts presented. This facilitating approach involves assigning particular steps that should be included and used in most of the lectures in the module. Each step is timed and conducted within certain length so that the lecturer can ensure all aspects are discussed during the course of a lecture. The following steps in table 35 can be used in the programme of lectures of this module.

Table 37: Programme that can be applied for new module

Time	*Step*
20 min	*Insights on ecological principles in design and interior design.*
30 min	*Student work on a problem to think about the concepts.*
20 min	*Report back in the class.*
20 min	*Lecturer provides examples of where these concepts been used.*
30 min	*Ask students how they would apply (reflection).*

As mentioned earlier, each lecture lasts 2 hours. These 2 hours should be divided into tasks that discuss certain ecological concepts. It begins with 20 minutes of discussing ecological principles combined with principles of design or interior design. These concepts are discussed in detail in chapter 5.

The next step is done within 30 minutes to conduct tasks that motivate students to discuss these concepts in higher order thinking, for example using brain-storming exercises or thinking about difficult scenarios and problems to solve using these concepts. Many of these types of exercises are discussed in Chapter 4 and some in Chapter 5 and were used in the facilitative workshops.

After this stage, students should report back to the class and briefly present what they have come up with in addressing their task. If students were working in groups, they can assign one to two members of the group to discuss their ideas and the outcome of working together. This task can be done in about 20 minutes before moving on to the next step. It is important that the lecturer acts as a facilitator to make groups report back and use friendly comments to inform the students to summarise and explain their work as quickly as possible to give all groups a chance.

Finally, there should be a reflection session so that students can look back upon what they have learned in order to firmly plant that information into their minds before leaving the classroom. Reflections are also an important part of each lecture as they enable the lecturer to see which elements of the lecture that most affected the students. Moreover, they help students to figure out how they can expand on what they have learned in the lecture and combine it with their existing skills and experiences.

10.11 Conclusion

This chapter has explored and developed in detail the elements of a new participatory module, designed to teach key principles of sustainability to students of interior design. The development of the module represents the culmination of an extensive literature review, presented in chapters 4, 5, and 6, and the results of quantitative and qualitative evaluations, presented in chapters 8 and 9.

The present chapter has described the structure of the new module, and discussed the aims and main components that the participatory module encapsulates. An explanation of how to run the sessions of the module has been given. Finally, the learning outcomes (LOs) have been identified, and an assessment procedure to check if these LOs have been achieved has been discussed. As explained, it is very important to ensure alignment between the learning outcomes and the assessments used in the module.

During the development of this module, it has been borne in mind that the staff members who supervise it may previously have had little or no experience with participative teaching. Therefore the researcher has been careful to offer detailed guidance on the steps and skills needed to facilitate its successful delivery. Ideas and

instructions on how to embed sustainability concepts within the module have been discussed in order to encourage ecological thinking in those taking part.

Consideration has been given to practical matters of ensuring that participative sessions run smoothly and on time. In addition, guidance and suggestions have been offered in constructing a program within sessions, and throughout an entire semester, so that course providers can cover essential concepts in sustainability in an orderly and logical fashion during the module.

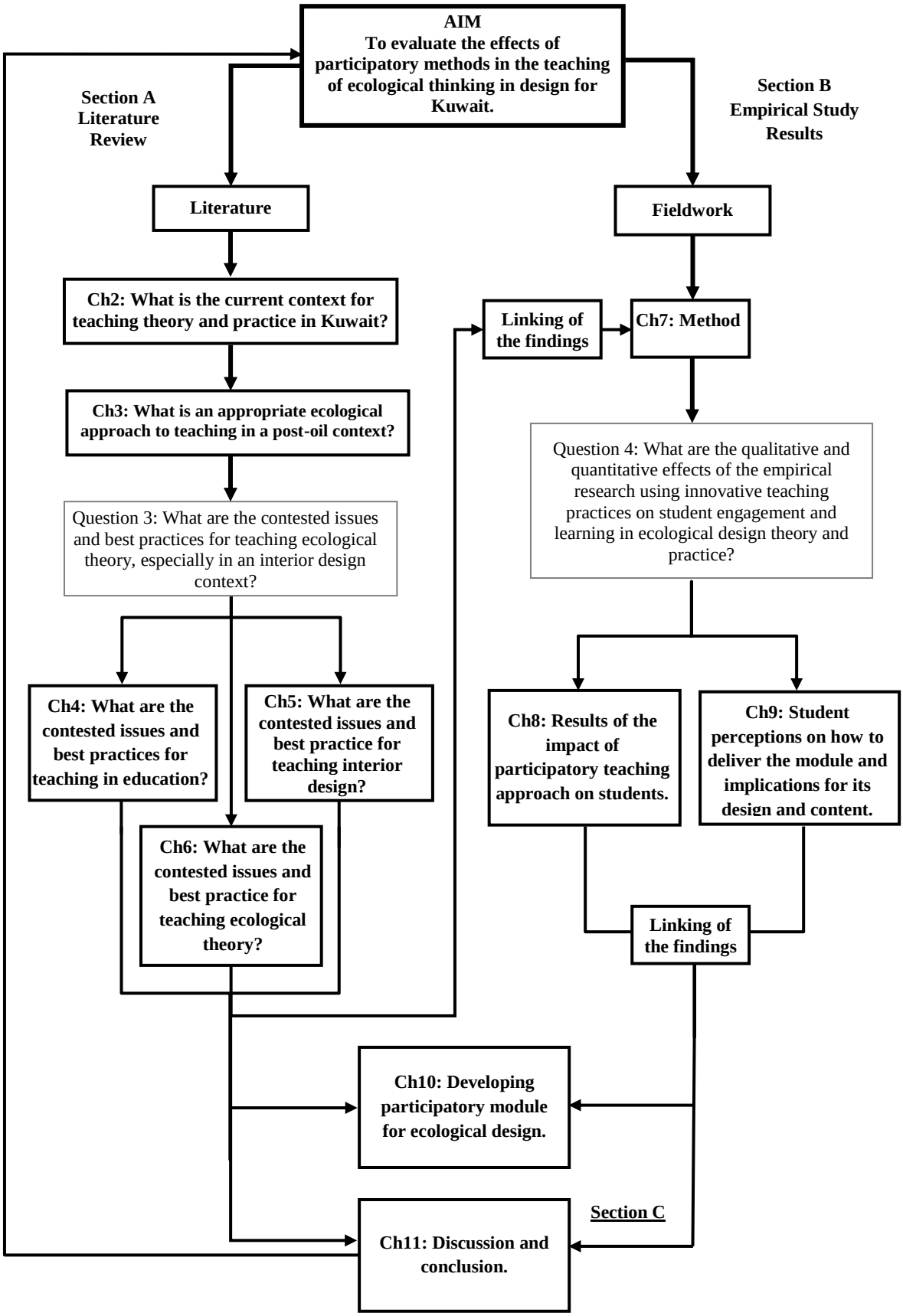
The researcher is confident that the problem of a lack of ecological awareness among students can be eliminated through the participative methods proposed. However, this will require good planning and the combined efforts of teaching staff and students to develop and optimise the sustainability module over time. The disadvantages of current teaching styles will gradually be overcome as lecturers improve their skills in the new participatory techniques and students are empowered to become more independent and confident in becoming engaged in the learning process.

The last chapter of this thesis will examine the overall conclusions, findings, and significance of the research. It will consider its challenges and limitations. Finally, it will discuss what further work is needed to ensure that students of interior design in countries such as Kuwait, which have been slow to adopt participative modes of teaching, are provided with the skills needed to incorporate key principles of sustainability into their future designs.

SECTION C

Having discussed in Section B the methodology, results and the subsequent module in participatory teaching to embed ecological thinking for KEI design students, this thesis now concludes with a discussion and conclusions of what has been learned. Chapter 11, which contains the research discussion and conclusion. The following diagram shows the chapters that comprise section C in the context of the overall research plane.

Discussions and conclusions of the research in section C.



CHAPTER 11

DISCUSSION AND CONCLUSIONS

This final chapter reviews the nature, purpose, and outcome of the research, to what extent the initial aim was achieved, limitations of the study, and recommendations for future investigations in the same and similar fields. The following section provides a summary of the work undertaken, the questions that the researcher set out to answer, and the methodology employed.

11.1 Summary

The purpose of this thesis has been to explore and deliver the design of a module for higher education that incorporates the teaching of sustainability and environmental awareness in the context of interior design, specifically in an environment where, until now, traditional, highly didactic teaching has been the norm (Al-Sharaf, 2006). The researcher, who is from Kuwait, chose to collect data for informing the design of the new module from a vocational university in his native country, which, for the purposes of this work, is referred to as the Kuwait Educational Institute (KEI). Although developed using observations from just this one location, the module is intended (with local modifications) to be applicable anywhere in the world that offers an interior design programme at a tertiary level but where, to date, the teaching has not covered sustainability and has been centred primarily on didactic practices.

The work is significant because the new module is intended to encourage a general shift in thinking toward sustainability, firstly in the design students who are exposed directly to the module, and then, over time, in the wider population who will be influenced by the work, products, or teaching of these individuals (Tikka, Kuitunen, and Tynys, 2000). It is significant, too, because it seeks to introduce new methods of imparting knowledge and skills in a part of the world where old-fashioned didactic teaching has long held sway. These new teaching methods put the student at the heart of the learning process, and instil and reward creativity, cooperation, and self-confidence (Handley et al., 2006).

The ultimate goal of the research, as defined at the start of this thesis, was: to evaluate the effects of participatory methods in the teaching of ecological thinking in design in Kuwait. In order to carry out this evaluation, five main questions were framed, as follows:

1. What is the current context for teaching theory and practice in Kuwait?
2. What is an appropriate ecological approach to teaching in a post-oil context?
3. What are the contested issues and best practices for teaching ecological theory, especially in an interior design context?
4. What are the qualitative and quantitative effects of the empirical research using innovative teaching practices on student engagement and learning in ecological design theory and practice?
5. What can a new module in ecological design be developed to address the issues outlined above?

Chapter 1 provided a broad introduction to the subject of the research. Chapter 2 focused on the current status of environmental awareness and teaching methods in

Kuwait, and the urgent need to educate students there and, by proxy, the broader public, on local sustainability issues. Chapter 3 examined how educators should adapt to conveying key environmental concepts as the world moves into a post-oil phase, with emphasis on the role of participatory learning.

The next three chapters were concerned with a review of the literature as it bore upon the use of participatory methods to teach ecological thinking in design. Chapter 4 presented insights from literature that focus on applicable theories of learning and teaching and concluded with recommendations for best practices from teaching. Chapter 5 examined the main theories and concepts in ecology and sustainability that need be conveyed, with recommendations on their application to interior design. Chapter 6 reviewed theories and principles from design education that could usefully inform how to design and develop the teaching of ecological thinking in an interior design context.

Chapter 7 discussed the methodology used in this study and why it was chosen. The research questions were addressed and answered by applying an innovative methodology, based on action research (Brydon-Miller, Greenwood, and Maguire, 2003) and a combination of quantitative and qualitative techniques. Indeed, one of the original contributions and aspects of the present study, in addition to the evaluation of a new teaching module, lies in this pioneering methodology, in which the researcher took on the role of teacher and facilitator in the workshops that tested the effectiveness of the different types of intervention. Some of the implications of this methodology are discussed in a later section of this chapter.

The impact of participatory and didactic methods of delivering workshops in sustainability was investigated with different groups of students who responded via a questionnaire both before and after the interventions. Likert scoring was used to

quantify the responses and a quantitative analysis conducted on the data. The results and analysis of this aspect of the research were presented in the first part of Chapter 8. They indicated an increased positive attitude toward facilitative teaching methods as a result of exposure to the participatory workshops and dissatisfaction with the current programme in terms of its didactic approach and lack of content regarding environmental matters. The second part of Chapter 8 discussed, from a qualitative standpoint, the results of interviews with students on this same topic – a comparison of the participatory and didactic workshops. A greater emphasis on group work, development of communication skills, and the introduction of new technology into classes were all indicated.

Chapter 9 examined the results of the evaluation related to the question of what kind of teaching that participants, both students and staff, thought was needed in an ecological module for design students. Data from interviews with staff and students and from a carousel experiment with students, together pertinent qualitative from the questionnaire were used in this part of the analysis. Students were strongly of the opinion that a more positive and empathic attitude on the part of teachers is an important factor in how well something is learned. Enthusiasm was seen as being a crucial element in teaching, irrespective of the lecturer's age or national identity. Chapter 9 discussed the outcome of interviews conducted with both students and lecturers on what aspects of sustainability they regarded as most important to include in the module. The contemporary application of traditional architectural and design methods was seen as being a high priority, as was recycling and intimately connecting the built environment and interior spaces with the natural, external environment. It was felt that local geometric and organic influences should be adopted where appropriate, and buildings and their components, including interiors,

designed so as to take advantages of natural resources for purposes such lighting, cooling, and heating.

Chapter 10 addressed the design of a participatory module for teaching sustainability principles and ideas to interior design students in Kuwait and similar regions. This design took into account the key findings from the evaluation.

11.2 Limitations of the research

All of the data for this study were gathered at a single institute for higher education in Kuwait, KEI. While information from other universities and colleges with interior design programmes may have been valuable, KEI is the only vocational university in Kuwait and, indeed, only one of two non-private universities in the country. Although with more time and other resources, the researcher would have been able to include other case studies, an advantage of focusing on KEI meant that the study could be carried out in depth and, therefore, detailed conclusions drawn about the design of the new teaching module.

Initially, the researcher had wanted to conduct the interventions with mixed gender groups. However, the authorities at KEI insisted, on religious and cultural grounds, that separate workshops be run for male and female students. To mitigate any potential loss of data and insight stemming from the separation of the sexes, the researcher performed a statistical analysis to see if there was any significant discrepancy in terms of impact on the different genders and as shown by the results in Chapter 7 there was no such discrepancy.

As the researcher worked on this case study while, at the same time, being part of the organisation in which it was conducted, he might potentially be seen as having compromised his independence as an observer. However, his involvement with KEI

allowed him access to lecturers and students, and to conduct classes, which may otherwise not have been possible. To preserve anonymity, KEI is not referred to here by its real name.

To some extent the study was circumscribed by the fact that the students involved had little or no prior exposure, at an academic level, to principles of sustainability or participatory learning. This meant that the researcher had to be careful in creating for them an experience that enabled him to try out a new way of teaching that could be compared with a teaching method that was within their comfort zone. It also involved him proceeding cautiously to find a way to collect data in order to test that difference. A further limitation imposed on the study by KEI, due to scheduling and availability of classrooms, was that students had to be divided into smaller groups who attended only one type of workshop, either didactic or participatory. The researcher would have preferred to use the same, larger sample and expose all these students to both types of intervention. To compensate for this restriction, data was collected from the groups in parallel and analysed using the statistical methods discussed in Chapter 7.

Finally, the method of action research has its own set of limitations. There is always a risk of bias when the researcher is a participant, or actor, in his own study. In this case, for instance, it is possible that in, face-to-face interviews, students may have been reticent to criticise the performance of the researcher as facilitator of the workshops. However, students who attended the didactic workshop did not indicate that they found the method of teaching to be superior to what they were accustomed, whereas those who went to the participatory sessions made a strong positive comparison. Action research has also come under criticism, especially from positivists, on the basis of validity and accuracy, on the grounds that the findings

may be unique to a specific case and that, under different circumstances or locations, the outcome might be very different. The results found by the researcher were consistent between different groups, and between the different ways used to collect data; however, the consistency of the method and its outcome could only be tested further by using different case studies at other universities or in different countries, which is a possibility that other researchers may which to pursue in the future.

11.3 Theoretical implications

The implications and significance of the research presented here fall into several broad categories: learning and teaching, sustainability and environmental thinking, design, and cultural issues that impact upon the way teaching is carried out. The study involved bringing a participatory style of teaching to students in a part of the world, Kuwait, that is not accustomed to such a method, and, at the same, delivering a subject, sustainability, that has not in the past been taught to students of design (Michalos, Creech, McDonald, and Kahlke, 2009). As a first step, the researcher examined the spectrum of theories of learning and corresponding models of teaching that have been proposed and discussed in the literature with a view to their suitability as basis for the evaluation a new participatory approach (Wilson and Peterson, 2006). In Western institutions, the positive benefits to learning of student engagement and participation have long been noted (Handley et al., 2006) as has the need to cultivate innovative thinking in subjects such as that being addressed here – sustainability in design (Castronova, 2002). A particularly important tool in this type of learning environment, it has been found, is co-creation, in which students work collaboratively on a project or problem and jointly produce an outcome (Sanders and Stappers, 2008).

The researcher determined to test if such an approach could be successfully transplanted into a different cultural environment – one with which, as a Kuwaiti, he was intimately familiar. It is clear from earlier research (Ziegahn, 2001) that the strategies used in teaching are different from one culture to another. Such a radical new approach as participation and co-creation cannot simply be thrown at students who are unfamiliar with working in such a way without some explanation and degree of control. In assessing how to compare the impact of the new student-centred teaching approach with the existing didactic style, the researcher settled upon action research (Brydon-Miller, Greenwood, and Maguire, 2003), in which he himself would take on the roles of teacher, facilitator, and observer, as the most appropriate method of investigation. This would allow the researcher to include all the necessary elements that previous studies have shown to be most effective in facilitating participatory workshops, including a positive demeanour and attitude on the part of the facilitator (Costa, Van Rensburg, and Rushton, 2007) and the use of a variety of modern technologies and techniques (Hirumi, 2002).

An examination of the literature revealed an array of models of environmental thinking and philosophies regarding sustainability and our orientation with respect to local and global ecology (Vescio, 2008). The issue for the researcher was to select from among these the most appropriate to convey in an introductory course to design students in a place where such ideas have not previously been included in the educational programme. A unifying theme of the literature was that of interconnectivity – the notion that the many components of the local and global ecosystem, both natural and anthropogenic, are linked and must work together to be function successfully (Owens, 2009). This finds an analogue in the participatory teaching approach where successful outcomes depend upon group collaboration and

a system of elements (students) working together harmoniously, so that the learning process reflects and becomes part of the content of that which is being learned. Further, sustainability depends upon understanding that Earth's resources are limited and must be used wisely, through the use of recycling and renewables, especially in places such as Kuwait that face shortages of basic ingredients like fresh water (Darwish and Darwish, 2005). This, together with the notion of finite resilience, also emerged as key aspects to be included in the evaluation. The paradigms of ecological literacy (Stone and Barlow, 2005) and holism (Andreev, 2008), biophilic design (Kellert et al., 2011), permaculture (Dawborn and Smith, 2011), and resilience (Folke et al., 2002) emerged as the philosophies and methodologies most appropriate to convey.

Along with theories of sustainability and ecology, the researcher explored which theories and concepts would work be best to inform the design of the evaluation. At the heart of his thinking was how to fuse common elements from environmentalism, the participatory nature of the learning process, and the subject of design itself, in the knowledge that the evaluation would be conducted in a place where living harmoniously with the local environment is something with strong traditional roots, which need to be rediscovered and reintegrated into the design process. The elements of educational design theory he chose to include are those that stress creativity and holism, emphasising the need for innovative thinking to address new challenges posed by sustainability and finite resources, and a collaborative, cooperative approach to tackle complex issues. Specifically, the paradigms that seemed best tailored to structure the new model around included the Kemp approach (Morrison, Ross, Kemp, and Kalman, 2010), the Dick and Carey model (Jones, 2014), and the C.R.A.P. design theory (Kopec, 2012). Design influences that the researcher chose to

incorporate in his choice of exercises and challenges for students included the notion of "wicked" problems, which, for their solution, require a collaborative attack and thinking outside the box (Brooker, 2013).

Underlying all the theories of learning, sustainability, and design to be used in carrying out the evaluation was the knowledge that it must be delivered in the cultural context of Kuwait and other, similar types of countries. The researcher needed to take into account that students in the place where the evaluation would be carried out are accustomed and acclimatised to a separation of sexes in the classroom as well as a rigid, didactic approach to teaching in which the student is expected to memorise what the lecturer says and regurgitate this at exam time. The researcher had to be careful, during the study, to measure the reactions to the evaluation workshops of the students in different gender groups to see if they differed.

11.4 Methodological implications

One of the most innovative aspects of this research lay in its methodology, which was complex and challenging in that it required the integration of a number of different philosophies and techniques. The primary goal of building, from scratch, a module to evaluate the teaching of sustainability in the context of interior design in a place where this had never been done before required the researcher to embed himself in the study and hence adopt the principles of action research (Reason and Bradbury, 2002). At the same time, to gather data that would effectively compare the approach that a review of the literature indicated would be most appropriate with the existing didactic mode of teaching necessitated a combination of quantitative and qualitative data collection methods (Miller et al., 2008).

The novelty of the research at a theoretical level lay in selecting, based on a survey of the literature, what combination of learning models and corresponding teaching strategies on the one hand, and sustainability and environmental paradigms on the other, could be fused effectively, given the cultural context in which the evaluation would take place intended. A central feature that emerged from the study was the need for a good practitioner – both the researcher and the facilitator – to be able to reflect. This process, of reflection, in turn, depends on being able to build on numerous iterations of learning. So, in this research, contrasting workshops were held, data from them collected, analysed, and compared, and then the outcome reflected upon in order that it can be fed back into the next cycle of development. What has been presented here is the basis for a rigorous reflective practice that can be carried forward into investigation at more sites and in other applications.

On a personal level, the researcher found that by adopting this methodology – by taking on the dual role of observer and facilitator – the effectiveness of his teaching and his ability to adapt based on the feedback of students was enhanced. Teaching thus becomes a powerful way, not only of facilitating learning, but also of understanding what is going on from the student's point of view. It is hoped that the present study will contribute to the idea that valuable progress can be made by collecting data during teaching, then analysing it and reflecting back upon the results. Thus an evaluative and iterative mechanism is embedded into teaching that can be used to inform future improvements to and evolution of educational programmes.

This last point is particularly relevant and significant in the context of trying to shift the culture of teaching in places such as Kuwait, which has still barely moved on from exclusively traditional didactic practices. If a few members of staff agreed to participate in an experiment where a new module, along the lines of that designed in

this study, were taught to students, data collected, and the outcomes used to determine future directions in teaching across the board then enhancements could be made very quickly. This is particularly relevant in a subject such as environmentally-aware design where there is a need to improve the education of students sooner rather than later, to help mitigate the effects of a fast-changing climate, especially in parts of the world that will be most adversely affected. Kuwait is one such place, with climate changes taking place every year to more extreme levels. The recorded temperature in Kuwait on July 2016 was 54C (129.3F): the highest in the eastern hemisphere and the highest ever recorded on Earth using modern, reliable equipment. Kuwait is also experiencing more dust storms, severe droughts, and previously unheard-of occurrences of snow in winter and flash flooding.

11.5 Future research

Once implemented, it would be interesting to track the progress of a participatory module, based on the evaluation here, throughout an academic year and conduct another survey of students and lecturers at the end of it to see how attitudes might have changed and what further recommendations from participants and facilitators might be made. Researchers might also try testing the impact of a similar approach to teaching sustainability in other programmes, such as architecture and civil engineering.

There is scope, too, for extending this research to investigate, using a similar methodology, the influence that different cultures have on the impact of participative learning. A considerable amount of work has already been done on how learning is influenced by the culture in which it takes place. But studies are needed to investigate what happens if various participatory designs are applied in the same kind

of classroom in different cultures. Would the outcomes be the same? For example, there has been research that shows when Chinese people learn they start with a topic and explore it further and further until they narrow it to a single point of view. This is very different from the usual Western approach where some aim is defined at the outset and the investigation expands until some conclusion is reached. It has been observed that lecturers may, for example, receive essays from students and mark them low because they have not factored in that they are the products of different cultures of learning. So, the question is, what would happen if participatory methods, such as those explored in this thesis, were applied in different cultural contexts. Would the outcome be different, or would the participation itself shift and change as cultural effects came into play?

Finally, there is the question of how the innovative ideas explored and developed in this research can be extended. One of the most striking results that have been seen is how students are drawn into the participatory workshops, energised by them, and driven to take part in the learning. The question is: how can this approach be expanded into more teaching programmes in parts of the world where overly rigid didactic methods have prevailed and where students of design and other subjects could greatly benefit from them?

11.6 Conclusions

This research started with a simple problem: to create evaluate a new approach to teaching that transmits key principles in sustainability to students of interior design. The problem was nuanced by the need for the module to be applicable and effective in a situation where such teaching had never before been attempted, namely an institute of higher education in Kuwait. To address the problem, the researcher drew

upon the literature on contemporary theories of learning, environmental science, and design, noting particularly any references to cultural context. A participatory learning environment, involving group work, collaboration, investigation, innovative thinking, and the development of communication skills, emerged as the most appropriate way forward.

Prior studies also pointed to models of sustainability and ecological thinking that would be suited to accompanying this mode of teaching and to students who, in most cases, had not been previously been exposed to academic classes on the environment and its relationship and relevance to design. These models emphasised holistic aspects of sustainability – the interconnectivity of components of the biosphere and of human interactions with it – and the advantages of matching local activities and lifestyles to local environmental needs and situations. The feedback received from both students and lecturers at KEI revealed that they were already aware of the desirability of incorporating traditional design and architecture in future efforts at achieving sustainability alongside modern technology and techniques, and that the students became more so after exposure to the interventions in this study. Furthermore, based on the results from the questionnaire and the interviews, following statistical analysis, it was apparent that those who attended the participatory workshops approved of the techniques used and were eager to see a wider application of them in their education. This research is a small step toward the introduction of more student-centred learning in places such as Kuwait and specifically in the area of sustainability as applied to interior design. The participatory workshops proved effective, popular, and superior in their impact to comparison didactic sessions. The challenge now is to see them taken up in practice

and for the staff in institutions such as KEI to become agreeable to, and adept at, their widespread implementation.

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APPENDIX 1

A.1.1 Published Paper

APPENDIX 2

A.2.1 Research Information Sheet

Research in Designing with Ecological Confederations

Dear participants

Thank you for taking part in this research. This research seeks to develop ecological knowledge among interior design students. It is part of a PhD programme in the University of Dundee, Scotland, United Kingdome. This questionnaire will help to understand current process of design education and information on ecological topics. The outcome of this research will assist to develop a module of ecological principles for interior design discipline.

Your participation is completely voluntary and you can leave at any time you wish. In addition, your privacy will be respected and your identity is not required in this research at all times. The responses that you will give will be treated in confidentiality and will be destroyed after the data is collected. The questionnaire will take approximately 5 minutes to complete.

Thank you for your participation.

Kind regards

Sami Alazemi

A.2.2 Questionnaire

Class: ……
Student No**. 1 ,** Form: [ ] **i** , [ ] **ii**

Designing Ecological Module for Interior Design Programme

This questionnaire seeks to know your views on ecological topics and best ways to teach these subjects. This work is part of a PhD research in the University of Dundee, Scotland, UK. The result of this research will help to develop the future programmes. Please note that your response will be treated in discretion and will remain anonyms.

Age: [ ] less than 20 [ ] 21-30 [ ] 31-40 [ ] 41-50 [ ] More than 50

Gender: [ ] Male [ ] Female

Pleas select the appropriate answer from the following statements to indicate the extent of which you agree or disagree.

Statement	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
1. Preparing educational modules in interior design should be done only by the teacher.	1	2	3	4	5
2. Assessing student work during the course should be done only by teachers.	1	2	3	4	5
3. Group work assists students to develop skills that are necessary in the discipline of interior design.	1	2	3	4	5
4. Good designers need only have expertise in their own discipline and do not need to be familiar with other disciplines to be effective.	1	2	3	4	5
5. Good designers need to have effective social and cultural skills to communicate with a particular audience or society.	1	2	3	4	5
6. I am satisfied with what I have received, in terms of learning materials and teaching methods, from the existing programme.	1	2	3	4	5
7. The subject material provided by the present programme gives enough information on how to design using environmentally sustainable methods.	1	2	3	4	5
8. Designs should be appropriate to the surrounding environment and ecology.	1	2	3	4	5
9. Designs should be appropriate to the cultural or traditional elements in any society.	1	2	3	4	5
10. Designers should be members of the societies for which they are designing and be familiar with its history, culture and, environment.	1	2	3	4	5
11. One of the elements of a good designer is to know the relationship between culture and environment.	1	2	3	4	5
12. Designs should be inspired by nature.	1	2	3	4	5
13. Design students need more field and training courses to enhance their personal and professional skills.	1	2	3	4	5

14. Design students need a number of workshops/ seminars outside their field or area of study.	1	2	3	4	5
15. Programme modules and training courses that students receive during their undergraduate studies are enough to develop sustainable and ecological awareness.	1	2	3	4	5
16. Workshops or general training courses provided during study are important in developing additional skills for the designer.	1	2	3	4	5
17. Design students should develop communication and persuasion skills to present their designs.	1	2	3	4	5
18. Design students need to study subjects that develop exploratory and reasoning skills.	1	2	3	4	5

Notes and suggestions:

As part of this research there will be a final workshop that will include both tutors and students. Your insight and participation in this final workshop will help to suggest and agree on topics for the new proposed module.

Therefore, if you would like to attend the final workshop please notify the researcher on your way out.

Your participation is highly appreciated.

Code completed by the researcher:
(Student **No. 1** / W.S. no: […] / Type [ ] P , [ ] D)

APPENDIX 3

A.3.1 Pilot study handout

Pilot Workshop on Design & Ecology

Co-designing paradigms in ecological thinking

Design education has long been effective in preparing and producing highly skilled designers who enter the mainstream of professional design practices. However, many design institutions in higher education take a particular route that does not focus or give priority toward ecological thinking for design students throughout their programmes.

In this pilot workshop participant from different design disciplines will learn key ecological approaches in design that can be used into their own practice. As part of my PhD research the results of this workshop will help to inform processes and methodologies of co-designing a teaching module in interior design programme. Your efforts will help to promote ecological thinking in educational institutions of design.

For catering purposes if you are interested to attend please send an email to s.z.alazemi@dundee.ac.uk

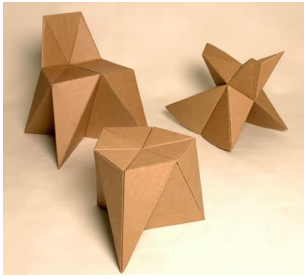
Time & Venue:

Tuesday 15th April 2014

11:00 p.m. – 1:45 p.m.

Matthew building- Room 400

Snacks and beverages will be served



APPENDIX 4

A.4.1 Participatory workshop programme with students.

Participatory workshop, Summer Course- June 2015 (Outline)
venue KEI – Interior Design (Students)

Time & Room	**Tasks & exercises**	**Steps to do for the participant**	**Means**	**Steps by the researcher**	**Done by**	**Reminders**
0800-0900	**Room Setup**	Avoid delay in the timetable	n/a	• Setup room tables and chairs and spaces around walls. • Setup sheets for expertise exercise. • Setup projector. Prepare room for the first exercise.	Researcher & Assistant	Obtain the room keys from the department secretary as early as possible.
0900 -0915	**Attendance Registration and Tea/ Coffee**	Prepare participants for the workshop	n/a	• Place on the registration desk: marker pens and sticky notes: name tags; blank post-it notes for group mapping exercises. • Tea and coffee.	Researcher & Assistant	Make visible: Programme, list of attendees, evaluation questionnaire.
0915 – 0925 10”	**Opening**	- Welcome - An overview of day and programme - Expectations, aims and objectives - Communicate housekeeping - Communicate ground rules	Projector Laptop PowerPoint software	Introduce myself for participant using PowerPoint slides	Researcher	Presentation – Studying at the University of Dundee intro, PhD research in Ecological design. PowerPoint slides with Programme on wall
0925 – 1015 20”	**Indicator exercise Survey One**	- Present a survey to participants to know the level of their knowledge in the following areas: 1- Group and participatory work. 2- Ecological design; 3- Tutor approach in teaching as the main source of knowledge.	Survey of 20 Question	Monitor the participation.	Researcher & Assistant	Make sure students place a code on the (before) questionnaire.
0925 - 0940 <u>15”</u>	**Ice Breaker** **Introducing next session**	Create an open and engaging start to the workshop Quickly get a sense of the diversity of people skills in the room	Ice Breaker	-Explanation of session to participants (5 mins). - Ask participants to work together in pairs – better when they find	Researcher	Keep the atmosphere relaxed Ask students to arrange their chairs close to each other.

		- Explain the mapping exercise (next session)		someone they don't know well. - Spend 3 minutes per person explaining their background and what they hope to get out of the workshop by participating - After 3 mins swap to another student. - At end each person introduces the other to the rest describe their background and their expectations.		
0940 – 1010 30"	**Presentation**	Presenting the effects of current designs on the environment (the problem), and the main concepts of ecological design (possible solutions), to reach ecological awareness.	Power point. Pictures. Video clips	Explain the following objectives: -ecological awareness -importance of participatory engagement in ecological design.	Researcher	Make sure to move around the class and use different voice tones.
1010-1020 10"	**Divide students into groups**	Group selection will be identified by their interests. - To know participants area of interests. - To use their interests of design subjects in the following exercise range of expertise, Design interests in (Material, Space, Function)	A4 Labels to be sticked on wall	Different areas of design subjects will be labelled on the wall Each person indicates their interests of design subject by standing next to the paper that represent him/her.	Researcher & Assistant	Divide students number equally after knowing how they are grouping.
1020-1025 15"	**Presentation of the task required by groups (future environmental Scenario)**	Explaining tasks for the groups to enable them to work together on solving a problem in an environmental scenario	Power point	-Envisioning a particular future scenario then determining possible ways to solve it through their own experience and interest in design. -Using simple natural materials to create physical prototypes. By using natural material instead of conventional material will help them	Researcher	Materials will be placed on two tables so that the groups can use in their design. Indicating the materials to the groups Do not interfere with their thinking or choices.

				to fully engage and understand the extent ecological design and ways of thinking out of the box.		
1025-1110 40” 5” explaining	**Group design**	- Creation of project ideas. Group work together to come up with design ideas. - Sharing project ideas and discussing possible solutions in each group	- group work -prototyping using provided raw materials from nature.	Ask students to: - discuss their ideas: grouping similar / overlapping ideas; seeking out synergies, links based on content of project ideas and discussions / interactions. Prototyping their ideas using the provided materials	Researcher	Use materials provided on the tables
1135-1150 15”	**Outcome assessment**	Students should experience group assessment and how to manage group projects.	A1 sheets, next to the table of each group. Stick notes	Ask everyone to pass by each group to rank each project using stick notes next to the group A1 sheet. Ask each group to star rank other groups work.	Researcher	Encourage listening, appreciating and understanding participants perspective.
1050 - 1200 10”	**Reflection and sharing ideas**	- communicate research ideas across participants; another iteration of development of ideas. - To reflect on the importance of making all parties including lesser involved parties such as students as co-creators in the teaching process.	Forming a circle for discussion	- Ask students about their experience and what have they learned from the discussion and from the activities. - Possibilities of adapting this teaching approach in their own classes	Researcher	Open discussion in a round chair setting
1200-1210 10”	**Ending: concluding** **Questionnaire number two**	Ending workshop	After Questionnaire	- Next steps: brief report, future workshops / events - Workshop evaluation exercise (feedback questions): paper and online	Researcher & Assistant	Closing remarks. Make sure student handed the 2nd questionnaire

1205-1235 30”						- Tidying-up - Collection of materials - Rearranging furniture - Photographing

A.4.2 Didactic workshop programme with Students.

Didactic Workshop, Summer Course- June 2015 (Outline)
venue KEI – Interior Design (Students)

Time & Room	**Tasks & exercises**	**Steps for the participant**	**Means**	**Steps by the researcher**	**Done by**	**Reminders**
0800-0900	**Room Setup**	Avoid delay in the timetable	n/a	• Setup room tables and chairs and spaces around walls. • Setup sheets for expertise exercise. • Setup projector. Prepare room for the first exercise.	Researcher & Assistant	• Obtain the room keys from the department secretary as early as possible.
0900 -0915	**Attendance Registration**	Prepare participants for the workshop	n/a	• Place on the registration desk: blank post-it notes for individual ideas.	Researcher & Assistant	Unpack: Programme, list of attendees, evaluation questionnaire.
0915 – 0925 10”	**Opening**	- Welcome - An overview of day and programme - Expectations, aims and objectives - Communicate housekeeping - Communicate ground rules	n/a	Introduce myself for participant verbally	Researcher	Presentation – Studying at the University of Dundee intro, PhD research in Ecological design. Programme on wall
0925 – 0945 20”	**Indicator exercise Survey One**	- Present a survey to participants to know the level of their knowledge in the following areas: 1- Group and participatory work. 2- Ecological design; 3- Tutor approach in teaching as the main source of knowledge.	Survey of 20 Question	Monitor the participation.	Researcher & Assistant	Make sure students place a code on the (before) questionnaire.
0945 – 1005 20”	**Introducing next session**	Explain to the participants the next step verbally.	n/a	n/a	Researcher	Each person is seating on their desk. Be formal as usual lecturing.

1005 – 1035 30”	**Lecturing**	Presenting the effects of current designs on the environment (the problem), and the main concepts of ecological design (possible solutions), to reach ecological awareness.	Power point. Bullet points	Explain what is ecological awareness	Researcher	Providing hand-outs about the presentations and ecological concepts.
1035 – 1045 10”	**think individually**	- write your interests if design subjects	A4 paper pens	each person indicates what interests of design they have to use it in following tasks	Researcher	Students to use A4 papers to take notes
1045-1100 15”	**Explain of task required from each student (think of an environmental issue)**	-Explaining tasks to groups in order to enable them to work together on solving problems. - To enable tutors to use design thinking methods in problem solving and the importance of participatory work.	A4 paper pens	Ask students to write solutions that they think of from their own experience in design	Researcher	If students are stuck try to provide choices and hints in similar way used by the lecturers in the department by informing the students exactly what to do.
1000-1130 30” + 5” explaining	**Individual design**	Each student creates a project idea individually based on the discussion of ecological concepts.	Individual sketching	Explaining the task. Prototyping their ideas using traditional ways in their programme	Researcher	students should sketch their design solutions and idea individually.

1135-1150 15”	**Outcome assessment**	Research briefly assess student work	n/a	Give a mark out of 10 for individually for each student based on his performance and understanding of the concepts.		
1200-1210 10”	**Ending: concluding** **Survey number two**	Ending workshop	After Questionnaire	- Next steps: brief report, future workshops / events - Workshop evaluation exercise (feedback questions): paper and online	Researcher & Assistant	Closing remarks Make sure student handed the 2nd questionnaire
1205-1235 30”					Researcher & Assistant	- Tidying-up - Collection of materials - Rearranging furniture - Photographing

A.4.3 Topic suggestion participatory workshop with students and lecturers.

Topic selection participatory workshop, Summer Course- June 2015 (Outline)
venue KEI – Interior Design (Students and lecturers)

Time & Room	**Tasks & exercises**	**Steps to do for the participant**	**Means**	**Steps by the researcher**	**Done by**	**Reminders**
08:00	**Room Setup**	Avoid delay in the timetable	n/a	• Setup room tables and chairs and spaces around walls. • Setup sheets for expertise exercise. • Setup projector. Prepare room for the first exercise.	Researcher & Assistant	- Setup room tables and chairs and spaces around walls - Setup sheets for expertise exercise - Setup projector - Prepare room 2 for new ideas 1 exercise
0900 - 0915	**Attendance Registration and Tea/ Coffee**	Prepare participants for the workshop	n/a	• Place on the registration desk: marker pens and sticky notes: name tags; blank post-it notes for group mapping exercises. • Tea and coffee.	Researcher & Assistant	- **Tea and coffee** - **Registration desk**: table with marker pens and sticky notes: name stickers; blank post-it notes for mapping exercise. Make visible: Programme, list of attendees, evaluation questionnaire.
0915 – 0925 10”	**Opening**	- Welcome - An overview of day and programme - Expectations, aims and objectives - Communicate housekeeping - Communicate ground rules	Presenting to all participants using A1 sheet		Researcher & Assistant	Presentation – Studying at the University of Dundee, PhD research in ecological design. Sheet A1 with Programme on wall
0925 – 1015 20”	**Introductions** Introducing next session	quickly get a sense of the diversity of people skills in the room	Ice Breaker Each participant will introduce	- Explanation of session to participants (5 mins). - Spend 3 minutes per person explaining their background and what they	Researcher	Room tables will be arranged in a large circle facing white a board and A1 sheet. Small stickers and pens will be presented to write name and

			their self's.	hope to get out of the workshop		subject of each person
0925 - 0940 <u>15"</u>	**Explanation of the following task**	Reminding attendee about the aim of the session which is to work together to co-create of in developing the module content.	n/a	A revision of most important issues discusses of ecological ideas and the importance of participatory method toward ecological design and in particular to in interior design	Researcher	A1 Sheet
0940 – 0950 10"	**Divide groups by Subject Area**	- Get to know participants area of interests. - use their interests of design subjects in the following exercise range of expertise, Design interests in (Material, Space, Function)	Group selection will be identified per skills to cause empowerment between tutors and students	Different areas of design subjects will be labelled on the wall. Each person indicates their interests of design subject by standing next to it.	Researcher	A4 Labels to be sticked on wall
0950-1005 15"	**Explain of task required by groups**	-Explaining tasks to groups in order to enable them to work together on solving problems -Enable tutors and students to use design thinking methods in problem solving and the importance of participatory work	Power point	- Explain how to work in groups to come up with ideas or solutions from their own expertise	Researcher	Materials will be placed on tables. Pens/ stick notes/ A1 sheets
1005-1035 <u>30"</u>	**<u>Group design of</u> <u>Introduction in Ecological Design Module</u>**	- Creation of project ideas. Group work together to come up with design ideas. - Sharing project ideas and discussing possible solutions in each group	Group work	Interactive discussion of ideas to: - Suggesting appropriate topics of ecological design methods. - Ways of teaching	Researcher	Use of stick notes on A1 sheets for each group

5" explaining				approaches that can help to deliver the aims of the new module.		
1035-1150 15"	**Mapping exercise / Outcome assessment**	Experience group assessment and how to manage group thinking.	Group activity	Everyone will pass by each group to star rate each topic presented on the A1 sheet - Each participant will rank each project using stick notes next to the group A1 sheet.	Researcher & Assistant	A1 sheets, next to the table of each group. Stick notes
1050 - 1110 20"	**Reflection and sharing ideas**	**- To communicate research ideas across participants; another iteration of development of ideas.** **- To reflect on the importance of making both teachers and students as co-creators in the teaching process.**	Open discussion	- Open discussion in a chair setting	Researcher	- Blank A1 paper (2 pages) - Post-it notes - Ball point pens - A1 paper on which maps are formed (2 sheets)
1110-1115 5"	**Ending: concluding plenary**	Ending workshop Closing remarks	Evaluation forms	- Concluding statements from organisers - Workshop evaluation exercise (feedback questions)	Researcher & Assistant	Collect workshop evaluation forms
1115-1145 30"					Researcher & Assistant	- Tidying-up - Collection of materials - Rearranging furniture - Photographing