

**Biophilic Design? A Study of Emotions, Influences,
and Perceptions of Furniture Design
Incorporating Living Organisms**

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ABSTRACT

Biophilia is a theory that proposes the innate feeling of human beings to be associated with nature and living organisms. Emotional design encompasses diverse approaches to feelings and emotions in relation to design. Within this framework, this study aimed to explore the influences of furniture designers, as well as the perceptions of potential users, in regards to furniture which incorporates living organisms. Interestingly, a review of the literature found that, although Biophilic Design has been widely reported in architecture and environmental design circles, few studies have addressed the application of these principles in the context of furniture design. The empirical research documented in this thesis has employed a cross-over mixed methods approach, which encompasses integration of qualitative and quantitative data. A classification of 235 furniture designs with embedded living organisms (such as plants, animals, and insects) was conducted, and a conceptual model with 4 main categories and 24 subcategories was developed and tested through an online survey. The online survey was disseminated to general respondents, and the most significant responses were stratified before another respondent group of Australian Designers was added to strengthen the findings. In parallel to the online survey, 17 designers of furniture design with living organisms classified previously were interviewed. The aim of the interviews was to understand the reasons and rationale of incorporating living organisms in furniture designs. Finally, the quantitative data from the online survey and the qualitative data from the interviews were visually presented, analysed and triangulated. Main findings of the research, as well as conclusions and suggestions for future research conclude the dissertation.

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Bismillahirrahmanirrahim.

I would like to take this opportunity to thank Allah the Most Merciful God for His unwavering blessings. Without Him, I'm nothing more than a spiritual encase.

I would like to express my gratitude and appreciation to my primary supervisor, Associate Professor Dr. Carlos Montana Hoyos, for his guidance, encouragement, patience, and his generous contribution for the completion of this research project. I believe I learned a lot, even though I've doubted myself during this Ph.D.'s journey. He's always there to support and counsel me. I would also like to thank Professor Elivio Bonollo, my secondary supervisor for his advice, support, and guidance. I thank Professor Bill Green for his reviews and advice.

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Sincere appreciation for my parents, and family, friends and everyone I came to know in Australia and Malaysia for their support, continuous encouragement, time and love. To all whom I forgot to mention, thank you so much for everything.

I dedicate my dissertation to my family, people whom I love and lastly, my fellow students whom I get the inspiration from.

MY Ph.D. ANECDOTE

I used to say to my SV (Supervisor), ‘I don’t think I learned enough. I don’t really remember about the journals I have read. It’s as if I have never learned anything...’ I used to think that what I did was never enough and I wish I could do more. I wish I could remember everything I read! I wish I were more skilful before I further my study. Well, I wish I could do everything. Women are good at multitasking, right? Thinking about all this, it does make me laugh. I’m trying too hard to do my best. My SV answered me, ‘Ayn, you’ve learned a lot, you just don’t realize it yet. I don’t expect you to memorize every single article or journal or theory. You’ve done a lot. You’ll be okay. And remember, a Ph.D. is not about saving the world. What you did was a small part of it. Don’t be too hard on yourself...’

I guess I am too hard on myself. I need to enjoy life and relax a bit. So, what I’m sharing here is what I learned on the journey to discover myself.

Life as a student is awesome! I treasured every moment of it. It can’t be denied that it was hard to be a Ph.D. student, with hundreds, perhaps thousands of articles to read and write, OMG, writing is the hardest task of all. Maybe, people out there would say I’m whining for nothing, ‘You’re studying, taking a break from working and having the time of your life there blah blah...’, but trust me, academic writing is hard, especially when writing in your second language. When people are so good with words, it can be a lot easier, I guess. I know that this dissertation is not perfect in terms of the grammar and the language, but I have worked with an editor and used language correction software to refine it. I tried my hardest to make it as best as possible. I put a lot of effort to complete my study. I even dream about it in my sleep. It’s my life, my everything (it sounds dramatic, but that’s the truth☺).

Australia was my home for 3 and a half years. What a great experience. Meeting new people or even traveling to places where I’ve never dreamed of before. Well, it’s not every day you can see the new world; when you have the chance, just go for it. Yep, I got the chance to travel to Europe for a month! I have never imagined myself traveling the world alone, and that’s what I did, from AUSTRALIA. Quite a long journey (22 hours, gosh!), but worthy! I didn’t even get the chance to go to the Borneo when I was in Malaysia. But, that will be on my bucket list from now on.

Being too perfectionist is not a good thing

That’s what I learned here. Everything is not perfect, and neither am I.

I learned to relax and enjoy the moment

I learned about procrastinating. I had never used that word before. I learned to relax and not rush into things. I even became a modest driver. I'm very patient and drive within the speed limit. I enjoy the nature, the lake and the weather here. The best season is Autumn, but I love playing with the snow too. Back in Malaysia, I was like the Flash, drove off my sporty Savvy. That's when I was so young and dangerous, LOL!

I learned to get to know myself, better than before

Being 30s and single is hard. I'm so jealous of everyone who has someone to hold on to and to share everything with when you are far away from your family and friends. I wish I could find my other half and be happy. I must meet few toads along the way before I found my prince, right? People say you will find love right where you are. I guess I did, but...not the main concern right now.

I'm doing exercise every day and STILL enjoying my favourite ice cream. I was never skinny and will never be a skinny girl. I enjoy my food too much, but at the end of the day, I keep on complaining about why I can't shed any pounds off. This is so funny, and I realized I complained every day, and it's my roommates who had to hear about it. I pity them for having to hear about it most of the time. Thank you for lending me your ears, dear roomies!

I found my new passions

Travelling, cooking and trying new healthy foods are my new paroxysms. Is that even a word? (LOL) Spain and Greece here I come, wait for me in 2018.

I love Allah the Almighty more

I learned to be a pious Muslim and trying my best to be a better person. I have never doubted my belief. I believe in Allah more than before and hopefully, will always be part of this Deen until the day I die. I know, in the news, people talk about how bad the Muslims are, never judge people by their looks or what they believe in, please! One of my dear friends (not a Muslim) used to say, and I love quoting him, 'Treat the people the way you want to be treated...' and don't forget to smile too.

A Ph.D. is just a Ph.D.

What matters the most is the experiences that you've gathered along the way. And even more important, you learned to be who you are and be better. I really enjoyed my Ph.D.'s journey and hope some of you might too. I laughed, cheered, teased, stressed, and mostly cried a lot.

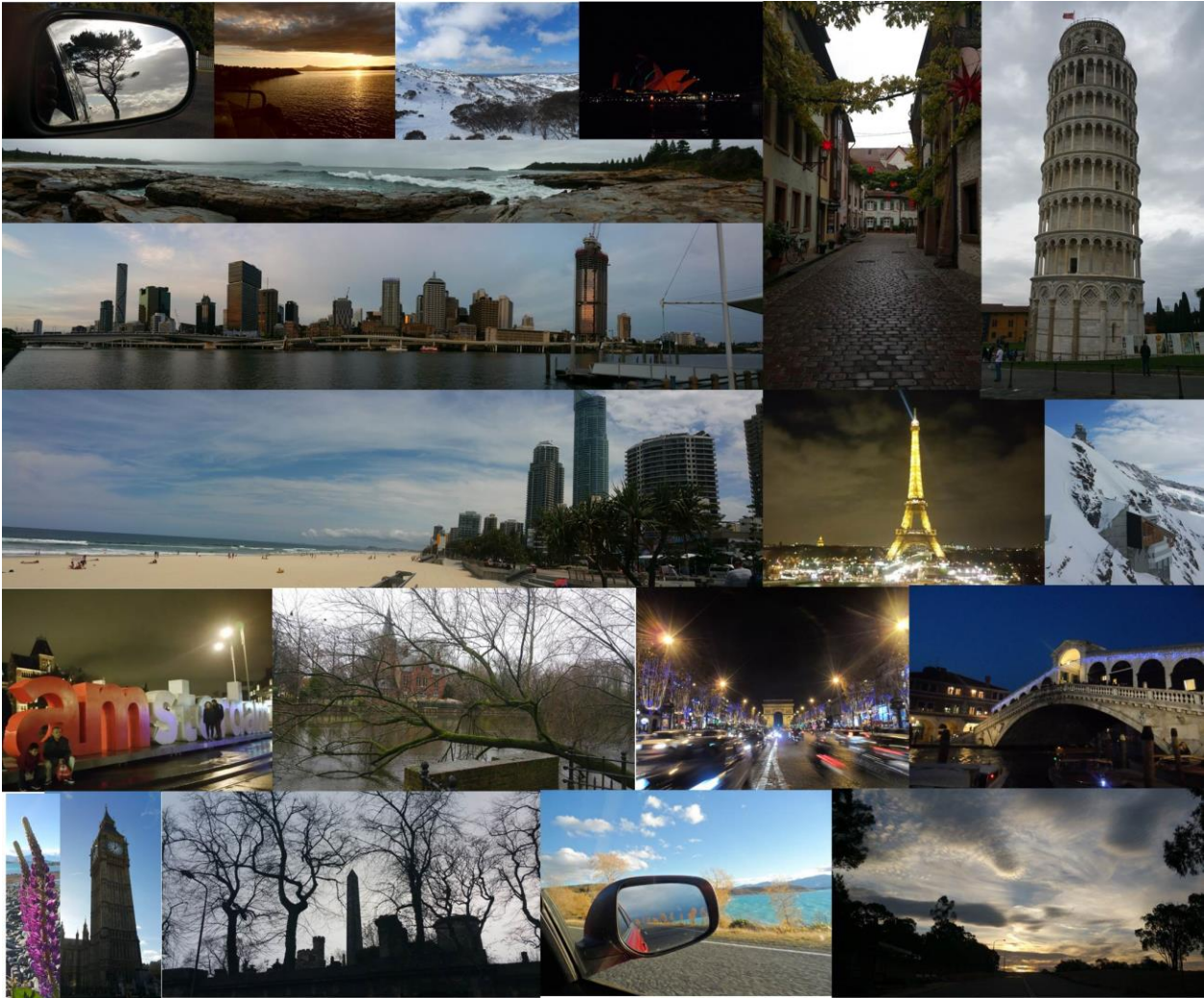
I've drowned in a roller coaster of emotions, but, the negative feelings never have to leave my cubicle/room. I'm a grown up woman now; I can feel that.

I'm smiling when I'm writing this anecdote. I guess life in Australia is the life I can treasure and remember the most.

I miss my family, right now, but, I wish so bad I'll be back here in Australia soon. I haven't been to most of the Australia yet (Tassie, Adelaide, Perth, NT and Uluru, OMG. I have to come back!).



'Ayn Sayuti



I hope this is not the end of my journey; I wish to experience more in the future!

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LIST OF ABBREVIATIONS

2D	Two-Dimensional Drawing
3D	Three-Dimensional Drawing
AC	Art Design/ Creative
AD	Australian Designers
AJS	Academic Journal of Science
AR-CAD	Augmented Reality Computer Aided Drawing
E	Educators
FDLO	Furniture Design with Living Organisms
FDWLO	Furniture Design Without Living Organisms
IBM	International Business Machines
IADD	Interactive Affective Design Diagram
ID	International Designers
IJAS	the International Journal of Arts and Science Conference
HDTV	High-Definition Television
HTML	Hyper-Text Mark-up Language
MMR	Mixed Methods Research
NVIVO	A program or software which allows for "in vivo" codes
PANAS	Positive Affect Negative Affect Schedule
PrEmo	Product Emotion Measurement Instrument
PERL	Practical Export and Reporting Language

PPP	Product Personality Profiling
S	Students
SAM	Self-Assessment Manikin
SD	Standard Deviation
SDMT	Symbol Digit Modalities Test
SEQUAMS	Sensory Quality Assessment Method
SPSS	Statistical Package for the Social Science software
TU Delft	Technology University of Delft
UK	United Kingdom
ZIPERS	the Zuckerman Inventory of Personal Reactions

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1.1 Context of the Study

Several studies have been done in the fields of psychology, human behaviour and health about the effect of plants in the living space, especially in hospitals. These studies have proven that nature helps in patients' recovery (Baun et al., 1984; Odendaal, 2000; Walsh, 2009a; Walsh, 2009b, among others) or has a positive effect on the performance of workers in their offices (Kaplan, 1995; Gray and Birrell, 2004; Grinde & Patil, 2009 among others). Even pictures or photos of greenery can help the patients feel better or even tiny pot plants or small aquariums in the living space or offices make a big difference in human being's attitude, behaviour, and lifestyle (Kaplan, 1995; Gray and Birrell, 2004; Grinde & Patil, 2009 among others).

Living in a big city or an urban environment is normal for most people nowadays, and contact with nature has progressively decreased. Nature offers so much to us, and it is undeniable how nature has benefited us for many centuries, however, nowadays living elements are less present in urban environments. Nature has many types of impact on people, it affects the way we live, think, learn, or even survive. Many studies have been conducted to try to understand how nature affects people (Mehrabian and Russell, 1974; Ulrich 1981; Balling and Falk, 1982, Heerwagen; 2009 among others). This project further investigated the roles of nature within the built environment, by studying influences and perceptions of furniture designs incorporating living organisms.

Biophilia and biophilic design propose a reconnection with nature. Biophilic design helps people to be close to nature, especially in the built environment. As stated above, the various benefits that nature brings to us make designers, architects, and others realize the importance to human health and wellbeing of being close to nature. These people who design with nature might have different rationales, and this was found to be a topic worth studying.

Nowadays, many designers seem to aim to bring back nature closer to people, as there is an apparent decrease of interaction between human beings and nature. Furniture designs with living organisms such as plants or living animals have become increasingly popular. Having this type of furniture design in our living space, mainly indoors, might be perceived in many different ways by potential users, and might help users to be closer to nature and living elements. Several studies have shown that nature, living plants and animals create emotional attachments for people, as human beings need to feel a connection with something which can

make them feel better, be it plants or animals (Baun et al., 1984; Kaplan, 1995; Odendaal, 2000; Walsh, 2009a; Walsh, 2009b among others).

Having a small live organism in the built environment can have different meanings and interpretations for users. Furniture designs have evolved and changed throughout the time. Furniture pieces are not merely used only for basic practical functions but have become more diverse, with an intrinsic collaboration of human emotion, mind, and skills. This project has studied hundreds of extraordinary furniture designs, which were embedded with living organisms, for example; a chair which invited insects especially ants to live inside the house.

Moreover, this study focused on the development of the typology or a matrix of the types of Furniture Design with Living Organisms (in this dissertation referred to as FDLO) in different contexts and types of functionality. A conceptual model on the reasons why designers embedded living organisms (LO) into their designs was developed to assist in finding out the perception and opinion of potential consumers on FDLOs. This study can also be an inspiration for further research on exploring “live” elements or living materials in new products and material explorations, in other various design fields.

1.2 Scope and Main Topics

This study was conducted with the aim to provide further understanding and new knowledge about how living organisms in the built environment, and namely in furniture, affect people emotionally. Embedding living organisms in furniture designs might be due to many different reasons. Furthermore, reactions by potential users, or the general public, to these furniture designs with living organisms might be varied.

Studying influences and perceptions of furniture designs with living organisms, and understanding how emotional responses to visual perceptions of these designs might be related, or not, to Biophilia Theory and Biophilic Design, was the scope of this study. This study was developed within the theoretical framework of biophilia theory, biophilic design, and emotional design.

1.3 Overall Aim

To better understand the relationships between furniture design, biophilia theory, and emotional design. This can be done through the exploration of the influences of that designers have on furniture and perceptions by potential users in regards to furniture which incorporates living organisms such as plants and animals.

1.4 Objectives

1. To further understand furniture design with living organisms and its relationships with biophilia theory and emotional design.
2. To carry out a critical survey of the literature and other sources of information on:
 - biophilia theory and its relationship with design and emotion.
 - classifying examples of furniture which have been embedded with living organisms and identifying the theory underlying this approach.
 - identifying the rationale that designers commonly employ in designing furniture embedded with living organisms.
3. To carry out a survey based on mixed methods, whereby images of furniture with living organisms are tested online to determine people's perceptions toward furniture embedded with living organisms.
4. To summarize findings, conclusions and to make recommendations for future research.
5. To use the above information to generate new knowledge about biophilia and emotional design in relation to furniture design.

1.5 Research Questions

Main Question:

1. What are the relationships between biophilia theory and emotional design in furniture embedded with living organisms?

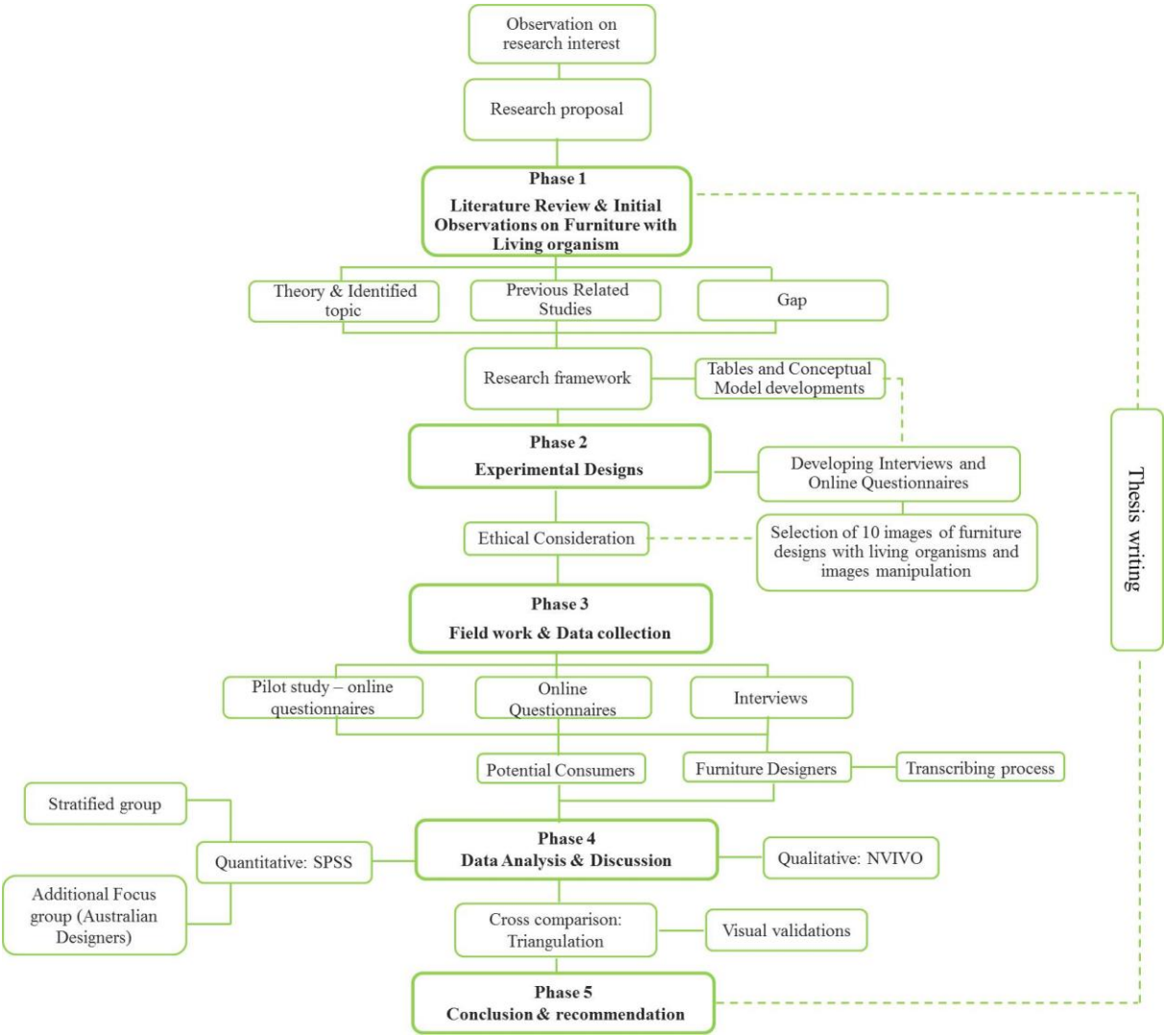
Other Questions:

2. What are the criteria to classify and understand current examples of furniture incorporating living organisms?
3. Why do some designers embed living organisms in furniture design?
4. How do people perceive furniture designs incorporating living organisms?

1.6 Research Methodology

In order to achieve the overall and specific aims, this research was conducted by; 1: observations on the current FDLO, 2: interviews - to gather information from current furniture designers (qualitative data), 3: survey using questionnaires, to obtain quantitative data through feedback from the selected samples of potential users, on how they perceive the images of furniture designs with living organisms (FDLO). This research was developed in 5 phases as shown in Figure 1.1 below.

Figure 1.1: Overall research plan: a graphic outlining the theoretical and empirical activities carried out in this research project



This study began with observations and literature review on several related topics, and biophilia was chosen, as most studies related to Biophilic Design were found in Architecture and Landscape Design fields, but no related studies were found in furniture design. The

researcher started to look into design books and websites which featured furniture designs with living plants. This genre appeared very interesting, but no study was found in the industrial and furniture design fields, even though many designers were producing hundreds of this type of designs all around the world. After conducting a literature review to provide a basis for this study, the researcher looked further into related previous studies and identified the relevant topics which could be linked to the studies, to strengthen and structure this research. A research framework and methodology were developed and used as a guideline for this study. Early conceptual models and an initial classification and typology of FDLOs were developed before the Second Phase, which started with the development of questionnaires for the interviews and online surveys. The data collection phase (Phase 3) commenced by dissemination of the online questionnaires and interviews with designers involved in designing some identified and selected furniture designs with living organisms. Further analyses and data validations were done in Phase 4. The final phase includes discussion, conclusions and recommends future research. Further discussion of the Research Phases can be found in Chapter 3. The table below shows the research methods and measurement tools used to perform this research while answering the research questions.

Table 1.1: Research question related to the chosen Research Methods and tools to measure.

Research Questions	Research Methods	Measurements and tools
RQ 1: What are the relationships between biophilia theory and emotional design in furniture embedded with living organisms?	<ul style="list-style-type: none"> - Literature review of biophilia, biophilic designs, emotional designs – a background study, theories and definitions. - Interview sessions with designers and online questionnaires with general respondents and specific group of Australian designers. 	<ul style="list-style-type: none"> - Secondary data: Books, journals, articles - Primary data: Quantitative analysis: SPSS, Frequency tables, u-test (Mann- Whitney), Kruskal-Wallis, Qualitative: NVIVO Coding, Word Cloud-word frequency; Online survey tool
RQ 2: What are the criteria to classify and understand current examples of furniture with living organisms?	<ul style="list-style-type: none"> - Literature review and initial observation of at least 235 furniture design with living organisms, - Development of conceptual model 	<ul style="list-style-type: none"> - Secondary data: design books and online design websites - Graphics software (Adobe Illustrator and Photoshop) to develop the conceptual models and categorized tables to identify the furniture design with living organisms.
RQ 3: Why do some designers embed living organisms in furniture design?	<ul style="list-style-type: none"> - Interviews with designers to find the rationale behind the development of furniture designs with living organisms 	<ul style="list-style-type: none"> - Semi-structured interview format, Open-ended questionnaires and analysed with the NVIVO software and Microsoft Excel.
RQ 4: How do people perceive furniture designs with living organisms?	<ul style="list-style-type: none"> - Online questionnaires with general respondents and specific group of Australian designers. 	<ul style="list-style-type: none"> - Online survey tools: Closed-ended, Image Selection, Multiple Choice, Semantic Scale, Likert scale. Quantitative analysis: SPSS and Microsoft Excel

1.7 Organization of Thesis

Chapter 1 presents a brief introduction to the topics and background of this research, which consists of an overall introduction, main aim, specific aims, research questions, research methodology, limitations of the study, organization of the thesis and identification of a gap in knowledge.

Chapter 2 discusses and provides information on furniture design, biophilia, biophilic design, and emotional design, with relevant sub-topics and previous related studies which helped to support this study while helping the researcher to identify the gap in knowledge.

Chapter 3 presents a detailed research design, methodology, and theoretical development. The research used a mixed methods approach to collect the data through an initial search and classification/typology of current FDLOs, online surveys, and interviews. The chapter explains how the research was done and how it was developed, including the design processes of online questionnaires, which was the main contribution to help in the data collection processes. A pilot study was conducted before the actual online survey. This was to ensure the questionnaire was easily understandable and practical for respondents, before disseminating it to a larger audience in the actual survey.

In parallel, interviews were done to gather information from 17 designers who had been involved in designing FDLOs, as found in the initial search. Conceptual models were developed continuously throughout the project. These conceptual models serve as the framework and visual interpretation to understand and explain the topics, how they are connected, and also to communicate the ideas and new knowledge which resulted from this study.

Chapter 4 presents the results from the quantitative data and data analysis. This chapter focuses on analysing the data collected using SPSS 23 software.

Chapter 5 discusses the qualitative data gathered from the interviews with designers, which used NVIVO, Microsoft Excel, and Word Cloud accumulates to help visualize and analyse the findings.

Chapter 6 validates and discusses the findings by triangulating the results gathered from the online surveys and interviews. Tables were developed from the results to see the relations from each section in the questionnaire and interviews, and these comparisons and

triangulation were specifically done to further validate the conceptual model, which was the main concern in this study.

Chapter 7 summarises the research findings, provides main conclusions of the study and recommends further research based on the data obtained through literature review, data collection, and the development of the conceptual models.

This study received very useful feedback at different stages and was developed through several discussions and participation in internal seminars within the University, as well as local and international conferences. There were some good discussions about how to improve and further validate the research methods by having a stratification of groups of respondents. Dissemination of the questionnaire among a group of Australian designers was also suggested and incorporated into the project in order to strengthen the findings. These discussions were held before this research was presented in the International Journal of Arts and Science Conference in Germany (IJAS 2014). As a result, a peer-reviewed journal paper was published in the Academic Journal of Science (AJS). This study was also presented at a Doctoral Colloquium in November 2015 in Brisbane, Queensland during The International Association of Societies of Design Research (IASDR 2015). Through this peer-reviewing process, many of the ideas expressed in this thesis were discussed with fellow designers and conferences attendees and then refined through several iterations.

1.8 Limitations of the Study

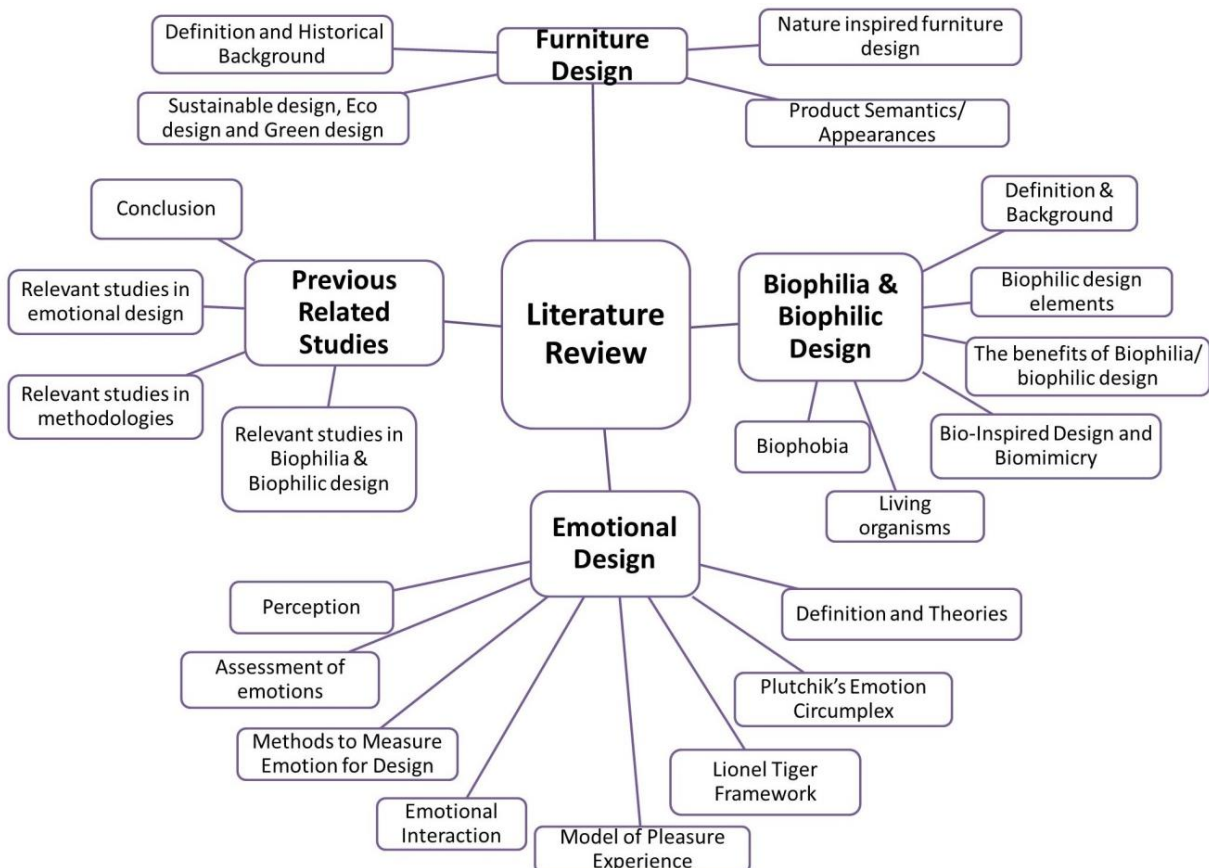
As described previously, this study mainly focuses on furniture designs with living organisms, and how they may affect the visual perceptions and emotional responses of users. This study does not cover a detailed study of emotions and perceptions but uses an emotional scale (specifically designed for this study and adapted from existing ones mainly used to measure emotional responses from respondents). There were issues which could not be avoided, such as the availability of designers who were willing to participate in the interview sessions (only 17 designers agreed to be interviewed from more than 100 invited designers), a limited budget for the online survey tool (which needs monthly subscriptions for full access), and possible drawback by respondents to answer the questionnaires in the survey phase (as only 27 Australian designers responded, from 200 invitations sent by email). However, given the limitations, this study was conducted in a satisfactory way, and the results were subject to the Mann-Whitney and Kruskal-Wallis test used for non-parametric tests, where there were no equal numbers of respondents used, to further validate them.

CHAPTER 2 LITERATURE REVIEW

Introduction

This chapter begins with a review of literature related to furniture design and includes a brief explanation of the main definitions, historical background, nature-inspired furniture design, design semantics and product appearances. Next, biophilia theory and biophilic design are explained further in this chapter, followed by other related topics, such as living organisms, and biophobia. This chapter also discusses the theories of emotion and emotional design, including models of pleasure, emotional interaction, common methods of measurement of emotion used in the design fields and a brief discussion on perception. A review of the previous related studies is presented in the final part of this chapter; these previous studies provide examples and evidence to support this study. As a result of this literature review, a gap in knowledge was clearly identified and this provides the basis and justification for this research project. As shown in Figure 2.1 below, a mind map describing main topics is presented for ease of reference.

Figure 2.1: Mind map describing the relationships of the main topics discussed in the literature review

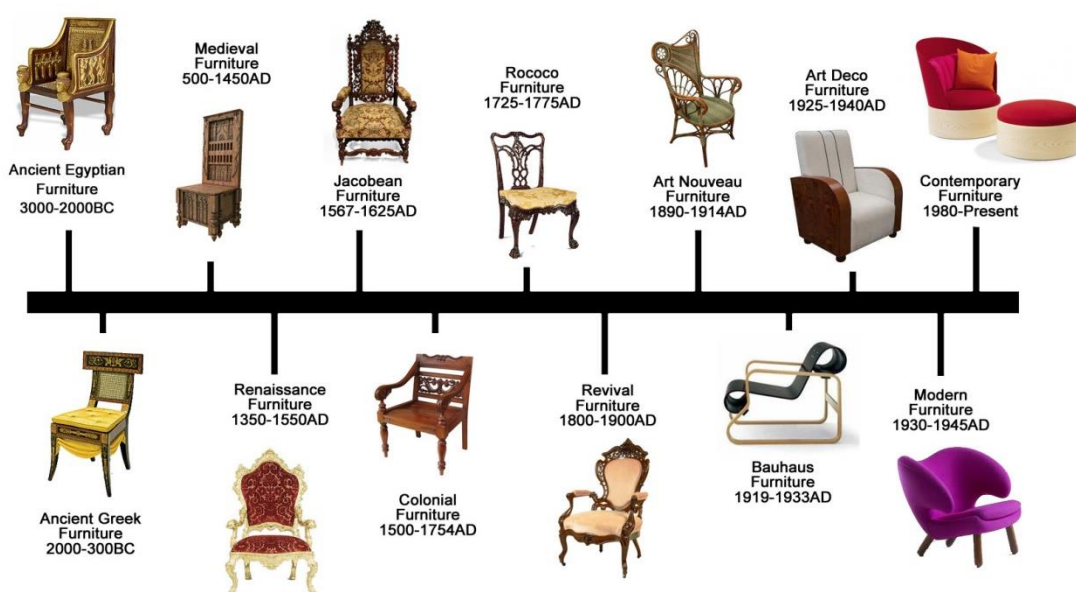


2.1 Furniture Design

2.1.1 Definition and Historical Background

Furniture design can be defined as the design of movable, functional objects that support human activities which consist of tables, chairs, sofas, beds, storages, shelves, wall systems, dividers and others. Different types of furniture are designed to cater to different types of activities. Furniture has been used in previous centuries to serve religious purposes and showed the status of the owners. Table 2.1 below briefly summarizes the chronological order of furniture design periods ranging from 3000 BC until the modern era. It can be seen that furniture designs can be classified based on the material usages, craftsmanship, function, styles, status, beliefs, cultures, eras, psychographic and demographic factors (Hinchman, 2009; Pina, 2010). Furthermore, furniture designs can also be historical artefacts that provide an overview of human being's ways of living. For example, a chair can be designed to be a throne for the king (a luxurious eclectic piece to show the status of people), be used as part of religious ceremonies or can just be used by all people in public areas such as offices, schools, parks and malls. Contemporary furniture designs are very diverse because of new needs, new types of spaces, new trends, advances in ergonomics, and the development of new technologies in manufacturing and materials. Table 2.1 also illustrates the variety of designs, shapes, styles, materials and colours that have been used to differentiate chairs according to eras and trends (Additional information on chairs by Vitra Design Museum can be found at Appendix B, Chapter 2 – Literature Review, page 196).

Table 2.1: Furniture design timeline (<http://www.ebarza.com/pages/famous-designers>)



2.1.2 Sustainable design, Eco-design and Green design

To understand Furniture Design with Living Organisms (FDLOs), it is important to situate some of them within experiments for sustainable design.

Sustainable design can be defined as environmentally conscious design. According to www.gsa.gov (2015), sustainable designs seek to reduce the negative impact on the environment by reducing the consumption of energy, materials, and minimizing waste, while optimizing the operational and maintenance practices. Although “sustainability” as a concept is not new, and was found in indigenous tribes and documented since the 5th century by the Greeks, the vast usage and over consumption of natural resources due to human activities in the industrial world caused a tremendous impact and significant threats towards the environment (Montana-Hoyos, 2010). Thorpe (2007) has divided sustainable design into three primary focuses of Ecology, Economy and Culture in the demanding state of developments and globalization from the revolutionary of the industrial era till today’s design world. Tischner (1997) described sustainable design as a design that meets a definite need by using the smallest amount of materials and energy and creates the least amount of waste and toxins in its whole life cycle. The awareness towards sustainability is crucial, not just for designers, but for the community, so that the environment and its ecosystems can be conserved for the next generations. This awareness towards preserving nature and the environment has created new movements, which aim to tackle the problems generated by over consumption.

Eco-design considers the environmental impacts during the whole life cycle of a product. Also, known as “green design,” “environmentally – friendly design” or “Design for Environment” (DfE), Eco-design movements started in the 1960s (Montana-Hoyos, 2010). According to Proctor (2009), Eco-design consists of taking into account all environmental criteria, such as biodegradability, fair trade, locally sourced materials, low energy consumption, low waste, no toxins, recyclability, and well-managed resources.

2.1.3 Design Semantics and Product Appearance

To understand and analyse a product, or more specifically piece of furniture, it is important to comprehend what it communicates. Thus, Semantics and product appearance will be briefly discussed below.

2.1.3a Semantics

According to <http://www.thefreedictionary.com/semantics> (2014), “semantics” is “the study of interpretations of a formal theory”. In linguistics, semantics can be defined as “the meaning of words or symbols”. The term “semantics” is widely used in design to define the meaning of a product, visually and physically. Product semantics (as defined by Krippendorff, 1989) should not only be concerned with the form, surfaces, visual or tactile qualities and materials, but by the understanding of the consumers toward the product, how it functions, and its interfaces. Product semantics can be understood as how consumers and users perceive and understand a product. As also stated by Krippendorff (1989), “designed” products should enable consumers to make sense of things. Related studies on product aesthetics, semantics, and styling in design are by Veryzer (1993), Symth and Wallace (2000), Bloch et. al. (2003), Crilly et. al. (2004), Leder et. al. (2004), Zuo and Jones (2007), Boess (2008), Krippendorff (2008), Lawson and Storer (2008) and Bonollo (2010). Furthermore, Demirbilek and Sener (2010) conducted a study which relates semantics and emotional design to product ergonomics.

2.1.3b Product appearances

Marketing research confirms that while choosing or finding the right product for a specific purpose or usage, consumers and users highly value a product’s appearance (Veryzer, 1993; Yamamoto and Lambert, 1994; Bloch, 1995; Creusen and Schoormans, 2005). Well-designed products don’t just serve a pragmatic or functional purpose, but also please consumers visually through the various colours, shapes, forms and materials. All of these aspects may create a simple satisfaction. Product’s appearance is not only important as a “visual pleaser”, but also sends a message to potential consumers on the functions, trends and other product characteristics which can be visually perceived, producing a positive visual experience. An example of studies about product appearances done in product design are by Govers and Schoormans (2005), Mugge, Govers and Schoormans (2008) and Blijlevens et. al. (2009).

Some of the previous studies described above have been useful to understand the relationships between product appearance and product perception, which is an important area of this research project, as applied to furniture design with living organisms.

2.2 Biophilia and Biophilic Design

2.2.1 Biophilia Theory: Definition, Background, and Related Studies

As defined by the Dictionary of Environment and Ecology Fifth Edition (2004), the prefix bio means “referring to living organisms” and the suffix philia means “attraction towards or liking for something.” As such, biophilia describes the innate feeling of human beings to be associated with nature and living organisms. Fromm, as cited by Eckardt (1994) proposes that Biophilia can benefit human vitality and wellbeing as nature offers a conducive environment for human development and growth. Moreover, biophilia theory proposes reactions and behaviours of human beings towards their environment, and how their surroundings affect their daily life. Wilson (1984, page 1) developed Biophilia theory and defined it as “the innate tendency to focus on life and lifelike processes.”

There are several reasons why humans need to be close to nature or other living organisms. For example,

(1) *Benefits of nature to human beings*: as nature provides food, water, shelter, new materials, etc. Many studies show how nature has inspired designers, artists, scientists, researchers, and even common people.

(2) *To experience and explore nature* because this world provides:

a) *visual experience*: such as seeing the greenery landscape, oceans, rivers and mountains, clear blue sky or even cloudy skies, the spectrum colours of rainbows and the radiant colours of the sunrise and sunset every day in our life.

b) *physical experience*: the exhilarating feeling while swimming in the sea or river, climbing a tree or mountains or maybe running away from dangerous animals, and

c) *sense and emotional experience*: by feeling the textures of the trees or grains of sand and pebbles, touching the animals’ furs or skins, hearing the sound of birds, animals, insects, feeling the water ripples and flowing, and so on.

(3) *Nature affects people’s emotions behaviour and health*: there are several studies about human preferences towards nature and how nature affects us in daily life, in positive or negative ways depending on how we experience it (Mehrabian and Russell,

1974; Ulrich 1981; Balling and Falk, 1982; Kaplan, 1995; Williams, 1996; Frumkin, 2003; Heerwagen, 2009; Simaika and Samways, 2010; Capaldi et. al., 2014).

(4) *Nature inspires people:* in studies, artworks, designs, work and environment (Benyus, 1997; Van den Berg and Windjes, 2000; Orr, 2002; Thorpe, 2007; Helms et. al., 2009; Heerwagen, 2003; Montana-Hoyos, 2010; Gruber et. al., 2011; Gray and Birrell, 2014).

(5) *Interaction with living organisms other than human:* as animals and plants, which are part of nature have proven to be a companion for humans. Animals have been associated with humans and been living together since long ago. Studies by Baun et. al. (1984), Walsh (2009a) and Walsh (2009b) suggested that a physical contact with animals creates a bonding and produces relaxation effects, physical and mental health benefits. A study which involved children, by Nagengast et. al. (1997) discussed that having pets helped in physiological arousal and behavioural distress in children. A study of the influences on social- emotional and cognitive development of children by Endenburg and van Lith (2011), showed that human affiliation with animals brings benefits in therapy sessions with patients in hospitals (Odendaal, 2000; Hoffman et. al., 2009; O'haire, 2010).

(6) *Changes in lifestyle:* as human nowadays live in urban environments that have limited spaces for natural elements, created a stressful lifestyle, pollution, and environmental issues.

(7) As a result, this has consciousness of point 6 has triggered *awareness on sustainability and the importance to preserve the nature* (Flannery, 2005; Heerwagen, 2006; Beatley, 2011; Kellert, 2012). This issue is huge and more people nowadays participate and work together to find solutions and address this issue.

2.2.2 Definition and Background of Biophilic Design

Biophilia theory has evolved into practical applications, such as biophilic design, by Kellert et. al. in 2008. Biophilic design is the application of biophilia theory to the built environment, where the roles of nature to the human mind, emotion, and physical well-being are crucial (Kellert et. al., 2008). According to Kellert et. al. (2008, page 3), biophilic design is:

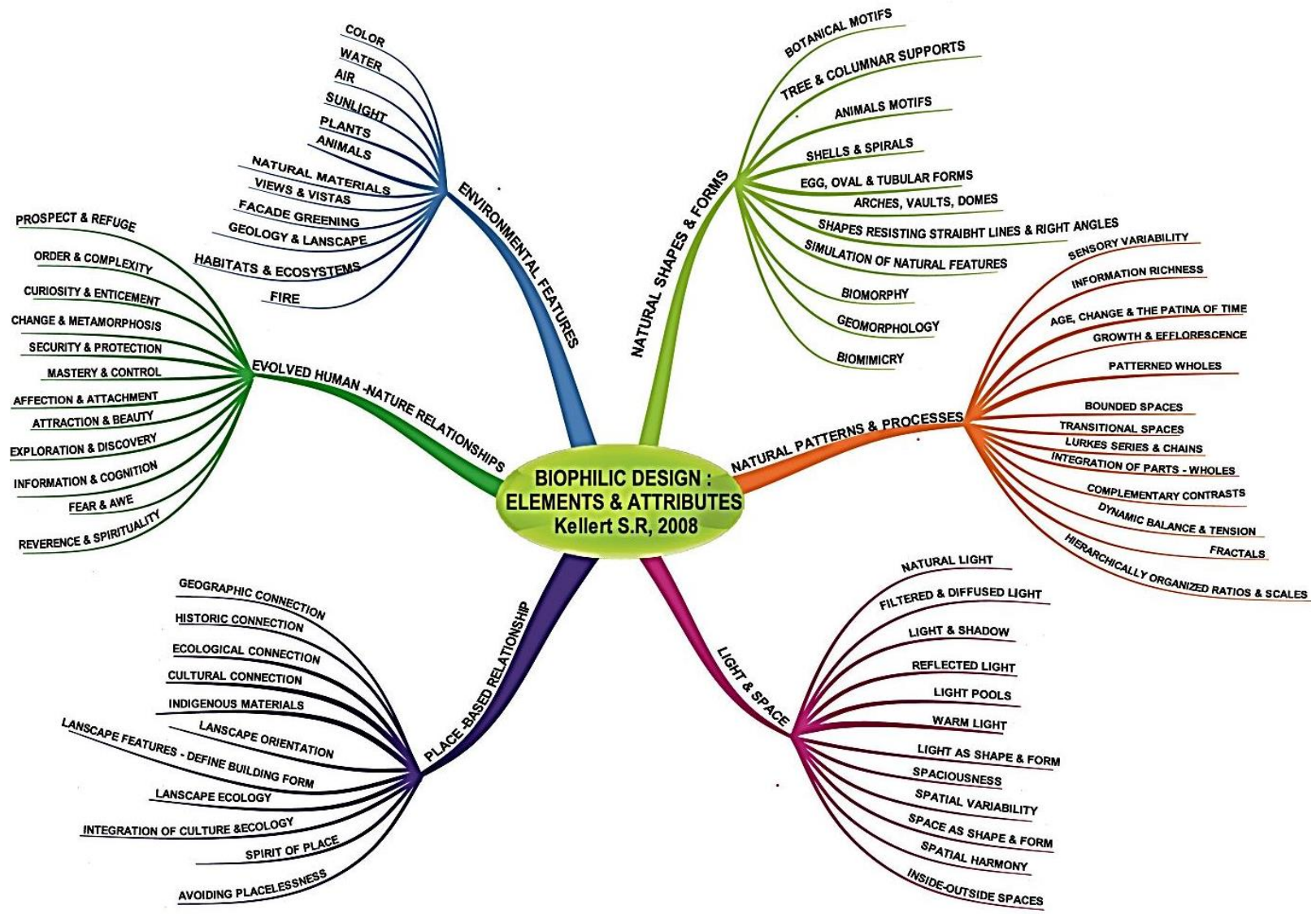
“The deliberate attempt to translate an understanding of the inherent human affinity to affiliate with natural systems and processes – known as biophilia, into the design of the built environment.”

2.2.2a Biophilic Design Elements

Kellert et. al. (2008, page 7 - 15) have divided biophilic design into six design elements, which can be a useful guide for designers and researchers to apply in design that can bring nature closer to people. The six design elements that were discussed are (1) Environmental features which involve colour, water, air, sunlight, plants, animals, natural materials, views and vistas, facade greening, geology and landscape, habitats and ecosystems and fire in nature, (2) Natural shapes and forms in man-made designs that include the natural traits, motifs, forms or structures,(3) Natural patterns and processes which comprise the integration of natural elements and cycles that are compatible to be adapted to the built environment,(4) Light and space, involving the function of lights and spaces in outdoors and indoors of built environment, (5) Place-based relationship, as the merging of ecology into culture, for example the adaptation of yin-yang into design, where the Chinese culture incorporates the natural elements of daily life, and finally (6) Evolved human-nature relationships, where the affiliations between human beings with nature and how nature has influenced them is discussed.

In view of the above findings, an image summarising the elements of biophilic design has been constructed as shown in Figure 2.2 below.

Figure 2.2: Biophilic Design Elements. Mindmap by the author, according to Keller et. al. (2008).



2.2.2b Benefits of Biophilic Design

Many studies have addressed the benefits to human beings, of having natural elements nearby or indoors. These include research by Mehrabian and Russell (1974), Ulrich (1981), Balling and Falk (1982), Kaplan (1995), Williams (1996), Odendaal (2000), Hoffman et. al. (2009), O’haire (2010) Simaika and Samways (2010), Bartczak et. al. (2013), among others. Diverse studies about Biophilic design have been conducted in the disciplines of the built environment, mainly architecture and landscape architecture. For example, Johnson (2014) studied 5 different types of built environments (health, office, public, residential and community spaces), while Heath (2014) focused on biophilic design principles in health spaces. Frumkin (2001) stated 4 main domains of nature contact that may benefit human health, which are animals, plants, landscapes and wilderness experience. Huelat et. al. (2008) conducted a descriptive study on how biophilia has health benefits. Grinde and Patil (2009) reviewed 50 relevant studies on the effects of the outdoor and indoor environments in human well-being, concluding that the presence of plants can positively impact the human mind.

In the Australian context, studies by Reeve et. al. (2012, 2013) in architecture and biophilic urbanism used a mixed methods approach to analyse 20 case studies and two stakeholder focus groups in Perth and Brisbane. They concentrated on external biophilic elements and incorporated vegetation for aesthetic purposes (additional info in Appendix B, Chapter 2 – Literature Review, page 197). Terrapin Bright Green (2012 and 2014), a design consultancy from the USA conducted studies on productivity and employee well-being, concluding that incorporating nature in the built environment can help to enhance the employees’ productivity, thus lower production costs (additional info in Appendix B, Chapter 2 – Literature Review, page 198).

2.2.2c Biophilia, Bio-inspired Design, and Design for Sustainability

While biophilia involves the reactions and the tendencies of human beings towards nature, most bio-inspired design approaches adapt or mimic the natural elements and incorporate them into designs or technologies to solve problems (Benyus, 1997; Thorpe, 2007; Montana-Hoyos, 2010; Gruber, 2011). It is important to note that although many examples of furniture designs with living organisms (especially with plants) are related to green design (Eco-design or environmentally friendly design) or sustainable design (which encompasses social, environmental and economic aspects of design,) this research will focus on biophilic design, rather than on design for sustainability. Furthermore, although biophilic design is sometimes related to biomimicry, (design inspired by nature, also known as bionics, biomimetics and

biomorphism, see Figure 2.3) they are not the same. Thus, although related to biophilia and biophilic design, sustainable design and biomimicry will not be main topics to be explored in this study.

Figure 2.3: Example of biomimicry and bio-inspired design. Source: <http://andrewhessel.com/?cat=52>



2.2.2d Living Organisms

According to <http://www.thefreedictionary.com/Living+organisms> (2014), a living organism can be defined as an individual form of life or a living body, including animals, plants, bacteria, fungi, algae, and others. Living organisms are a main part or subject of this study, as it investigates furniture designs which incorporate living organisms (mainly plants and living animals). Further explanation of a new typology of furniture design proposed through this study (and which is a novel contribution to knowledge in the design fields), Furniture Design with Living Organisms (FDLOs) can be found in Chapter 3 (page 44 - 49).

2.2.2e Biophobia

In order to understand Biophilia, it is also important to understand its opposite, Biophobia. Oxford dictionaries (2014) define Biophobia as (1) a refusal or marked reluctance to consider or accept biological (especially genetic or evolutionary) factors or theories about human life and (2) avoidance of contact with animals, plants, or organic materials; strong aversion to aspects of the natural world. As stated by Williams (1996) and Simaika and Samways (2010), biophobia is the opposite of biophilia. For this study, it is important to note that respondents might include people with biophobia.

2.3 Emotional Design

2.3.1 Definition and Classifications

Emotion can be defined as subjective biological conscious or non-conscious expressions, which involve facial and vocal expressions, physiological symptoms and occur depending on certain events that can be experienced in daily life (Niedenthal et. al., 2006). Moreover, according to Plutchik (2001) and Khalid and Helander (2006) emotions involve human's internal stimulations and happen naturally while influencing the way human beings react, behave and think. Heath (1986, page 8) states that;

“Emotion is always associated with a change in sensory perception, and that which we perceive affects our emotional state... Every emotion is associated with memory recall, and emotions are usually generated by memories.”

Emotion is defined by Scherer (2005, page 3) as

“an episode of interrelated, synchronized changes in the states of all or most of the five organismic subsystems in response to the evaluation of an external or internal stimulus event as relevant to major concerns of the organism”.

Emotions have been recorded and classified in many different ways. For example, Scherer (2005) divided emotion into 5 components which are (1) *cognitive component* (appraisal) which function as evaluators of objects and events, (2) *neurophysiological component* (bodily symptoms) which are responsible for the system regulation, (3) *motivational component* (action tendencies) involving in emotional preparation and direction of action, (4) *motor expression component* (facial and vocal expression) responsible for communication and behaviour intention, and finally (5) *subjective feeling component* (emotional experience), which involve monitoring the internal feelings and interaction with other organisms.

Scherer (2005) also proposes a list of affect categories (positive and negative emotions) and pertinent words which can be used to describe the emotions that can be seen in the Table 2.2 below.

Table 2.2: Affect categories and words stem by Scherer (2005)

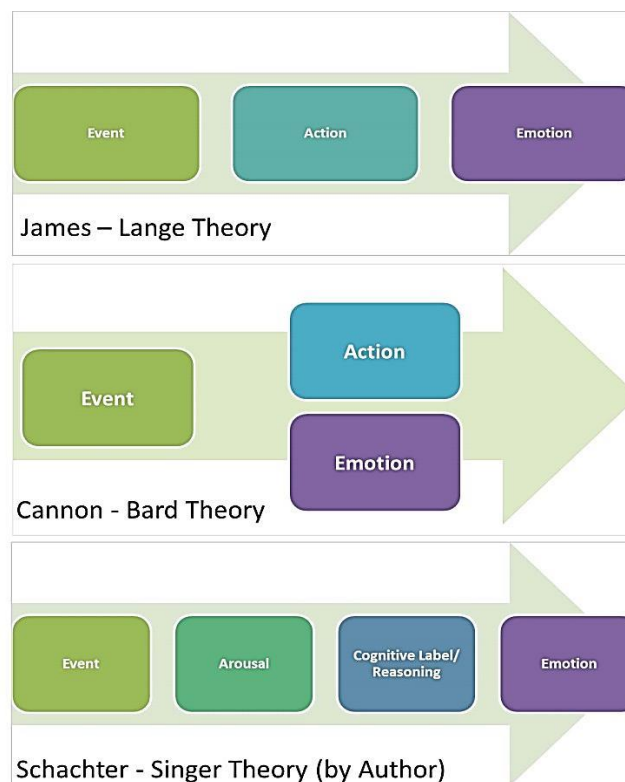
Affect categories and word stems of pertinent labels for category members	
Affect categories	Pertinent words or word stems
Admiration/Awe	admir*, ador*, awe*, dazed, dazzl*, enrapt*, enthrall*, fascina*, marveli*, rapt*, reveren*, spellbound, wonder*, worship*
Amusement	amus*, fun*, humor*, laugh*, play*, rollick*, smil*
Anger	anger, angr*, cross*, enrag*, furious, fury, incens*, infuriat*, irate, ire*, mad*, rag*, resent*, temper, wrath*, wrought*
Anxiety	anguish*, anxi*, apprehens*, diffiden*, jitter*, nervous*, trepida*, wari*, wary, worried*, worry*
Being touched	affect*, mov*, touch*
Boredom	bor*, ennui, indifferen*, languor*, tedi*, wear*
Compassion	commiser*, compass*, empath*, pit*
Contempt	contempt*, denigr*, deprec*, deris*, despi*, disdain*, scorn*
Contentment	comfortabl*, content*, satisf*
Desperation	deject*, desolat*, despair*, desperat*, despond*, disconsolat*, hopeless*, inconsol*
Disappointment	comedown, disappoint*, discontent*, disenchant*, disgruntl*, disillusion*, frustrat*, jilt*, letdown, resign*, sour*, thwart*
Disgust	abhor*, avers*, detest*, disgust*, dislik*, disrelish, distast*, loath*, nause*, queas*, repugn*, repuls*, revolt*, sicken*
Dissatisfaction	dissatisf*, unhapp*
Envy	envious*, envy*
Fear	afraid*, aghast*, alarm*, dread*, fear*, fright*, horr*, panic*, scare*, terror*
Feeling	love, affection*, fond*, love*, friend*, tender*
Gratitude	grat*, thank*
Guilt	blame*, contriti*, guilt*, remorse*, repent*
Happiness	cheer*, bliss*, delect*, delight*, enchant*, enjoy*, felicit*, happ*, merr*
Hatred	acrimon*, hat*, rancor*
Hope	buoyan*, confident*, faith*, hop*, optim*
Humility	devout*, humility
Interest/Enthusiasm	absor*, alert, animat*, ardor*, attenti*, curi*, eager*, enrapt*, engross*, enthusias*, ferv*, interes*, zeal*
Irritation	annoy*, exasperat*, grump*, indign*, irrita*, sullen*, vex*
Jealousy	covetous*, jealous*
Joy	ecstat*, elat*, euphor*, exalt*, exhilar*, exult*, flush*, glee*, joy*, jubil*, overjoyed, ravish*, rejoic*
Longing	crav*, daydream*, desir*, fanta*, hanker*, hark*, homesick*, long*, nostalg*, pin*, regret*, wish*, wistf*, yearn*
Lust	carnal, lust*, climax, ecsta*, orgas*, sensu*, sexual*
Pleasure/Enjoyment	enjoy*, delight*, glow*, pleas*, thrill*, zest*
Pride	pride*, proud*
Relaxation/Serenity	ease*, calm*, carefree, casual, detach*, dispassion*, equanim*, eventemper*, laid-back, peace*, placid*, poise*, relax*, seren*, tranquil*, unruffl*
Relief	relie*
Sadness	chagrin*, deject*, dole*, gloom*, glum*, grie*, hopeles*, melancho*, mourn*, sad*, sorrow*, tear*, weep*
Shame	abash*, asham*, crush*, disgrace*, embarras*, humili*, shame*
Surprise	amaze*, astonish*, dumbfound*, startl*, stunn*, surpris*, aback, thunderstruck, wonder*
Tension/Stress	activ*, agit*, discomfort*, distress*, strain*, stress*, tense*
Positive	agree*, excellent, fair, fine, good, nice, positiv*
Negative	bad, disagree*, lousy, negativ*, unpleas*

Khalid and Helander (2006) stated two methods to record emotion, which are (1) *facial expressions analysis*, which focuses on emotional states, cognitive states, and temperament and personality, and finally (2) *voice expressions*, which focuses on voices styles such as pitch, loudness, tone, and timing. Finally, Desmet (2012) developed a typology of 25 positive emotions that were divided into 9 categories which are (1) *empathy* (sympathy, kindness, respect), (2) *affection* (love, admiration, dreaminess), (3) *aspiration* (lust, desire, worship), (4) *enjoyment* (euphoria, joy, amusement), (5) *optimism* (hope, anticipation), (6) *animation* (surprise, energized), (7) *assurance* (courage, pride, confidence), (8) *interest* (inspiration, enchantment, fascination), (9) *gratification* (relief, relaxation, satisfaction).

2.3.2 Theories of Emotion

As cited by Kalat and Shiota (2007), three of the main theories of emotion include (1) *James – Lange Theory* which emerged in the year 1884 -1885, where they described how the body reacted towards emotional responses to any events, (2) *Cannon –Bard Theory* (the early 1900s) explained how humans assess their emotion and react at the same time, which made more sense than the previous theory by James – Lange and (3) *Schachter - Singer Theory* (the early 1900s), which studied the physiological changes of the body and their relevance to emotional responses, as different people interpret the arousal differently depending on the situations or events. As a result, people will experience different emotions. Figure 2.4 below, summarizes the 3 main theories.

Figure 2.4: Theories of Emotion (by Author) based on Kallat and Shiota (2007)



2.3.3 Emotion Circumplex model

In 1980, Plutchik developed an emotion circumplex model using a colour wheel where he categorised and placed similar emotions close to each other, and opposite emotions 180 degrees apart. Plutchik then converted this information into a 3D model. According to Plutchik and Conte (1997), the circumplex was designed to describe relations among variables characterized by similarity and polarity dimensions in an analogical way. This

model has been used to show the variety of interpersonal domains including emotions, personality traits, personality disorders, and ego defences.

2.3.4 Four Pleasure Framework

Jordan (2002), indicated that humans had created functional and decorative artefacts, not just to make life easier, but also to promote satisfaction and pleasure of the users. Jordan summarized Tiger's four pleasure framework in products study, which are (1) *physio-pleasure* (physical) that involves the body and sensory organs, (2) *socio-pleasure* (social) that involves the enjoyment from relationship with other people or others, (3) *psycho-pleasure* (psychological) which is related to people's cognitive and emotional responses and (4) *ideo-pleasure* (ideological), which refers to people's values or what concerns them. Lots of designs nowadays are created to amplify the hedonic benefits which can be found in daily-use products, furniture, automotive, sports or even in fashion items.

2.3.5 Model of Pleasure Experience

Norman (2004) discusses three levels of emotion in relation to design, which are; (1) *visceral level* (2) *behavioural level* (3) *reflective level*. These three levels have been used to map product characteristics. As stated by Norman, *visceral design* includes the visual appearances that can be interpreted; *behavioural design* is the effective performance, pleasurable usage of the product and the functionality, and *reflective design* involves the memories and understandings of the experience of satisfaction after using the product.

2.3.6 Emotional Interaction in product design

A study by Yang and Chen (2008) discussed three levels of emotional interaction in product designs, which are (1) *reactive interaction*; (2) *behavioural interaction* and (3) *reflective interaction*, which may be adapted from Norman (2004). *Reactive interaction* is when users are stimulated through the senses that include seeing, hearing, smelling, touching, and tasting while using the products. Products which can convey or trigger all these senses can create diverse emotional responses. *Behavioural interaction* involves the functionality and the experience of the users while using the products that prompts the pleasure responses. Finally, *reflective interaction* involves the knowledge, culture and evaluation of the products as most products can create different meanings of experiences and memories for different users. All of the emotional interaction levels are related and help users to achieve satisfaction while using the products.

2.3.7 Methods to Measure Emotion in Design

Kalat and Shiota (2007), discussed methods to measure emotion in design and there are three methods that have been used by psychologists to study emotions, which are (1) *self-reports*; where respondents can describe what he or she feels, and tell about it to other people, (2) *physiological measurement*; by using gadgets to measure the heart rate, blood pressure, sweat, brain activity, chemical level in blood and body, or other variables that occur during the emotional responses, and (3) *behaviours*; facial, vocal or body reactions of respondent towards the stimulation, which can be observed or seen by a researcher.

2.3.8 Assessment of Emotions

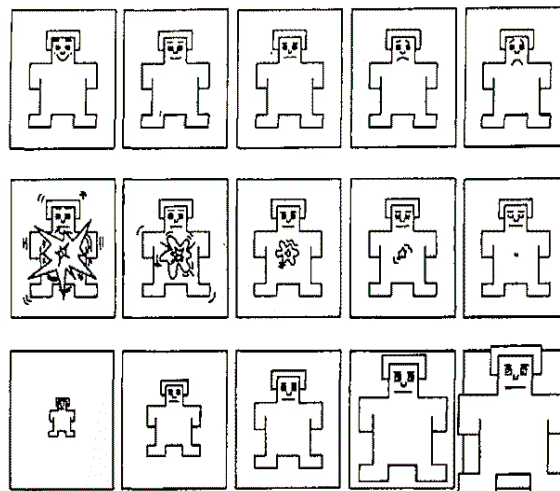
In detail, there are at least ten assessment methods that have been developed or used widely in the design fields to identify emotion, which are:

- (1) **Likert Scales:** named after Dr. Rensis Likert in the 1930s, a psychologist who invented this measurement tool. It allows respondents to choose a level of agreement or disagreement with a neutral option regarding the questionnaires, which normally use 3-, 5- and 7-points or more. Likert scales are a quantitative method and can be used to measure response towards products, services and more (Matell and Jacoby, 1972; Albaum, 1997; Johns, 2010).
- (2) **Semantic Differential Scale:** was developed by Osgood (1940s to 1950s) to measure the meaning of language quantitatively, as different people interpret the meaning of language differently based on their age, experience and lifestyle (Osgood, 1952; Osgood and Tannenbaum, 1955; Osgood, 1962; <http://srmo.sagepub.com/view/the-sage-encyclopedia-of-social-science-research-methods/n905.xml>, 2013). According to Mehrabian and Russell (1974) and Martin and Hanington (2012), semantic differential scales helped to characterize human judgments towards any relevant objects, events, activities or situations, as a linguistic tool with deeper connotative meaning. Mehrabian and Russell (1974) improved the scale for their studies by adapting it to 18 adjective pairs and using nine-point scales. The semantic differential scale is useful to be used in the design disciplines to measure the response towards product usages, functionality, preferences and more.
- (3) **Kansei Engineering (Nagamachi) Scale:** was developed by Nagamachi in the 1970s, and refers to mental responses to external stimuli or psychological

feelings. It was a consumer-oriented technology for new product development, which has been widely used by Japanese industries, especially in car design, electrical appliances, construction, and clothing among others. According to Nagamachi (1995), Kansei Engineering can be defined as “translating technology of a consumer’s feelings and image for a product into a design element”. This method aims to develop new products based on consumer’s feelings and demand which have produced good results in the industry.

(4) **Self-Assessment Manikin (SAM):** by Bradley and Lang is a method which assesses the pleasure, arousal, and dominance of people’s emotions towards objects or events, using pictures or figures. Emotions can be rated using a nine-point scale, consisting of five figures, and the four spaces in between each figure.

Figure 2.5: Self-Assessment Manikin (SAM), source: <http://www.acrwebsite.org/search/view-conference-proceedings.aspx?Id=7581>



Each category of emotions (assessment of pleasure, arousal and dominance) are measured as shown in the figure above (Figure. 2.5), which is a non-verbal, pictorial assessment technique towards varied stimuli (Bradley and Lang, 1994). According to Bradley and Lang (1994), SAM ranges from a smiling figure to a frowning figure, which symbolizes pleasure (see the first line of Figure 2.5) SAM also ranges from an excited, wide-eyed figure to a relaxed or sleepy figure for arousal (see the second line of Figure 2.5). Finally, large figures to a small figure represent dominance (see the third line of Figure 2.5). SAM was available to be used in IBM digital version. This method of assessment was widely used in its time for psychophysiological studies in the

marketing fields, to gain feedback from a consumer's emotional response towards advertising and commercial studies (Morris, 1995). Even though this assessment method helped to identify the emotional experiences and responses of respondents, the images used were unrefined. Desmet (2000, 2003, 2012) later developed a new version of figures, to help identify the emotional responses more easily and accurately.

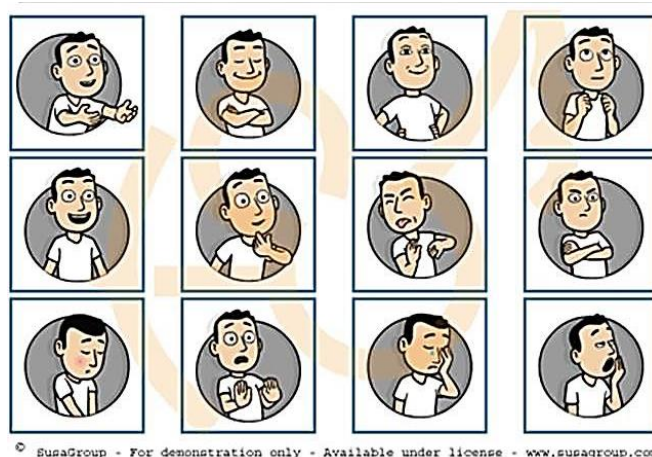
- (5) **Positive Affect Negative Affect Schedule (PANAS)**: was developed by Watson et. al. in 1988 to measure a person's positive mood (refers to enthusiasm, alertness, and activeness) and negative mood (refers to distress feelings and displeasure moments) in different periods of time or environments. Watson et. al. used a 5-point scale rating consisting of 1: *very slightly or not at all*, 2: *little*, 3: *moderately*, 4: *quite a bit*, 5: *extremely* on 10-items mood scales.
- (6) **Products as Personalities**: is a questionnaire for measuring pleasure in products, which was used by Philips Corporate Design and developed by Jordan in 2000, and focused on user's feelings.
- (7) **PrEmo**: is an abbreviation for Product Emotion Measurement Instrument (PrEmo). This tool was developed by Desmet in 2003, to assess emotional responses to consumer products, through non-verbal, self-report measurement instruments that use animated cartoon characters. Desmet (2000) originally developed PrEmo in his Ph.D. on product emotions, to assess the emotional reactions towards different products, including car design. His research was funded by German Mitsubishi Motor R&D. Figure 2.6a below shows an early version of PrEmo that consists of 18 figure emotion sets. The nine figures on the left represent 9 negative emotions, which are: disgusted, indignant, contempt, aversive, disappointed, dissatisfied, bored, disillusioned, and vulnerable. The nine figures on the right represent 9 positive emotions, which represent: enthusiastic, inspired, desiring, appreciative, pleasantly surprise, attracted, content, fascinated, and softened (Desmet, 2000).

Figure 2.6a: PrEmo by Desmet, development of the year 2000. Source : <http://designmind.frogdesign.com/articles/winter/tasting-rainbows.html?page=2>



According to Desmet (2000), the expressions of emotion not only involve face expressions but entire body postures. Actors were hired to portray each emotion to create these animation figures. Desmet, in collaboration with TU Delft and SusaGroup, later developed a new version of PrEmo, which initially consisted of 14 figure emotions, before becoming a simplified 12 emotion cartoon set (www.premotool.com/about-premo, 2012) as shown in Figure 2.6b below.

Figure 2.6b: Latest PrEmo by Desmet, 2012. Source : <http://www.premotool.com/about-premo/the-science-behind-premo/>



(8) **Product Personality Profiling (PPP)** was developed by McDonagh et. al. (2000). It is a new projective technique that has been widely used in marketing and applies a psychoanalytical approach to measuring personality features and emotional responses towards product design by imagining products as persons

with distinct personalities. McDonagh et. al. used mood boards with a collection of visual images and a visual product evaluation (questionnaires).

(9) **SEQUAMS:** stands for Sensory Quality Assessment Method. It was developed by Bonapace in 2002, and is relatively similar to Kansei engineering, but measures design elements individually using Likert Scales (Demir, 2008).

(10) **Product Personality Scale:** was developed by Mugge, Govers, Schoormans (2009). This method was used to assess product personality using a set of personality characteristics to distinguish a product from others. According to Govers and Schoormans (2005), products have symbolic meanings, and the physical appearance of the products can be described with human personality traits or characteristics.

Six main methodologies which commonly used to measure emotions and perceptions of respondents are (1) *PrEmo by Desmet et. al. (2000)*, an instrument to measure emotions and product appearance by using visualised animations of cartoon characters of 14 types of emotion, (2) *Product Personality Profiling (PPP) by McDonagh et. al. (2002)*, a projective technique that has been widely used in marketing, that applies a psychoanalytical approach to measure personality features and emotional responses towards product design by imagining products as persons with distinct personalities, (3) *SEQUAM – Sensory Quality Assessment Method, by Bonapace (2002)* quite similar to Kansei engineering, which measures design elements individually using Likert Scales (Demir, 2008), (4) *Product Personality Scale, by Mugge, Govers, Schoormans (2009)*, which assesses product personality using a set of personality characteristics to distinguish a product from others, (5) *Self-Assessment Manikin (SAM) by Bradley and Lang (1995)* that assesses the pleasure, arousal and dominance of people's emotions towards objects or events directly using pictures or figures and can be rated using a 9 – point scale of five figures and in between each figure. Finally, (6) *the Semantic Differential Scale by Mehrabian and Russell (1974)*, which consist of 18 adjective pairs and using 9 – point scales to rate objects, events, and situations.

This study used assessment methods by combining the Likert scale, semantic scale, and adaptation of Self-Assessment Manikin (SAM) and PrEmo for the online questionnaire format. The semantic scale was designed to be a coloured version with positive and negative adjective words which were also adapted from SAM and PrEmo then used to measure the

emotional reaction towards the FDLOs. Detailed information on the measurement scale used for the online questionnaire can be found in Chapter 3.

2.4 Perception: Definition and Relevance to this Study

As defined by dictionary.com (2016), perception is an immediate or intuitive recognition, psychological, or aesthetic qualities; insight; intuition; discernment, which are apprehended by senses of mind, cognition and understanding. Perception can be related to illusion and hallucination, which, according to Fish (2010) has no difference because it involves the mental states or events or experiences and connected to visual experiences. Merleau-Ponty (2004), discussed perception by seeing the connection between the world of perception and the world of science, space, sensory objects, animal life, self and other people experienced, art and philosophy, and the world of classical and modern.

A closely related study of perception in design was conducted by Dunston et. al. (2002) on design visualization using the Augmented Reality Computer Aided Drawing (AR-CAD) to enhance the visualization of the model. A study by DiSalvo et. al. (2002), on human – robot interaction was more focused on the initial understanding of facial features images of 48 humanoid robots, and how people perceived the “humanness” of the robot. Another study in biological cybernetics by Carozza (2016) about the design development of a cybernetic hand (prosthetic hand) devices, discussed attributes of perception, physical appearance, and functionality to study the reasons why amputees prefer not to use a cybernetic hand regularly.

The connection of the above studies to this study is how the potential consumers and designers (the respondents of this study) perceive the FDLOs visually and emotionally. It is important for this study to identify and to know the reaction of potential consumers on their visual perception, towards the FDLOs and their preferences of living organisms (separately). This evaluation on perception can help to identify the suitable or preferable types of living organisms that can be embedded into furniture design. Detailed information on the survey results can be found in Chapter 4.

2.5 Previous Related Studies and Identification of a Gap in Knowledge

After reviewing several previous related studies, this literature review evidenced that there are no research studies regarding biophilia theory or biophilic design specifically conducted in furniture design. Many studies have been conducted to understand the effects of real plants and natural elements towards psychology, health and attention in human-environment

relationships (Kaplan, 1995; Tennessen and Cimprich, 1995; Frumkin, 2001, Bringslimark et al., 2009; Grinde and Patil, 2009; Howell et. al. 2011; Joye and Van den Berg, 2011). Furthermore, different studies on emotion and experience with nature were also developed by Perkins (2010) and Hinds and Sparks (2011). Kahn Jr. (1997) conducted research on children's affiliation with nature in education and human development. All these studies showed that nature and natural elements have effects on human beings' mental, physical, behavioural and emotional aspects. Some of the most relevant studies for this research project will be explained in more detail below.

2.5.1 Most Relevant Studies about Biophilia & Biophilic Design

2.5.1a Ulrich (1981): Natural versus Urban Scenes: Some Psychophysiological Effects

A related study by Ulrich (1981) demonstrated the effects of natural and urban scenes towards psychophysiological (psychology and physiology) aspects. He used slides which consisted of 400 different environmental photographs of southern Sweden in the first stage. Subsequently, slides of selected natural environments with water, nature with green vegetation and full urban landscapes were presented to test subjects, while heart rate and alpha amplitude were measured before and after slides were viewed. Reactions were measured based on semantic scales and the Zuckerman Inventory of Personal Reactions (ZIPERS). ZIPERS assessed feelings on five factors which are (1) *fear arousal*, (2) *positive affect*, (3) *anger/aggression*, (4) *attentiveness* and (5) *sadness*. Results suggested that natural scenes with water had positive influences on psychological and physiological aspects of the test subjects.

2.5.1b Balling and Falk (1982): Development of Visual Preferences for Natural Environment

Another related study was conducted by Balling and Falk (1982), where they assessed the visual preferences towards natural landscapes. The study comprised a total of 548 subjects of 9 different groups consisting of elementary school children, college students, and adults. This study used a range of natural environments presented in 68 slides with 5 different biomes, which were; (1) *tropical rainforest*, (2) *desert*, (3) *savannah*, (4) *temperate deciduous forest* and (5) *coniferous forest*. Subjects rated and judged the views according to their preferences using a 6-point Likert scale, ranging from extremely desirable (6) to extremely undesirable (1). Results suggested that most subjects preferred savannah landscapes to live in, over the other four biomes.

2.5.1c Tennessen & Cimprich (1995): Views to Nature: Effects on Attention

A study by Tennessen and Cimprich (1995) evaluated the effects of nature on fatigue and individual attention. The purpose of this study was to explore whether university dormitory residents with more natural views from their windows would score better than those with less natural views, on tests of direct attention. 72 undergraduate students who stayed in a dormitory with different window views were categorised into four groups. The methods used to measure individual attention were: (1) *Digit Span Forward and Backward*, (2) *Symbol Digit Modalities Test (SDMT)*, (3) *Necker Cube Pattern Control Test*, and (4) *Attentional Function Index*. The views were categorized as; all natural view, mostly natural view, mostly built view, and all built view. As a result, natural views were associated with better performance on attentional measures. All natural views received significantly higher on SDMT.

2.5.1d Kahn Jr. et. al. (2009): The Human Relation with Nature and Technological Nature

Kahn Jr., et. al. (2009) conducted a study on the relationship of human beings with nature and technological (artificial) nature, which used the technology to bring nature closer to human beings in indoor spaces. Technological nature includes videos and live webcams of nature, robot animals and virtual natural environments. This study was a research program cutting across different technological forms which involved high-definition television (HDTV). The 50 inches plasma-display “windows” were installed in 7 faculty windowless offices in a university setting. The participants’ practices, judgments, beliefs, and moods were assessed over the 16-week observation. The findings of this study showed that participants enjoyed the plasma-display window, and results suggested that experiencing this technological nature may be better than experiencing no nature at all. Kahn Jr., et. al. also conducted another study, which consisted of 90 participants (30 people per group) in office settings which had a glass window with a sufficient nature view, and a plasma-display window. The aim was to compare results, and answer the research question “is technological nature as good as actual nature?”. Results suggested that the plasma-display window can’t compete with the actual window with natural views.

2.5.1e Windhager et. al. (2010): Fish in a Mall Aquarium – An Ethological Investigation of Biophilia

Possibly the closest study to the one proposed in this dissertation, found during the literature review, was conducted by Windhager et. al. in 2010. In their research of biophilia theory in relation to the landscape and urban planning, they conducted an ethological investigation that focused on human–animal interactions, by studying the effects of placing an aquarium with live fish in a commercial display in a shopping mall. The aim of this study was to test the behaviour of people in the cities towards natural elements in the artificial surroundings. This study used a direct behavioural observation method (ethology) by using a hidden video camera, and respondent reactions (behaviours) were observed, aiming to understand human behaviour and reactions to living organisms in non-natural surroundings (a European shopping mall in Austria). Artificial plants were also used and were set up near the fish aquarium, in three different settings of a shop window display. Passers’-by reactions before the aquarium was placed, during and after the aquarium was removed were video recorded for 54 days. 66% of people stopped to watch the first window display setting, 70% stopped to watch the second setting that displayed fish in the aquarium, and 57% watched the window display after the aquarium was removed. Although not necessarily conclusive, this study suggested that living organisms (fish in the aquarium) influenced the passers-by and attracted people’s attention.

2.5.1f Wolfs (2014): Biophilic Design and Bio-Collaboration: Applications and Implications in the Field of Industrial Design

Wolfs (2014) observed practical applications of biophilic design elements and attributes by Kellert (2011) as an indicator for future application. Wolfs looked into biophilic industrial design (as defined in his study) examples and categorized the examples into (1) *Bio-Collaboration: Indoors Air Purification*, (2) *Bio-Collaboration: Sustainable Energy Production*, (3) *Bio-manufacture: Materials and Processes*, (4) *Bio-Systems: Interdependent Home Appliances*. He then did a product analysis using the Biophilic attributes by tabulating and cross-referencing them with the product designs. This study proposed an integrated framework model for Biophilic Industrial Design, as seen below in Figure 2.7.

Figure 2.7: Framework of Biophilic Industrial Design by Wolfs (2014)

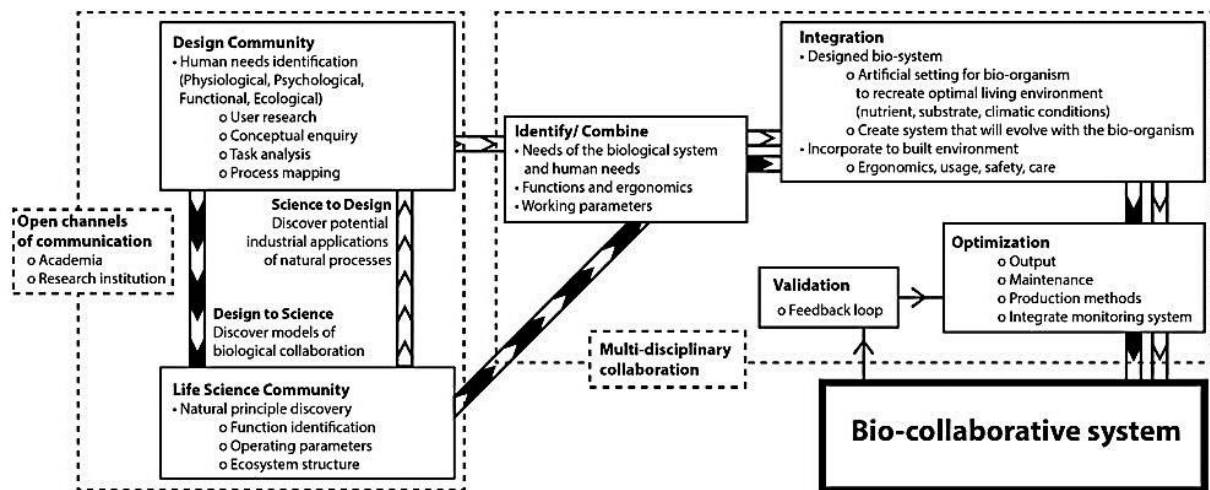


Figure 15 A Framework for Biophilic Industrial Design

2.5.2 Studies in Emotional Design

Studies relevant to this research project, related to emotional design have been conducted by Chitturi (2009), Fokkinga and Desmet (2013). These studies focused on negative emotions and experience of product designs. Similar studies which focused more on positive design and experience design are by Hassenzahl et. al. (2013) and Desmet and Pohlmeier (2013). Other related studies by Blijlevens et. al. (2009), show how these researchers conducted a study on consumer perception of product appearance. Moreover, work by Lenay (2010), where he did a study on touching contacts and emotional values, and by Demirbilek and Sener (2010) on emotional design and design semantics, are also related.

2.5.2a Dazkir and Read, (2011): Furniture Forms and Their Influence on Our Emotional Responses toward Interior Environments

Possibly another one of the closest studies to this research project was conducted by Dazkir and Read (2011). They conducted research on furniture forms, and the influence on the emotional responses of participants towards interior environments, using simulated settings. These simulated settings consisted of two curvilinear and two rectilinear furniture figures, distributed through an online survey to collect data from 4 different computer generated images in greyscale interior settings, which were used as visual stimuli. The data were collected using Mehrabian and Russell's 9-point scale for a semantic differential measure of pleasure and arousal. A hundred and eleven people (111) participated in the study, which concluded that the participants preferred to spend more time in the setting with only curvilinear lines rather than the setting with rectilinear lines. Respondents gave feedback such

as curvilinear furniture looked more comfortable, interesting and calmed compared to rectilinear furniture. The study also suggested that curvilinear forms would promote positive feelings and relaxation.

2.5.2b Barrass (2013) “ZiZi: The Affectionate Couch and the Interactive Affect Design Diagram”

Barrass (2013), designed an affectionate couch, ZiZi, which provides physical and emotional support to users. The couch was designed with sounds and purring vibration which can express feelings. This study was developed to explore the use of sounds in objects, and how people reacted to them. Equipped with a motion detector, this couch can sense movement up to 3 metres away and allow the users to interact and experience the sensation of its sonic responses with animated sounds of pet-like character. The sounds were added to attract attention, reward sitting, encourage patting, and convey contentment. The four states of the interaction of users and the couch were labelled nothing, sitting, patting and stroking. The couch was exhibited in the House of Tomorrow, in Melbourne in 2004 and observation was done to document the reaction of audiences and how the couch responded to them. Based on these observations, results of the study suggested that the couch had successfully produced empathy and feelings toward a lifeless object while producing playful behaviour and social interactions. Barrass mapped the emotional responses using the Interactive Affective Design Diagram (IADD), and overall positive emotions (pleasure) were recorded. He overlaid the rating of emotional responses with Russell’s circumplex of emotion.

2.5.2c Ibrahim (2014): Emotional Impact on Furniture Design (Action & Reaction) User-Based Approach

Another study was done by Ibrahim (2014) about the emotional impact on furniture design. Ibrahim conducted a study on furniture design using the Normative Approach. This study was developed to identify and validate the emotional responses from consumers towards a coffee table design. Questionnaires were answered by a group of 42 respondents composed of product design students from Germany and Egypt (26 men and 16 women). The coffee table design was presented in 2D and 3D drawings forms. Participants were also involved in designing the coffee table by giving feedback on their preferences on shapes, material usages, colours and textures. This study also enabled the participants to experience the design and purchase processes by making decisions on the coffee table design. Based on the results, 64.3% of participants decided to purchase the coffee table. According to the researcher, this research developed a method for product acceptance throughout the design stages, product

appearance and purchase decision. He found that respondents liked the idea of being involved throughout all the processes. This study showed the connection of emotions and design in the reflective, behavioural and visceral level.

2.5.2d Barrass (2015): Sonic Interaction Design of Pet Furniture with Emotions Using the Interactive Affect Design Diagram

The latest study by Barrass (2015) is a proposal for a “pet furniture” by embedding the emotional expression into interactive objects using the Interactive Affect Design Diagram (IADD), which was developed from studies of the emotional effect of a database of sounds in the Affect Grid. This study used a selection of 100 dog voices, sampled and classified in the Affect Grid. This experiment was a continuation from the previous ZiZi Affectionate Couch. Patsy, the Designer Pouf-doodle, can interact with people through 3 sensors, with vibration and high and low voice or noise sensors. It can bark, growl and snarl depending on the arousal received. This project was exhibited in the Musify + Gamify exhibition in Sydney from 26 May to 6 June 2015. People recognized this small furniture with a character of a small dog.

2.5.3 Most Relevant Studies Regarding Research Methodologies

2.5.3a Roth (2006): Validating the Use of Internet Survey Techniques in Visual Landscape Assessment – An Empirical Study from Germany

A related study in landscape architecture, which was conducted by Roth in 2005, explored the validity of online surveys to evaluate and assess the scenic quality of 17 visual images of Germany’s landscape sites. Roth tested the reliability of the online survey and proposed that the scenic quality of visual variety, beauty, visual naturalness and overall scenic quality can be validated adequately on the internet. However, as limitations of the study, Roth also discusses that the assessment on landscape’s peculiarity/typicality cannot be done online unless the respondents have further background knowledge of the landscape shown in the surveys. Roth used the test-retest-method and the split-half-method to validate the reliability of the online survey, and compared traditional colour print-based questionnaires with the data resulting from the online survey. The images in the online survey were assessed in the HTML (Hyper-Text Markup Language) format web pages, JavaScripts programs and Practical Export and Reporting Language (PERL) using an 11-point rating scale with 25 descriptive terms. 35 respondents were invited to participate, and only 15 responded (over 40% of the sample) to test the reliability of online survey. The results of this study suggested that the internet survey is a reliable instrument to gather valid data from images of studied objects.

2.5.3b White and Gatersleben (2011): Greenery on Residential Buildings: Does it Affect Preferences and Perceptions of Beauty?

A study in the perception of greenery on residential buildings was conducted in 2011 by White and Gatersleben. This study aimed to address the lack of research in the perception of “building–integrated vegetation” and to compare the level of preferences of houses with vegetation and without vegetation. The study was conducted in two parts; an online survey in which 188 participants (79 male and 109 female) rated photographs of houses with and without vegetation, and also interviews (4 male and 4 female, in total 8 participants). This study used 24 photographs which were digitally manipulated using Adobe Photoshop CS2. Four different images of houses from the UK residential area were changed digitally adding five vegetation types which were turf roof (short grass), flowering *sedum* roof (red colour), tall flowering meadow roof, ivy façade, brown roof and no vegetation. Participants were recruited in two ways which were through the advertisement in various forums on the internet, posters, leaflets and newspaper, and also through a snowball sampling method. The results of this study showed that buildings with vegetation were preferred, and perceived as beautiful, restorative, and had more positive affective quality than those without vegetation. Ivy façade and meadow turf rated highest. This study also validates the methodology used in this Ph.D. research.

2.6 Conclusions of the Literature Review

From the previous literature review, it can be seen that there is a gap (or lack of) knowledge about biophilia, biophilic design and emotional design in relation to furniture design embedded with living organisms, which is worthy of exploration. Although several research projects about biophilia and biophilic design regarding the physical and psychological responses of people towards nature were identified, most previous research is basically in the fields of environment and behaviour, psychology, health, education, urban planning, and landscape architecture. None is specific to furniture design. It is not clear how biophilia or biophilic design theories apply to furniture design. As such, this research project was necessary and worthwhile.

A study by Wolfs (2014) about biophilic design in the industrial design field was the most relevant study. He provided examples of product designs that incorporated living plants and triangulated it with the Biophilic elements in his study. The studies by Roth (2005) and Gatersleben (2011) were used as guidelines for research methodology. These studies used a set of images (which were manipulated using computer graphics software) and were done

online, which validated that online questionnaire can be used to gather data. These studies also contributed to the idea of using manipulated images in the second section of the online questionnaire, which is Design Preferences (Section B). Studies in emotional design, especially by Desmet (2000, 2012), Dazkir and Read (2011) and Barrass (2013) as mentioned previously, were used as a guideline in the online questionnaire, Emotional Design (Section C). Their approaches in these studies such as the use of semantic adjective words, images of characters to measure emotions and Likert or semantic scales, inspired the researcher to design the 7-point coloured emotional scale version for this study, mainly to measure the emotional reaction towards the FDLOs. A detailed explanation on the emotional scale and the online questionnaire can be found in the next chapter (Chapter 3 and Appendix C: Chapter 3 – Research Methodology, page 224 – 228). The researcher hopes that there will be more studies in the future about biophilic design in the field of Industrial Design as the application of biophilic design in this field can bring lots of benefits towards the designers themselves and the potential consumers.

CHAPTER 3 RESEARCH METHODS: INITIAL OBSERVATIONS, THEORETICAL DEVELOPMENTS, AND EXPERIMENTAL RESEARCH

3.1 Introduction

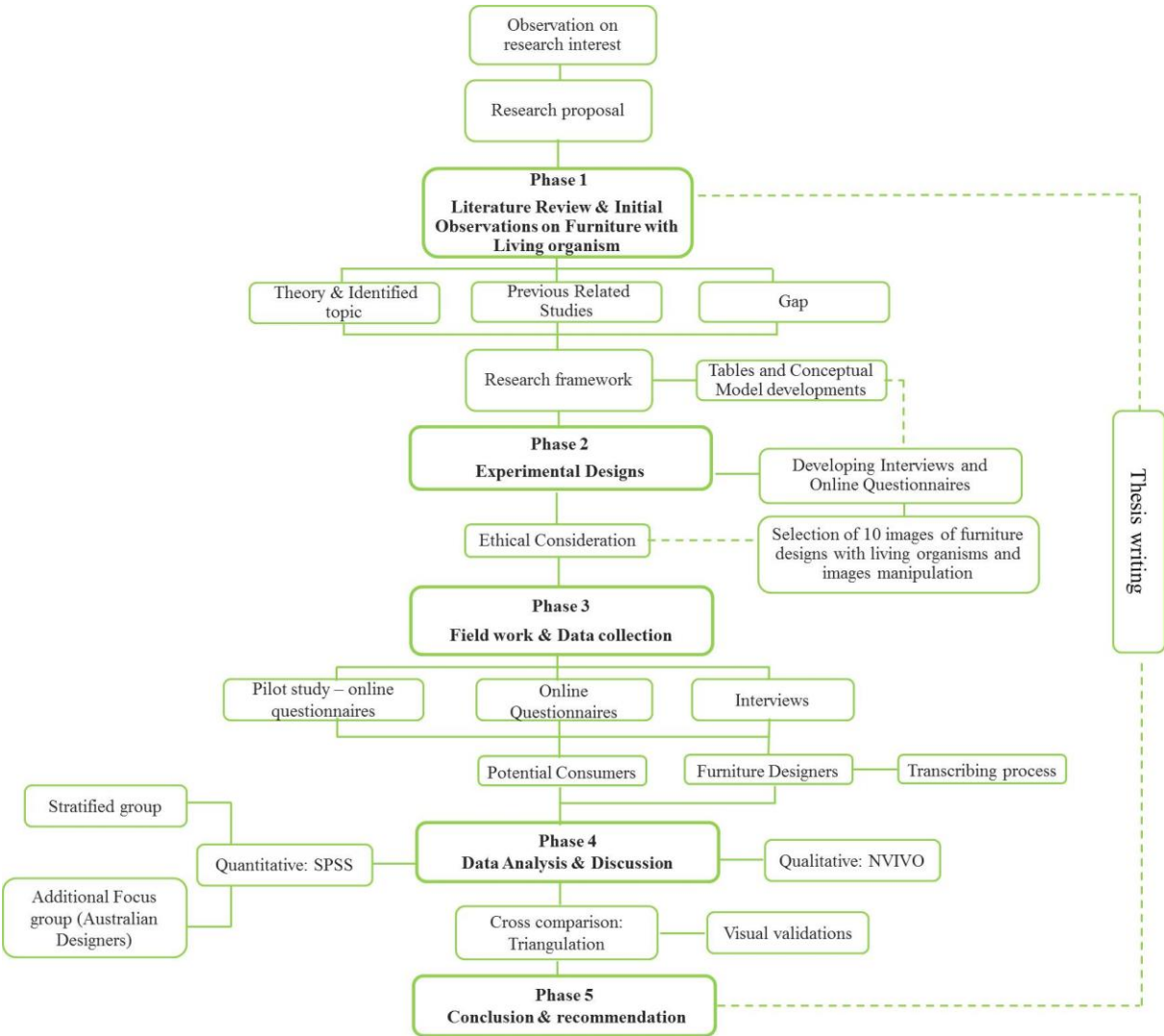
This chapter reports on the research methods, initial observations, theory, experimental plan and conceptual developments of this research project. In order to achieve the overall aim and specific aims, this research was done by; (1) *observations* on the current furniture designs embedded with living organisms, (2) *interviews* - by gathering information from current furniture designers (qualitative data), (3) *survey using questionnaires*, by obtaining quantitative and qualitative data through feedback from potential users on how they perceived the images of furniture with living organisms.

This research used a mixed methods approach of qualitative and quantitative analysis to achieve the research outcomes, aiming to answer the research questions that were formulated based on the previous literature reviews and initial observations. Figure 1.1 (which is recalled from chapter 1) explains the overall research plans, which were carried out in this research. The entire corresponding steps are explained briefly:

Phase 1: Literature Review and Initial Observations

While developing the research proposal, related data and information were collected to help the researcher to understand more about the theories, definitions of terms and information from previous research studies. The literature review provided information on the theories on Biophilia, Biophilic design, emotional design and studies in various fields which relate to this research. A gap in knowledge was identified, and no related studies specifically in furniture design were found, which evidenced the significance of this Ph.D. research. In parallel, an initial search and classification of current furniture designs which embed living organisms helped develop an introduction and theoretical framework for the project and was presented in a conference.

Figure 1.1: Overall research plan: a graphic outlining the theoretical and empirical activities carried out in this research project



Phase 2: Conceptual Model Development, Survey, and Interviews Design

Several series of conceptual models were developed based on the findings from the initial observations. The latest design was simplified and was tested in the online survey. The researcher conducted an online survey on respondent’s perceptions and their emotions towards FDLOs using sets of furniture design images that were gathered previously in the initial observation phase. Comparisons of images were made between furniture with living organisms found during the initial observations and the same furniture after being altered (to take away the image of living elements such as plants or animals, using Photoshop CS5). Moreover, a new visualisation of the conceptual model (specifically adapted for the questionnaire) was used to gain feedback from respondents. Based on the study of current designs and several discussions, the researcher developed sets of questionnaires to survey

respondent's perceptions and their emotions towards FDLOs. A list of questions was developed for interview sessions with the designers of selected FDLOs, to find the main rationale on why they embedded living organisms into their designs. This will be discussed further as part of this chapter.

Phase 3: Field Work and Data Collection

Observations

This research activity was related to the initial observations on previous and current furniture designs embedded with living organisms. At least 235 FDLOs were found, documented and classified in this study.

Survey – Online Questionnaire

Questionnaires were designed using online tools to help the researcher to obtain information from the respondents (potential consumers) using close-ended format questions. The questionnaires were designed to have 5 sections (A, B, C, D and E) and further explanation about the questionnaires can be found on page 55 – 64 and in Appendix C: Chapter 3 – Research Methodology, page 224– 252). This survey helped to answer the research questions on how people or potential consumers perceive the FDLOs and to identify what are the relationships between biophilia theory and emotional design, in relation to FDLOs. Several online survey tools were tested, as discussed in Appendix C: Chapter 3 – Research Methodology, page 224 - 228.

Pilot Study

A pilot study was carried out before the actual survey with a small group (7 invited people). This pilot study was conducted online before the actual questionnaire was disseminated to the respondents. This was to ensure the questionnaire was easily understandable and practical for respondents. Amendments were made, such as adding a save button for the respondents to save the answers when they were interrupted while doing the online survey, so they could continue answering it later. The answer buttons were also modified by adding information (this applied to Section D, conceptual model) for easier data clarification for analysis, and more options were added to answer the questions with multiple choice answers. The pilot test helped to ensure that the questionnaire was working well, easy for the respondents to answer, and helped the researcher to plan and refine the questions or features of the questionnaire for findings analysis.

Interviews

Interviews were done to gather information from at least 17 selected designers, who had been involved in designing the FDLOs as found in the initial observations. The format of the interview questions was decided based on each designer's knowledge and experience and used a semi-structured interview format. A semi-structured interview uses open-ended questions and is flexible, to gain feedback from respondents. Although the questions were prepared before the interview sessions began, they could vary, or other details could be asked according to the respondents answers to get more information when it was appropriate (Bryman, 2012; www.sociology.org.uk/methfi.pdf, 2013). All of the interviews were done through Skype, as the designers came from all over the world. These interviews were recorded and transcribed. The research question on the reasons why designers embedded living organisms into furniture design was answered from these interviews.

Phase 4: Analysis of Data, Triangulation, Latest Theoretical Developments and Discussion

This phase focused on analysing the data collected in phase 3 using compatible software (such as NVIVO 10 for qualitative data and SPSS version 21 for quantitative data) while further developing the theoretical models and discussing findings.

Phase 5: Conclusions and Further Research

Conclusions were drawn, and recommendations for further research were suggested based on the data, facts and figures obtained through Phases 2 to 4 (Further information in Chapter 7).

3.2 Research Methods and Underlying Theory

The theory underpinning the mixed methods research design applied in this thesis includes a modified pragmatic approach along with a mixed methods research design.

3.2.1 Pragmatism

Pragmatists were philosophers and thinkers like William James, Charles Peirce and John Dewey in the 20th century. The word pragmatism (Bawden, 1904) was used not only in philosophical way but in a general way as well.

Denscombe (2008) stated that pragmatism provides a set of assumptions about knowledge and inquiry which distinguish this approach purely from the quantitative and qualitative approach of positivism and constructivism viewpoints. This term of practicality is also agreed by Helfrich and Conant in a transcribed discussion in *Think: Philosophy for Everyone*, which

was edited by Law (2004); Pragmatism can be defined as ‘practicality’ or ‘doing what works.’ As stated by Conant, the ‘pragma’ insists on practice and practicality - has to do with an intention to practice. As also cited by Feilzer (2010), pragmatism allows researchers to be free of mental and practical constraints, and researchers do not have to follow or obey one single or particular research method or technique.

3.2.2 Mixed Methods Research (MMR)

Quantitative research includes systematic statistical procedures of scientific explanation which involve measurements, numbers or amounts of variables in surveys, experiments, and correlational studies or analysis. Qualitative research involves the descriptive, historical, ethnographic elements of the studies that are seen as a whole, generally while constructing the research interpretation (Thomas, 2003; Creswell, 2009). Mixed methods research usually combines quantitative and qualitative forms of research, as described by Creswell (2009) and Bryman (2012). It is a concurrent mixed methods procedure, in which quantitative and qualitative data are collected at the same time, and the information is then incorporated to achieve more understanding of the research questions. Johnson et. al. (2007, page 121) have defined mixed methods in general by summarizing definitions from 19 well-known research scholars:

“...the type of research in which a researcher or a team of researchers combines elements of qualitative and quantitative research approaches (e.g., use of qualitative and quantitative viewpoints, data collection, analysis, inference techniques) for the broad purposes of breadth and depth of understanding and corroboration.”

Johnson et. al. (2007, page 129) also proposed a more comprehensive definition or summary of mixed methods as follows:

“Mixed methods research is an intellectual and practical synthesis based on qualitative and quantitative research; it is the third methodological or a research paradigm (along with qualitative and quantitative research) ...”

The research paradigm of mixed methods research is explained by Johnson et. al. 2007, page 129 as

“...the research paradigm that *a) partners with the philosophy of pragmatism in one of its forms (left, right, middle), b) follows the logic of a mixed methods research..., c) relies on quantitative and qualitative viewpoints, data collection, analysis and inference technique...,*

d) is cognizant, appreciative and inclusive of local and border socio – political realities, resources, and needs.”

From the definitions or summaries of the mixed method research above, it can be concluded that this approach was adapted from the pragmatist approach using qualitative and quantitative research methods.

According to Ivankova et. al., (2005) neither using quantitative nor qualitative methods alone are sufficient. By using the mixed methods approach, they can complement each other, and a robust analysis can be achieved, even though this mixed methods design is not easy to be implemented.

Table 3.1 explains the rationale for the research plan that was used in this study, which applied a mixed methods research design.

Table 3.1: Study design table

Data Required		Study Design Corresponding Steps
1	How to gather information, background theory, and related studies?	Literature Reviews
2	How will the research be managed?	Research Methodology (flow chart)
3	Who will provide the information?	Respondents – Designers and potential users
4	How to collect relevant data?	Conduction of interviews (qualitative) and online survey (quantitative)
5	How to measure the data from the findings?	Evaluation and analysis of results using related software: NVIVO and SPSS
6	How long will the study take?	Plan of Studies (Timeline)

3.2.3 Mixed Methods Analysis and Evaluation

This study applied a modified pragmatic approach which, as outlined by Onwuegbuzie et. al. (2009) is a cross – over mixed analysis that involves one or more analyses of quantitative data with qualitative data. According to Onwuegbuzie et. al. (2009), cross – over mixed analyses are distinct from, for example; a parallel mixed analysis (a parallel mixed analysis involves the collection of both types, and analyses conducted per data set, for example: using the same instrument for both qualitative and quantitative data). Cross – over mixed analyses are conducted separately for the data analysis of both qualitative and quantitative, once they have been completed, and it involves a “between – paradigm” analysis, which encompasses more integration of qualitative and qualitative results. For example; the quantitative data for this study were gathered from the online survey of a stratified group and a main group using the

online questionnaire while the qualitative data was gathered from the interviews with FDLO's designers using a different set of questions, which was totally different from the online survey. The findings from both analyses were compared after the analyses had been done for both, and a triangulation analysis was executed to evaluate the results from both, and in this case, the data was also presented visually within the same display, as an Integrated Data Display (Onwuegbuzie et. al., 2009).

3.2.4 Triangulation

According to Mertens and Hesse-Biber (2012), triangulation is a measurement technique often used to locate an object in space by relying on two points to triangulate on an unknown fixed point. This concept was borrowed by the social scientists to be used in the validation process of assessing the reliability of the results. As cited by Fielding (2012), triangulation is a convergent of data validation, which involves comparing data from different sources. Torrance (2012) concluded that triangulation is used in Mixed Method Research (MMR) to the perceived strengths of comparing, contrasting and to integrate different types of data. As also cited by him, the original method of triangulation by Denzin in 1970s included the multiple investigators along with multiple methods.

As for this study, a triangulation between the stratified group and the main group was done for the quantitative results to compare the opinion on FDLOs visually and emotionally, which can be found in Chapter 6. The data which was acquired from the qualitative study, mainly from the interviews, was triangulated with the tested conceptual model in the online questionnaire. The results that were gathered from both quantitative and qualitative data were used to identify the rationale of using living organisms in furniture design, and to position the FDLOs in the suitable main category and subcategories of the conceptual model.

The triangulation helped to answer the 1st, 2nd and 3rd questions of this research on the relationships between biophilia theory and emotional design in furniture design with living organisms, the reasons designers embedded living organisms in their furniture designs, and on how potential consumers perceive the FDLOs.

3.3 Initial Observations

After a literature review on biophilic design and related studies, an initial observation was done by gathering images of FDLOs from design related books and design websites. At least 235 designs were gathered and documented in the classification table/typology.

This research started when the researcher stumbled across Biophilia in (Universal Principles of Design, Lidwell et. al., 2010) about having images of nature indoors to cure or to heal patients in a hospital. The reviewed project had been done visually, by placing images of nature in the patient's room to help them recover. The researcher conducted a literature review to find more information about this topic. Fortunately, even though many studies were found in other fields (as discussed in the literature review of Chapter 2) there was no previous research done in the industrial design field, and more specifically in furniture design. This newly discovered and interesting topic encouraged the researcher to start looking and searching for current furniture trends online, and the researcher found a series of new designs which incorporated living organisms that could be related to Biophilia. To identify this new genre of furniture design, hundreds of design sources were reviewed, including several design books and websites. In design books, this type of furniture design was usually categorized under Eco-design, sustainable design, green design or biomimicry, and was even called 'living furniture' by certain design websites. This triggered more interest to find more about this newly found topic. By searching "furniture with living plants", "living furniture", "growing furniture", "furniture with living organisms", "pet furniture" among other related searches, the researcher managed to find and document at least 235 furniture designs with living organisms, designed by furniture designers from all around the world. The development of the typology has helped in answering the second question of this research, by classifying the current examples of FDLOs and is one of the main novel contributions to knowledge of this research project.

3.3.1 Furniture Designs with Living Organisms (FDLOs)

FDLOs, as seen in Figure 3.2 below, can be considered as a new typology (or genre) of furniture design, which incorporates natural living elements, such as live plants or animals into the design. As explained before, some of the designs which are available in the market are categorised into other genres of furniture design. From the observations, it can be seen that this genre of furniture design has various variations in types, function, shapes and forms, materials, colours and trends, as identified in the tables below.

Figure 3.1: Examples of FDLOs



In this study, 235 FDLOs were classified, mainly according to function (chair/ bench, table and other types of furniture design) and context (indoor and outdoor). The 235 selected pieces were divided as follows; 38 indoor chairs or benches, 38 outdoor chairs or benches, 52 indoor tables, 18 outdoor tables, 67 other types of indoor furniture, and finally 22 other types of outdoor furniture, as seen in Table 3.2a and 3.2b. Other 4 detailed classification tables, which were previously developed for the conceptual model (with subcategories), can be found in Appendix C: Chapter 3 – Research Methodology, page 201 - 209. References of the Table 3.2a and 3.2b can be found in the References B: FDLOs, page 179.

Table 3.2a: Identified 235 FDLOs - Indoor






































































































































































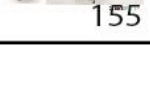


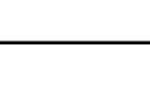
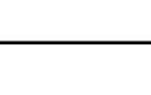
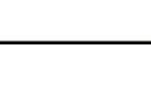






























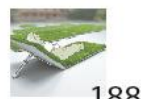











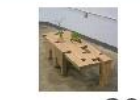



































Indoor	Chair/Bench	 1	 2	 3	 4	 5	 6	 7	 8	 9	 10	 11	 12	 13	 14	
		 15	 16	 17	 18	 19	 20	 21	 22	 23	 24	 25	 26	 27	 28	
		 29	 30	 31	 32	 33	 34	 35	 36	 37	 38					
	Table	 39	 40	 41	 42	 43	 44	 45	 46	 47	 48	 49	 50	 51	 52	
		 53	 54	 55	 56	 57	 58	 59	 60	 61	 62	 63	 64	 65	 66	
		 67	 68	 69	 70	 71	 72	 73	 74	 75	 76	 77	 78	 79	 80	
		 81	 82	 83	 84	 85	 86	 87	 88	 89	 90					
		 91	 92	 93	 94	 95	 96	 97	 98	 99	 100	 101	 102	 103	 104	
	Others	 105	 106	 107	 108	 109	 110	 111	 112	 113	 114	 115	 116	 117	 118	
		 119	 120	 121	 122	 123	 124	 125	 126	 127	 128	 129	 130	 131	 132	
		 133	 134	 135	 136	 137	 138	 139	 140	 141	 142	 143	 144	 145	 146	
		 147	 148	 149	 150	 151	 152	 153	 154	 155	 156	 157				
		 158	 159	 160	 161	 162	 163	 164	 165	 166	 167	 168	 169	 170	 171	

Table 3.2b: Identified 235 FDLOs - Outdoor

Outdoor	Chair/Bench	 158	 159	 160	 161	 162	 163	 164	 165	 166	 167	 168	 169	 170	 171	
		 172	 173	 174	 175	 176	 177	 178	 179	 180	 181	 182	 183	 184	 185	
		 186	 187	 188	 189	 190	 191	 192	 193	 194	 195					
	Table	 196	 197	 198	 199	 200	 201	 202	 203	 204	 205	 206	 207	 208	 209	
		 210	 211	 212	 213											
	Others	 214	 215	 216	 217	 218	 219	 220	 221	 222	 223	 224	 225	 226	 227	
		 228	 229	 230	 231	 232	 233	 234	 235							

3.4 Theoretical Developments

3.4.1 Conceptual Model Development

The conceptual model was developed to identify and categorise the rationale behind the reasons of why designers embedded living organisms into furniture design. In the early stage of the conceptual developments, the researcher proposed a model with 12 different subcategories compiled into 4 main categories that comprise (1) *Function and Practicality*, (2) *Aesthetics*, (3) *Emotional* (4) *Design Process*, from the previous analysis of the initial observations. The conceptual model was developed progressively through several iterations until it was finalised and used in the online survey, and later used to analyse the findings, which were gathered from the data collection phase (and will be explained further in the data analysis of Chapter 4 and Chapter 5). Figures 3.2 until 3.5 show the main iterations for the developments of the conceptual model for this study.

The first development of the conceptual model consisted of 12 subcategories within 4 main categories (as illustrated in Figure 3.2 below) which were (1) *Function and Practicality*, (2) *Aesthetics*, (3) *Emotional* (4) *Design Process*. There were 5 subcategories under the first category, which were: *to learn, farming, purify air/ water, generate energy* and *to encourage hobby*. There were also 2 subcategories under (2) *Aesthetic*, which were: *aesthetic value/ decoration* and *collection and display*. There were 3 subcategories under (3) *Emotional*, which were: *to experience nature, environmental consciousness* and *to heal/ calm/ lower stress*. For the final category (4) *Design Process*; the 2 subcategories were: *conceptual design* and *experiment*. In figure 3.2, the arrows show the subcategories in the conceptual model. It was an early ideation, which was found not to be clear enough. The second iteration of the conceptual model used coloured areas instead of arrows, to better describe visually the four proposed categories of the conceptual model.

Figure 3.2: Initial Conceptual Model of reasons behind FDLOs



The conceptual design was developed into a simple and neat rounded shape with the same categories as above which can be seen in figure 3.3 below.

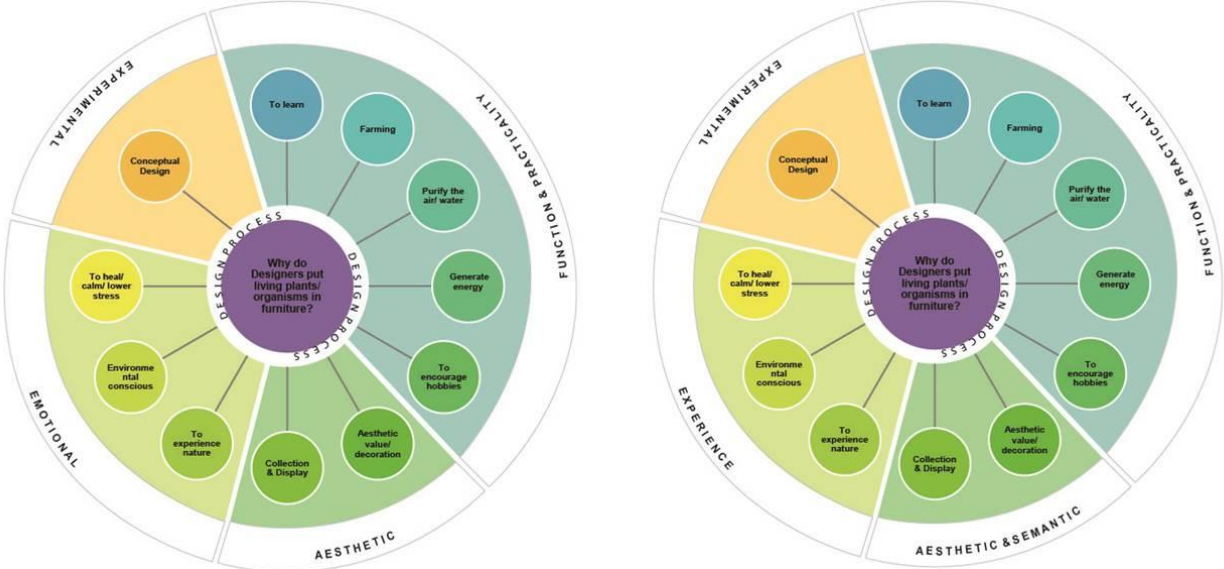
Figure 3.3: The second iteration of the conceptual model



After several discussions, the main categories of the conceptual model were changed. The changes included adding the word Semantic into the Aesthetic category, changing the Emotional category to the Experience category, and the Design Process to the Experimental

category. The different categories were created to help the researcher to distinguish the functions or purposes of the FDLOs. Some of the furniture designs might have more functions or purposes based on what the current designers had proposed. The new development can be seen in Figure 3.4 below.

Figure 3.4: The third and fourth developments of the conceptual model



After further thinking and discussion on the literature review and through observing new FDLOs that were found, the final development of the conceptual model was a result of adding another 12 subcategories, which turned into 24 subcategories under the 4 main categories. The 12 new subcategories at this stage were: Communication/ convey a message, Contemplation, Entertainment, to stimulate senses, Part of a research project, Exploration of new materials, Exploration of new technologies, to break rules/ be different and 4 other reasons (1 for each main category). These newly added subcategories were identified and categorised according to the main 4 categories. The new and final conceptual model consists of 4 main categories, which are *A: Function and Practicality*, *B: Aesthetic and Semantic*, *C: Experience* and *D: Experimental*. The first main category of *A: Function and Practicality* was divided into 6 subcategories, which are: *A1: to learn*, *A2: farming or food*, *A3: purify air or water*, *A4: generate energy*, *A5: to encourage hobbies*, and *A6: other reasons*. Six (6) subcategories under the *B: Aesthetic and Semantic* category are: *B1: aesthetic value or decoration*, *B2: collection and display*, *B3: communication or to convey a message*, *B4: artistic reasons*, *B5: contemplation* and *B6: other reasons*. For the *C: Experience* category, 6 subcategories are: *C1: to experience or interact with nature*, *C2: environmental consciousness*, *C3: to heal, calm or lower stress*, *C4: entertainment*, *C5: to stimulate senses*

and C6: *other reasons*. Finally, in the fourth category of D: Experimental, the 6 subcategories are as follows: D1: *conceptual design*, D2: *part of a research project*, D3: *exploration of new materials*, D4: *exploration of new technologies*, D5: *to break the rules or be different* and D6: *other reasons*.

After several visual amendments (Further developments of the conceptual model can be found in Appendix C: Chapter 3 – Research Methodology, page 211 - 215), the final conceptual model was designed with colour coding of Blue, Orange, Purple, and Green. The colour hues turned darker when they reached the final subcategories of each main category, which can be seen in Figure 3.6 below. This colour coding helps to identify and categorize the results from the interviews and surveys in a visual way. A table was developed, which provided details, explanation and rationales of the main categories and subcategories, in terms of definition and the purpose of living organisms in the FDLOs. This table can be found in Appendix C: Chapter 3 – Research Methodology, page 217 – 223.

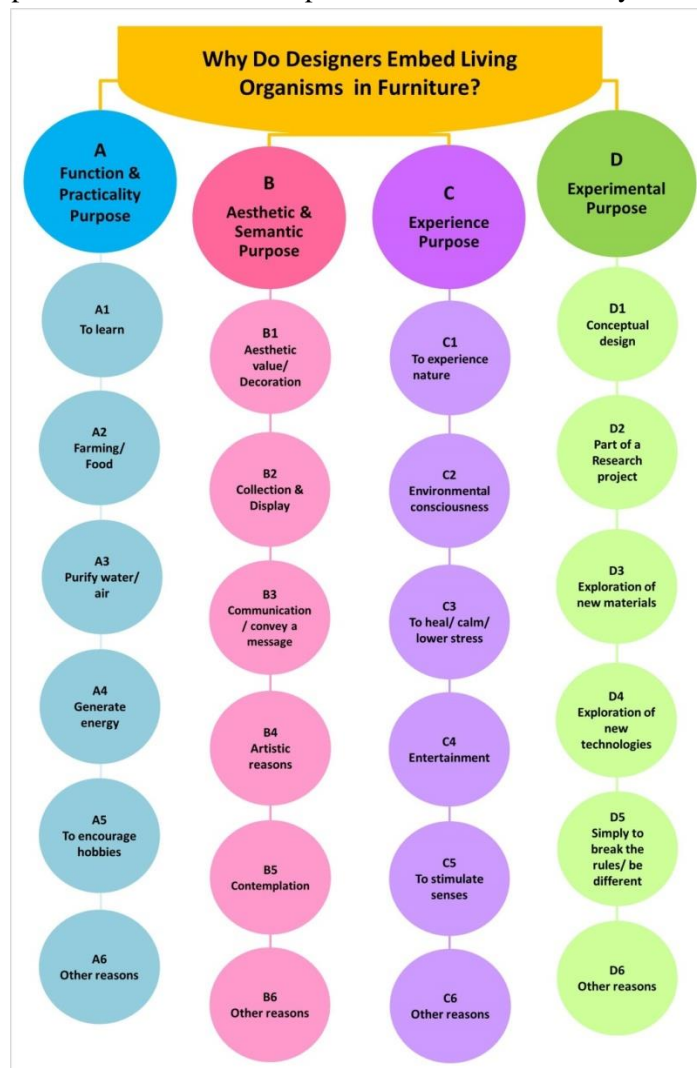
Figure 3.5: The final development of the conceptual model



3.4.2 Conceptual Model for the Online Questionnaire

The conceptual model was used and tested in the online survey, to find out the opinion of the potential consumers (the respondents) about the FDLOs and what they thought of the functions or purposes of the living organisms which were embedded into the designs. Although the content is identical, the graphic design of the conceptual model was simplified from the previous rounded version, as explained earlier, to make it suitable for the online survey and its format. Figure 3.6 below, shows the final design of the conceptual model which was used for the online survey. This conceptual model was developed similar to the arrangement of the questionnaire answer button in Section D to avoid confusion or misinterpretation (Please refer page 63 for the questionnaire sample).

Figure 3.6: The conceptual model that was simplified for the online survey



3.5 Experimental Planning and Design

3.5.1 Survey – Online Questionnaire

As found in the literature review, a valid way of conducting this type of research is to use images through online survey. For example; similar studies conducted by Roth (2005) and White and Gatersleben (2011) validate this.

This project used an online survey questionnaire using selected web survey hosts that provide services to develop or design the questionnaire, host the surveys, collect and analyse the data. Online surveys can easily be forwarded or linked to online social media such as Facebook, Twitter, emails and other web alliances to get more feedback from the respondents, and are expected to reach them without hassle. According to Zhang (2000), Evans and Mathur (2002) and Kiernan et al. (2005), the web – based surveys have potential to become a powerful tool in survey research because of the rapid and vast usage of the Internet and its powerful means in communication. The disadvantages of using the internet as medium for research surveys are perception as junk mail, low response rate, respondent lack of online experience, privacy issues, unclear answering instructions, technological variants, and other reasons (Schmidt, 1997; Evans and Mathur, 2005; Roth; 2005; Behrend et. al., 2011). However, it stills provides major strengths that support the studies involving research online surveys for research.

The advantages of using the online survey, as stated by Schmidt (1997) and cited by Zhang (2000) and Evans and Mathur (2005), Kiernan et. al. (2005), Couper and Miller (2008) and Behrend et. al. (2011) are; global reach, flexibility, speed and timeliness, technological innovations, convenience, low cost, ease of data entry and analysis, question diversity, ease to follow – up, controlled sampling, ease to obtain large samples, required completion of answers and control to answer, among other relevant positive advantages. The emergence of new technologies and software developments has also helped to support and develop new operational web hosts that provide online survey services such as surveyGizmo, Survey Monkey, esurveycreator and many others. This aids in designing the questionnaires to become more customizable, visually appealing, interactive, easily navigated, and user-friendly and most importantly, can be analysed using SPSS and other relevant data analysis and research software. The development of the online questionnaire took around 6 months, and more than a year to gain responses. A detailed explanation of the work and several iterations involved in the development of the questionnaire can be found the Appendix C: Chapter 3 – Research Methodology, page 224 – 228.

3.5.2 Final survey

The final online questionnaire had five sections and was designed to gather different data. It was designed to have 6 pages only, but with a mandatory answering format, in which the respondents were required to answer every question without skipping any question before they could proceed further. This feature helped data processing, minimizing incomplete answers or problems when respondents skipped any questions if they did not want to answer. The chosen online survey tool had features that helped control the answers and required completion of answers, as discussed earlier.

The ten (10) FDLOs selected for the online survey for Sections B, C and D were (as shown in Table 3.3 below):

Table 3.3: 10 selected FDLOs for the online survey

				
The Threatening Cactus Chair	The Retrofitted Rococo Chair	Life Within Object	Mushroom Ate my Furniture	The Stitch Table
				
The Moss Table	The Aqua Table	The Cultivation Kitchen	Local River	The Greenwall

The first section; Section A, collected demographic data through respondents' background questions using a radio button format. Twelve (12) questions were asked in this section about the basic information (gender, age, working background, education, and the continent of origin) and preferences towards activities, pets, and plants.

The questionnaire from Section B until Section D consisted of 10 questions with 10 images of selected FDLOs. The second section was on Design (Section B), where respondents were

required to compare and choose preferred images of the FDLOs with similar, but digitally altered furniture designs. This section used image button choices (A or B).

In the third section was Emotional Design (Section C), where respondents had to analyse and choose the emotional response on the images of furniture with living organisms using the emotion scales designed for this project.

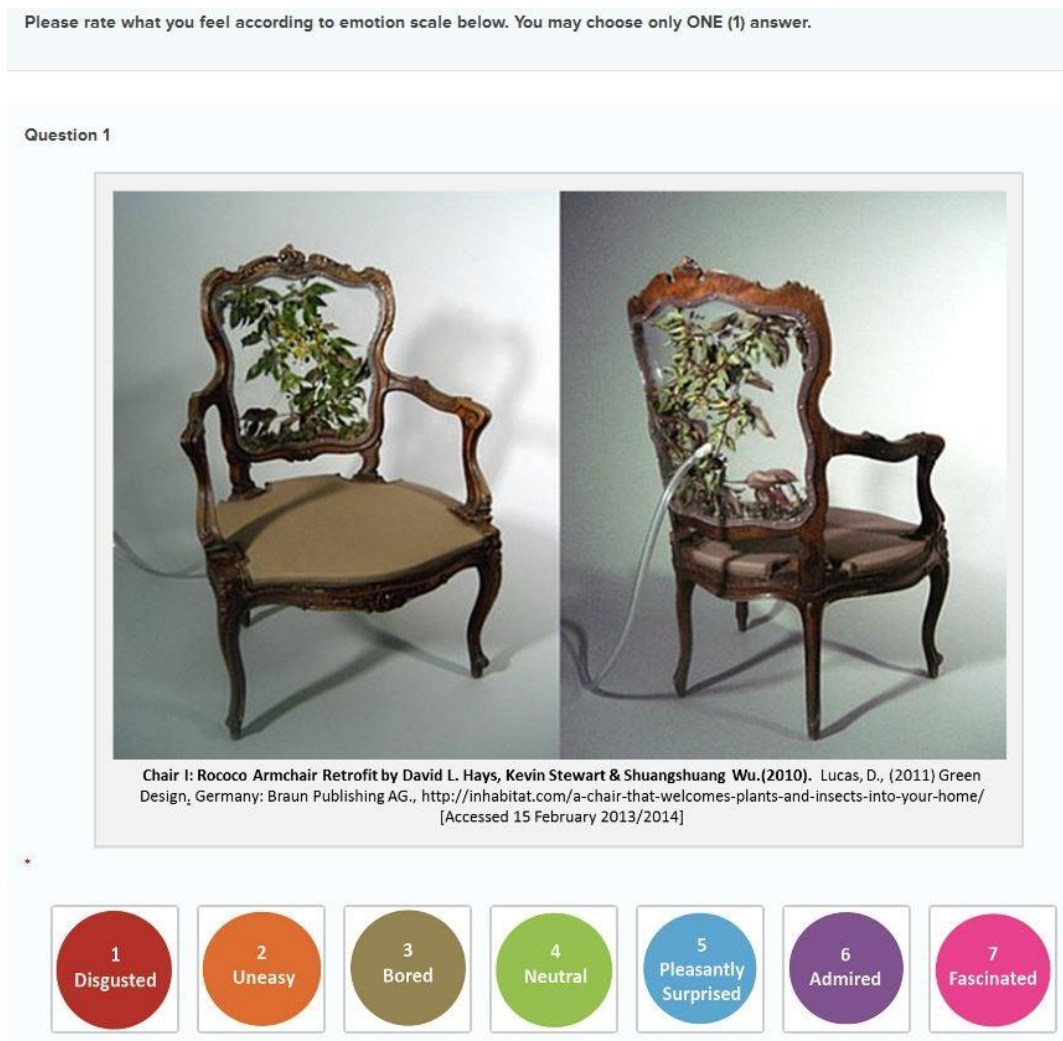
The fourth section of the questionnaire involved the conceptual model (Section D), and respondents were required to choose the reasons and subcategories suitable for the images of the FDLOs, according to the conceptual model that was discussed previously. A sample of a simple instruction was provided to the respondents as a guideline to answer this section. For this section, a minimum of four answers were required for the respondents to answer, before they could proceed to the final section.

The final Section E involved questions related to Biophilic Design, where respondents needed to answer 13 questions. Eight out of 13 questions used a Likert scale format while others used an image button of close-ended format, where respondents could only choose 1 answer for each question.

3.5.2a Rationale behind the Emotional Scale

The emotional scale used in this project was designed specifically for this section. It used words that were adapted from the PrEmo method (semantic/ emotion adjectives) used by Desmet (2000, 2003, 2012), Self-Assessment Manikin by Bradley and Lang (1994) and the Semantic Differential Scale (Osgood, 1952; Osgood and Tannenbaum, 1955; Osgood, 1962). The 7- point emotional design scale, as shown in the figure 3.7 below, was developed to be used in the questionnaires to measure emotional responses to the selected images. The 7 emotional descriptors (words) that were used in this section are (1) *Disgusted*, (2) *Uneasy*, (3) *Bored*, (4) *Neutral*, (5) *Pleasantly surprised*, (6) *Admired* and (7) *Fascinated*.

Figure 3.7: The 7-point emotional scale used in the online questionnaire



For brevity, the next pages show samples of the online questionnaire for each section in Figure 3.8a – 3.8f. The full details of the questionnaire are also given in Appendix C: Chapter 3 – Research Methodology, page 229 - 252. The questions were kept as short as possible and with relevant images.

3.5.2b Questionnaire form, (Sample of each section only)

Figure 3.8a: Sample of the front page of the online questionnaire

A Study of Emotion, Influences and Perceptions of Furniture Design with Living Organisms in Relation to Biophilic Design

The survey is better viewed on a computer or a tablet pc as the images might be too big for smart phones.

The main purpose of this study, which is part of a PhD research project at the University of Canberra, is to better understand relationships between furniture design, biophilia theory and emotional design through exploration of the influences of furniture designers and perceptions by potential users in regards to furniture which incorporates living organisms such as plants and animals.

This study is for academic purposes only. The benefit of this study is to create new knowledge in the topics of furniture design, emotional design and biophilic design.

This survey is normally completed in 20 minutes. Thank you in advance for participating.

Consent Statement

"I have read and understood the information provided. I am aware of any conditions that would prevent my participation, and I agree to participate in this project. I have had the opportunity to ask questions about my participation in this research. All questions I have asked have been answered to my satisfaction"

As outlined in the informed consent form the results will not be traceable to any particular individual. Complete confidentiality is assured and the survey result will be used for academic purposes only.

Disclaimer: images may include animals such as fish or snakes. If by chance you might be disturbed by these, please let us know beforehand, or you may opt out to participate.

Some of the images have been digitally altered for the purpose of this study and not all of the products are shown as designers intended or as they're published. All efforts were made to get approvals from the designers of the pieces that were digitally altered.

Do you agree to participate? If your answer is YES, please continue to the next section, if your answer in NO, you may close the browser.

- Yes
 No

A summary of the research report can be forwarded to you or your representative when published. If you would like to receive a copy of the report, please include your email address below.

If you have any questions regarding the questionnaires and survey, please contact the researcher using the address below.

Nurul 'Ayn Ahmad Sayuti
Environmental Design
Faculty of Arts and Design
University of Canberra
ACT 2601
Australia
Email: u3092325@uni.canberra.edu.au

For any other queries and concerns, please contact Dr Carlos Montana Hoyos, Supervisor of this project.

Email: carlos.montana.hoyos@canberra.edu.au



Powered by **surveygizmo**

Figure 3.8b: Sample of Section A of the online questionnaire

Section A - Respondent Background

What is your gender? *

- Male
- Female

What is your age? *

- 18 - 25
- 25 - 30
- 31 - 40
- 41 - 50
- 51 - 60
- more than 60

What is your working background? *

- Advertising/ Media
- Art and Design/ Creative
- Education/ Academic
- Finance/ Banking/ Marketing
- Govt/ Civil Service
- IT/ Computers/ Technologies
- Medical/ Dental
- Technical/ Science/ Engineering
- Student
- Unemployed
- Retired
- Other

What is your current or previous education background? *

- Postgraduate
- Undergraduate
- Certificate
- Other

What is your continent of origin? *

- Africas
- Americas
- Asia
- Australia and Ocenia
- Europe

Preferences: Which activities do you prefer? *

- Outdoor
- Indoor

Preferences: Do you have pets? *

- Yes
- No

Preferences: What sort of pets do you have? *

- Cat
- Dog
- Fish
- No Pets
- Other

Figure 3.8c: Sample of Section B of the online questionnaire

Section B - Design

From the following pairs of images, please select which one you prefer.

Question 10 *



A



B

Figure 3.8d: Sample of Section C of the online questionnaire

Section C - Emotional Design

Question 10



- 1
Disgusted
- 2
Uneasy
- 3
Bored
- 4
Neutral
- 5
Pleasantly
Surprised
- 6
Admired
- 7
Fascinated

Figure 3.8e: Sample of Section D of the online questionnaire

Section D - Conceptual Model

Question 10



Cultivation Kitchen INAX (2008).

Japan Good Design Award Book, (2008). Retrieved from <http://www.designstudiocrac.com/English/1cty1-en.htm> [Accessed 24 May 2013].
<http://spatialinteractions.wordpress.com/2011/10/01/cultivation-kitchen/> [Accessed 5 March 2013].

Please look carefully at the furniture design above, then select which sub categories you think are suitable. You may choose minimum FOUR (4) answers.

<p>A1 To learn</p> <p>Function & Practicality (A1)</p>	<p>B1 Aesthetic value/ Decoration</p> <p>Aesthetic & Semantic (B1)</p>	<p>C1 To experience nature</p> <p>Experience (C1)</p>	<p>D1 Conceptual design</p> <p>Experimental (D1)</p>
<p>A2 Farming/ Food</p> <p>Function & Practicality (A2)</p>	<p>B2 Collection & Display</p> <p>Aesthetic & Semantic (B2)</p>	<p>C2 Environmental consciousness</p> <p>Experience (C2)</p>	<p>D2 Part of a research project</p> <p>Experimental (D2)</p>
<p>A3 Purify water/ air</p> <p>Function & Practicality (A3)</p>	<p>B3 Communication / convey a message</p> <p>Aesthetic & Semantic (B3)</p>	<p>C3 To heal/ calm/ lower stress</p> <p>Experience (C3)</p>	<p>D3 Exploration of new materials</p> <p>Experimental (D3)</p>
<p>A4 Generate energy</p> <p>Function & Practicality (A4)</p>	<p>B4 Artistic reasons</p> <p>Aesthetic & Semantic (B4)</p>	<p>C4 Entertainment</p> <p>Experience (C4)</p>	<p>D4 Exploration of new technologies</p> <p>Experimental (D4)</p>
<p>A5 To encourage hobbies</p> <p>Function & Practicality (A5)</p>	<p>B5 Contemplation</p> <p>Aesthetic & Semantic (B5)</p>	<p>C5 To stimulate senses</p> <p>Experience (C5)</p>	<p>D5 To break the rules/ be different</p> <p>Experimental (D5)</p>
<p>A6 Other reasons</p> <p>Function & Practicality (A6)</p>	<p>B6 Other reasons</p> <p>Aesthetic & Semantic (B6)</p>	<p>C6 Other reasons</p> <p>Experience (C6)</p>	<p>D6 Other reasons</p> <p>Experimental (D6)</p>

Figure 3.8f: Sample of Section E of the online questionnaire

Section E - Biophilic Design

How do you prefer to experience nature? *

Indoor Outdoor Both

Do you like to have living organisms (such as plants or animals) inside your house? *

1 Strongly Disagree 2 Disagree 3 Neither Agree or Disagree 4 Agree 5 Strongly Agree

Having natural elements and living organisms indoors can:

A. Release stress/ calm you *

1 Strongly Disagree 2 Disagree 3 Neither Agree or Disagree 4 Agree 5 Strongly Agree

B. Create awareness of nature and ecological impact *

1 Strongly Disagree 2 Disagree 3 Neither Agree or Disagree 4 Agree 5 Strongly Agree

Please select which type of living plant you would prefer to be embedded into a furniture design piece. *

A Green & leafy B Flowery C Fruit plant D Moss E Cacti F No Living Plants

Please select which type of living animal you would prefer to be embedded with due care into a furniture design piece. *

A Mammals B Reptilians C Amphibians D Insects E Birds F Fish G No Living Animals

Which plant do you least prefer? *

A Green & leafy B Flowery C Fruit plant D Moss E Cacti

Which animal do you least prefer? *

A Mammals B Reptilians C Amphibians D Insects E Birds F Fish

END OF QUESTIONNAIRES

Thank you for your cooperation and taking the time to answer this questionnaire

3.5.3 Sampling of Respondents of the online survey

Initially, a broad range of people from different countries were chosen randomly from the age of 18 to 60 (around 260 responses were gathered), to answer an online questionnaire, which was disseminated through social media and emails. According to Teddlie and Yu (2007), random sampling is perhaps the most well-known of all sampling strategies and the accessible population has an equal chance of being included in the sample. From the general responses, the data were stratified. Three main groups were identified as (1) *Art and Design/ Creative*, (2) *Academic/ Education* and the highest responses were received from (3) *Students*. Stratified Sampling is a type of sampling gathered from a random sampling that is stratified into separate groups concerning one or more characteristics from each selected stratum (Teddlie and Yu, 2007; Collins et. al., 2008). Another 27 responses were gathered from *Australian Designers* to strengthen the findings and was used to compare the results with the *International designers or Art and Design/ Creative* group, from the stratified general respondents group. Around 200 design consultancies throughout Australia were contacted through email regarding the online questionnaire, and only 27 responses were received. Table 3.4 below, shows the minimum sample size recommendations that are commonly used for quantitative and qualitative research design. This table was used as a guideline to make sure that the relevant number of respondents had been achieved in this study, as highlighted in **blue box**.

Table 3.4: Minimum sample size recommendations for most common quantitative and qualitative research designs by Collins, Onwuegbuzie and Qun (2008) and Onwuegbuzie and Collins (2007)

Research design/method	Minimum sample size suggestion
Correlational	64 participants for one-tailed hypotheses; 82 participants for two-tailed hypotheses (Onwuegbuzie et al., 2004)
Causal-comparative	51 participants per group for one-tailed hypotheses; 64 participants for two-tailed hypotheses (Onwuegbuzie et al., 2004)
Experimental	21 participants per group for one-tailed hypotheses (Onwuegbuzie et al., 2004)
Case study	3-5 participants (Creswell, 2002)
Phenomenological	5-10 interviews (Creswell, 1998); 6 (Morse, 1994)
Grounded theory	15-20 (Creswell, 2002); 20-30 (Creswell, 1998)
Ethnography	1 cultural group (Creswell, 2002); 30-50 interviews (Morse, 1994)
Ethological	100 - 200 units of observation (Morse, 1994)

This study also used the snowball/chain technique, where respondents were asked to disseminate the questionnaires on behalf of the researcher to help and get a bigger sample size and gain more feedback through the social media and emails. Snowball/chain is a process where participants are asked to recruit individuals to join the study (Collins et. al., 2008). Table 3.5 shows the sample size for this study. A detailed breakdown of the participants can be seen in Quantitative Chapter (Chapter 4, page 74).

Table 3.5: Sample size for this study

Tools/ method	Participants	Minimum sample achieved
Online Questionnaire	General participants: 260 respondents	more than 21 per group
	Main group: 27 respondents of Australian designers	at least 6 per group

3.6 Interviews

Interviews were done with 17 designers of selected FDLOs, as found in the initial observations. All the interviews were done through Skype, recorded and then transcribed, as the selected designers came from all over the world. The interviews were done by using a semi-structured interview format with open-ended questions, and was flexible, to gain more feedback from respondents. Although the questions were prepared before the interview sessions began, they could vary, and other details were asked according to the respondents' answers, and as suggested by Bryman (2012) and www.sociology.org.uk/methfi.pdf, (2013). The designers were contacted through email, and it took more than a month to schedule the interview session with each designer. As per Australian research ethics procedures, a consent form, abstract of the study and the questions list was sent to the designers before the interviews, to give them time to prepare on the topics. Thirteen (13) questions were asked and can be seen in Figure 3.10 below.

Figure 3.9: Interview questions for the FDLOs designers

Interview Questions (for Designers)

Section A: Background of Respondent

Name : _____

Gender:

Male	Female
-------------	---------------

What is your design background? (Specific design discipline)

What is your working Experience? How many years you've been designing (or in your field)?

Are you working with the furniture industry? If yes, Please explain.

Section B: Interview Questions

1. Why did you choose to embed living organisms in your design project (Name of design)?
Answer: _____
2. What was your main purpose when you designed the project (Name of design)?
Answer: _____
3. Did you try to communicate or convey a specific message through your design? If yes, what was it, and why?
Answer: _____
4. In relation to your project, what was the main concept behind it?
Answer: _____
5. How did you get your inspiration to design this type of furniture (with living organisms)?
Answer: _____
6. Is your furniture piece just a concept, or is it commercialised?
Answer: _____
7. Do you know what biophilia theory and biophilic design are? (If yes, go to question 8. If no, go to question 9)
Answer: _____
8. If yes to question 7, were you aware about biophilia theory or biophilic design while you designed your project (of furniture with living organisms)?
Answer: _____
9. Why did you choose the specific types of plants or animals embedded into your design?
Answer: _____
10. Do you know what emotional design is? (If yes, go to question 11 and 12. If no, go to question 13)
Answer: _____
11. Did you use principles of emotional design when designing your project?
Answer: _____
12. Do you think that natural elements can encourage emotional attachment of people with their furniture?
Answer: _____
13. How have people responded to your design? (Positive or negative reactions of viewers)
Answer: _____

3.6.1 Sampling of Respondents of the Interviews

More than 100 FDLOs designers were contacted for the interviews, but only 17 agreed to be interviewed. Table 3.6 below, shows the minimum sample size recommendations, which can be seen as highlighted in blue box.

Table 3.6: Minimum sample size recommendations for most common quantitative and qualitative research designs by Collins, Onwuegbuzie and Qun (2008) and Onwuegbuzie and Collins (2007)

Research design/method	Minimum sample size suggestion
Data Collection Procedure	
Focus group	6-9 participants (Krueger, 2000); 6-10 participants (Langford et al., 2002; Morgan, 1997); 6- 12 participants (Johnson and Christensen, 2004); 6- 12 participants (Bernard, 1995); 8-12 participants (Baumgartner et al., 2002) 3 - 6 focus groups (Krueger, 1994; Morgan, 1997; Onwuegbuzie, Dickinson, Leech, and Zoran, 2007)
Interview	12 participants (Guest, Bunce, and Johnson, 2006)


Table 3.7 shows the sample size for the participants in interviews.






Table 3.7: Sample size for this study






Tools/ method	Participants	Minimum sample achieved
Interviews	17 FDLOs designers	At least 12 participants






A manageable number of 17 interviewees were identified as seen in Table 3.8 below. For the sake of brevity and anonymity, designers are identified only by their initials, their country of origin or current work, and their FDLOs.


Table 3.8: Interviewed FDLOs designers and their designs

No	Designers (Interviewees)	FDLOs
1	AG, Mexico	Talita Bench Exterior 

<p>2</p>	<p>CP, London, UK</p> <p>(This design also used in the online questionnaire with permission)</p>	<p>The Moss Table</p> 
<p>3</p>	<p>GZ, USA</p> <p>(This design also used in the online questionnaire with permission)</p>	<p>The Stitch Table</p> 
<p>4</p>	<p>KL, Germany</p>	<p>The Roots</p> 
<p>5</p>	<p>KHJ, South Korea</p>	<p>HappilyEver</p> 
<p>6</p>	<p>MH, Germany</p>	<p>The BalKonzept</p> 

7	NU, USA	<p style="text-align: center;">Desert Eco Chair</p> 
8	NF, USA	<p style="text-align: center;">Grass Ottoman</p> 
9	DB, Iceland	<p style="text-align: center;">The Furnibloom</p> 
10	EW, USA	<p style="text-align: center;">The Planter Table</p> 
11	<p>DLH, USA</p> <p>(This design also used in the online questionnaire with permission)</p>	<p style="text-align: center;">The Retrofitted Rococo Chair</p> 

12	JL, USA	<p>The Galapagos Coffee Table</p> 
13	MA, Canada,	<p>The Grass Lamp</p> 
14	NR, France,	<p>Co-Habitation</p> 
15	PVH, Norway,	<p>The Spire</p> 
16	<p>SWR, Sweden/ Taiwan, (This design also used in the online questionnaire with permission)</p>	<p>Mushroom Ate my Furniture</p> 

17	TH, Japan, (This design also used in the online questionnaire with permission)	<p style="text-align: center;">The Cultivation Kitchen</p> 
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3.7 Ethical Considerations

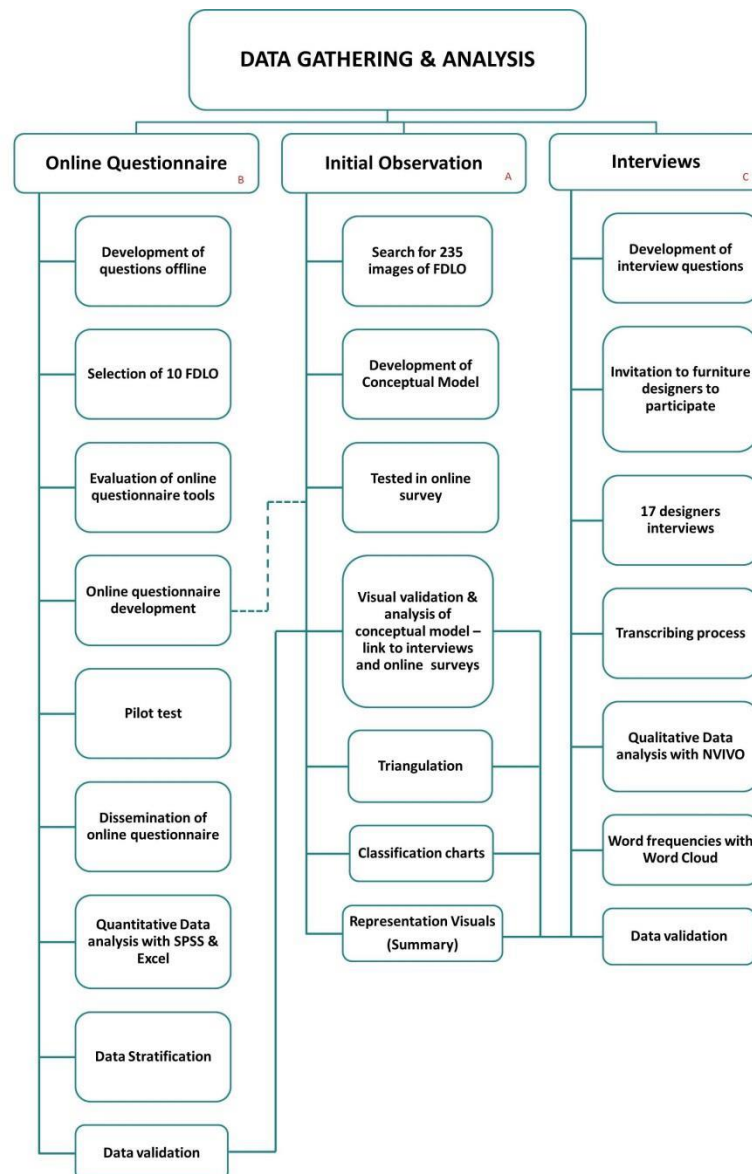
It is a prerequisite in Australia (and other countries) for every research project involving human beings to obtain permission from the Human Research Ethics Committee (HREC) to conduct and collect data. A relevant application form was submitted for consideration and approval, before conducting the tests, as stated in the National Statement on Ethical Conduct in Human Research (2007) to protect the rights of participants in this study (HREC, 2013). This application was approved in May 2014 and the online survey was disseminated by August 2014. Interviews were conducted in parallel with the surveys. A copy of the Approval of Ethics Application can be found in Appendix C: Chapter 3 – Research Methodology, page 253.

CHAPTER 4 QUANTITATIVE DATA ANALYSIS AND EXPERIMENTAL RESULTS

4.1 Introduction

This chapter will describe the related research activities, focusing on a quantitative part related to the online questionnaire data, obtained from 260 general respondents and 27 Australian designers. The empirical results are summarized and explained hereunder and for ease of reference, Figure 4.1 was designed to show the data gathering and analysis process. This chapter reports on the quantitative results and analyses. The qualitative results and the triangulation will be discussed further in Chapters 5 and 6 respectively.

Figure 4.1: Data gathering and analyses process



4.2 Quantitative Data: Sampling Rationale

The data gathered from the online questionnaire was divided into 5 data sets. Overall respondents were 287. The first data set had consisted of 260 general respondents before it was stratified into a group of *Art and Design/ Creative, Educators, and Students*, which are the 3 highest groups of respondents from the general respondents (second data set). The third data set was gathered from the Australian designers. About 200 design consultancies around Australia were contacted during this phase, and 27 responded and agreed to participate. The final data set is the comparison data between the *Australian Designers* and *International Designers* (Art and Design/ Creative) where 92 respondents were gathered from the survey. The detailed breakdown information can be seen in Table 4.1 below. All of the data were analysed using the SPSS and Microsoft Excel software.

Table 4.1: The breakdown information of data gathered from the online surveys

Online Survey Data	Respondents
Overall Respondents	287
First Data Set – General Respondents	260
Second Data Set – Stratification Group (Designers, Educators, and Students)	197
Third Data Set - Australian Designer	27
Fourth Data Set – Australian Designer and International Designers	92

In this chapter, only the second data set of the stratification group (Designers, Educators, and Students) and the fourth data set, the Australian designers and International designers are discussed. The general respondent's data is too general and broad to be discussed as it consists of 12 different working backgrounds. The further information on the respondents can be found in Appendix D: Chapter 4 – Quantitative Results, page 256 – 258.

The researcher will discuss the most important findings in this study. Firstly, the fourth data set (Australian and International designers), which is the main sample for this study. Secondly, the discussion will continue to the summaries of a second data set of stratified groups. It is worth noting that there are few tables which do not have 100% frequency due to the usage 0- point decimal in the SPSS, and show only 99.9% frequency. The validity of the data which was presented in the tables was verified and confirmed by a statistician.

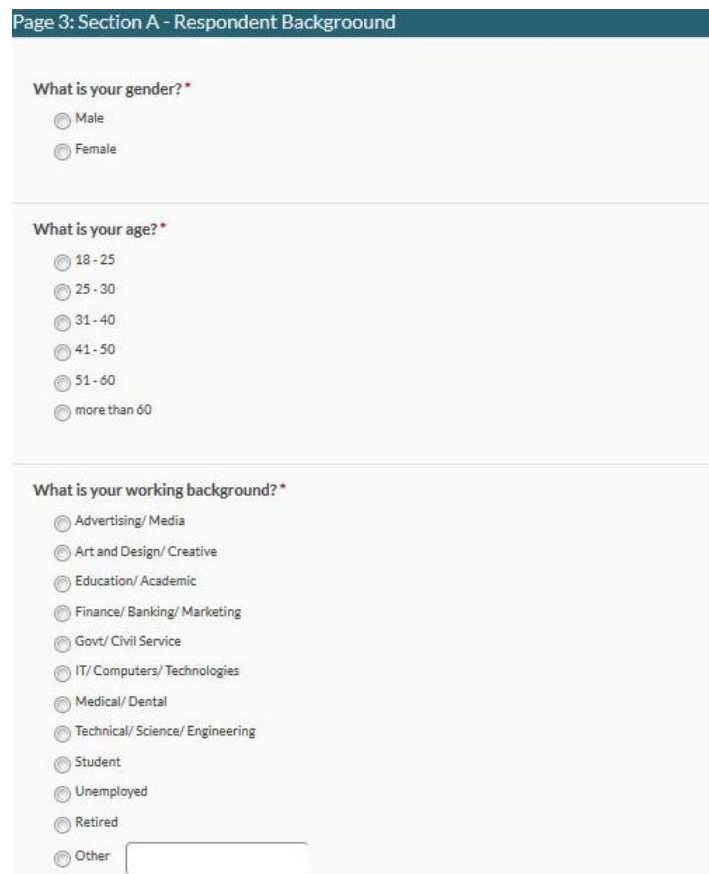
4.2.1 Online Questionnaire

As explained in the previous chapters, the online survey was designed to gather information on perception of respondents towards FDLOs, design preferences (visually), emotional responses, validation of the conceptual model and general knowledge on biophilic design. The quantitative data was gathered by disseminating an online questionnaire using the online survey tool, surveyGizmo.com (a detailed explanation about how the questionnaire was designed and launched is in Appendix C: Chapter 3 – Research Methodology, page 224 - 228). There are 5 sections in the questionnaire. The respondents were required to answer all of the questions in each section before they could proceed to the next section. The survey took a minimum of 20 minutes to be completed and was designed to be user-friendly, interactive and attractive by using vibrant colour answer buttons and images.

4.2.1a Section A: Respondent Background

Section A looked at the *Basic Demographics* with 12 questions for respondents to answer. Detailed results gathered from the surveyGizmo.com on the background of respondents can be found in the Appendix D: Chapter 4 – Quantitative Results, page 256 – 258).

Figure 4.2: Sample of questions in Section A of the online survey questionnaire



Page 3: Section A - Respondent Background

What is your gender? *

Male

Female

What is your age? *

18 - 25

25 - 30

31 - 40

41 - 50

51 - 60

more than 60

What is your working background? *

Advertising/ Media

Art and Design/ Creative

Education/ Academic

Finance/ Banking/ Marketing

Govt/ Civil Service

IT/ Computers/ Technologies

Medical/ Dental

Technical/ Science/ Engineering

Student

Unemployed

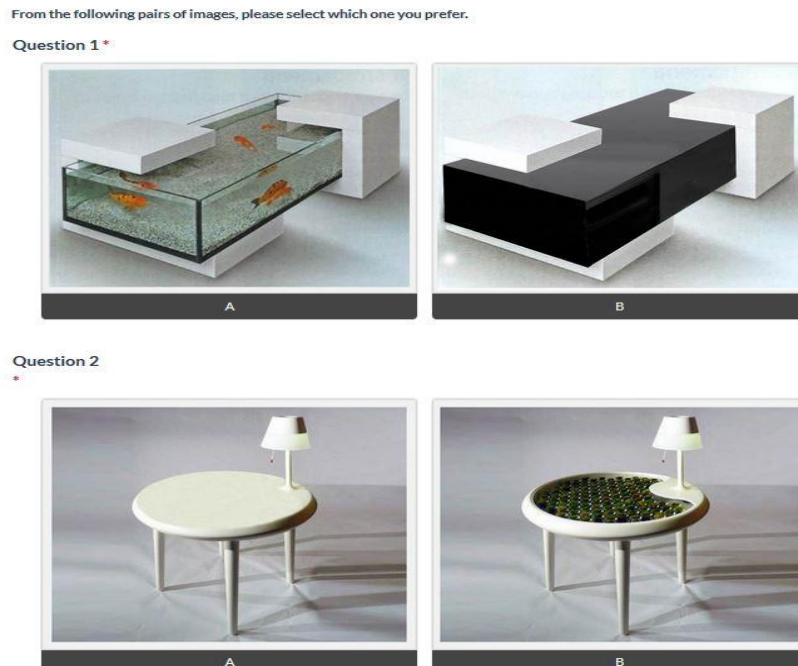
Retired

Other

4.2.1b Section B: Design Preference

Section B was a *Design Preference* section where respondents were asked to choose the preferred design. There were 10 questions for this section and it used an image selection format.

Figure 4.3: Samples of questions in Section B of the online survey questionnaire
Section B - Design



4.2.2a Results from Section B: Fourth Data Set (Australian Designers and International Designers)

This section aimed to test respondents' visual perception of the FDLOs and to avoid bias in the responses any information of the designs was taken out, and only the images were shown. The position of all images with the living organisms was varied for each question. It was not intended to confuse the respondents, but to reassure that the respondents answered the questions diligently and cautiously. All of the tables and figures in this section show the descriptive data for comparison of valid frequency, valid percent and the cumulative percentage that were calculated using SPSS. The respondents from this fourth data set comprised 92 respondents, namely, 27 Australian designers and 65 International designers.

For brevity, only 3 questions and the overall results will be discussed in this section, based on the lowest and highest responses received from the respondents. These questions are Question

5, 8 and 9. Other questions can be found in the Appendix D: Chapter 4 – Quantitative Results, page 292 – 299.

Question 5 – The Lowest Preferences

Table 4.2: Summary of the lowest preferences in percentage of frequency for question 5



Question 5: Preference				
ID			Frequency	Percentage
Australian Designers	Valid	A (without LO)	26	96.3
		B (with LO)	1	3.7
		Total	27	100.0
International Designers	Valid	A (without LO)	55	84.6
		B (with LO)	10	15.4
		Total	65	100.0

Table 4.2 illustrates the preferences and percentage of frequency of the two chairs, from responses by Australian and International designers, where it was noted that both groups of designers preferred the chair made of wood without the cactus, with significantly higher responses of 96.3% and 84.6% in both groups. Please note that while the design is similar in form, the material is completely different (wood and glass), and this could have also influenced the responses and made the real cactus chair least preferable. Unfortunately, it is clear that the 2 chairs were perceived differently due to the different materials. While both chairs (wood and glass) are from the same designer, they are not necessarily comparable.

While the 2 images were initially thought to be comparable, after careful review the researcher acknowledges the 2 images should be of the same material, i.e. either both made of wood or of glass. This way it would have provided a more equitable basis between the two images and been potentially more useful in obtaining the emotional responses in the online research survey. Future related research should definitely have this into consideration.

Question 8 - Highest Preferences

Table 4.3: Summary of the highest preferences in percentage of frequency for question 8



Question 8: Preference

ID			Frequency	Percentage
Australian Designers	Valid	A (with LO)	19	70.4
		B (without LO)	8	29.6
		Total	27	100.0
International Designers	Valid	A (with LO)	47	72.3
		B (without LO)	18	27.7
		Total	65	100.0

Table 4.3 illustrates the highest preferences in the percentage and frequency for Question 8, where both International and Australian designers (respondents) preferred the design with living organisms with 72.30% and 70.40%, respectively. This furniture piece, titled Greenwall received the highest responses from the Australian Designers.

Question 9 - Highest Preferences

Table 4.4: Summary of the highest preferences in percentage of frequency for question 9



Question 9: Preference

ID			Frequency	Percentage
Australian Designers	Valid	A (without LO)	9	33.3
		B (with LO)	18	66.7
		Total	27	100.0
International Designers	Valid	A (without LO)	12	18.5
		B (with LO)	53	81.5
		Total	65	100.0

Table 4.4 shows the highest preferences of the percentage of frequency for Question 9 where both Australian and International designers preferred the design with the living organisms. This design was highly preferred by Australian Designers (66.7%) but even more so by International designers (81.5%).

Summary of Results of Section B

Figure 4.4: Summary of percentage frequency bar chart of all design preference questions for FDLOs

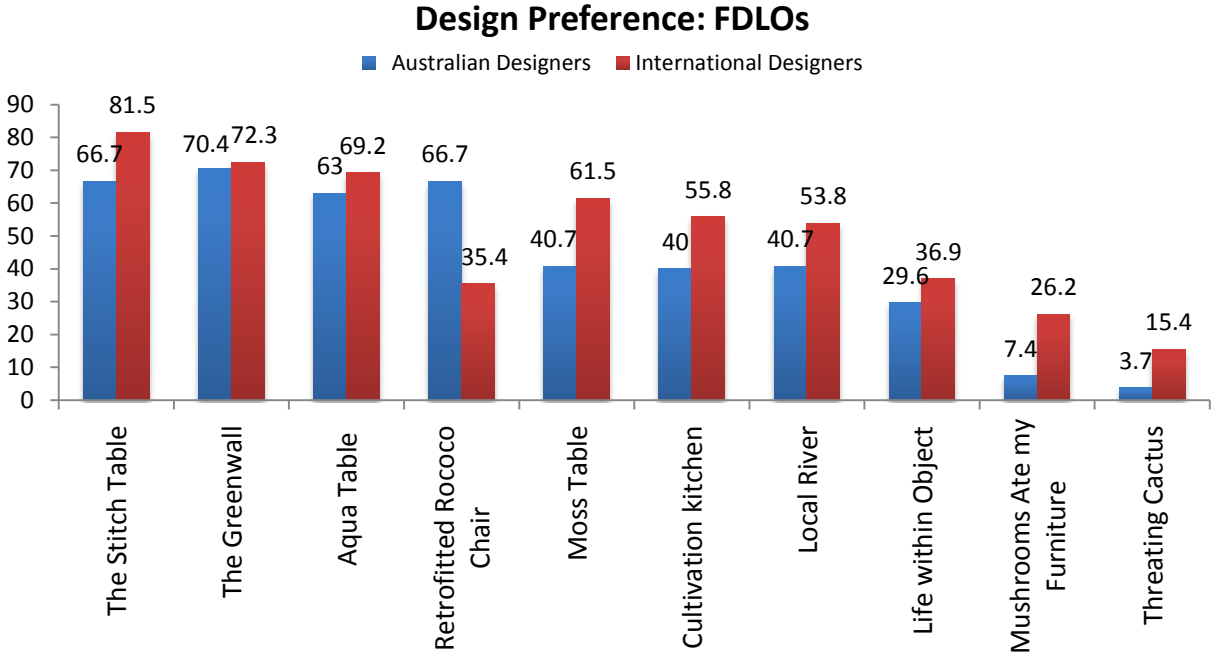


Figure 4.4 illustrates the highest to the lowest percentage of preferences towards 10 FDLOs and their counterparts (which were manipulated digitally to appear without the living organisms). The respondents were asked to choose their preferred design from each pair of designs for each question. It can be seen that *the Stitch Table* received the highest percentage while *the Threatening Cactus chair* received the lowest percentage. *The Threatening Cactus chair* (with living organisms) had the lowest percentage of preference. The same goes with the design titled *Mushrooms Ate My Furniture*, where respondents may have seen the mushrooms as parasites, as the nature of mushrooms or fungi is to embed, live and withdraw the life out of other things to stay alive.

The Mann-Whitney test may be applied to test the significant differences in opinion on design preferences between two groups of respondents for Section B. The results obtained by SPSS analysis of these data are summarised in Table 4.5 below. This table lists the survey questions in Section B, the Mann-Whitney U, Wilcoxon W, Z, and Asymp. Sig. (2-tailed) statistics test, all of which further validated the data, mindful of the fact that the sample sizes were different for the Australian and International designers. An interesting finding is depicted in Green. This test has detected a significant difference for *the Retrofitted Rococo*

Chair, where it indicates different visual preferences with 0.006 (as noted, the probability level or p-value, is listed in the row labelled “Asymp. Sig. (2 tailed), p=0.05, it shows the highly significant difference in both designers groups. As also depicted in Figure 4.4, the significant difference shown in the table is from the Retrofitted Rococo Chair, where it received different responses. 66.7% of the Australian designers prefer it, but only 35.4% percentage of International Designers preferred it. This suggests disagreement between the two groups of designers.

Table 4.5: Example of the Mann-Whitney test applied to Section B questions, Design preference. Question 1 to 10 (SPSS output)

Test Statistics ^a										
Preference	Question 1: The Aqua Table	Question 2: The Moss Table	Question 3: Life within Object	Question 4: The Cultivation Kitchen	Question 5: The Threatening Cactus Chair	Question 6: The Retrofitted Rococo Chair	Question 7: Mushrooms Ate My Furniture	Question 8: The Greenwall	Question 9: The Stitch Table	Question 10: Local River
Mann-Whitney U	822.500	695.000	813.500	547.500	775.000	603.000	713.000	860.500	747.000	762.500
Wilcoxon W	2967.500	2840.000	2958.500	1925.500	1153.000	981.000	1091.000	3005.500	1125.000	1140.500
Z	-.581	-1.818	-.665	-1.288	-1.564	-2.734	-2.012	-.187	-1.539	-1.139
Asymp. Sig. (2-tailed)	.561	.069	.506	.198	.118	.006	.044	.852	.124	.255

a. Grouping Variable: ID

4.2.2b Results from Second Data Set: Stratification Groups (Designers, Educators, and Students) from General Respondents

This second data set was obtained from the online survey. The stratification group consisted of designers, educators, and students (excluding the Australian designers), as this data was gathered from the first data set of general respondents. The respondents from this second data set comprised of 197 respondents, namely, 65 of Art and Design/Creative from International designers, 78 from Education/Academic background and 54 students. For the sake of brevity, all of the information of the second data set is in Appendix D: Chapter 4 – Quantitative Results, page 331 – 332. Full Results on page 331 - 366). Only a summary of each section is included here. As stated previously, Section B was designed to gather information on design preferences on visual samples of FDLOs, as compared to the same or similar FDLOs that were digitally manipulated to be without the living organisms. For this part, only summarized results of question 1 – 10 will be discussed.

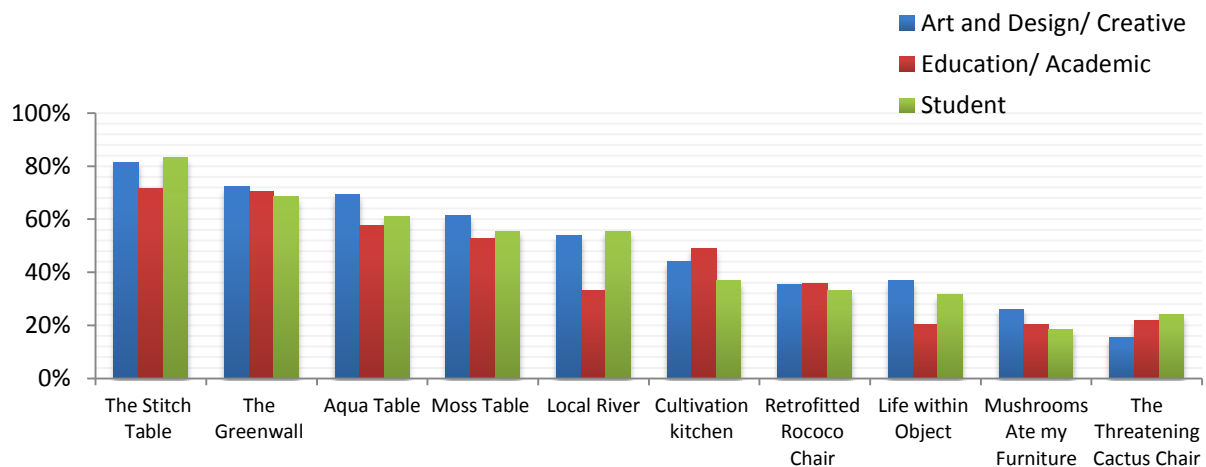
Summary of Results of Section B: Question 1 – 10

Table 4.6 illustrates the summary of responses towards 10 FDLOs surveyed. In each question, respondents were asked to choose the preferred between two designs. As highlighted in green, it can be seen that *the Stitch Table* received the highest percentage of preference in the 3 stratified groups. Interestingly, the *Threatening Cactus Chair* received the lowest percentage (15.4%) from Art and Design/Creative, while the Education/Academic group equally chose both *Life within Objects* and *Mushroom Ate my Furniture* (20.5%). The group of students also chose *Mushroom Ate my Furniture* as the least preferred (18.5%). It can be speculated that *the Threatening Cactus Chair* received the lowest percentages because of the type of living organism that was used in the design, as stated in the previous data set, as the pointy cactus is usually perceived as dangerous and is especially visible inside the glass chair. Also, the use of the transparent glass as the main material may affect the preference towards this chair as glass may look fragile, and unsafe to sit on. It is important to note that comparing a glass chair with a wooden chair, and not 2 identical glass chairs with, and without the cactus might also affect the responses. This section helped to confirm, not surprisingly, that the usage of certain types of living organisms, in this case, cacti and mushrooms in the design, may negatively affect the preferences towards the FDLOs, as perceived visually.

Table 4.6: Summary in percentage for Section B, Design Preference

FDLOs	Art and Design/ Creative	Education/ Academic	Student
<i>The Stitch Table</i>	81.5%	71.8%	83.3%
The Greenwall	72.3%	70.5%	68.5%
The Aqua Table	69.2%	57.7%	61.1%
The Moss Table	61.5%	52.6%	55.6%
The Local River	53.8%	33.3%	55.6%
The Cultivation Kitchen	44.2%	48.9%	37.1%
The Retrofitted Rococo Chair	35.4%	35.9%	33.3%
Life within Object	36.9%	20.5%	31.5%
Mushrooms Ate my Furniture	26.2%	20.5%	18.5%
The Threatening Cactus	15.4%	21.8%	24.1%

Figure 4.5: Summary of percentage and frequency of responses in bar chart for Section B, Design Preference



The Kruskal-Wallis H test (<https://statistics.laerd.com/spss-tutorials/kruskal-wallis-h-test-using-spss-statistics.php>) is a rank-based nonparametric test that can be used to determine if there are statistically significant differences between two or more groups of an independent variable on a continuous or ordinal dependent variable. It is considered an extension of the Mann-Whitney U test to allow the comparison of more than two independent groups. The Kruskal-Wallis test was employed with these questions to compare more than 2 groups, although the questions in this section were not using a Likert scale format. In this case, 3 different groups (as explained above) from the stratified data were analysed. The results of the Kruskal-Wallis test showed that there were significant differences among responses to questions 3 and 10 as listed below in Table 4.7. This test detected an important difference between the Local River that scored a different preferences value of 0.14 and the Life within Object Chair with a value of 0.88. As noted, the probability level or p-value is listed in the row labelled “Asymp. Sig. (2 tailed), even though the result is greater than $p=0.05$ (i.e., the respective p values are all above $p=0.05$), it still shows a significant difference among the 3 groups. Referring to Table 4.6 and Figure 4.5, the significant difference can be seen when 33.3% of the Education/Academic group responded to the Local River, as compared to 53.8% and 55.6 % of the Arts and Design/Creative group and Students group, respectively. They also least preferred (20.5%) the Life within Object as compared to 36.9% and 31.5 % of the Arts and Design/Creative group and Students group, respectively. This comparison suggests that in some cases, the Education/Academic group preferred the digitally manipulated designs without living organisms, as compared to the original FDLOs and they have a different preference for the designs.

Table 4.7: Kruskal-Wallis test results of responses to questions 1-10, a comparison towards agreement on design preferences (SPSS output format)

Preference	Test Statistics ^{a,b}									
	Q 1: The Aqua Table	Q 2: The Moss Table	Q3: Life within Object	Q 4: The Cultivation Kitchen	Q 5: The Threatenin g Cactus Chair	Q 6: The Retrofitted Rococo Chair	Q 7: Mushroom s Ate My Furniture	Qn 8: The Greenwall	Q 9: The Stitch Table	Q 10: Local River
Chi-Square	2.058	1.174	4.853	1.097	1.546	.097	1.133	.203	3.118	8.582
df	2	2	2	2	2	2	2	2	2	2
Asymp. Sig.	.357	.556	.088	.578	.462	.953	.568	.904	.210	.014

a. Kruskal Wallis Test
b. Grouping Variable: What is your working background?

4.2.3 Section C: Emotional Design

Section C was an *Emotional Design* section where respondents were asked to rate their emotions while seeing the images of the FDLOs. This section used the Emotion Scale format developed specifically for this project, and Section C also consisted of 10 questions.

Figure 4.6: Sample of questions in Section C of the online survey questionnaire

Section C - Emotional Design

Please rate what you feel according to emotion scale below. You may choose only ONE (1) answer.

Question 1

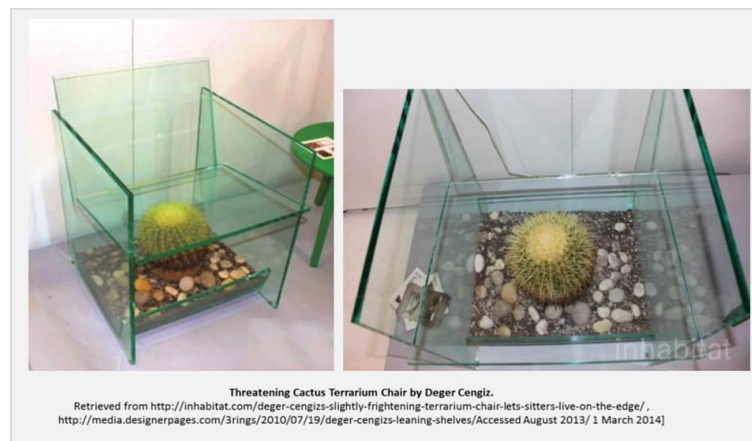


4.2.3a Result from Section C: Fourth Data Set (Australian Designers and International Designers)

This section was designed to gather the information of emotional perception towards the images. The respondents were asked to rate their emotions based on the emotional scale that can be seen in Figure 4.2c (previously described in Chapter 3). A brief information was provided for each image. For brevity, only 4 questions and the summary results will be discussed in this section. This includes Questions 2, 3, 6 and 7, based on the highest and the lowest responses on the emotional design scale (positive and negative emotions). Answers to other questions can be found in the Appendix D: Chapter 4, page 300 – 310.

Question 2: The Threatening Cactus Chair – Highest Negative Emotion

Table 4.8: Summary of the highest negative emotion in percentage of frequency for question 2



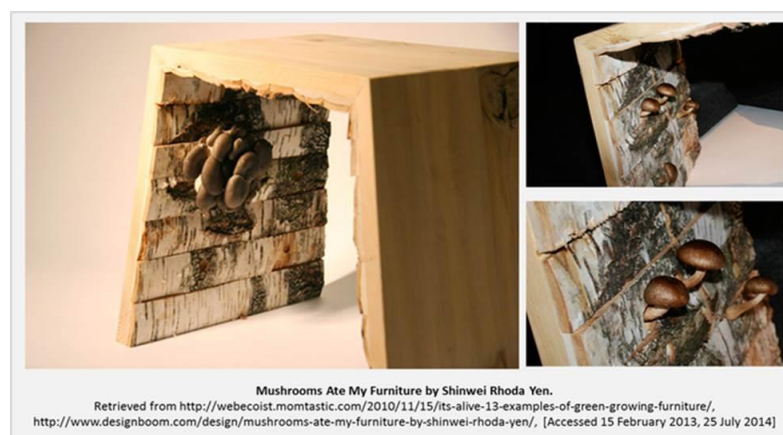
Question 2: Emotional Response (The Threatening Cactus Chair)

ID		Frequency	Percentage
Australian Designers	Valid	1 Disgusted	2 7.4
		2 Uneasy	11 40.7
		3 Bored	3 11.1
		4 Neutral	6 22.2
		5 Pleasantly Surprised	4 14.8
		7 Fascinated	1 3.7
		Total	27 100.0
International Designers	Valid	1 Disgusted	1 1.5
		2 Uneasy	29 44.6
		3 Bored	13 20.0
		4 Neutral	7 10.8
		5 Pleasantly Surprised	10 15.4
		6 Admired	3 4.6
		7 Fascinated	2 3.1
	Total	65 100.0	

Table 4.8 shows the frequency and percentages of responses related to the 7-point emotional scale, for the Threatening Cactus Chair. The highest percentage of negative emotional response from both Australian and International Designer groups were 40.70% and 44.60%, respectively for the emotional descriptor “Uneasy”. This chair received a negative emotional response with an overall count of 59.2% and 66.10%, respectively, making it among the highest negative responses received. This response can be related to Question 5 of Section B; Design, where this chair was the least preferred also. Even though it was mostly perceived negatively, this design still received some positive responses with 23.10% and 18.5% from both Australian and International Designer groups, respectively. Item number 6 of the emotional scale (“Admired”) is not shown in the table above, as 0% of the Australian Designers chose it.

Question 6: Mushrooms Ate My Furniture – Highest Negative Emotion

Table 4.9: Summary of the highest negative emotion in percentage of frequency for question 6



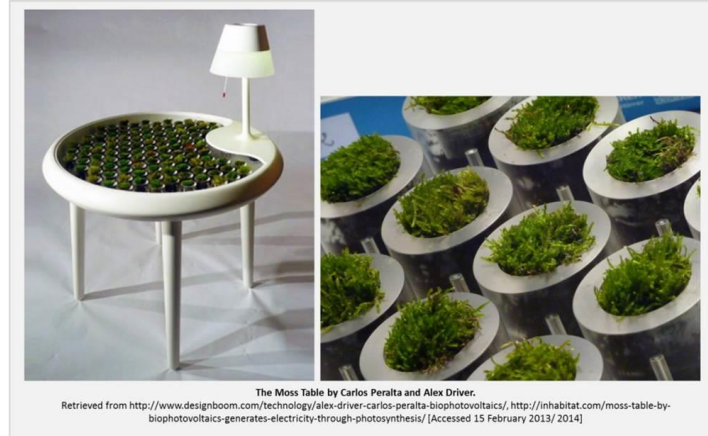
Question 6: Emotional Response (Mushrooms Ate My Furniture)

ID		Frequency	Percentage	
Australian Designers	Valid	1 Disgusted	5	18.5
		2 Uneasy	11	40.7
		3 Bored	1	3.7
		4 Neutral	7	25.9
		5 Pleasantly Surprised	1	3.7
		7 Fascinated	2	7.4
		Total	27	100.0
International Designers	Valid	1 Disgusted	11	16.9
		2 Uneasy	14	21.5
		3 Bored	3	4.6
		4 Neutral	17	26.2
		5 Pleasantly Surprised	10	15.4
		6 Admired	7	10.8
		7 Fascinated	3	4.6
	Total	65	100.0	

As shown in Table 4.9, Mushrooms Ate My Furniture received negative responses of 62.9% from Australian Designers and 42.6% from International designers. Only 11.10% of Australian Designers and 30.80% of non-Australian Designers responded positively to this design. The highest negative emotional response was “Uneasy” with 40.70% from the Australian Designers. 26.20% of International Designers chose a neutral response. Zero percent (0%) of Australian designers chose “Admired” to describe their feelings towards the design. This design received the highest negative emotional response from the Australian Designers.

Question 3: The Moss Table – Highest Positive Emotion

Table 4.10: Summary of the highest positive emotion in percentage of frequency for question 3



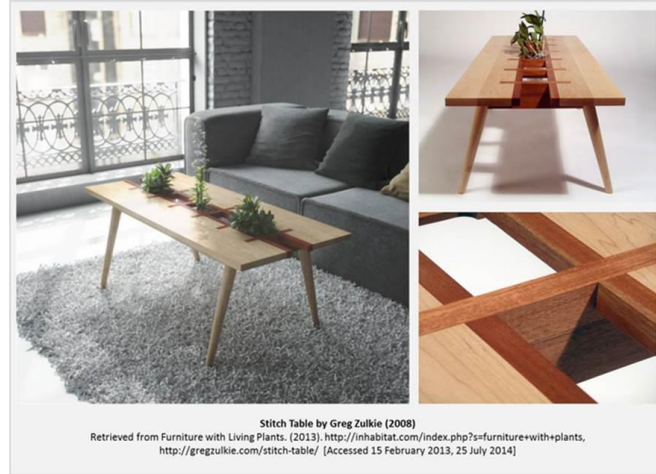
Question 3: Emotional Response (The Moss Table)

ID		Frequency	Percentage
Australian Designers	Valid	2 Uneasy	3 11.1
		3 Bored	1 3.7
		4 Neutral	7 25.9
		5 Pleasantly Surprised	8 29.6
		6 Admired	2 7.4
		7 Fascinated	6 22.2
		Total	27 100.0
International Designers	Valid	2 Uneasy	5 7.7
		3 Bored	6 9.2
		4 Neutral	14 21.5
		5 Pleasantly Surprised	16 24.6
		6 Admired	16 24.6
		7 Fascinated	8 12.3
		Total	65 100.0

As shown in Table 4.10, the Moss Table received positive emotional responses of 61.5% and 59.2% from both Australian and International Designers, respectively. The highest emotional response from Australian Designers was “Pleasantly Surprised” (29.60%) while International Designers chose “pleasantly surprised” and “Admired” in a similar percentage of 24.6%. None of the designers from both groups reported a response of 1 “Disgusted.” This design received the highest positive emotional response from the Australian Designers.

Question 7: The Stitch Table – Highest Positive Emotion

Table 4.11: Summary of the highest positive emotion in percentage of frequency for question 7



Question 7: Emotional Response (The Stitch Table)

ID		Frequency	Percentage
Australian Designers	Valid	2 Uneasy	3.7
		3 Bored	11.1
		4 Neutral	33.3
		5 Pleasantly Surprised	22.2
		6 Admired	22.2
		7 Fascinated	7.4
		Total	100.0
International Designers	Valid	2 Uneasy	1.5
		3 Bored	6.2
		4 Neutral	10.8
		5 Pleasantly Surprised	32.3
		6 Admired	33.8
		7 Fascinated	15.4
		Total	100.0

Table 4.11 shows the frequency and percentage of the Stitch Table, which received very positive responses from both Australian (51.85%) and International Designers (81.50%) groups. The individual highest response was “Neutral” (33.30%) from the Australian Designers and 33.80% for “Admired” from the International Designers. The lowest rating (0%) was for disgusted from both designer groups. This result shows that this design received the highest positive responses, including the highest positive response from the International Designers.

Summary of Results of Section C

Table 4.12: Summary of all results of Section C in percentage of frequency of positive and negative emotional responses for Australian and International designers (being Yellow the highest negative and Green the highest positive)

Australian Designer				International Designers			
FDLOs	Positive Emotion	Neutral	Negative Emotion	FDLOs	Positive Emotion	Neutral	Negative Emotion
The Moss Table	59.20%	25.9%	14.80%	The Stich Table	81.50%	10.8%	7.70%
The Greenwall	55.50%	29.6%	14.80%	The Cultivation Kitchen	67.80%	29.2%	3.10%
The Cultivation Kitchen	55.50%	29.6%	14.80%	The Greenwall	67.70%	21.5%	10.80%
The Stich Table	51.85%	33.3%	14.80%	The Aqua Table	66.10%	15.4%	18.50%
The Aqua Table	51.80%	11.1%	37%	The Moss Table	61.50%	21.5%	16.90%
The Retrofitted Rococo Chair	37%	33.3%	29.60%	Local River	61.50%	7.7%	30.70%
Life within Object	37%	14.8%	48.10%	Life Within Object	47.70%	24.6%	27.70%
Local River	29.60%	14.8%	55.50%	The Retrofitted Rococo Chair	33.90%	24.6%	41.50%
The Threatening Cactus	18.50%	22.2%	59.20%	Mushrooms Ate my Furniture	30.80%	26.2%	42.60%
Mushrooms Ate my Furniture	11.10%	25.9%	62.90%	The Threatening Cactus	23.10%	10.8%	66.10%

Table 4.12 shows the summary of overall results of Section C, Emotional Design. It can be seen that both groups of respondents have different responses towards the FDLOs, where the Moss Table received the highest positive response from the Australian Designers (59.2%) while the International Designers chose the Stich Table (81.50%) for positive responses. Two different designs have the highest negative responses (62.90%) for Mushrooms Ate my Furniture by the Australian Designers, and 66.10% for The Threatening Cactus Chair by International Designers.

Table 4.13: Summary of valid means of Section C (emotional design) in percentage of frequency for Australian and International designers (SPSS output)

ID	Statistics										
	Q 1: The Retrofitted Rococo Chair	Q 2: The Threatening Cactus Chair	Q 3: The Moss Table	Q 4: Life within Object	Q 5: The Aqua Table	Q 6: Mushroom s Ate My Furniture	Q 7: The Stitch Table	Q 8: The Greenwall	Q 9: The Cultivation Kitchen	Q10: Local River	
Australian Designers	N Valid	27	27	27	27	27	27	27	27	27	
	N Missing	0	0	0	0	0	0	0	0	0	
	Mean	3.93	3.11	4.85	3.78	4.30	2.85	4.70	4.81	4.78	3.37
	Std. Error of Mean	.250	.284	.301	.322	.328	.323	.244	.233	.274	.374
	Median	4.00	3.00	5.00	4.00	5.00	2.00	5.00	5.00	5.00	3.00
	Std. Deviation	1.299	1.476	1.562	1.672	1.706	1.680	1.265	1.210	1.423	1.944
International Designers	N Valid	65	65	65	65	65	65	65	65	65	
	N Missing	0	0	0	0	0	0	0	0	0	
	Mean	3.75	3.20	4.86	4.25	4.95	3.52	5.37	5.22	5.22	4.43
	Std. Error of Mean	.187	.181	.177	.189	.199	.224	.143	.165	.153	.226
	Median	4.00	3.00	5.00	4.00	5.00	4.00	5.00	6.00	5.00	5.00
	Std. Deviation	1.511	1.460	1.424	1.521	1.605	1.804	1.153	1.329	1.231	1.820

Since a Likert scale is an ordinal scale (and in this case, a 7-point emotional scale), the numerical value of the SD (Standard Deviation), positive or negative, needs to be considered on how it may increase or decrease the mean values. However, the non-parametric or discrete data associated with Likert scale tests are not usually considered as being normally distributed (Field, 2009; Pallant, 2011). Based on the information from Table 4.13 above, it can be seen that 5 out of 10 results have a Mean of more than 4, which shows that, generally most of the FDLOs received positive emotional responses from the Australian Designers. One design, i.e., *Mushrooms Ate My Furniture* obtained the lowest mean of 2.85 that is below 4 and indicates that more than half of the respondents reacted negatively towards this FDLO. Whereas, the International Designers responded positively towards 7 designs, with Means that are more than 4, including the Moss Table, Life within Objects, the Aqua Table, the Stitch Table, the Greenwall, the Cultivation Kitchen and the Local River. The lowest mean was the Threatening Cactus Chair with a value of 3.20 that was lower than 4, which indicated a negative emotional response towards this FDLO. However, these outcomes are sufficient indications and mainly suggest a positive emotional reaction towards most of the FDLOs in this survey, as more than 5 designs scored a Mean value of 4 or more. The results from this

Section C also can be related to the previous Section B, Design Preference, which will be explained further in the triangulation chapter (Chapter 6).

Table 4.14: Summary of Mann-Whitney Test in percentage of frequency applied to Section C for Australian and International Designers (SPSS output)

	Test Statistics ^a									
	Q 1: The Retrofitted Rococo Chair	Q 2: The Threatening Cactus Chair	Q 3: The Moss Table	Q 4: Life within Object	Q 5: The Aqua Table	Q 6: Mushrooms Ate My Furniture	Q 7: The Stitch Table	Q 8: The Greenwall	Q 9: The Cultivation Kitchen	Q10: Local River
Mann-Whitney U	809.500	844.000	869.500	728.000	676.500	684.500	605.000	707.000	722.500	596.500
Wilcoxon W	2954.500	1222.000	1247.500	1106.00	1054.500	1062.500	983.000	1085.000	1100.500	974.500
Z	-.600	-.302	-.070	-1.308	-1.761	-1.694	-2.412	-1.508	-1.369	-2.457
Asymp. Sig. (2-tailed)	.549	.763	.944	.191	.078	.090	.016	.132	.171	.014

a. Grouping Variable: ID

The Mann-Whitney test may be applied to test the significant differences in the opinion, for this case the emotional responses, between two groups of respondents for Section C, mindful of the fact that the sample sizes are different for the Australian and International designers (Figure 4.14). This test has detected a significant difference for the design titled the *Local River*, where it indicated different emotional responses with 0.014 and *The Stitch Table* with 0.016 (as noted, the probability level or p-value, is listed in the row labelled “Asymp. Sig. (2 tailed), it shows the significant difference and disagreement of both designer groups (Please refer to Table 4.12, as both groups of respondents have different reactions towards this design).

4.2.3b Results from Second Data Set: Stratification Groups (Designers, Educators, and Students) from General Respondents

Summarized results of responses to questions 1 – 10 will be discussed in this part, and detailed analyses can be found in the Appendix D: Chapter 4, page 333 – 337. This section consisted of 10 questions with images of FDLOs and used an emotional scale purposely designed for this study, which is similar to a Likert Scale. *The Stitch Table* received the highest percentage of positive emotional responses (81.5%), and *the Threatening Cactus Chair* received the highest percentage of negative emotional responses (66.10%) among the Art and Design/Creative group.

Summary of Results of Section C: Question 1 – 10

Table 4.15a: Summary responses for Section C, Emotional Design from the Art and Design/Creative group

Art and Design/Creative		
FDLOs	Positive Emotions	Negative Emotions
The Stitch Table	81.50%	7.70%
The Cultivation Kitchen	67.80%	3.10%
The Greenwall	67.70%	10.80%
The Aqua Table	66.10%	18.50%
The Moss Table	61.50%	16.90%
Local River	61.50%	30.70%
Life within Object	47.70%	27.70%
The Retrofitted Rococo Chair	33.90%	41.50%
Mushrooms Ate My Furniture	30.80%	43.00%
The Threatening Cactus	23.10%	66.10%

Table 4.15b: Summary responses for Section C, Emotional Design from the Education/ Academic group

Education/Academic		
FDLOs	Positive Emotions	Negative Emotions
The Stitch Table	71.80%	7.70%
The Moss Table	71.70%	16.70%
The Greenwall	69.20%	6.40%
The Cultivation Kitchen	69.20%	10.20%
The Aqua Table	68.00%	18.00%
Life within Object	46.20%	34.60%
Mushrooms Ate My Furniture	44.80%	44.90%
Local River	42.30%	43.60%
The Retrofitted Rococo Chair	38.40%	43.60%
The Threatening Cactus	24.30%	53.80%

Table 4.15b above shows the highest and lowest percentages of positive and negative emotional responses towards 10 FDLOs from the Education/Academic respondents. Similar to the Art and Design/Creative respondents (Table 4.15a), *the Stitch Table* obtained the highest positive emotional responses (71.8%), while *the Threatening Cactus Chair* received the highest percentage of negative emotional responses (53.80%).

Table 4.15c: Summary of responses to Section C, Emotional Design from the Students group

Students		
FDLOs	Positive Emotions	Negative Emotions
The Stitch Table	79.60%	1.90%
The Greenwall	77.80%	5.60%
The Cultivation Kitchen	68.60%	11.10%
The Aqua Table	68.50%	9.30%
The Moss Table	62.90%	16.70%
Local River	57.40%	27.80%
The Retrofitted Rococo Chair	38.90%	35.20%
Life within Object	38.90%	38.90%
The Threatening Cactus	35.20%	50.10%
Mushrooms Ate My Furniture	26.00%	51.90%

As illustrated in Table 4.15c above, the results are similar to the Art and Design/Creative and Education/Academic respondents. *The Stitch Table* received the highest positive emotional responses by the Students group (79.6%), but unlike the other 2 groups, *Mushrooms Ate My Furniture* obtained the highest percentage of negative emotional responses (51.90%). These results show different responses towards the living organisms embedded into the FDLOs, yet, the *Threatening Cactus* and *Mushrooms Ate My Furniture* are the least favoured by the respondents, emotionally and visually.

Based on the information from Table 4.16 below, it can be seen that responses for more than 6 questions have a Mean of more than 4, which shows that, generally most of the FDLOs received positive emotional responses from this stratified group. The other 4 designs; The Retrofitted Rococo Chair, The Threatening Cactus, Mushrooms Ate My Furniture and Local River were highlighted in yellow, which obtained a mean below 4. This indicated that more than half of the respondents reacted negatively towards these 4 FDLOs. The outcomes are sufficient to suggest a mostly positive emotional reaction towards 6 or 7 of the FDLOs surveyed. This might be due to the preferences towards living organisms that were embedded into the designs, besides material usages and in some cases the design of the piece of furniture itself. These results can also be related to the previous Section B; Design Preference, as discussed previously.

Table 4.16: Summary of responses to questions 1-10 from Section C; Emotional Design

		Statistics										
Emotion		Q 1: The Retrofitted Rococo Chair	Q 2: The Threatenin g Cactus Chair	Q 3: The Moss Table	Q 4: Life within Object	Q 5: The Aqua Table	Q 6: Mushroom s Ate My Furniture	Q 7: The Stitch Table	Q 8: The Greenwall	Q 9: The Cultivati on Kitchen	Q10: Local River	
Art and Design/ Creative	N	Valid	65	65	65	65	65	65	65	65	65	65
		Missing	0	0	0	0	0	0	0	0	0	0
		Mean	3.75	3.20	4.86	4.25	4.95	3.52	5.37	5.22	5.22	4.43
		Median	4.00	3.00	5.00	4.00	5.00	4.00	5.00	6.00	5.00	5.00
		Mode	5	2	5 ^a	5	6	4	6	6	4	5
		Std. Deviation	1.511	1.460	1.424	1.521	1.605	1.804	1.153	1.329	1.231	1.820
	Sum	244	208	316	276	322	229	349	339	339	288	
Education/ Academic	N	Valid	78	78	78	78	78	78	78	78	78	78
		Missing	0	0	0	0	0	0	0	0	0	0
		Mean	3.69	3.32	4.94	4.08	5.18	3.56	5.29	5.29	5.29	3.81
		Median	4.00	3.00	5.00	4.00	6.00	4.00	6.00	6.00	5.50	4.00
		Mode	2 ^a	2	5	2	6	5	6	6	7	2
		Std. Deviation	1.606	1.655	1.498	1.815	1.601	2.004	1.320	1.300	1.521	2.114
	Sum	288	259	385	318	404	278	413	413	413	297	
Student	N	Valid	54	54	54	54	54	54	54	54	54	54
		Missing	0	0	0	0	0	0	0	0	0	0
		Mean	3.96	3.50	4.80	4.02	5.22	3.20	5.44	5.57	5.22	4.37
		Median	4.00	3.50	5.00	4.00	5.00	3.00	5.00	6.00	5.00	5.00
		Mode	2 ^a	2	5	2	5	2	5	6	6 ^a	5
		Std. Deviation	1.780	1.746	1.459	1.868	1.369	1.698	1.076	1.268	1.488	1.916
	Sum	214	189	259	217	282	173	294	301	282	236	

a. Multiple modes exist. The smallest value is shown

The Kruskal-Wallis test has also been employed to compare 3 main groups of the stratified data. As presented in the Table 4.17 below, the results of the Kruskal-Wallis test show no significant difference for all questions as the p-value is more than 0.05.

Table 4.17: Kruskal-Wallis test results of responses to questions 1-10 on Emotional Design, comparison towards emotional responses (SPSS output format)

		Test Statistics ^{a,b}									
		Q 1: The Retrofitted Rococo Chair	Q 2: The Threatening Cactus Chair	Q 3: The Moss Table	Q 4: Life within Object	Q 5: The Aqua Table	Q 6: Mushroom s Ate My Furniture	Q 7: The Stitch Table	Q 8: The Greenwall	Q 9: The Cultivation Kitchen	Q10: Local River
Chi-Square		.520	.473	.585	.637	.895	1.258	.052	2.508	.521	3.896
df		2	2	2	2	2	2	2	2	2	2
Asymp. Sig.		.771	.789	.746	.727	.639	.533	.974	.285	.771	.143

a. Kruskal Wallis Test
b. Grouping Variable: What is your working background?

4.2.4 Section D: Conceptual Model

Section D was the *Conceptual Model* section, where respondents were asked to choose at least 4 answers from 24 subcategories, that they thought were suitable for the given images. This section also had 10 questions and used a multiple images selection formats.

Figure 4.7: Samples of questions in Section D of the online survey questionnaire

Please look carefully at the furniture design above, then select which sub categories you think are suitable. You may choose minimum FOUR (4) answers.

<p>A1 To learn</p> <p>Function & Practicality (A1)</p>	<p>B1 Aesthetic value/ Decoration</p> <p>Aesthetic & Semantic (B1)</p>	<p>C1 To experience nature</p> <p>Experience (C1)</p>	<p>D1 Conceptual design</p> <p>Experimental (D1)</p>
<p>A2 Farming/ Food</p> <p>Function & Practicality (A2)</p>	<p>B2 Collection & Display</p> <p>Aesthetic & Semantic (B2)</p>	<p>C2 Environmental consciousness</p> <p>Experience (C2)</p>	<p>D2 Part of a research project</p> <p>Experimental (D2)</p>
<p>A3 Purify water/ air</p> <p>Function & Practicality (A3)</p>	<p>B3 Communication / convey a message</p> <p>Aesthetic & Semantic (B3)</p>	<p>C3 To heal/ calm/ lower stress</p> <p>Experience (C3)</p>	<p>D3 Exploration of new materials</p> <p>Experimental (D3)</p>
<p>A4 Generate energy</p> <p>Function & Practicality (A4)</p>	<p>B4 Artistic reasons</p> <p>Aesthetic & Semantic (B4)</p>	<p>C4 Entertainment</p> <p>Experience (C4)</p>	<p>D4 Exploration of new technologies</p> <p>Experimental (D4)</p>
<p>A5 To encourage hobbies</p> <p>Function & Practicality (A5)</p>	<p>B5 Contemplation</p> <p>Aesthetic & Semantic (B5)</p>	<p>C5 To stimulate senses</p> <p>Experience (C5)</p>	<p>D5 To break the rules/ be different</p> <p>Experimental (D5)</p>
<p>A6 Other reasons</p> <p>Function & Practicality (A6)</p>	<p>B6 Other reasons</p> <p>Aesthetic & Semantic (B6)</p>	<p>C6 Other reasons</p> <p>Experience (C6)</p>	<p>D6 Other reasons</p> <p>Experimental (D6)</p>
















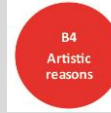
















4.2.4a Results from Section D: Fourth Data Set (Australian Designers and International Designers)

















This section was designed to validate the Conceptual Model. Twenty-four (24) subcategories were listed, and the respondents were asked to choose a minimum of 4 answers that they thought were suitable for the images of the FDLOs. Brief information about the design was provided on each image to help the respondents to answer the questions based on more information about the furniture piece, and not only the visual appearance. For brevity and to avoid repetition, only 1 question will be discussed in this section, based on the highest responses on the subcategories of the Conceptual Model. Other questions and results can be found in the Appendix D: Chapter 4, page 271 – 274.

Question 10: Conceptual Model (The Cultivation Kitchen)

As shown in Table 4.18 below, the highest subcategory for the Cultivation Kitchen was A2: Farming/food, that was preferred by 85.20% of Australian designers and 61.5% of International designers. The second highest subcategory was C2: Environmental consciousness, with 55.60% and 49.20% responses from Australian and International designers, respectively. This FDLO was in fact designed for urban domestic farming and environmental consciousness, as will be explained later in Chapter 5 (interviews), and the responses to the online survey were in line with the original intention of the designer, as the ultimate reasons for the Cultivation Kitchen design were the A2 and C2 subcategories.

Table 4.18: Summary of overall results as percentage of frequency for the subcategory of Conceptual Model for Question 10

The Cultivation Kitchen											
Australian Designer				International Designers							
1		85.20%	13		14.80%	1		61.50%	13		24.60%
2		55.60%	14		14.80%	2		49.20%	14		24.60%
3		40.70%	15		14.80%	3		40.00%	15		16.90%
4		37.00%	16		7.40%	4		36.90%	16		16.90%
5		33.30%	17		7.40%	5		33.80%	17		16.90%
6		29.60%	18		3.70%	6		33.80%	18		15.40%
7		25.90%	19		3.70%	7		33.80%	19		13.80%
8		25.90%	20		3.70%	8		30.80%	20		12.30%



9		22.20%	21		3.70%	9		30.80%	21		9.20%
10		18.50%	22		3.70%	10		30.80%	22		9.20%
11		18.50%	23		0%	11		26.20%	23		7.70%
12		14.80%	24		0%	12		26.20%	24		6.20%

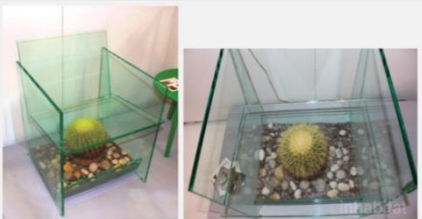

Summary of Results of Section D: Conceptual Model Analysis for Australian and International Designers





The results from this section can be related to the final Conceptual Model directly (Figure 3.5 in page 54).

Table 4.19 below summarizes the top 10 answers chosen by the two designers groups for the Conceptual Model questions. The top 10 answers from the respondents can be used to outline which main categories of the FDLOs can be grouped by looking into the colour coding of the subcategories that were mostly present in the answers. For example for Q1: The Rococo Retrofitted Chair, the Australian designers chose 4 green hues, 4 purple hues, and 2 orange hues, while International designers chose 4 orange hues, 3 purples hues, and 3 greens hues. If we link the table to the final Conceptual Model (Figure 3.6) above, the green hues represent the Experimental category. Purple hues represent the Experience category, and orange hues represent the Aesthetic and Semantic category. It can be concluded from the findings that both designer groups agreed that *The Retrofitted Rococo Chair* belongs to those three categories. The similarity in subcategories can also be seen (as highlighted in red and with more than 3 answers) when both groups of respondents chose D1: Conceptual design and D2: Part of a research project, from the Experimental category and C1: To experience nature, C4: Entertainment and C5: To stimulate senses, that belong to the main category C: Experience. The results of this section will be further discussed in the triangulation and discussion chapters.

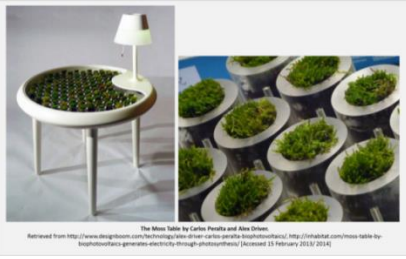
Table 4.19: Summary of the top 10 answers linked to each question to subcategories of the Conceptual Model

Furniture Design with Living Organisms (FDLOs)/ Questions	Subcategories of the Conceptual Model – from the Online Survey															
<p>Q1: The Retrofitted Rococo Chair</p>  <p><small>Chair 1: Rococo Armchair Retrofitted by David L. Hays, Kevin Stewart & Shuangshuang Wu (2019). Lucas, D. (2011) Green Design, Germany: Braun Publishing AG. http://inhabitat.com/a-chair-that-welcomes-plants-and-insects-into-your-home/ (Accessed 15 February 2019, 2014)</small></p>	<p>Australian Designers</p>	<p>D5 To break the rules/ be different</p>	<p>B4 Artistic reasons</p>	<p>D1 Conceptual design</p>	<p>B2 Collection & Display</p>	<p>D2 Part of a research project</p>										
<p>Experimental: D5, D1, D2, D3 Experience: C2, C5, C1, C4 Aesthetic & Semantic: B4, B2</p>																
<p>International Designers</p> <table border="1"> <tr> <td>D5 To break the rules/ be different</td> <td>B4 Artistic reasons</td> <td>D1 Conceptual design</td> <td>B2 Collection & Display</td> <td>B1 Aesthetic value/ Decoration</td> </tr> <tr> <td>C1 To experience nature</td> <td>C4 Entertainment</td> <td>D2 Part of a research project</td> <td>C5 To stimulate senses</td> <td>B3 Communication /convey message</td> </tr> </table> <p>Aesthetic & Semantic: B4, B2, B1, B3 Experimental: D5, D1, D2 Experience: C1, C4, C5</p>							D5 To break the rules/ be different	B4 Artistic reasons	D1 Conceptual design	B2 Collection & Display	B1 Aesthetic value/ Decoration	C1 To experience nature	C4 Entertainment	D2 Part of a research project	C5 To stimulate senses	B3 Communication /convey message
D5 To break the rules/ be different	B4 Artistic reasons	D1 Conceptual design	B2 Collection & Display	B1 Aesthetic value/ Decoration												
C1 To experience nature	C4 Entertainment	D2 Part of a research project	C5 To stimulate senses	B3 Communication /convey message												
<p>Q2: Life within Object</p>  <p><small>La Vida en los Objetos' (Life within Objects) by Martín Azúa Barrio, Spain. (2011). Furniture with Living Plants. (2011). Retrieved from http://inhabitat.com/next-gen-furniture-revolution/. http://inhabitat.com/next-gen-furniture-revolution-creator-creates-cute-home-for-plants-and-animals/ (Accessed 15 February 2019, http://www.decoeur.net/2008/12/19/la-vida-en-los-objetos/ (Accessed 1 March 2014)</small></p>	<p>Australian Designers</p>	<p>D1 Conceptual design</p>	<p>C1 To experience nature</p>	<p>D5 To break the rules/ be different</p>	<p>A5 To encourage hobbies</p>	<p>C5 To stimulate senses</p>										
<p>Experience: C1, C5, C3, C4 Function and Practicality: A5, A1 Aesthetic & Semantic: B1, B4 Experimental: D1, D5</p>																
<p>International Designers</p> <table border="1"> <tr> <td>C1 To experience nature</td> <td>D5 To break the rules/ be different</td> <td>D1 Conceptual design</td> <td>C3 To heal/ calm/ lower stress</td> <td>C4 Entertainment</td> </tr> <tr> <td>A5 To encourage hobbies</td> <td>C5 To stimulate senses</td> <td>C2 Environmental consciousness</td> <td>B1 Aesthetic value/ Decoration</td> <td>B2 Collection & Display</td> </tr> </table> <p>Experience: C1, C3, C4, C5, C2 Aesthetic & Semantic: B1, B2 Experimental: D5, D1</p>							C1 To experience nature	D5 To break the rules/ be different	D1 Conceptual design	C3 To heal/ calm/ lower stress	C4 Entertainment	A5 To encourage hobbies	C5 To stimulate senses	C2 Environmental consciousness	B1 Aesthetic value/ Decoration	B2 Collection & Display
C1 To experience nature	D5 To break the rules/ be different	D1 Conceptual design	C3 To heal/ calm/ lower stress	C4 Entertainment												
A5 To encourage hobbies	C5 To stimulate senses	C2 Environmental consciousness	B1 Aesthetic value/ Decoration	B2 Collection & Display												

	Function and Practicality:A5					
<p>Q3: The Threatening Cactus</p>  <p><small>Threatening Cactus Terrarium Chair by Oger Cerigo. Retrieved from http://inhabitat.com/ogger-cerigo-highly-lighting-terrarium-chair-lets-owners-see-on-the-edge/ / <a 105="" 175"="" 403="" 522="" href="http://media.designpages.com/3img/2010/07/18/ogger-cerigo-leaving-shelves/Accessed August 2013/1 March 2014</small></p> </td> <td data-bbox=">Australian Designers</small></p>	D5 To break the rules/ be different	B4 Artistic reasons	D1 Conceptual design	B3 Communication /convey message	C5 To stimulate senses	
		D2 Part of a research project	C4 Entertainment	B2 Collection & Display	A6 Other reasons	B1 Aesthetic value/ Decoration
<p>Aesthetic and Semantic: B4, B3, B2, B1 Experimental: D5, D1, D2 Experience: C5,C4 Function and Practicality:A6</p>						
	International Designers	D5 To break the rules/ be different	D1 Conceptual design	B4 Artistic reasons	C5 To stimulate senses	B1 Aesthetic value/ Decoration
		C4 Entertainment	B2 Collection & Display	C1 To experience nature	B3 Communication /convey message	D3 Exploration of new materials
<p>Aesthetic and Semantic: B4, B1, B2, B3 Experimental: D5, D1, D3 Experience: C5, C4, C1</p>						
<p>Q4: The Stitch Table</p>  <p><small>Stitch Table by Greg Zulkie (2008) Retrieved from Furniture with Living Plants. (2013). http://inhabitat.com/index.php?option=com_content&view=article&id=12345&Itemid=1 / http://gregzulkie.com/stitch-table/ (Accessed 23 February 2013, 23 July 2014)</small></p>	Australian Designers	B1 Aesthetic value/ Decoration	B2 Collection & Display	C3 To heal/ calm/ lower stress	B4 Artistic reasons	C1 To experience nature
		D1 Conceptual design	A3 Purify water/ air	C5 To stimulate senses	C2 Environmental consciousness	A2 Farming/ Food
<p>Experience: C3, C1, C5, C2 Aesthetic and Semantic: B1, B2, B4 Function and Practicality:A3, A2</p>						
	International Designers	B1 Aesthetic value/ Decoration	C1 To experience nature	D1 Conceptual design	C5 To stimulate senses	B2 Collection & Display
		C3 To heal/ calm/ lower stress	A5 To encourage hobbies	B4 Artistic reasons	D5 To break the rules/ be different	C2 Environmental consciousness
<p>Experience: C1, C5, C3, C2 Aesthetic and Semantic: B1, B2, B4 Experimental: D1, D5 Function and Practicality:A5</p>						

Q5: The Green Wall 	Australian Designers	B1 Aesthetic value/ Decoration	B2 Collection & Display	D1 Conceptual design	C1 To experience nature	C3 To heal/ calm/ lower stress
		C5 To stimulate senses	B4 Artistic reasons	A3 Purify water/ air	C2 Environmental consciousness	A2 Farming/ Food
	Experience: C1, C3, C5, C2 Aesthetic and Semantic: B1, B2, B4 Function and Practicality: A3, A2 Experimental: D1					
Q6: Mushrooms Ate my Furniture 	International Designers	B1 Aesthetic value/ Decoration	C1 To experience nature	C3 To heal/ calm/ lower stress	B2 Collection & Display	D1 Conceptual design
		C5 To stimulate senses	C2 Environmental consciousness	A5 To encourage hobbies	B4 Artistic reasons	A3 Purify water/ air
	Experience: C1, C3, C5, C2 Aesthetic and Semantic: B1, B2, B4 Function and Practicality: A5, A3 Experimental: D1					
Q6: Mushrooms Ate my Furniture 	Australian Designers	D5 To break the rules/ be different	D2 Part of a research project	D1 Conceptual design	B3 Communication /convey message	D3 Exploration of new materials
		B4 Artistic reasons	A2 Farming/ Food	C5 To stimulate senses	C1 To experience nature	C2 Environmental consciousness
	Experimental: D5, D2, D1, D3 Experience: C5, C1, C2 Aesthetic and Semantic: B3, B4 Function and Practicality: A2					
Q6: Mushrooms Ate my Furniture 	International Designers	C1 To experience nature	D1 Conceptual design	D3 Exploration of new materials	D5 To break the rules/ be different	B4 Artistic reasons
		B3 Communication /convey message	D2 Part of a research project	B1 Aesthetic value/ Decoration	C2 Environmental consciousness	A2 Farming/ Food
	Experimental: D1, D3, D5, D2 Aesthetic and Semantic: B4, B3, B1 Experience: C1, C2 Function and Practicality: A2					

Q7: The Moss Table



Australian Designers	D1 Conceptual design	B1 Aesthetic value/ Decoration	D5 To break the rules/ be different	B4 Artistic reasons	D4 Exploration of new technologies
	C3 To heal/ calm/ lower stress	C1 To experience nature	C5 To stimulate senses	D3 Exploration of new materials	A3 Purify water/ air

Experimental: D1, D5, D4, D3
Experience: C3, C1, C5
Aesthetic and Semantic: B1, B4
Function and Practicality: A3

International Designers	B1 Aesthetic value/ Decoration	D1 Conceptual design	D4 Exploration of new technologies	C5 To stimulate senses	C1 To experience nature
	D3 Exploration of new materials	B2 Collection & Display	B4 Artistic reasons	C2 Environmental consciousness	D2 Part of a research project

Experimental: D1, D4, D3, D2
Experience: C5, C1, C2
Aesthetic and Semantic: B1, B2, B4

Q8: The Aqua Table



Australian Designers	B1 Aesthetic value/ Decoration	C3 To heal/ calm/ lower stress	C1 To experience nature	C4 Entertainment	B2 Collection & Display
	D1 Conceptual design	A5 To encourage hobbies	B4 Artistic reasons	D5 To break the rules/ be different	B5 Contemplation

Aesthetic and Semantic: B1, B2, B4, B5
Experience: C3, C1, C4
Experimental: D1, D5
Function and Practicality: A5

International Designers	B1 Aesthetic value/ Decoration	C1 To experience nature	C3 To heal/ calm/ lower stress	C4 Entertainment	B2 Collection & Display
	D1 Conceptual design	A5 To encourage hobbies	B4 Artistic reasons	D5 To break the rules/ be different	C5 To stimulate senses

Experience: C1, C3, C4, C5
Aesthetic and Semantic: B1, B2, B4
Experimental: D1, D5
Function and Practicality: A5

<p>Q9: Local River</p>  <p>Local River by Matthew Lehaneur and Anthony van den Broeke (2008). Paris M., (2008). Green Design. Dubai: Carlton Books Limited. http://www.designboom.com/design/local-river-by-matthew-lehaneur-with-anthony-van-den-broeke/, http://www.themagazine.com/sustainable-product-design/local-river-by-matthew-lehaneur.html, http://diumoflora.blogspot.com.au/2011/04/matthew-lehaneur.html, http://diumoflora.blogspot.com.au/2011/04/matthew-lehaneur.html [Accessed February & August 2014]</p>	Australian Designer	D1 Conceptual design	C1 To experience nature	D5 To break the rules/ be different	C5 To stimulate senses	D2 Part of a research project
	B2 Collection & Display	B1 Aesthetic value/ Decoration	A5 To encourage hobbies	A1 To learn	B4 Artistic reasons	
	<p>Experimental: D1, D5, D2 Aesthetic and Semantic: B2, B1, B4 Experience purpose: C1, C5 Function and Practicality: A5, A1</p>					
<p>International Designers</p>	D1 Conceptual design	C1 To experience nature	B2 Collection & Display	D5 To break the rules/ be different	B4 Artistic reasons	
	B1 Aesthetic value/ Decoration	C4 Entertainment	C5 To stimulate senses	D2 Part of a research project	A5 To encourage hobbies	
	<p>Experimental: D1, D5, D2 Experience: C1, C4, C5 Aesthetic and Semantic: B2, B4, B1 Function and Practicality: A5</p>					
<p>Q10: The Cultivation Kitchen</p>  <p>Cultivation Kitchen (2008). Japan Good Design Award Book, (2008). Retrieved from http://www.designstudioinc.com/English/ky/s-en.htm [Accessed 24 May 2015]. http://www.interactiondesign.com/2011/12/01/cultivation-kitchen/ [Accessed 3 March 2015].</p>	Australian Designer	A2 Farming/ Food	C2 Environmental consciousness	D1 Conceptual design	A1 To learn	A3 Purify water/ air
	B2 Collection & Display	C1 To experience nature	A5 To encourage hobbies	D4 Exploration of new technologies	B3 Communication /convey message	
	<p>Function and Practicality: A2, A1, A3, A5 Experimental: D1, D4 Experience: C2, C1 Aesthetic and Semantic: B2, B3</p>					
<p>International Designers</p>	A2 Farming/ Food	C2 Environmental consciousness	D2 Part of a research project	C1 To experience nature	D1 Conceptual design	
	D4 Exploration of new technologies	B1 Aesthetic value/ Decoration	A1 To learn	A3 Purify water/ air	B3 Communication /convey message	
	<p>Function and Practicality: A2, A1, A3 Experimental: D2, D1, D4 Experience: C2, C1 Aesthetic and Semantic: B1, B3</p>					

4.2.4b Results from Second Data Set: Stratification Groups (Designers, Educators, and Students) from General Respondents

Summary of Results of Section D

As explained previously in the fourth data set, a table that summarizes the top 10 answers that were preferred by the stratified group for the questions of Conceptual Model was also developed and could be found in Appendix D: Results from Chapter 4, page 275 – 285, full results, page 338 - 357). The top 10 answers that scored the highest percentages in Section D: Conceptual Model were considered. For example, the Retrofitted Rococo Chair can be categorized into Aesthetic and Semantic purpose as selected by Art and Design/Creative and Education/ Academic group, and Experience purpose as selected by the Student group, because more than 20% preferred at least 4 subcategories from each category of the respondents. These subcategories were selected according to the Pareto Principle (<http://betterexplained.com/articles/understanding-the-pareto-principle-the-8020-rule/>), which states that 20% of the causes can produce 80% of the effects. As such, results over 20% were selected to define the main category to which the FDLOs belong to.

4.2.5 Section E: Biophilic Design

The final section was Section E that was the *Biophilic Design* section, where 13 questions were asked using the closed ended question and Likert Scale formats about the personal preferences with nature and living organisms, and a background of the biophilic design.

Figure 4.8: Samples of questions in Section E of the online survey questionnaire

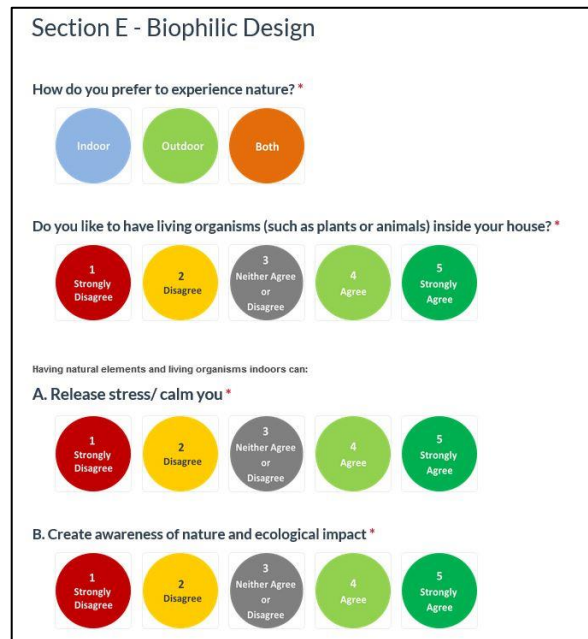


Table 4.20: Summary and format of the questions in Section E of the online survey questionnaire

Question – Section E – Biophilic Design	Format
Q1 How do you prefer to experience nature?	Closed-Ended Question
Q2 Do you like to have living organisms (such as plants or animals) inside your house?	Likert Scale
Q3 Having natural elements and living organisms indoors can: A. Release stress/ calm you	Likert Scale
Q4 B. Create awareness of nature and ecological impact	Likert Scale
Q5 C. Foster a sense of care (as living organisms need to be watered or fed)	Likert Scale
Q6 D. Be educational (especially for children)	Likert Scale
Q7 E. Be dangerous and inconvenient, as in the case of allergies	Likert Scale
Q8 F. Be not desirable, as they are usually messy, dirty, or require much of my time	Likert Scale
Q9 Would you like to have a piece of furniture with living organisms inside your house?	Yes/ no
Q10 Please select which type of living plant you would prefer to be embedded into a furniture design piece.	Closed-Ended Question
Q11 Please select which type of living animal you would prefer to be embedded with due care into a furniture design piece.	Closed-Ended Question
Q12 Which plant do you least prefer?	Closed-Ended Question
Q13 Which animal do you least prefer?	Closed-Ended Question

4.2.5a Result from Section E: Fourth Data Set Responses by Australian Designers and International Designers

This section was designed to retrieve information on biophilic design and how respondents experience nature and living organisms. This section is also important because the results provided information on the respondent's preference towards the FDLOs. Thirteen (13) questions were asked using a closed- ended format, Yes/No and Likert scale.

Question 1

Table 4.21: Summary as percentage and frequency for question 1, Biophilic design

ID			Frequency	Percentage
Australian Designers	Valid	1 (Indoor)	0	0
		2 (Outdoor)	12	44.4
		3 (Both)	15	55.6
		Total	27	100.0
International Designers	Valid	1 (Indoor)	2	3.1
		2 (Outdoor)	24	36.9
		3 (Both)	39	60.0
		Total	65	100.0

Based on the results from Table 4.21, more than half of both Australian and International Designer groups prefer to experience nature indoor and outdoor with 55.6% and 60% responses, respectively.

Question 2

Table 4.22: Summary as percentage and frequency for question 2, Biophilic design

ID			Frequency	Percentage
Australian Designers	Valid	1 (Strongly Disagree)	1	3.7
		2 (Disagree)	0	0
		3 (Neither Agree or Disagree)	3	11.1
		4 (Agree)	9	33.3
		5 (Strongly Agree)	14	51.9
		Total	27	100.0
International Designers	Valid	1 (Strongly Disagree)	0	0
		2 (Disagree)	4	6.2
		3 (Neither Agree or Disagree)	5	7.7
		4 (Agree)	32	49.2
		5 (Strongly Agree)	24	36.9
		Total	65	100.0

Table 4.22 shows the percentage and frequency of question 2 about having living organisms, including pets and any types of plants, indoor. It can be seen that the highest percentage of Australian Designers (51.90%) Strongly Agree, while 49.20% of International Designers Agree to have FDLOs. From these results, it can be seen that the data is keenly leaning towards Agree by more than half of the respondents (with Mean of more than 4). A majority of both groups of respondents like to have living organisms indoor, which can also be seen in Table 4.23, the SPSS output.

Table 4.23: Summary of valid mean results as percentage and frequency for Question 2, Biophilic Design section (SPSS output)

Statistics			
Question 2: Biophilic Design (Do you like to have living organisms (such as plants or animals) inside your house?)			
Australian Designers	N	Valid	27
		Missing	0
	Mean		4.30
	Std. Error of Mean		.183
International Designers	N	Valid	65
		Missing	0
	Mean		4.17
	Std. Error of Mean		.102
		Std. Deviation	.821

Question 3

Table 4.24: Summary as percentage and frequency for question 3, Biophilic design

ID			Frequency	Percentage
Australian Designers	Valid	1 (Strongly Disagree)	0	0
		2 (Disagree)	0	0
		3 (Neither Agree or Disagree)	1	3.7
		4 (Agree)	16	59.3
		5 (Strongly Agree)	10	37.0
		Total	27	100.0
International Designers	Valid	1 (Strongly Disagree)	0	0
		2 (Disagree)	2	3.1
		3 (Neither Agree or Disagree)	7	10.8
		4 (Agree)	34	52.3
		5 (Strongly Agree)	22	33.8
		Total	65	100.0

As illustrated in Table 4.24, the highest percentage of Australian Designers chose Agree (59.30%) and 52.30% of International Designers. The results show that respondents “Agree” that having natural elements indoor can release stress and bring calmness. No responses for “Strongly Disagree” were received from both designer groups.

Question 4

Table 4.25: Summary as percentage and frequency for question 4, Biophilic design

ID			Frequency	Percentage
Australian Designers	Valid	1 (Strongly Disagree)	0	0
		2 (Disagree)	2	7.4
		3 (Neither Agree or Disagree)	8	29.6
		4 (Agree)	13	48.1
		5 (Strongly Agree)	4	14.8
		Total	27	100.0
International Designers	Valid	1 (Strongly Disagree)	1	1.5
		2 (Disagree)	2	3.1
		3 (Neither Agree or Disagree)	9	13.8
		4 (Agree)	41	63.1
		5 (Strongly Agree)	12	18.5
		Total	65	100.0

Table 4.25 shows the frequency and percentage of the question: having natural elements and living organisms indoor can create awareness of nature and ecological impact. More International designers chose "Agree" (63.10 %) than Australian designers (48.10%) with the statement of question 4.

Question 5

Table 4.26: Summary as percentage and frequency for question 5, Biophilic design

ID			Frequency	Percentage
Australian Designers	Valid	1 (Strongly Disagree)	0	0
		2 (Disagree)	3	11.1
		3 (Neither Agree or Disagree)	2	7.4
		4 (Agree)	15	55.6
		5 (Strongly Agree)	7	25.9
		Total	27	100.0
International Designers	Valid	1 (Strongly Disagree)	1	1.5
		2 (Disagree)	1	1.5
		3 (Neither Agree or Disagree)	7	10.8
		4 (Agree)	37	56.9
		5 (Strongly Agree)	19	29.2
		Total	65	100.0

As shown in the table 4.26, the highest percentages of Australian respondents chose "Agree" for question 5 (55.65%), but slightly more of International respondents (56.9%). Both groups "Agree" that having natural elements and living organisms indoor can foster a sense of care as living organisms need to be watered or fed.

Question 6

Table 4.27: Summary as percentage and frequency for question 6, Biophilic design

ID			Frequency	Percentage
Australian Designers	Valid	1 (Strongly Disagree)	0	0
		2 (Disagree)	0	0
		3 (Neither Agree or Disagree)	4	14.8
		4 (Agree)	12	44.4
		5 (Strongly Agree)	11	40.7
		Total	27	100.0
International Designers	Valid	1 (Strongly Disagree)	1	1.5
		2 (Disagree)	2	3.1
		3 (Neither Agree or Disagree)	5	7.7
		4 (Agree)	31	47.7
		5 (Strongly Agree)	26	40.0
		Total	65	100.0

Table 4.27 shows the frequency and percentages of respondents to question 6, which asks if having natural elements and living organisms indoor can be educational, especially for children. Both designer groups choose “Agree”, where 44.40% of Australian designers and 47.7% from International designers.

Question 7

Table 4.28: Summary as percentage and frequency for question 7, Biophilic design

ID			Frequency	Percentage
Australian Designers	Valid	1 (Strongly Disagree)	1	3.7
		2 (Disagree)	8	29.6
		3 (Neither Agree or Disagree)	13	48.1
		4 (Agree)	4	14.8
		5 (Strongly Agree)	1	3.7
		Total	27	100.0
International Designers	Valid	1 (Strongly Disagree)	4	6.2
		2 (Disagree)	22	33.8
		3 (Neither Agree or Disagree)	20	30.8
		4 (Agree)	14	21.5
		5 (Strongly Agree)	5	7.7
		Total	65	100.0

As illustrated in Table 4.28, the highest percentage was 48.10% for “Neither Agree or Disagree” by the Australian designers and 33.80% of the International designers “Disagree.” From this result, it can be seen that both designer groups have a different opinion about the statement: having natural elements and living organisms indoor can be dangerous and inconvenient, as in the case of allergies.

Question 8

Table 4.29: Summary as percentage and frequency for question 8, Biophilic design

ID			Frequency	Percentage
Australian Designers	Valid	1 (Strongly Disagree)	2	7.4
		2 (Disagree)	9	33.3
		3 (Neither Agree or Disagree)	12	44.4
		4 (Agree)	3	11.1
		5 (Strongly Agree)	1	3.7
		Total	27	100.0
International Designers	Valid	1 (Strongly Disagree)	11	16.9
		2 (Disagree)	10	15.4
		3 (Neither Agree or Disagree)	18	27.7
		4 (Agree)	24	36.9
		5 (Strongly Agree)	2	3.1
		Total	65	100.0

Table 4.29 shows the frequency and percentages of responses to question 8 of "having natural elements and living organisms indoor as something being not desirable, as they are usually messy, dirty or require much of the time". Both groups also have different opinions responding to this question where 33.30% of the Australian designers "Disagree," while 36.9% of the International designers "Agree" with the question, even though 44.4% of the Australian designers "Neither Agree nor Disagree."

The Mean Value and Mann – Whitney U Test on Questions 3 to 8

The table 4.30 below shows the mean and standard deviation as well as standard error of the mean for responses regarding questions 3 – 8. The Likert scale employed in this part of the questionnaire was a 5- point scale with 3 as Neither Agree or Disagree (neutral mid-point). Responses with a mean close to the value 3 would indicate that about half of the respondents agreed while the other half disagreed.

Table 4.30: The Likert scale type output (using SPSS software) for Questions 3 to 8

		Statistics						
Having natural elements and living organisms indoors can:		Question 3: A. Release stress/ calm you	Question 4: B. Create awareness of nature and ecological impact	Question 5: C. Foster a sense of care (as living organisms need to be watered or fed)	Question 6: D. Be educational (especially for children)	Question 7: E. Be dangerous and inconvenient, as in case of allergies	Question 8: F. Be not desirable, as they are usually messy, dirty or require much of my time	
Australian Designers	N	Valid	27	27	27	27	27	
		Missing	0	0	0	0	0	
		Mean	4.33	3.70	3.96	4.26	2.85	2.70
		Std. Error of Mean	.107	.158	.173	.137	.166	.176
		Std. Deviation	.555	.823	.898	.712	.864	.912
International Designers	N	Valid	65	65	65	65	65	
		Missing	0	0	0	0	0	
		Mean	4.17	3.94	4.11	4.22	2.91	2.94
		Std. Error of Mean	.092	.095	.096	.104	.131	.144
		Std. Deviation	.741	.768	.773	.838	1.057	1.158

The standard deviation provides a measure of dispersion of individual values while the standard error of the mean provides an indication of the variation (\pm) in the mean value. If the mean value for a particular response to questions is clearly above 3, as in Table 4.30 above, then it may be assumed that more of the participants agree with the questions against those that disagree and vice versa. It is realized that Likert scale response data are usually regarded as non-parametric statistics, which is not normally distributed and require the relevant statistical test, in this case, the Mann-Whitney U test (Field, 2009; Pallant, 2011) to ascertain if there is any significant difference between two groups of responses. Based on Table 4.31 below, it shows no significant differences.

Table 4.31: Example of the Mann-Whitney U test applied to questions of Section E; Biophilic Design (Question 3 to 8); (SPSS output)

Having natural elements and living organisms indoors can:	Test Statistics ^a					
	Question 3: A. Release stress/ calm you)	Question 4: B. Create awareness of nature and ecological impact	Question 5: C. Foster a sense of care (as living organisms need to be watered or fed)	Question 6: D. Be educational (especially for children)	Question 7: E. Be dangerous and inconvenient, as in case of allergies	Question 8: F. Be not desirable, as they are usually messy, dirty or require much of my time
Mann-Whitney U	793.500	722.500	816.500	876.000	864.500	732.000
Wilcoxon W	2938.500	1100.500	1194.500	1254.000	1242.500	1110.000
Z	-.807	-1.499	-.586	-.014	-.117	-1.295
Asymp. Sig. (2-tailed)	.420	.134	.558	.989	.907	.195

a. Grouping Variable: ID

Question 9

Table 4.32: Summary of percentage and frequency of responses to question 9, Biophilic design

ID			Frequency	Percentage
Australian Designers	Valid	Yes	15	55.6
		No	12	44.4
		Total	27	100.0
International Designers	Valid	Yes	42	64.6
		No	23	35.4
		Total	65	100.0

Table 4.32 shows the frequency and percentage of responses for question 9 on having FDLOs inside the house. Both Australian and International designers answered “Yes” with 55.6% and 64.6%, respectively.

Question 10

Table 4.33: Summary of percentage and frequency of responses to question 10, Biophilic design

ID			Frequency	Percentage
Australian Designers	Valid	A (Green & Leafy)	14	51.9
		B (Flowery)	1	3.7
		C (Fruit Plant)	0	0
		D (Moss)	5	18.5
		E (Cacti)	0	0
		F (No Living Plants)	7	25.9
		Total	27	100.0
International Designers	Valid	A (Green & Leafy)	32	49.2
		B (Flowery)	3	4.6
		C (Fruit Plant)	5	7.7
		D (Moss)	8	12.3
		E (Cacti)	6	9.2
		F (No Living Plants)	11	16.9
		Total	65	100.0

Question 10 asked the respondents to choose the type of plants they preferred. According to the Table 4.33, most of both Australian and International designer respondents chose Green and Leafy (51.90% and 49.2%, respectively).

Question 11

Table 4.34: Summary of percentage and frequency of responses to question 11, Biophilic design

ID			Frequency	Percentage
Australian Designers	Valid	A (Mammals)	2	7.4
		B (Reptilians)	1	3.7
		C (Amphibians)	0	0
		D (Insects)	1	3.7
		E (Birds)	0	0
		F (Fish)	10	37.0
		G (No Living Animals)	13	48.1
		Total	27	100.0
International Designers	Valid	A (Mammals)	4	6.2
		B (Reptilians)	0	0
		C (Amphibians)	1	1.5
		D (Insects)	2	3.1
		E (Birds)	2	3.1
		F (Fish)	25	38.5
		G (No Living Animals)	31	47.7
		Total	65	100.0

For this question, respondents were asked to choose the type of animal they preferred to be embedded into the furniture. Both groups chose No living animals with the highest percentage of 48.10% and 47.7% respectively. However, among the selected types of animals, fish received high responses with 37% and 38.50% correspondingly.

Question 12

Table 4.35: Summary of percentage and frequency of responses to question 12, Biophilic design

ID			Frequency	Percentage
Australian Designers	Valid	B (Flowery)	7	25.9
		A (Green & Leafy)	1	3.7
		C (Fruit Plant)	5	18.5
		D (Moss)	5	18.5
		E (Cacti)	9	33.3
		Total	27	100.0
International Designers	Valid	A (Green & Leafy)	15	23.1
		B (Flowery)	9	13.8
		C (Fruit Plant)	10	15.4
		D (Moss)	16	24.6
		E (Cacti)	15	23.1
		Total	65	100.0

According to Table 4.35, 33.30% of Australian designers least prefer the Cacti, while 24.6% of the International designers least prefer the Moss to be embedded into the FDLOs.

Question 13

Table 4.36: Summary of percentage and frequency of responses to question 13, Biophilic design

ID			Frequency	Percentage
Australian Designers	Valid	B (Reptilians)	11	40.7
		C (Amphibians)	2	7.4
		D (Insects)	11	40.7
		E (Birds)	3	11.1
		Total	27	100.0
International Designers	Valid	A (Mammals)	8	12.3
		B (Reptilians)	14	21.5
		C (Amphibians)	5	7.7
		D (Insects)	21	32.3
		E (Birds)	5	7.7
		F (Fish)	12	18.5
		Total	65	100.0

Table 4.36 shows the frequency and percentage of the least preferred animal to be embedded into the FDLOs. The Australian designers equally chose 2 groups of animals, Reptilians and Insects (40.70%), while 32.30% of the International designers only chose Insects.

Summary of Results of Section E

The questions in this section asked respondents about their preferences on experiencing nature, whether having it outdoors, indoors or both. From the results, it was evident that both designer groups enjoy nature indoors and outdoors. Questions 2 – 8 asked questions about Biophilic design in general, on having the living organism indoors. Topics included a) preferences of having the living organisms inside the house, b) if living organisms can release stress/calm the respondents, c) whether living organisms can create awareness of nature and ecological impact, d) whether living organisms can foster sense of care, e) whether living organisms are educational for children especially, or by the contrary f) whether living organisms are perceived to be dangerous and inconvenient, in case of allergies, and finally, g) whether living organisms are not desirable as the living organisms are usually messy, dirty or require much time to be taken care of. Four (4) out of 6 questions leaned towards agreeing while the other 2 questions leaned towards disagreement level. This has been explained previously on the mean value and Mann-Whitney U test. The last 5 questions asked the respondent's opinion about having the FDLOs indoor and the types of living organisms that they preferred or not, to be embedded into the designs.

4.2.5b Results from Second Data Set: Stratification Groups (Designers, Educators, and Students) from General Respondents

Summary of Results of Section E

Thirteen (13) questions were designed for this section to get feedback on Biophilic design. All of the respondents from the stratified group prefer to experience nature, both indoor and outdoor. The respondents were also asked to answer the last 5 questions about having the FDLOs indoor and the type of living organisms that they prefer or not to be embedded into the design. Based on the results, more than 60% of the respondents would like to have the FDLOs at home. Green and leafy plants were the most preferred plants while cacti were the least preferred. Based on the results also, it was noted that most respondents preferred not to have living animals embedded into the FDLOs. Amphibians and reptilians were the least preferred animals. Recalling from the questions in section B (Design Preference) and C (Emotional Design); these findings can be linked to questions in Section E. The results also confirmed that living plants such as cacti in *the Threatening Cactus Chair* and living animals such as snake-like fish (*Local River*) were the least preferred living organisms to be embedded into the FDLOs. Detailed analyses of responses to questions 1 – 13 can be found in Appendix D: Chapter 4 – Quantitative Results, page 286 – 292 and page 358 - 366).

4.3 Summary of Chapter 4

In summary for this chapter, the online questionnaire data was obtained from 260 general respondents and 27 Australian designers. The data was stratified and analysed in stages. Based on the results of analysis, there were overall 5 data sets from 287 respondents. The first data set was from the general respondents, which was then stratified into a second data set consisting of designers, educators, and students. Australian Designers formed the third data set, and it was acquired to strengthen the data and was also used in comparison with International Designers (from the stratified group) and formed the fourth data set. For brevity, only the fourth data set, the highest and the lowest percentages, were discussed in detail in this chapter, but complete information is in the Appendix D: Chapter 4 – Quantitative Results, page 271 – 366.

For Section B, *the Stitch Table* and *the Greenwall* were the most preferred FDLOs while *the Threatening Cactus chair* and *Mushroom Ate My Furniture* were the least preferred. The highest positive emotional responses were received by *the Moss Table* and *the Stitch Table*

while *the Threatening Cactus Chair* and *Mushroom Ate My Furniture* also received the highest negative emotional responses for Section C. Section D only discussed the highest percentages of the subcategories of the Conceptual Model questions. The results were summarized and classified according to the subcategories and main categories in tables. As for section E, most respondents preferred to experience nature, both indoor and outdoor. Based on the SPSS results, the Likert Scale questions received a Mean value of more than 3 (questions 2 – 6), which specify that about half of the respondents agreed while the other half disagreed. Question 7 and 8 received a Mean value of 3 or less, which mainly indicates disagreement. Moreover, slightly more than half of these potential consumers (55.6%) thought that they would like to own an FDLO. The respondents also preferred green and leafy plants, but no living animals to be embedded into the FDLOs. Cacti and moss were the least preferred plants while reptilians and insects were the least preferred animals.

The obtained results from this quantitative data analysis will be triangulated with the qualitative data of Chapter 5, and this triangulation will be further discussed in Chapter 6.

CHAPTER 5 QUALITATIVE DATA ANALYSIS AND RESULTS

5.1 Interviews with Designers of Selected FDLOs

Interviews included 17 designers who had designed furniture with living organisms. Interviewed designers came from the United States of America, Germany, Sweden, Norway, Iceland, Mexico, South Korea and Japan. A semi-structured interview format was applied, which was easier for the researcher to gain additional information from the designers about their designs and the rationale behind the FDLOs. The duration of the interviews ranged from approximately 30 minutes to 90 minutes. All of the interviews were conducted in English and were transcribed using “O transcribe” that is available online for free. The interviews were aimed to answer research question number 3 of the research (Why do some designers embed living organisms in furniture design?), and to find the reasons behind embedding living organisms in furniture designs, from the designers’ points of view. The interviewed designers have stated various reasons that can be linked to the Conceptual Model. From this, the researcher can relate the connection between the rationales and the Conceptual Model. A visual validation table and a chart were designed to show the connection of the answers to the main Conceptual Model, and these will be shown later.

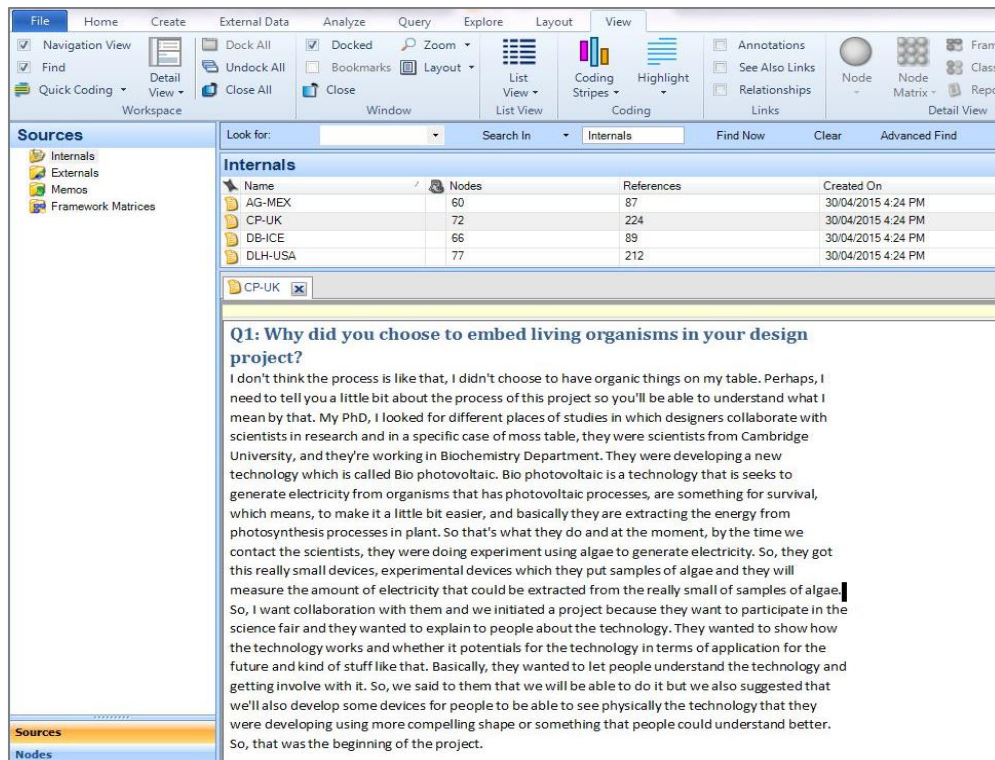
Semi-structured interviews have been applied in this case to question the designers about the rationale, purpose, and inspiration for designing selected FDLOs and the concept behind their designs, as well as their previous knowledge (if any) on biophilic design and emotional design. Thirteen (13) main questions were used for these interviews as listed in the table below (Table 5.1).

Table 5.1: Interview questions for the designers of the FDLOs

Q1: Why did you choose to embed living organisms in your design project?
Q2: What was your main purpose when you designed the project?
Q3: Did you try to communicate or convey a specific message through your design? If yes, what was it, and why?
Q4: In relation to your project, what was the main concept behind it?
Q5: How did you get your inspiration to design this type of furniture (with living organisms)?
Q6: Is your furniture piece just a concept, or is it commercialised?
Q7: Do you know what biophilia theory and biophilic design are?
Q8: If yes to question 7, were you aware of biophilia theory or biophilic design while you designed your project (of furniture with living organisms)?
Q9: Why did you choose the specific types of plants or animals embedded into your design?
Q10: Do you know what emotional design is? (If yes, go to question 11 and 12. If no, go to question 13)
Q11: Did you use principles of emotional design when designing your project?
Q12: Do you think that natural elements can encourage emotional attachment of people with their furniture?
Q13: How have people responded to your design? (Positive or negative reactions of viewers)

Figure 5.1 below provides an example of how NVIVO qualitative software was used to process the data gathered in the interviews. By creating data folders for interviews information, categorising and organizing themes (Nodes), NVIVO is also providing tools which help to translate the data visually (Richards, 1999; Bazley and Richards, 2000).

Figure 5.1: Examples of interviews with furniture designers in NVIVO



The researcher has listed only keywords and relevant answers from each theme (which were arranged according to the questions in the interviews) and transferred these into the analysis table based on its relation to the proposed conceptual model. Each answer by the interviewed designers was identified and arranged into a table based on the 13 questions as mentioned in Table 5.1, and highlighted. Relevant keywords then were transferred into the Nodes as not all answers were included. The simplified version was provided in the Appendix E (page 378 - 409) before the analysis table for these findings was made (which shows the percentage of responses. Figure 5.2 below shows the listing of the themes, which were identified from the interview questions. There were 13 main themes or *parent nodes* (as called in NVIVO) that have been recorded and analysed to provide information for this study. The themes are; 1) *Reasons for using living organisms*, 2) *Main purpose for designing the furniture*, 3) *Communication and conveying a message*, 4) *Design concept of FDLOs*, 5) *Inspiration of FDLOs*, 6) *Commercialized or Conceptual furniture*, 7) *Knowledge of biophilia theory or*

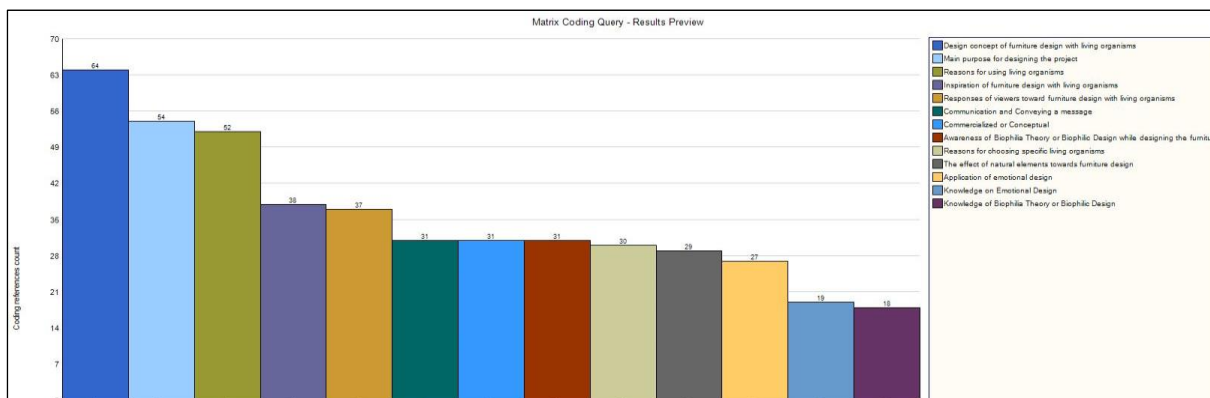
biophilic design, 8) Awareness of biophilia theory or biophilic design while designing the FDLOs, 9) Reasons for choosing specific living organisms, 10) Knowledge of emotional design, 11) Application of emotional design, 12) The effects of natural elements towards furniture design, and 13) Response of viewers towards FDLOs. 4 questions (1, 2, 4, and 9) were linked to the conceptual model and all of the answers were gathered in the Conceptual Model Nodes, which are discussed further in page 125.

Figures 5.2: A list of 13 detailed themes or parent nodes (NVIVO software format)

Name	Sources	References
Reasons for using living organisms	17	52
Main purpose for designing the project	17	54
Communication and Conveying a message	17	31
Design concept of furniture design with living organisms	17	64
Inspiration of furniture design with living organisms	17	38
Commercialized or Conceptual	17	31
Knowledge of Biophilia Theory or Biophilic Design	17	18
Awareness of Biophilia Theory or Biophilic Design while designing the furniture with living organisms	17	31
Reasons for choosing specific living organisms	17	30
Knowledge on Emotional Design	17	19
Application of emotional design	17	27
The effect of natural elements towards furniture design	17	29
Responses of viewers toward furniture design with living organisms	17	37

As depicted in Figure 5.3 below, the graph shows the frequency of references that were extracted from the sources (interviews). The number of the sources in this figure indicates the number of interview transcripts obtained while the references signify how many times the responses from the interviews were coded and referred to.

Figure 5.3: Frequency graph of themes (or parent nodes) in NVIVO software format



For brevity and to avoid repetition as much as possible, the qualitative analyses will only discuss the main themes that show significant results as an example of the data gathered for this chapter which is Design Concept of FDLOs (64 references). Other themes and qualitative results are fully detailed in Appendix E: Chapter 5, page 368 – 377 and 378 - 409.

Each *parent node* has its *child nodes* and *grandchild nodes* dependent on the categorized information. The 3 main significant themes/ parent nodes are, 1) *design concept*, 2) the *main purpose*, and 3) *reasons for using living organisms*. These 3 main parent nodes have each been divided into 4 *child nodes* and 6 *grandchild nodes* (as shown in Figure 5.4 below). Each *child node* is linked to the 4 main categories of the conceptual model, and each *grandchild node* is related to the 24 subcategories.

Figure 5.4: NVIVO software format shows the 4 child nodes and 24 grandchild nodes of one of the themes analysed in Design Concept of FDLOs

The figure consists of two screenshots of the NVivo software interface, showing the 'Themes' table. The top screenshot highlights the 'Child Nodes' section, and the bottom screenshot highlights the 'Grandchild Nodes' section.

Child Nodes

Name	Sources	References
Reasons for using living organisms	17	52
Main purpose for designing the project	17	54
Communication and Conveying a message	17	31
Design concept of furniture design with living organisms	17	64
A Function & Practicality Purpose	12	38
D Experimental Purpose	5	15
C Experience Purpose	12	27
B Aesthetic & Semantic Purpose	6	11

Grandchild Nodes

Name	Sources	References
A Function & Practicality Purpose	12	38
A1 To Learn	0	0
A2 Farming or Food	4	5
A3 Purify water or air	1	2
A4 Generate Energy	1	2
A5 To encourage hobbies	1	1
A6 Other reasons	9	20
D Experimental Purpose	5	15
D1 Conceptual design	1	1
D2 Part of a research project	0	0
D3 Exploration of new materials	4	4
D4 Exploration of new technologies	2	6
D5 To break the rules or be different	0	0
D6 Other reasons	1	2
C Experience Purpose	12	27
C1 To experience nature	6	10
C2 Environmental consciousness	3	7
C3 To heal or calm or lower stress	1	1
C4 Entertainment	2	2
C5 To stimulate senses	0	0
C6 Other reasons	6	9
B Aesthetic & Semantic Purpose	6	11
B1 Aesthetic value or decoration	1	2
B2 Collection and display	2	2
B3 Communication or convey message	3	7
B4 Artistic reasons	0	0
B5 Contemplation	0	0
B6 Other reasons	0	0

5.2 Highest Frequencies

5.2.1 Theme 1: Design Concept of FDLOs

A design concept is the idea behind a design. It is how designers plan on solving a design problem. Figure 5.4 above and Table 5.2 below show and explain how the data were categorized and also show the highest to the lowest responses count. All the responses from the interviews were coded under the child nodes depending on the themes. Each theme was purposely linked to the Conceptual Model because the qualitative data gathered from the interviews was meant to be used to identify the main reasons why the living organisms were embedded into designs (to answer the research question Number 3). Table 5.1 explains the detailed results on child and grandchild nodes for the design concept of FDLOs with responses counts, percentages and designers (sources) involved in the interviews. The response count in NVIVO might be varied because NVIVO software is unable to count the exact amount of references that were repetitive in the child or grandchild nodes. This happened to most NVIVO results in this chapter; therefore, a new table was designed for each theme with a new count that was manually calculated. To avoid confusion, only the new designed tables for each main theme will be discussed further in this chapter. Responses counts in the tables discussed in this chapter are more detailed in the sums and were used to count the valid percentage and frequency.

As seen in Table 5.2 below, the design concept of FDLOs had the highest frequency of 83 references. This same result appears in Figures 5.3 and 5.4 (above) as 64, because NVIVO would only calculate the answer from the same designer even if it appeared more times in the subcategories; as such these appearances in the subcategories were counted manually.

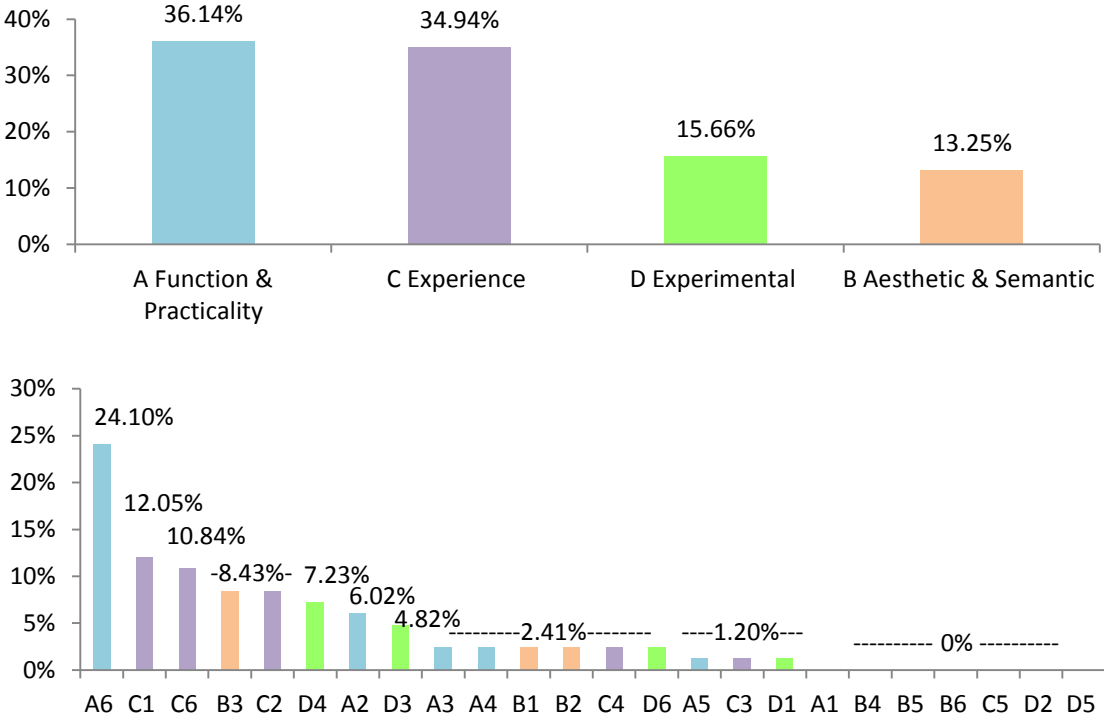
The highest count of responses from the interviews for this question was 30 that came from 12 sources (designers). The subcategory *A6: Other Reasons*, which is part of the *A: Function and Practicality* category, received 20 counts from 9 sources, indicating the highest count of responses for this theme.

Table 5.2: Detailed breakdown of responses count and percentage of design concept of FDLOs from the NVIVO software

Child and Grandchild Nodes (Conceptual Model/ Subcategories)	Responses Count	Percentage	Designers
A: Function and Practicality	30	36.14%	
A1: To Learn	0	0	
A2: Farming or Food	5	6.02%	DB_ICE, JL_USA, SWR_SWE, TH_JAP (4)
A3: Purify water or air	2	2.41%	JL_USA (1)
A4: Generate Energy	2	2.41%	CP_UK (1)
A5: To encourage hobbies	1	1.20%	MH_GER (1)
A6: Other reasons <ul style="list-style-type: none"> – furniture function as a greenhouse – multipurpose function furniture/space saving product design – symbiont furniture – attach to other object – usability, comfort and fresh – to create a place for other living organisms to live – to decompose furniture – material used 	20	24.10%	DB_ICE, GZ_USA, MA_CAN, MH_GER, NF_USA, NR_FRA, PVH_NOR, SWR_SWE (8)
B: Aesthetic and Semantic	11	13.25%	
B1: Aesthetic value or decoration	2	2.41%	JL_USA (1)
B2: Collection and display	2	2.41%	DB_ICE, GZ_USA (2)
B3: Communication or convey message	7	8.43%	AG_MEX, CP_UK, SWR_SWE (3)
B4: Artistic reasons	0	0	
B5: Contemplation	0	0	
B6: Other reasons	0	0	
C: Experience	29	34.94%	
C1: To experience nature	10	12.05%	DLH_USA, EW_USA, KHJ_SK, MA_CAN, NR_FRA, NU_USA (6)
C2: Environmental consciousness	7	8.43%	AG_MEX, PVH_NOR, SWR_SWE (3)
C3: To heal or calm or lower stress	1	1.20%	JL_USA (1)
C4: Entertainment	2	2.41%	NU_USA, SWR_SWE (2)
C5: To stimulate senses	0	0	
C6: Other reasons <ul style="list-style-type: none"> – memory – relationship of interior and exterior – relationship between human and animals (dogs) – care for plants – to transport oneself to a favourite nostalgic spot – program in society 	9	10.84%	AG_MEX, DLH_USA, KHJ_SK, MH_GER, NU_USA, TH_JAP (6)
D: Experimental	13	15.66%	
D1: Conceptual design	1	1.20%	KL_GER (1)
D2: Part of a research project	0	0	
D3: Exploration of new materials	4	4.82%	DLH_USA, GZ_USA, KL_GER, SWR_SWE (2)
D4: Exploration of new technologies	6	7.23%	CP_UK, DLH_USA (2)
D5: To break the rules or be different	0	0	
D6: Other reasons	2	2.41%	KL_GER (1)
	83	100%	

Figure 5.5a below shows the highest responses were from the A: *Function and Practicality* category (36.14%) followed by the C: *Experience* category (34.94%). These results suggest that the designers were more focused on the functionality, practicality and user experience reasons, rather than on the experimental, aesthetic and semantic reasons for the Design Concept of the FDLO projects.

Figure 5.5a and 5.5b: Percentage and frequency bar chart for 4 main categories and 24 subcategories of the Conceptual Model for Design Concept theme



As shown in Figure 5.5b above, the highest responses were from A6: *Other Reasons* from the A: *Function and Practicality* main category, where the designers explained the design concept of the FDLOs. Other reasons described by the designers included:

- furniture that functioned as a greenhouse,
- multi-purpose function furniture,
- space saving product design,
- symbiont furniture that can be attached to other objects,
- usability, comfort and looking as fresh grass,
- to create a place for other living organisms to live,
- to decompose furniture and material used.

The 4 highest results among the 24 subcategories as shown in the Table 5.2 above were for users or consumers C1: *to experience nature indoor* (12.05%) and C6: *other reasons*

5.3 Link between Interviews and the Conceptual Model

The results produced by this section were related and directly linked to the Conceptual Model and were gathered from the interviews with the FDLOs designers. All of the reasons the designers stated to embed living organisms into their designs were recorded, analysed and categorised under the *Conceptual Model* themes. According to Table 5.3 below, A: *Function and Practicality* category received the highest responses with 75 counts, followed by the C: *Experience* category with 69 responses count D: *Experimental* category (54 counts) and B: *Aesthetic and Semantic* category received the lowest responses (42 counts).

Table 5.3: Detailed breakdown of responses count and percentage of Conceptual Model from the NVIVO software

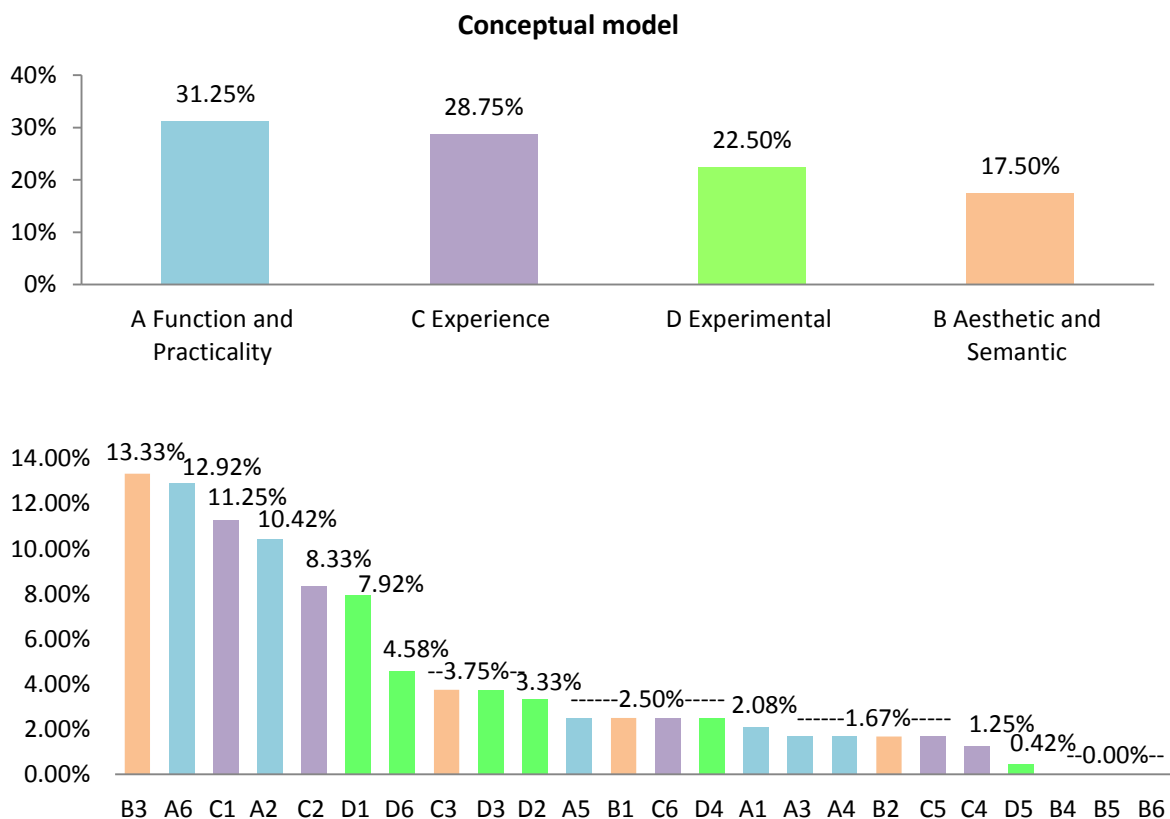
Child and Grandchild Nodes (Conceptual Model/ Subcategories)	Responses Count	Percentage	Designers
A: Function and Practicality	75	31.25%	
A1: To Learn	5	2.08%	DLH_USA, PVH_NOR, TH_JAP (3)
A2: Farming or Food	25	10.42%	DB_ICE, EW_USA, JL_USA, MA_CAN, MH_GER, PVH_NOR, SWR_SWE, TH_JAP (8)
A3: Purify water or air	4	1.67%	GZ_USA, JL_USA, MA_CAN (3)
A4: Generate Energy	4	1.67%	CP_UK (1)
A5: To encourage hobbies	6	2.5%	KL_GER, MH_GER, PVH_NOR (3)
A6: Other reasons <ul style="list-style-type: none"> – practicality reasons – Commercialized products – space saving for indoors and balcony – multipurpose/multifunction furniture – To bring life to the objects – High density versus the wild. It will be force to incorporate the green areas – To design small garden pieces – Solve seating need of project – Fitting visual for space/comfort and practicality – Usability, comfort, something fresh yet appropriate – To find some synergy between nature, living organisms which can give people a service. – it's about that kind of work which I think we created a culture of work between man and nature – To create furniture that has a purpose. – To decompose the furniture 	31	12.92%	DB_ICE, EW_USA, GZ_USA, MA_CAN, MH_GER, NF_USA, NR_FRA, NU_USA, SWR_SWE (9)

Child and Grandchild Nodes (Conceptual Model/ Subcategories)	Responses Count	Percentage	Designers
B: Aesthetic and Semantic	42	17.5%	
B1: Aesthetic value or decoration	6	2.5%	DB_ICE, GZ_USA, JL_USA, MA_CAN, NU_USA (5)
B2: Collection and display	4	1.67%	DB_ICE, GZ_USA, JL_USA, MH_GER (4)
B3: Communication or convey message	32	13.33%	AG_MEX, CP_UK, DB_ICE, DLH_USA, EW_USA, GZ_USA, JL_USA, KHJ_SK, KL_GER, MA_CAN, NF_USA, NR_FRA, NU_USA, PVH_NOR, SWR_SWE, TH_JAP (16)
B4: Artistic reasons	0	0	
B5: Contemplation	0	0	
B6: Other reasons	0	0	
C: Experience	69	28.75%	
C1: To experience nature	27	11.25%	DLH_USA, EW_USA, GZ_USA, JL_USA, KHJ_SK, MA_CAN, MH_GER, NR_FRA, NU_USA, TH_JAP (10)
C2: Environmental consciousness	20	8.33%	AG_MEX, CP_UK, DB_ICE, EW_USA, KL_GER, MA_CAN, MH_GER, NU_USA, PVH_NOR, SWR_SWE, TH_JAP (11)
C3: To heal or calm or lower stress	9	3.75%	JL_USA, MA_CAN, NU_USA, TH_JAP (4)
C4: Entertainment	3	1.25%	DB_ICE, NU_USA, SWR_SWE (3)
C5: To stimulate senses	4	1.67%	DLH_USA, PVH_NOR (2)
C6: Other reasons <ul style="list-style-type: none"> – growing up with plants – having no plants inside the house is like missing something – Because I'm interested in it – To promote the strong relationship – to take care of your plants 	6	2.5%	GZ_USA, KHJ_SK, MH_GER, PVH_NOR (4)
D: Experimental	54	22.5%	
D1: Conceptual design	19	7.92%	AG_MEX, CP_UK, DB_ICE, DLH_USA, EW_USA, GZ_USA, JL_USA, KHJ_SK, KL_GER, NR_FRA, NU_USA, PVH_NOR, SWR_SWE, TH_JAP (14)
D2: Part of a research project	8	3.33%	AG_MEX, CP_UK, DLH_USA, GZ_USA, KL_GER, SWR_SWE (6)
D3: Exploration of new materials	9	3.75%	CP_UK, DLH_USA, KL_GER, NF_USA, SWR_SWE (5)

D4: Exploration of new technologies	6	2.5%	CP_UK, DLH_USA (2)
D5: To break the rules or be different	1	0.42%	KL_GER (1)
D6: Other reasons <ul style="list-style-type: none"> – It's a project which was designed for a competition or exhibition – To question the decision between interior and exterior in architecture and the relation between architecture and landscape. – Encapsulating landscape. – Deformation. – Symbiont or symbiosis – Permaculture design. 	11	4.58%	AG_MEX, DLH_USA KL_GER, MH_GER, PVH_NOR, SWR_SWE, (6)
Overall answer counts	240	100%	

Figure 5.7a shows the overall results of the main categories, with A: Function and Practicality as the highest percentage (31.25%). Figure 5.7b below shows, B3: *to communicate or convey a message* was the highest percentage (13.33%) among the subcategories as the main reason for designers to embed living organisms into the designs. Followed by A6: *Other reasons* from the A: *Function and Practicality* category (12.92%), C1: *To experience nature* (11.25%), A2: *Farming/ food* (10.42%), C2: *Environmental consciousness* (8.33%) and D1: *Conceptual design* (7.92%).














Figure 5.7a and 5.7b: Summary of the Percentage and frequency bar chart for the 4 main categories and 24 subcategories of the Conceptual Model








5.3.1 Classification Table












Table 5.4 below summarizes and classifies the FDLOs designed by the interviewed designers according to various reasons. This table explains where each FDLO belongs to in the Conceptual Model, based on the selected subcategories by the interviewed designers. As mentioned previously in Chapter 3, it was easier to identify and classify the FDLOs using the table and colour coded subcategories. For example; The Talita Bench Exterior by AG from Mexico was designed for *B3: Communication/convey a message*, *C2: Environmental consciousness*, *D1: Conceptual design*, *D2: Part of a research project* and *D6: Other reasons*. The main reason for the design of this FDLO (Talita Bench Exterior) can be categorised as D: Experimental, because of the 3 subcategories in green (green hues), as stated by the interviewed designer. Most answers that were received from the interviews determine the category of the FDLOs, where each main category received at least 2 or more subcategories. The details can be viewed in Table 5.4.

Table 5.4: Classification table of Conceptual Model for the FDLOs from the interviewed designers













Designers and FDLOs	Subcategories of the Conceptual Model—from interviews/NVIVO			
AG, Mexico, Talita Bench Exterior 				
				
Experimental: D1, D2, D6				
CP, London, UK, The Moss Table 				
				
Experimental: D1, D2, D4				

<p>GZ, USA, The Stitch Table</p> 	<p>A3 Purify water/ air</p>	<p>A6 Other reasons</p>	<p>B1 Aesthetic value/ Decoration</p>	<p>B2 Collection & Display</p>
	<p>B3 Communication /convey message</p>	<p>C1 To experience nature</p>	<p>C6 Other reasons</p>	<p>D1 Conceptual design</p>
	<p>D2 Part of a research project</p>			
<p>Aesthetic and Semantic: B1, B2, B3 Function and Practicality: A3, A6 Experience: C1, C6 Experimental: D1, D2</p>				
<p>KL, Germany, The Roots</p> 	<p>B3 Communication /convey message</p>	<p>C2 Environmental consciousness</p>	<p>D1 Conceptual design</p>	<p>D2 Part of a research project</p>
	<p>D3 Exploration of new materials</p>	<p>D5 To break the rules/ be different</p>	<p>D6 Other reasons</p>	
<p>Experimental: D1, D2, D3, D5, D6</p>				
<p>KHJ, South Korea, HappilyEver</p> 	<p>B3 Communication /convey message</p>	<p>C1 To experience nature</p>	<p>C6 Other reasons</p>	<p>D1 Conceptual design</p>
<p>Experience: C1, C6</p>				
<p>MH, Germany, The BalKonzept</p>	<p>A2 Farming/ Food</p>	<p>A5 To encourage hobbies</p>	<p>A6 Other reasons</p>	<p>B2 Collection & Display</p>

	<p>C1 To experience nature</p>	<p>C2 Environmental consciousness</p>	<p>C6 Other reasons</p>	<p>D6 Other reasons</p>
<p>Experience: C1, C2, C6 Function and Practicality: A2, A5, A6</p>				
<p>NU, USA, Desert Eco Chair</p> 	<p>A6 Other reasons</p>	<p>B1 Aesthetic value/ Decoration</p>	<p>B3 Communication /convey message</p>	<p>C1 To experience nature</p>
<p>Experience: C1, C2, C3, C4 Aesthetic and Semantic: B1, B3</p>				
<p>NF, USA, Grass Ottoman</p> 	<p>A6 Other reasons</p>	<p>B3 Communication /convey message</p>	<p>D3 Exploration of new materials</p>	
<p>Uncategorized – Not using living organisms (This piece was not included in the results as from the interview with the designer, the researcher was told the grass was fake not real)</p>				
<p>DB, Iceland, The Furnibloom</p> 	<p>A2 Farming/ Food</p>	<p>A6 Other reasons</p>	<p>B1 Aesthetic value/ Decoration</p>	<p>B2 Collection & Display</p>
<p>Aesthetic and Semantic: B1, B2, B3 Function and Practicality: A2, A6 Experience: C2, C4</p>				

<p>EW, USA, The Planter Table</p> 				
				
<p>Function and Practicality: A2, A6</p>				
<p>DLH, USA, The Retrofitted Rococo Chair</p> 				
				
				
<p>Experimental: D1, D2, D3, D4, D6 Experience: C1, C5, C6</p>				
<p>JL, USA, The Galapagos Coffee Table</p> 				
				
<p>Aesthetic and Semantic: B1, B2, B3 Function and Practicality: A2, A3 Experience: C1, C3</p>				
<p>MA, Canada, The Grass lamp</p>				

				
<p>Experience: C1, C2, C3 Function and Practicality: A2, A3, A6 Aesthetic and Semantic: B1, B3</p>				
<p>NR, France, Co-Habitation</p> 				
				
<p>Experience: C1, C2</p>				
<p>PVH, Norway, The Spire</p> 				
   				
				
<p>Experience: C2, C5, C6 Function and Practicality: A1, A2, A5 Experimental: D1, D6</p>				
<p>SWR, Sweden/ Taiwan, Mushroom Ate my Furniture</p>				

				
				
Experimental: D1, D2, D3, D6 Function and Practicality: A2, A6 Experience: C2,C4				
TH, Japan, The Cultivation Kitchen 				
				
Experience: C1, C2, C3 Function and Practicality:A1, A2				

5.4 Summary of Chapter 5

In summary, 17 interviews with FDLO’s designers from around the world were conducted to find out the rationale behind the designs of the FDLOs, and why living organisms were embedded into the furniture pieces. Thirteen (13) questions were asked, and from that, 13 themes were developed to analyse the data obtained from the interviews in NVIVO software. In this chapter, only the highest frequencies theme was discussed. New frequency tables with percentages and response counts were developed for each theme as the NVIVO software was unable to count the exact amount of references that were repetitive in the themes. The exact counts of the frequencies were calculated manually and presented in detail in the tables Nature, plants or animals, received the highest percentage as inspirational reasons for designers to design FDLOs. The interviewed designers also noted that 15 out of 17 FDLOs received positive responses or feedback from viewers. For the *Conceptual Model theme*, all results were merged where it were used to find the rationale behind designers embedded living organisms in furniture. A table that provided complete frequencies (from all 13 themes) was developed from this as discussed previously. A classification table was designed to present the results visually and show the right categories for the FDLOs by interviewed

designers. Full results from this chapter can be found in Appendix E: Chapter 5, page 368 – 409. This qualitative data can be used to triangulate the quantitative data (from the previous chapter) for comparison purposes, mainly related to the Conceptual Model, which was tested in the online survey.

CHAPTER 6 TRIANGULATION ANALYSES AND DISCUSSION

6.1 Cross Comparison of Quantitative Results for Online Survey

The results of a cross comparison between the quantitative empirical results are tabulated in figures below. The quantitative analysis results were listed earlier in chapter 4 of data analyses for the Australian Designers (AD), International Designers (ID) and a stratified group consisting of designers (ID), educators (E) and students (S). The ID is the same group in the stratified group labelled with Art Design/Creative (AC). As mentioned before, the results gathered from the online survey were divided into 4 main sections. In summary, the tables in this chapter consist of results analysis from Section B (Design), Section C (Emotional Design) and Section E (Biophilic Design). Analysis results for Section D are discussed separately because the results consist of analyses of both quantitative and qualitative data.

6.1.1 Section B: Design preference

For the sake of comparison, digitally manipulated furniture without living organisms will be referred to as FDWLO, or Furniture Design Without Living Organisms. These results have been listed with respect to the category of; *for the highest preferences of FDLO, the highest preferences of furniture design without living organisms (FDWLO), the lowest preferences of FDLO and the lowest preferences of FDWLO*. The highlighted results in grey box in Table 6.1 correspond to similar responses from both main and stratified groups. The different responses suggest that there were disagreement and dissimilarity of preferences towards FDLOs for AD, ID and the stratified group.







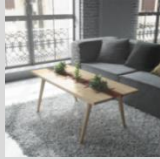


AD selected “The Greenwall” (70.4%; 19 respondents) *for the highest preferences of FDLO*, while the stratified group chose “the Stitch Table” (81.5%; 53 respondents for ID/AC, 71.8%; 56 respondents for E, and 83.3%; 45 respondents for S, respectively).













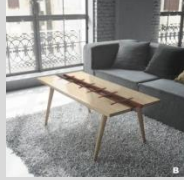
For the highest preferences of FDWLO, the AD and ID preferred the wood FDWLO of the “Threatening Cactus Chair” (96.3%; 26 respondents and 84.6%; 55 respondents, respectively), while the E preferred the “Life within Objects (fabric)” with 79.5% (62 respondents). E also chose the “Mushroom Ate my Furniture”, with 79.5% (62 respondents), and from the S with 81.5% (44 respondents).

For the lowest preferences of FDLO, it can be seen that both AD and ID had the same opinion where the “the Threatening Cactus Chair” received lowest the percentage (3.7%; 1 respondents and 15.4%; 10 respondents, respectively). For the stratified group, the responses were different when fewer from E and S responded to “the Life within Object” and “Mushroom Ate my Furniture” (20.5%; 16 respondents and 18.5%; 10 respondents, correspondingly).

“The digitally manipulated Stitch Table” where the living organisms were eliminated, was the lowest preferences FDWLO from the stratified group (18.5%; 12 respondents for AD, 28.2%; 22 respondents for E, and 16.7%; 9 respondents for S). While the digitally manipulated “Greenwall” received fewer responses from AD with 29.6% (8 respondents).

Table 6.1: Cross comparison analysis of quantitative results for section B; Design Preference

SECTION B: DESIGN PREFERENCES						
Australian Designers/International Designers				Stratified group (Art and Design/Creative, Education/Academic and Student)		
Q1 – Q10	Total	The highest preferences FDLO	The highest preferences FDWLO	Total	The highest preferences FDLO	The highest preferences FDWLO
	AD: 27	The Greenwall 70.4% 19 respondents 	The Threatening Cactus Chair (wood) 96.3% 26 respondents 	AC: 65	The Stitch Table 81.5% 53 respondents 	The Threatening Cactus Chair (wood) 84.6% 55 respondents 
	ID: 65	The Stitch Table 81.5% 53 respondents 	The Threatening Cactus Chair (wood) 84.6% 55 respondents 	E: 78	The Stitch Table 71.8% 56 respondents 	Life within Objects (fabric) 79.5% 62 respondents  Mushroom Ate my Furniture 79.5% 62 respondents 

				S: 54	The Stitch Table 83.3% 45 respondents 	Mushroom Ate my Furniture 81.5% 44 respondents 
<i>Total</i>	<i>The highest preferences FDLO</i>	<i>The highest preferences FDWLO</i>	<i>Total</i>	<i>The highest preferences FDLO</i>	<i>The highest preferences FDWLO</i>	
AD: 27	The Threatening Cactus Chair 3.7% 1 respondents 	The Greenwall 29.6% 8 respondents 	AC: 65	The Threatening Cactus Chair 15.4% 10 respondents 	The Stitch Table 18.5% 12 respondents 	
ID: 65	The Threatening Cactus Chair 15.4% 10 respondents 	The Stitch Table 18.5% 12 respondents 	E: 78	Life within Objects 20.5% 16 respondents  Mushroom Ate my Furniture 20.5% 16 respondents 	The Stitch Table 28.2% 22 respondents 	
			S: 54	Mushroom Ate my Furniture 18.5% 10 respondents 	The Stitch Table 16.7% 9 respondents 	

This section was designed to see how the respondents visually reacted towards FDLOs. From these results (above), it can be discussed and concluded that:











- *the types of living organisms* embedded into the designs might affect the preferences of the respondents towards the FDLOs. Living plants such as cactus and mushrooms were the least favourable plants to be embedded into the furniture, as most of the respondents did not select such designs. The mushrooms might look like decomposers as they are always seen in nature growing on deteriorated wood or lifeless objects, as well as fungi, mould on moist walls that might visually create discomfort feelings. This might create a negative perception, and it was not that surprising when “Mushroom Ate my Furniture” wasn't visually favoured by respondents. Living animals such as reptilians (turtles) were less preferred, as seen in the image of “Life within Object”.
- *the material used* also visually played important roles as more than 80% of the respondents decided to choose the wood FDWLO of the “Threatening Cactus Chair”
- which looked safer than the clear glass, because glass looks fragile and dangerous to sit on, with the pointy cactus beneath. Cactus can be considered an unfriendly and a dangerous plant, with the sharp pointy needles protruding from its body.
- *the overall form and aesthetics* of the FDLOs might also influence the preferences of respondents. This was exemplified by “the Stitch Table” and “the Greenwall”. “The Stitch table” used a combination of maple and red mahogany in the centre to form a stitch design which looked like there are split sections to show a natural contrast growing out of that manmade surface. “The Greenwall” was formed of a curvaceous shelf with an urban twist and looked great indoor and outdoor for plant-lovers to organize their garden.

6.1.2 Section C: Emotional Design

A cross comparison of the quantitative empirical survey results can be seen in Table 6.2 below. The analysis of results listed earlier in Chapter 4 have been included in this table alongside the noted quantitative analysis results of the designers group and the stratified group as mentioned earlier. This table has been listed with respect to *the highest positive emotion and the highest negative emotion* towards the FDLOs. The results highlighted in a grey box correspond to the similar responses from both main and stratified groups.

- The results shows that “the Stitch Table” received *the highest positive emotion* from the stratified groups (AC; 81.5%; 53 respondents, E; 71.8%; 56 respondents, and S; 79.6%; 43 respondents, respectively).
- “The Threatening Cactus Chair” received *the highest negative emotion* from the stratified groups with 66.10% (43 respondents from AC) and 53.80% (42 respondents from E), while the S group selected "the Mushrooms Ate My Furniture" with 50.1% (28 respondents).
- The AD have different emotional responses towards *the highest positive emotion and the highest negative emotion for FDLOs* where they selected “The Moss Table” (59.20%; 16 respondents) and “Mushrooms Ate my Furniture” (62.90%; 17 respondents), respectively.

Table 6.2: Cross Comparison analysis of quantitative results for section C, Emotional design

SECTION C: EMOTIONAL DESIGN					
Australian Designers (AD)/International Designers (ID)			Stratified group (Art and Design/Creative (AC), Education/ Academic (E) and Student (S))		
Total	<i>The highest positive emotion</i>	<i>The highest negative emotion</i>	Total	<i>The highest positive emotion</i>	<i>The highest negative emotion</i>
AD: 27	The Moss Table 59.20% 16 respondents 	Mushrooms Ate my Furniture 62.90% 17 respondents 	AC: 65	The Stitch Table 81.5% 53 respondents 	The Threatening Cactus 66.10% 43 respondents 
ID: 65	The Stich Table 81.50% 53 respondents 	The Threatening Cactus 66.10% 43 respondents 	E: 78	The Stich Table 71.80% 56 respondents 	The Threatening Cactus 66.10% 42 respondents 
			S: 54	The Stich Table 79.6% 43 respondents 	Mushrooms Ate My Furniture 51.9% 28 respondents 



The relatively low means for the noted quantitative results (highlighted in red in Table 6.3) correspond to the negative emotional responses towards the FDLOs. The response that is lower than 4 would indicate about half of the respondents showed negative emotional feelings, while, a response close to mean 4 or above indicates positive emotional responses. Perhaps a reserved or hedging response may have also been applied by respondents in arriving at the mean value. Question 1 “The Retrofitted Rococo Chair”, Question 2 “The Threatening Cactus Chair” and Question 6 “Mushrooms Ate My Furniture” showed negative emotional responses where the mean values were lower than 4. The results also showed the lower mean value was for the Question 4 “Life within Object” from the AD and for Question 10 “Local River” from the AD and the Students.




Table 6.3: Cross comparison analysis of Means and Standard Deviations from SPSS results for section C; Emotional Design

<i>SPSS</i>			
<i>Australian Designers (AD)</i>	<i>International Designers(ID)/ Art and Design/ Creative(AC)</i>	<i>Academic/ Education(E)</i>	<i>Students (S)</i>
Q1: The Retrofitted Rococo Chair			
Mean 3.93 SD 1.299	Mean 3.75 SD 1.511	Mean 3.69 SD 1.606	Mean 3.96 SD 1.780
Q2: The Threatening Cactus Chair			
Mean 3.11 SD 1.476	Mean 3.20 SD 1.460	Mean 3.32 SD 1.655	Mean 3.50 SD 1.746
Q3: The Moss Table			
Mean 4.85 SD 1.562	Mean 4.86 SD 1.424	Mean 4.94 SD 1.498	Mean 4.80 SD 1.459
Q4: Life within Object			
Mean 3.78 SD 1.672	Mean 4.25 SD 1.605	Mean 4.08 SD 1.815	Mean 4.02 SD 1.868
Q5: The Aqua Table			
Mean 4.30 SD 1.706	Mean 4.95 SD 1.605	Mean 5.18 SD 1.601	Mean 5.22 SD 1.369
Q6: Mushrooms Ate My Furniture			
Mean 2.85 SD 1.680	Mean 3.52 SD 1.804	Mean 3.56 SD 2.004	Mean 3.20 SD 1.698
Q7: The Stitch Table			
Mean 4.70 SD 1.265	Mean 5.37 SD 1.153	Mean 5.29 SD 1.320	Mean 5.44 SD 1.076
Q8: The Greenwall			
Mean 4.81 SD 1.210	Mean 5.22 SD 1.329	Mean 5.29 SD 1.300	Mean 5.57 SD 1.268
Q9: The Cultivation Kitchen			
Mean 4.78 SD 1.423	Mean 5.22 SD 1.231	Mean 5.29 SD 1.521	Mean 5.22 SD 1.488
Q10: Local River			
Mean 3.37 SD 1.944	Mean 4.43 SD 1.820	Mean 3.81 SD 2.114	Mean 4.37 SD 1.916

The summary of empirical results (Table 6.4) can be linked to the previous section of Design Preference (Section B) to confirm how the respondents, visually and emotionally perceived the FDLOs according to the percentages ranks that are highlighted in grey boxes. For example, a high percentage in Section B (Design Preference) for “the Stitch Table” shows a high percentage in positive emotions in Section C (Emotional Design). A low percentage of preferences can be seen for "Mushrooms Ate My Furniture" and it also shows a high negative percentage in emotion (Section C). From these results, it is suggested that the visual preferences are related to the emotional responses.

Table 6.4: Summary of cross study analysis of quantitative results for Section B and C

The cross study of Section B and Section C			
FDLO	Section B	Section C	
	Design Preferences	Positive Emotion	Negative Emotion
The Stitch Table 	Student: 83.3% 45 respondents International Designers/ Art and Design/ Creative: 81.5% 53 respondents Education/Academic: 71.8% 56 respondents Australian Designers: 66.7% 18 respondents	International Designers/ Art and Design/ Creative: 81.4% 53 respondents Student: 79.6% 43 respondents Education/Academic: 71.80% 56 respondents Australian Designers: 51.85% 14 respondents	Australian Designers: 14.8% 4 respondents International Designers/ Art and Design/ Creative: 7.7% 5 respondents Education/Academic: 7.7% 6 respondents Student: 1.9% 1 respondents
The Moss Table 	International Designers/ Art and Design/ Creative: 61.5% 40 respondents Student: 55.6% 30 respondents Education/Academic: 52.6% 41 respondents Australian Designers: 40.7% 11 respondents	Education/Academic: 71.7% 56 respondents Student: 62.9% 34 respondents International Designers/ Art and Design/ Creative: 61.5% 40 respondents Australian Designers: 59.2% 16 respondents	International Designers/ Art and Design/ Creative: 16.9% 11 respondents Education/Academic: 16.7% 13 respondents Student: 16.7% 9 respondents Australian Designers: 14.8% 4 respondents
The Retrofitted Rococo Chair	Australian Designers: 66.7% 18 respondents Education/Academic: 35.9%	Student: 38.9% 21 respondents Education/Academic: 38.4%	Education/Academic: 43.6% 34 respondents International Designers/ Art and Design/

	<p>28 respondents</p> <p>International Designers/ Art and Design/ Creative: 35.4% 23 respondents</p> <p>Student: 33.3% 18 respondents</p>	<p>30 respondents</p> <p>Australian Designers: 37% 10 respondents</p> <p>International Designers/ Art and Design/ Creative: 33.9% 22 respondents</p>	<p>Creative: 41.5% 27 respondents</p> <p>Student: 35.2% 19 respondents</p> <p>Australian Designers: 29.6% 8 respondents</p>
<p>Mushrooms Ate My Furniture</p> 	<p>International Designers/ Art and Design/ Creative: 26.2% 17 respondents</p> <p>Education/Academic: 20.5% 16 respondents</p> <p>Student: 18.5% 10 respondents</p> <p>Australian Designers: 7.4% 2 respondents</p>	<p>Education/Academic: 44.8% 35 respondents</p> <p>International Designers/ Art and Design/ Creative: 30.8% 20 respondents</p> <p>Student: 26% 14 respondents</p> <p>Australian Designers: 11.1% 3 respondents</p>	<p>Australian Designers: 62.90% 17 respondents</p> <p>Student: 50.1% 28 respondents</p> <p>Education/Academic: 44.9% 35 respondents</p> <p>International Designers/ Art and Design/ Creative: 43% 28 respondents</p>
<p>The Threatening Cactus Chair</p> 	<p>Student: 24.1% 13 respondents</p> <p>Education/Academic: 21.8% 17 respondents</p> <p>International Designers/ Art and Design/ Creative: 15.4% 10 respondents</p> <p>Australian Designers 3.7% 1 respondents</p>	<p>Student: 35.2% 19 respondents</p> <p>Education/Academic: 24.3% 19 respondents</p> <p>International Designers/ Art and Design/ Creative: 23.1% 15 respondents</p> <p>Australian Designers: 18.5% 5 respondents</p>	<p>International Designers/ Art and Design/ Creative: 66.10% 43 respondents</p> <p>Australian Designers: 59.2% 16 respondents</p> <p>Education/Academic: 53.80% 42 respondents</p> <p>Student: 51.9% 28 respondents</p>

6.1.3 Section E: Biophilic Design

- Table 6.5 below shows the tabulated cross comparison of the quantitative empirical data from the survey results. The noted quantitative analysis results of both designers group and the stratified group as mentioned earlier were listed earlier in Chapter 4 have also been included in this table. This table has been listed with respect to *the highest responses and the lowest responses* in relation to the questions.
- Questions from 2 until 8 were measured using a Likert scale while the rest of the questions were measured using a closed-ended question format. The relatively low

means for the noted quantitative results (highlighted in red) correspond to disagreement answers.

- The results from Question 1 show that all respondents (from both results) prefer to experience nature indoor and outdoor (more than 55%).
- Question 9 asked the respondents about their preferences on having FDLOs inside their house and more than 55% of respondents would like to have it.
- Questions from 10 until 13 were about the preferences of the respondents towards living plants and living animals that can be embedded into the furniture design. All respondents preferred *a green and leafy* type of plants (more than 49%) while for living animals, they preferred not to have a living animals embedded into furniture designs (38.9%). *Cacti* was the least preferred living plant while *reptilian and insects* were the least favoured animals to be embedded into furniture designs.







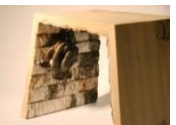
Table 6.5: Cross comparison analysis of quantitative results for section E, Biophilic Design

SECTION E: BIOPHILIC DESIGN					
Australian Designers (AD)/ International Designers (ID)			Stratified group (Art and Design/ Creative (AC), Education/ Academic (E) and Student (S))		
<i>Q1: How do you prefer to experience nature?</i>					
<i>Total</i>	<i>Highest responses</i>	<i>Lowest responses</i>	<i>Total</i>	<i>Highest responses</i>	<i>Lowest responses</i>
AD: 27	Both: 55.6% 15 respondents	Indoor: 0% 0 respondents	AC: 65	Both: 60% 39 respondents	Indoor: 3.1% 2 respondents
ID: 65	Both: 60% 39 respondents	Indoor: 3.1% 2 respondents	E: 78	Both: 59% 46 respondents	Indoor: 2.6% 2 respondents
			S: 54	Both: 64.8% 35 respondents	Indoor: 1.9% 1 respondents
<i>Q2: Do you like to have living organisms (such as plants or animals) inside your house?</i>					
SPSS					
<i>AD</i>		<i>ID/ AC</i>		<i>E</i>	
Mean 4.30 SD .953		Mean 4.17 SD .821		Mean 3.58 SD 1.087	
Mean 4.33 SD .555		Mean 4.17 SD .741		Mean 3.83 SD .973	
Mean 3.70 SD .823		Mean 3.94 SD .768		Mean 3.92 SD .818	
Mean 3.96 SD .898		Mean 4.11 SD .773		Mean 3.90 SD .815	
Mean 4.26 SD .712		Mean 4.22 SD .838		Mean 4.17 SD .813	
Mean 2.85 SD .864		Mean 2.91 SD 1.057		Mean 3.45 SD 1.015	
Mean 4.33 SD .555		Mean 4.17 SD .741		Mean 3.83 SD .973	
Mean 3.70 SD .823		Mean 3.94 SD .768		Mean 3.92 SD .818	
Mean 3.96 SD .898		Mean 4.11 SD .773		Mean 3.90 SD .815	
Mean 4.26 SD .712		Mean 4.22 SD .838		Mean 4.17 SD .813	
Mean 2.85 SD .864		Mean 2.91 SD 1.057		Mean 3.45 SD 1.015	
Mean 4.33 SD .555		Mean 4.17 SD .741		Mean 3.83 SD .973	

Mean 2.70 SD .912		Mean 2.94 SD 1.158		Mean 3.23 SD 1.161		Mean 2.94 SD .940					
<i>Q9: Would you like to have a piece of furniture with living organisms inside your house?</i>											
<i>Total</i>		<i>Highest responses</i>			<i>Total</i>		<i>Highest responses</i>				
AD: 27		Yes: 55.6% 15 respondents			AC: 65		Yes: 64.6% 42 respondents				
ID: 65		Yes: 64.6% 42 respondents			E: 78		Yes: 60.3% 47 respondents				
					S: 54		Yes: 77.8% 42 respondents				
<i>Q10: Type of plant you prefer</i>											
<i>Total</i>		<i>Highest responses</i>		<i>Lowest responses</i>		<i>Total</i>		<i>Highest responses</i>		<i>Lowest responses</i>	
AD: 27		Green and Leafy: 51.9% 14 respondents		Fruit Plant: 0% Cacti: 0% 0 respondents		AC: 65		Green and Leafy: 49.2% 32 respondents		Flowery: 4.6% 3 respondents	
ID: 65		Green and Leafy: 49.2% 32 respondents		Flowery: 4.6% 3 respondents		E: 78		Green and Leafy: 51.3% 40 Respondents		Fruit Plant: 2.6% Cacti: 2.6% 2 respondents each	
						S: 54		Green and Leafy: 50% 27 respondents		Moss: 1.9% 1 respondents	
<i>Q11: Type of animal you prefer</i>											
<i>Total</i>		<i>Highest responses</i>		<i>Lowest responses</i>		<i>Total</i>		<i>Highest responses</i>		<i>Lowest responses</i>	
AD: 27		No living animals: 48.10% 13 respondents		Amphibians: 0% Birds: 0% 0 respondents		AC: 65		No living animals: 47.7% 31 respondents		Reptilians: 0% 0 respondents	
ID: 65		No living animals: 47.7% 31 respondents		Reptilians: 0% 0 respondents		E: 78		No living animals: 52.6% 41 respondents		Amphibians: 0% Birds: 0% 0 respondents	
						S: 54		No living animals: 38.9% 21 respondents		Reptilians: 3.7% Birds: 3.7% 2 respondents each	
<i>Q12: Type of plant you least prefer</i>											
<i>Total</i>		<i>Highest responses</i>		<i>Lowest responses</i>		<i>Total</i>		<i>Highest responses</i>		<i>Lowest responses</i>	
AD: 27		Cacti: 33.3% 9 respondents		Green and Leafy: 3.7% 1 respondents		AC: 65		Moss: 24.6% 16 respondents		Flowery: 13.8% 9 respondents	
ID: 65		Moss: 24.6% 16 respondents		Flowery: 13.8% 9 respondents		E: 78		Cacti: 29.5% 23 respondents		Flowery: 10.3% 8 respondents	
						S: 54		Cacti: 27.8% Moss: 27.8% 15 respondents each		Green and Leafy: 9.3% 5 respondents	
<i>Q13: Type of animal you least prefer</i>											
<i>Total</i>		<i>Highest responses</i>		<i>Lowest responses</i>		<i>Total</i>		<i>Highest responses</i>		<i>Lowest responses</i>	
AD: 27		Reptilians: 40.70% Insects: 40.70% 11 respondents each		Mammals: 0% Fish: 0% 0 respondents		AC: 65		Insects: 32.3% 21 respondents		Amphibians: 7.7% Birds: 7.7% 5 respondents each	
ID: 65		Insects: 32.3% 21 respondents		Amphibians: 7.7% Birds: 7.7% 5 respondents each		E: 78		Reptilians: 41% 32 respondents		Birds: 7.7% 6 respondents	
						S: 54		Insects: 35.2% 19 respondents		Mammals: 5.6% 3 respondents	

These results can be concluded and linked to the results from Section B the (Design Preferences) and C (Emotional Design). These answers suggested that the type of living organisms in the FDLOs might visually and emotionally affect the preferences towards the FDLOs as shown in Table 6.6.

Table 6.6: The cross study summary of Section B, C and E

The cross study of Section B, Section C and Section E					
Section B		Section C		Section E	
The highest preferences FDLOs	The lowest preferences FDLOs	The highest Positive emotion	The highest Negative emotion	Type of plant you prefer: Highest responses	Type of plant you least prefer: Highest responses
 <p>AD: The Greenwall 70.4% 19 respondents</p>  <p>ID/AC: The Stitch Table 81.5% 53 respondents</p> <p>S: The Stitch Table 79.6% 43 respondents</p> <p>E: The Stitch Table 71.80% 56 respondents</p>	 <p>ID/AC: The Threatening Cactus Chair 15.4% 10 respondents</p> <p>AD: The Threatening Cactus Chair 3.7% 1 respondents</p>  <p>E: Mushroom Ate my Furniture 20.5% 16 respondents</p> <p>S: Mushroom Ate my Furniture 18.5% 10 respondents</p>	 <p>ID/ AC: The Stitch Table 81.5% 53 respondents</p> <p>S: The Stitch Table 79.6% 43 respondents</p> <p>E: The Stitch Table 71.80% 56 respondents</p>	 <p>ID/ AC: The Threatening Cactus 66.10% 43 respondents</p> <p>E: The Threatening Cactus 53.80% 42 respondents</p>  <p>AD: Mushrooms Ate my Furniture 62.90% 17 respondents</p> <p>S: Mushrooms Ate My Furniture 50.1% 28 respondents</p>	<p>AD: Green and Leafy: 51.9% 14 respondents</p> <p>E: Green and Leafy: 51.3% 40 Respondents</p> <p>S: Green and Leafy: 50% 27 respondents</p> <p>ID/AC: Green and Leafy: 49.2% 32 respondents</p>	<p>AD: Cacti: 33.3% 9 respondents</p> <p>E: Cacti: 29.5% 23 respondents</p> <p>S: Cacti: 27.8% Moss: 27.8% 15 respondents each</p>

6.1.4 The Relation of Question1, Question 2 and Question 9

Table 6.7 below shows that the FDLOs have a marketable potential from the potential consumers with at least 55.6% respondents wanting to have it in their home. Results also showed that even though the respondents preferred to experience nature both indoor and outdoor, it suggested that they still preferred to have living elements nearby or indoor, although it is not necessary for them to buy or to have an FDLO.

Table 6.7: the relation of Question1, 2 and 9

Q1 (experience nature)	Q2 (having FDLOs indoor)	Q9 (FDLOs inside house)
Both: indoor and outdoor 55.6% - 64.8%	Mean 3.58 – Mean 4.30 Neither agree nor disagree –Strongly Agree	Yes: 55.6% -77.8%

6.2 Triangulation Analysis of Quantitative and Qualitative Results – Online Surveys and Interviews

6.2.1 Section D – Conceptual Model

To explain further how the data were processed, analysed and triangulated in this section, a corresponding step was designed as seen in Figure 6.1 below. Firstly, 10 samples of FDLOs were selected for the online survey, and 17 interviews were conducted with the FDLOs designers. Next, the results were generated from SPSS and NVIVO and the Conceptual Model was used as a guideline to determine the main categories and subcategories that the FDLOs belonged to. Then, the analysis tables were designed to verify the relevant responses from the SPSS and NVIVO (These tables are available in Chapters 4 and 5). Following this, the triangulation table was generated, which consisted of analyses of the quantitative and qualitative results that were compared to find any similarities and differences between results. The visual representation results show detailed subcategories and FDLOs. Three (3) visual representations were developed from the triangulation table. This represented the data gathered from the interviews with the FDLOs designers, results from the Australian and International Designers and the stratified group (these illustrations can be found in the Appendix F: Chapter 6 – Triangulation, page 412 - 415). Lastly, the final representation results were produced in a table which will be explained later, which was designed to show the final summary of FDLOs and the main categories in the Conceptual Model section.

A triangulation analysis of the quantitative empirical survey results and the qualitative results can be seen in Table 6.8 below. The analysis results were listed earlier in chapters 4 and 5 had also been included in this table alongside the noted quantitative analysis and qualitative results. This table has been listed with respect to the relevant subcategories from the conceptual model which was identified from the data acquired from the survey and interviews. The results were arranged according to colour coding in as in the conceptual model (Please refer to Chapters 3, 4 and 5).

The results in Table 6.8 have been categorised into 2 sections, quantitative results from the Australian / International designers group and the stratified group of Art and Design/Creative, Education/Academic and Students. A qualitative result was from the interviewed designers. The results in this part were gathered and triangulated to elucidate the significance and the similarities in opinion about the FDLOs. The results were arranged by colour and categories from the conceptual model for easier understanding. The results, which are highlighted in red in Table 6.8 shows the similarity in responses from the quantitative and qualitative results. While 17 interviews were conducted with FDLOs designers, the results in Table 6.8 shows only 10 images of FDLOs that were used in the online survey (from the interviews, only 5 designers agreed to be included in the online survey). The 5 designs were Q1: The Rococo Retrofitted Chair, Q4: The Stitch Table, Q6: Mushrooms Ate my Furniture, Q7: The Moss Table and Q10: The Cultivation Kitchen. The comments given in the table are only for these 5 FDLOs, for the completed results of quantitative and qualitative triangulation. For brevity, the triangulation analysis for Q1: The Rococo Retrofitted Chair is shown in this section. Further analyses can be found in the Appendix F: Chapter 6 – Triangulation, page 417 – 429.

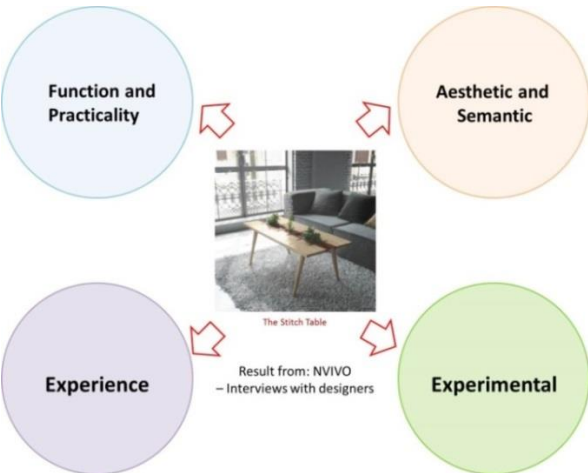
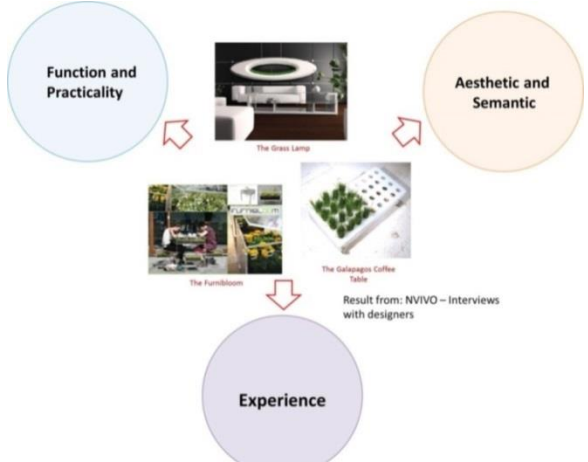
Table 6.8: Triangulation analysis of quantitative and qualitative results for section D; Conceptual Model.

SECTION D – CONCEPTUAL MODEL										
Quantitative results						Qualitative Results				
Australian Designers (AD)/ International Designers (ID)		Stratified group (Art and Design/ Creative (AC), Education/ Academic (E) and Student (S))						Interviews (FDLO Designers)		
AD	ID	AC	E		S		D			
Q1: The Rococo Retrofitted Chair										
Experimental: D5, D1, D2, D3		Experimental: D5, D1, D2		Experimental: D5, D1, D3				Experimental: D1, D2, D3, D4, D6		
		Aesthetic and Semantic: B4, B2, B1, B3		Aesthetic and Semantic: B4, B2, B1, B3		Aesthetic and Semantic: B1, B4, B2				
Experience: C2,C5, C1, C4		Experience: C1, C4, C5		Experience: C1, C2, C5		Experience: C1, C2, C5, C3		Experience: C1, C5, C6		
								Function & Practicality: A1		
<p>The similarity of answers from the quantitative and qualitative results for the <i>Q1: The Rococo Retrofitted Chair</i> can be seen here. These responses can be compared to the answers given by the FDLO designer for <i>Experimental category</i> (D1: Conceptual design, D2: Part of a research project, D3: Exploration of new materials, D4: Exploration of new technologies, D6: Other reasons) and <i>Experience category</i>: (C1: To experience nature, C5: To stimulate senses, C6: Other reasons). The survey groups also chose the subcategories of <i>Experimental category</i> (D1, D2, D3 with additional D5: To break the rules/ be different) and <i>Experience category</i> C1 and C5)</p>										

6.2.2 Final Summary and Discussion of the FDLOs and the Conceptual Model Results

For brevity, only the final summary is shown in this chapter. Based on the information gathered from the Table 6.8, as mentioned previously, visual representations which explained the connection between the results were designed. Table 6.9 below shows details of the Conceptual Model summary that were developed from the previous 3 visual representation results, by comparing each visualisation and merging the FDLOs into the similar main categories and subcategories (based on online survey and interviews results). The images were sorted and categorised according to the main categories in the Conceptual Model. Some of the designs were only categorised from the same sources such as NVIVO (designers) only or SPSS (respondents) only or both. This happens because of the findings from both data were varied between the rationales by the FDLOs designers and the opinions by respondents. It occurred because of the repetition of the FDLOs in the subcategories (please refer Table 6.8 and Appendix F: Chapter 6 – Triangulation, page 417 – 429 for further information).

Table 6.9: Detailed summary of FDLOs and the Conceptual Model from the triangulation analyses.

	<p>Based on the previous results, the Stitch Table can be categorised under all main categories of Function and Practicality, Aesthetic and Semantic, Experience and Experimental. The results were gathered from the NVIVO (interviews with designers). Results suggest the Stitch Table can belong to all main categories.</p>
	<p>From the interviews with designers, The Grass Lamp, The Galapagos Coffee Table, and The Furnibloom were categorised under 3 main categories of Function and Practicality, Aesthetic and Semantic, and Experience.</p>

<p>Function and Practicality</p> <p>Experience</p> <p>Result from: NVIVO – Interviews with designers</p> <p>The Spire</p> <p>Mushroom Ate my Furniture</p> <p>Experimental</p>	<p>The Spire, and Mushroom Ate my Furniture, were categorised under the 3 main categories of Function and Practicality, Experience, and Experimental. The results were also gathered from the interviews with designers.</p>
<p>Aesthetic and Semantic</p> <p>Experience</p> <p>Experimental</p> <p>Result from: SPSS – Online Survey (Stratified group)</p> <p>The Moss Table</p> <p>The Threatening Cactus Chair</p>	<p>The Moss Table and The Threatening Cactus Chair were categorised under the Aesthetic and Semantic, Experience and Experimental main categories. The results were gathered from the online survey of stratified groups.</p>
<p>Function and Practicality</p> <p>Experience</p> <p>Result from: NVIVO – Interviews with designers</p> <p>The Cultivation Kitchen</p> <p>The BalKonzept</p>	<p>The Cultivation Kitchen and The BalKonzept were categorised under 2 main categories of Function and Practicality and Experience. The results were gathered from the interviews with designers.</p>

	<p>The Moss Table and Chair 1: Rococo Chair Retrofitted were categorised under Experience and Experimental main categories. The Moss Table result was gathered from the online survey of Australian and International designers while the Rococo Chair Retrofitted, from both groups in the online surveys.</p>
	<p>Local River and the Threatening Cactus Chair were categorised under the Aesthetic and Semantic, and Experimental main categories. The results were gathered from the online survey of Australian and International designers.</p>
	<p>The Planter Table was categorised under the Function and Practicality category based on the results gathered from the interviews with designers while The Cultivation Kitchen results were gathered from the online survey of both groups.</p>

	<p>The Co-Habitation, Happily Ever After, and Life within Objects were categorised under the main category of Experience. The result of Life within Objects was gathered from the SPSS only, as no interview was done for this FDLO.</p>
	<p>Talita Bench Exterior, The Moss Table, the Roots and Mushroom Ate my Furniture were categorised under the Experimental main category based on the results gathered from the interviews and online surveys.</p>

The triangulation was useful to understand differences and similarities of the data from the online survey and interviews. Although the preferences and emotional responses are also significant findings for this study (which are more towards visual and emotional responses), the data gathered for the conceptual model mainly to compare, identify and validate the rationale behind of embedding the FDLOs from both qualitative and quantitative data. The main categories and subcategories helped to categorise the FDLOs by comparing the data gathered from the interviews and the survey. As results, series of tables and representation visuals which categorised the FDLOs were developed to identify the rationales and visually summarised the findings.

CHAPTER 7 CONCLUSIONS AND FUTURE RESEARCH

In this Ph.D. research project, a new typology of furniture; Furniture Design with Living Organisms (FDLOs) was proposed, and this was one of the main contributions to knowledge of this project. Many types of FDLOs were gathered, classified and investigated from theoretical and experimental points of view. A critical survey of relevant literature strongly suggested that further research into FDLOs was necessary to understand relations to biophilic design, emotional design, and further development of a proposed conceptual model. This was especially important, as no previous related empirical studies in furniture design were found. In general, the FDLOs gathered and analysed in this study had not been previously officially gathered, documented, classified or fully described as a potential new genre in furniture design, despite the fact that there are very interesting findings of this type of furniture design. Thus, another contribution to knowledge was the proposal of a theoretical model to help classify and understand different types of FDLOS, according to their different functions.

A theoretical groundwork through several iterations of proposed conceptual model developments explored the rationale of why designers incorporated living organisms in diverse types of furniture designs. The conceptual models were developed based on the initial observations, literature review, and thorough discussions in consideration of the findings and results of the gathered and classified FDLOs. After being fully developed and defined, the conceptual model was further validated and tested through the online survey. This experimental approach helped to evolve further and validate the theoretical background proposed in this project, which studied the reasons and motivations behind the designs of the FDLOs. In parallel to the conceptual model, a classification table was developed based on the types of furniture and their contexts, mainly outdoor and indoor spaces where at least 235 examples of FDLOs were documented. The FDLOs were gathered as images, and visually identified from books and design websites.

As previously discussed in this thesis, the empirical investigation was developed in 5 phases as follows: Phase 1: Literature review and initial observation on FDLOs, Phase 2: Conceptual model development, Survey and Interviews Design, Phase 3: Field Work and Data Collection, Phase 4: Analysis of Data and Latest Theoretical Development and Phase 5: Conclusions and Further Research. As part of the data collection, an internet survey was disseminated online, where 260 general respondents answered the questionnaires before another 27 Australian designers, as the latest sample, agreed to participate. Then, a stratified group was identified to

compare the quantitative findings. In parallel to the online survey, 17 FDLOs designers were interviewed for the qualitative data collection. Results were analysed using SPSS 23 and Microsoft Excel for the quantitative data and NVIVO 10 for the qualitative data. The main overall findings have been discussed in previous chapters, and a summary of conclusions will be discussed in more detail in this chapter.

The research methodology of this study was based on a modified pragmatic approach, which is a cross-over mixed analysis (Onwuegbuzie et al., 2009). This method is distinct from the parallel mixed analysis (Onwuegbuzie et al., 2009) because it uses different sets of questionnaires with different respondents, which were conducted separately for the online questionnaire and the interview. The findings from the qualitative and quantitative parts of this study were triangulated to validate the results further and presented previously in Chapters 4 and 5.

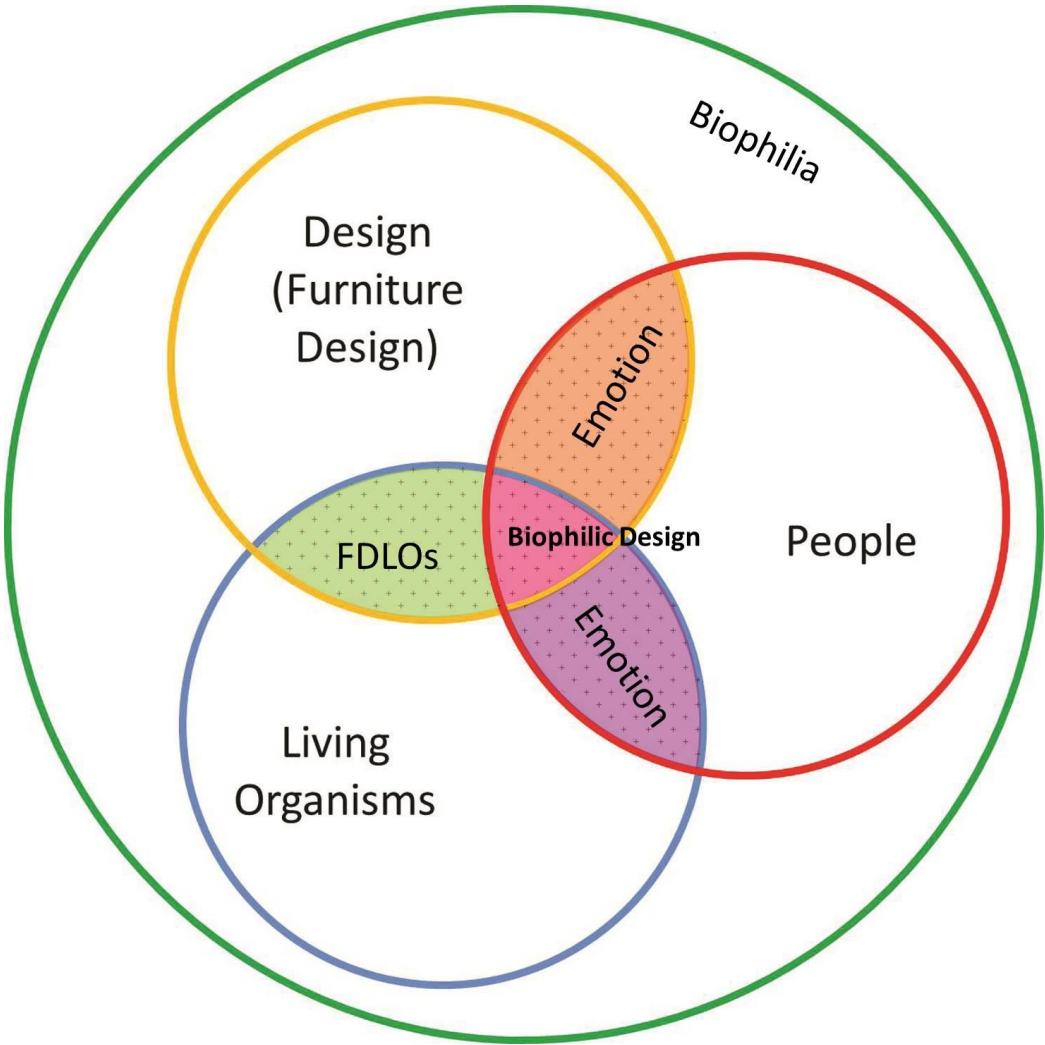
7.1 Achieved Aims and Answers to the Research Questions

The main aim of this study, which was also the basis for the main research question of this study, was: “To better understand the relationships between furniture design, biophilia theory and emotional design, through exploration and analysis of the influences of furniture designers and perceptions by potential users, in regards to furniture that incorporates living organisms such as plants and animals”. A fundamental objective of this study was to generate new knowledge and provide the groundwork to further understand the connections between FDLOs, biophilia, biophilic design and emotional design.

Figure 7.1 below shows an interdependence model of the main topics, as a conclusion of this study. In this interdependence model, the researcher proposes that furniture design, biophilia theory, biophilic design and emotional design are related to each other. The outer circle (green) represents *biophilia*, which was the basis for this study. Biophilia theory is the theoretical foundation for this study, as it provides the basis and ideology for the principles of *biophilic design*. Inside *biophilia* are 3 main elements, which are *design* (main focus on this project was specifically furniture design, yellow circle), *living organisms* (blue circle) and *people* (red circle). The main connection of these 3 elements is *biophilic design* (shaded in pink), which is thus placed in the centre of the model. This diagram also shows the connection and relationships between *furniture designs* and *living organisms* (shaded in light green) which is what constitutes *FDLOs*. *Emotions* are central to people, as they are psycho-

physiological reactions, many times triggered by external elements. As such, both *Furniture Designs*, as well as *Living Organisms*, can independently trigger positive or negative emotions in people. However, in the intersection of *Furniture Designs* and *Living Organisms* (FDLOs, the object of this study) *Emotions* are strongly linked to *Biophilic design*. Moreover, emotional design theory was an important topic in this study, which helped identifying an adequate method to measure or understand emotions related to products, translated to the development of an emotional scale specifically designed for this project, that, while strongly based on previous groundwork, is also a minor contribution to knowledge of this project. This emotional scale was used to identify the reactions of respondents towards the FDLOs. In summary, this interdependence diagram shows the connections of the main topics of this study, answering the main research question and addressing the main aim of this study.

Figure 7.1: The interdependence model showing the connections between furniture design, living organisms, biophilia theory, biophilic design and emotional design



Based on the findings from the online questionnaires, it can be concluded that the living organisms that were visually experienced through the images of the FDLOs and used in the questionnaire did affect the preferences, perceptions and emotional responses of respondents in different ways. This was evidenced, for example, in answers by respondents to questions that used the 7-point semantic scale specifically designed for this study to measure the emotional reaction. The scales showed strong tendencies of groups of people who had the same preferences or reactions towards certain FDLO's, and certain living organisms; plants or animals.

7.1.1 Emotional Design in FDLOs

Emotions generated by visual perceptions of FDLOs certainly can affect the preferences towards the images in surveys, and these emotions might be triggered by common reactions to natural elements, as well as by the type of furniture and its material. As could be expected, observing certain images, for example, *the Threatening Cactus Chair*, created a discomfort feeling in a high percentage of respondents. Unfortunately, the designer of this piece was not available for an interview, but from the online explanation of this piece it was suggested that the designer's intention was to be playful, while exploring visual experience in design. As written in his design blog:

“The Cactus Chair lets you get comfortable doing something your brain might naturally warn against sitting atop a 10-inch barrel cactus. The chair's transparent cast-acrylic planes challenge you to ignore the threat in all its thorny glory. You will be kept on the edge of your seat, surprisingly comfortable.”

Source: <http://thislexik.com/cactus-chair>

Another controversial design that triggered a high percentage of answers of “discomfort” in the emotional section of the survey was the image of *the Local River*, a furniture piece with snake-like fish in a square transparent tank with glass cases full of plants on top of it. As was expected, images of the snake-like fish were found intriguing, discomforting or even repulsive by some respondents. It is interesting here to understand the disconnection between the designer's intention and the public perception. This designer's intention was to try to develop an indoor farming concept. However, the general perception of some of these animals or plants was not necessarily positive. The selection of furniture pieces like the two examples described above was totally deliberate and intentional for this project, as it was suspected from the beginning that these FDLOs would be controversial.







The Stitch Table and *the Greenwall* were the most favourable designs that were also rated with the highest positive emotional responses. The Australian Designers preferred the *Greenwall* while the stratified group and the International Designers preferred the *Stitch Table* (based on design preference question). *The Stitch Table* has a simple design in wood, with green leafy plants embedded on top of it. *The Greenwall* has a more interesting curvaceous form, distinctive from typical wall shelves. With the addition of the green leafy plants, it was perceived as pleasant and comforting. As is well known in design, the type of furniture, form, shape, function and practicality of the furniture pieces influence respondents' decisions. However, interestingly, in the images described above, both designs were embedded with green leafy plants, and this is consistent with results of questions in Section D of the online survey, and other related studies found in the literature review, where these types of plants are generally preferred in domestic settings. A preference of people for green leafy plants over other plants (such as moss or fungi, for example) in interiors, and especially in furniture, is also a conclusion of this project, and further validates previous related studies. While merely a speculation, possibly the use of natural materials such as woods also had an effect on the preference for *the Stitch Table*, although this was not necessarily addressed in this study, and should possibly be verified in further studies. Both positive and negative emotional responses towards living organisms embedded in furniture were analysed within this study. Interestingly, and in relation to caring for living organisms, such as pets and plants, a majority of the interviewed designers themselves (16 out of 17) thought that nature, in the form of plants and animals/pets, can encourage emotional attachment of people with their furniture.




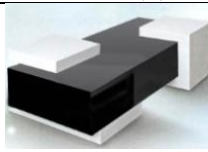






Positive and negative emotions revealed by the results were somehow predictable (yet further validated by this study), and related to the types of living organisms embedded by the designers. This shows that living organisms, in many cases, plants which are considered “ornamental”, and pleasant to the eyes as flowers or green leaves, created more positive affect, as opposed to the pointy thorns on the cactus or white and brown fungi. While varieties of fungi or mushrooms are delicacies in many cultures and could eventually be related to indoor farming for food, they can also be interpreted as parasites. While valid as a concept and experiment in design, having mushrooms on pieces of furniture was something that created a negative response from the participants in the survey, possibly because it had an aesthetic or semantic intention (communicate), rather than a practical reason (grow food). This explanation might also explain reactions to the *local river FDLO*.

In order to collate some of the main findings, Table 7.1 summarizes the emotional responses received by the FDLOs, while highlighting the living organisms used or embedded in the designs. The images of Furniture Design Without Living Organisms (FDWLOs) are also included in the table to show the relevant information gathered from this study. This table was developed based on the results of the online survey, with the use of 10 images of FDLOs. The table below summarizes the emotional responses, preferences, and types of living organisms gathered from the results. Findings of this research suggest that the combination of design (based on materials, forms etcetera) with certain types of living organisms, affect the preferences of the respondents towards FDLOs. For example, *the Threatening Cactus Chair*; with the usage of transparent glass and big pointy cactus underneath, makes the FDLO to be perceived negatively, both because of its living organisms, but also because of its material and forms. Another example of furniture that was preferred mainly for its physical appearance was *the Life within Object*, when at least 63% of respondents preferred it in fabric material and without living organisms, rather than the one incorporating the living organisms. The turtle in this specific FDLO (in the photo) is a reptilian, type of animal which was also the least preferred living animal according to the final questions in the survey.

As can be seen below, almost half of the FDLOs received a negative reaction from the respondents. This includes the *Threatening Cactus Chair*, *The Retrofitted Rococo Chair*, *Life within Object* and *Mushrooms Ate my Furniture*. Five (5) other designs which are *The Stitch Table*, *The Moss Table*, *The Aqua Table*, *The Cultivation Kitchen*, and *The Greenwall* received a positive emotional reaction. *The Local River* otherwise received both negative and positive reactions from the respondents. As in the case of the *Local River*, the divided emotional responses might be because of the functionality or the perceived usage, as it was shown in the image, and the respondents saw it as a design that may benefit them in the future, albeit having the images of snake-like fish in the tank. This was similar in the *Cultivation Kitchen*, where typical users preferred the kitchen counter without any vegetation. For *the Retrofitted Rococo Chair*, this might be different as it received both negative reactions for FDLO and FDWLO. Possibly, being some of the groups of respondents designers, they might consider this design is outdated. The same organisms (insects) might have been perceived differently, using another material or a more contemporary furniture design, rather than the original version of Rococo chair.

Table 7.1: Summary of emotional responses and preferences towards FDLOs

Name	Images of Furniture design in the survey		Types of living organisms (Section E)	Emotional responses (Section C)	Preferences (Section B)
	FDLO	FDWLO			
The Threatening Cactus Chair			Cactus: 33.3% least preferred Cactus	AD: Negative ID/ AC: Negative E: Negative S: Negative	Preference more towards the FDWLO, at least 75.9% for all respondents
Reaction:	Negative (-)	Positive (+)	Negative (-)	= Negative (-)	
The Retrofitted Rococo Chair			Ants (insects) 40.70% least preferred insects Green leaves: More than half preferred Green leafy plants	AD: Positive ID/AC: Negative E: Negative S: Negative	Australian designers preferred FDWLO while other respondents preferred the FDLO
Reaction:	Negative (-)	Negative (-)	Negative (-) for insects Positive (+) for green leaves	= Negative (-)	
Life within Object			Turtle (reptilian): 40.70% least preferred reptilian Green and Leafy: More than half preferred Green leafy plants	AD: Negative ID/AC: Positive E: Positive S: Positive/ Negative	Preference more towards the FDWLO, at least 63.1%
Reaction:	Negative (-)	Positive (+)	Negative (-) for reptilian Positive (+) for green leaves	= Negative (-)	
Mushrooms Ate my Furniture			Mushrooms/ Fungi: Not included in the questionnaire, but mushroom/ fungi perceived negatively when embedded into the design as in results.	A: Negative ID/ AC: Negative E: Negative S: Negative	Preference more towards the FDWLO, at least 73.8%
Reaction:	Negative (-)	Positive (+)	Negative (-)	= Negative (-)	
The Stitch Table			Green and Leafy: More than half preferred Green leafy plants	AD: Positive ID/AC: Positive E: Positive S: Positive	Preference towards the FDLO
Reaction:	Positive (+)	Negative (-)	Positive (+)	= Positive (+)	

The Moss Table			Moss: Least preferred plant	AD: Positive ID/AC: Positive E: Positive S: Positive	Australian designers preferred FDWLO while other respondents preferred the FDLO
Reaction:	Positive (+)	Positive (+)	Negative (-)	= Positive (+)	
The Aqua Table			Fish: Most preferred animals	AD: Positive ID/AC: Positive E: Positive S: Positive	Preference towards the FDLO
Reaction:	Positive (+)	Negative (-)	Positive (+)	= Positive (+)	
The Cultivation Kitchen			Vegetables (Green and Leafy): More than half preferred Green leafy plants	AD: Positive ID/AC: Positive E: Positive S: Positive	Preference more towards the FDWLO, at least 51.1%
Reaction:	Positive (+) and Negative (-)	Positive (+)	Positive (+)	= Positive (+)	
The Local River			Vegetables (Green and Leafy): More than half preferred Green leafy plants Fish: Most preferred animals	AD: Negative ID/AC: Positive E: Negative S: Positive	Preferences are divided towards both designs
Reaction:	Negative (-)	Positive (+)	Positive (+)	Positive (+)	= Both Negative (-) and Positive (+)
The Greenwall			Green and Leafy: More than half preferred Green leafy plants	AD: Positive ID/AC: Positive E: Positive S: Positive	Preference towards the FDLO
Reaction:	Positive (+)	Negative (-)	Positive (+)	= Positive (+)	

Perceptions and emotions about FDLOs and FWDLOs can be very subjective, as design is, and can vary among different people and cultures. Interestingly, reviewers of the dissertation provided their own interpretations of some of the designs here studied. For example, comments referring to The Stitch Table noted that people could interpret the FDWLO as incomplete or with missing items, due to the gap in the table surface. Other interesting comments were related to the possibility of people preferring The Retrofitted Rococo Chair without plants, not due to the plants themselves, but to the practicality of not harming them. Furthermore, a comment on the negative perceptions of cacti or mushrooms noted that the arrangement of the living organisms would influence their perception, and that cacti or mushrooms could be perceived positively with different arrangements in other FDLOs.

7.1.2 Emotional Design in Product Design

Dazkir and Read (2011, page 3) discussed about emotions and design,

“Evoking emotions through design provides rich interactions, and it influences satisfaction with the artifacts we use in our daily lives. Artifacts – whether designed settings or products - can appeal to human emotions through their usability, social or cultural context, semantics, and affordability”.

From the discussion above, it can be conferred that designs which can arouse emotions can generate deeper connections between the users and the designs. Consumers purchase products not only because of the products’ functionality but to satisfy them emotionally. Designers use emotions in design as a way to convey a message to consumers. As discussed in this study, a majority of the designers (from the interview) affected the emotions (positively or negatively) of the audiences (directly or indirectly) through the application of living elements in their designs. Moreover, Khalid and Heelander (2006) stated that the way users look and interpret a product are influenced by the cultural background and this affected the emotional experience of the consumers, where Western cultures encourage open emotional expression, while Eastern (Asian) cultures promote emotional balance and control. From this, it can be seen that there is a connection between emotional reaction, preferences and opinions on types of living organisms (in this study) which are dependent on countries or cultures of the respondents (as discussed in this chapter).

In regards to this study, the adaptation of natural elements can certainly evoke the emotional states of the users positively or negatively. This study has also explored the connection of emotions towards the natural elements. A question about emotional attachment was asked in the interviews. The question was; Do you think that natural elements can encourage emotional attachment of people with their furniture? 16 out 17 designers agreed that the adaptation of natural elements can encourage emotional attachment with the designs.

To sum up, this study completed its aims and answered the questions by:

- Providing a further understanding of furniture design, especially in its relation to embedded living organisms, by proposing a new furniture genre, and its relationships with biophilia theory and emotional design. Furniture design can have different meanings and interpretations, and generate a wide variety of emotions in people. This variety of emotions can also be enhanced when the furniture is embedded with living

organisms, where the owner or other people in contact with FDLOs get to be closer to nature, learn to care and become more conscious about other living organisms (related to Biophilia), especially in interior environments. However, living organisms might also cause a negative reaction to the FDLOs, as in cases of Biophobia, or simply disliking a type of plant or animal.

- This study also helped to identify relevant researches and studies from architecture, landscape and other related fields as stated previously, which show how nature can benefit the psychophysiological state of human beings. It also evidenced a gap in knowledge.
- Examples of FDLOs were identified and classified, and the rationales, main reasons, and purposes of designs of furniture embedded with living organisms were described through the conceptual model and were further validated and discussed in the survey and interviews. This helped to answer the second Research Question about the criteria to classify and understand current examples of furniture with living organisms.
- A new genre (FDLOs) and typology of furniture designs (at least 235 FDLOs were documented) was proposed through this study. A conceptual model and classification system to describe and understand FDLOs was also developed. This establishes groundwork that can be used as a starting point and guideline for further future research.
- The development and dissemination of the online questionnaire were to determine people's perceptions towards FDLOs, and the effects this type of furniture causes on people, mainly in relation to emotion. Interviews with designers were conducted to find the rationale and intentions behind the designs. The analyses of results helped to answer the 3rd and 4th research questions about the rationale behind the FDLOs and how people perceived them.
- Some FDLOs studied here generated negative emotions, which were predictable due to the normal reactions of people towards certain living organisms that are generally perceived as dangerous or repulsive, such as in the described cases of FDLOs with cactus and snake-like fish. However, overall a strong preference towards the positive effects of natural elements as proposed by the biophilia theory was found in this study. As evidenced by the results of questions 3 and 5 of section E in the survey, a majority of respondents agreed that living organisms or nature could help to release stress and calm people. A majority of respondents also agreed that having living organisms

embedded in furniture could possibly foster a sense of care for nature. On the other hand, answers to questions 7 and 8 evidenced that a majority of respondents disagreed with negative connotations towards natural living elements in interior spaces, such as that living organisms or nature can be dangerous or inconvenient (as in a case of allergies), or that the living organisms or nature are not desirable.

- Although further research and different related studies are necessary, these findings do seem to suggest overall positive emotional reactions towards nature, in line with biophilia theory and biophilic design.

From this study, the key findings were:

- Living plants such as cactus and mushrooms can be perceived as dangerous or dirty, not surprisingly the least favourable plants to be embedded into FDLOs. Potential users or buyers are less likely to choose furniture designs which include such living organisms. This research showed an overall trend of positive emotions towards green leafy plants, as well as overall trend of negative emotions towards spiny cactus and fungi (mushrooms), which was consistent with findings of other related studies found in the literature.
- Based on the findings, these living elements were usually embedded by the designers into furniture pieces as conceptual explorations, to create a strong message (especially for *Mushrooms Ate my Furniture*; to use natural materials to decompose unused furniture designs for sustainability, and *The Moss Table*; to show potential domestic usage of biophotovoltaic energy). Some FDLOs used the living organisms to propose a visual contradiction with the function of the furniture pieces (danger and comfort) and not necessarily to beautify or make the furniture more pleasant or attractive.
- Results also showed that FDLOs have the potential to be used indoor/inside the house, as at least 55% of the respondents would like to have the FDLOs in their house. This also suggests potential marketing possibilities for FDLOs, which in many cases are concepts, and not commercial products.
- While in this study, organisms such as mushrooms or cacti were perceived negatively due to their position or function in the furniture pieces, these same living organisms could also be perceived positively, if used in a different way, as for example cacti as part of a decorative terrarium. On the other hand, some living organisms which can be perceived negatively on their own can also be perceived positively if intelligently used in an FDLO. This is the case of moss, which was least preferred to be embedded in

furniture (see results of question 12, page 113). Nevertheless, the “moss table” was one of the preferred FDLOs by Australian designers, as seen in table 4.12, page 90. These findings further strengthen the importance of the relationship of the furniture pieces and the living organisms in the overall perceptions by potential users. In summary, the main impact of this research project towards design fields includes a new classification and development of furniture design (new genre in industrial design), and compilation of exploration in new materials and technologies for furniture.

7.2 Main Findings from the Interviews

- By using the conceptual model as basis, the reasons for using the living organisms in the furniture designs studied were mainly related to *A: Function and Practicality* (43.28%) followed by the *Experience category* (31.34%). This showed that most designers focused on the functionality of living organisms in designs, rather than to beautify or to make the furniture look more interesting.
- Nature, plants or animals were the main inspiration for the designers of the FDLOs, with a percentage of 29.03%.
- A slight majority (58.82%; 10 out of 17) of the interviewed designers didn't know about biophilia theory or biophilic design when they created their FDLOs. Most designers considered their designs to be classified within other design trends, for example, Green design or Sustainable design (23.52%; 4 designers). During the interviews, 29.41% (5 out of 17) considered that, while unintentional or not necessarily a main concern during the design process, their FDLOs could be related to biophilic design.
- Emotional design was also not a conscious or main consideration when the designers initially conceptualized their FDLOs. However, some designers considered emotional design to be important, as it can help understand and improve the product's relationship with the user, as well as possibly make the furniture pieces more desirable or marketable.
- The overall results gathered from the themes suggested that the designers were more focused on the functionality, practicality and user experience reasons, rather than on experimental, aesthetic and semantic reasons.

7.3 Relation of the Conceptual Model to the Survey and Interviews

From previous discussions with the assessors and audiences in confirmation seminars, it was suggested that the conceptual model should be tested and validated through the survey. The simplest version of the conceptual model was designed, hoping respondents could understand and see the connections between the questions and the conceptual model. The results which were gathered from the conceptual model section were analysed and triangulated. Detailed results are in chapters 4, 5 and 6. Table 7.2 was designed as a summary for the subcategories and shows the connection of findings from the interviews and the survey. Based on the results, 5 out of 10 FDLOs were involved in both survey and interviews. This table also shows whether the answers selected by the respondents were aligned with the designers' intentions for the selected FDLOs.

In Table 7.2 below, the similarity of answers gathered from both interviews and surveys can be seen highlighted in red boxes. For example, *the Retrofitted Rococo Chair* was mostly categorised in the *D: Experimental* main category, where both survey respondents and interviewed designers had the same opinions on *D1: Conceptual design*, *D2: Part of a research project*, and *D3: Exploration of new materials*. Both groups of respondents also agreed that *the Retrofitted Rococo Chair* can be classified in the *C: Experience* main category, by choosing the answers *C1: To experience nature* and *C5: To stimulate senses*. The interview with the designer of *the Stitch Table* showed a different opinion for the *D: Experimental* category, where the FDLO was a conceptual design and was made within a research project. However, the respondents in the survey did not think the FDLO was a conceptual design. They thought this design has potential to be manufactured (based on the images provided - details of images are in chapter 3).

Table 7.2: A summary table of the relations between the conceptual model, interviews and questionnaire

Subcategories/ FDLOs	A 1	A 2	A 3	A 4	A 5	A 6	B 1	B 2	B 3	B 4	B 5	B 6	C 1	C 2	C 3	C 4	C 5	C 6	D 1	D 2	D 3	D 4	D 5	D 6		
<i>The Rococo Retrofitted Chair</i>																										
Interviews									√				√					√	√	√	√	√			√	
Survey													√					√	√	√	√					
<i>The Stitch Table</i>																										
Interviews			√			√	√	√	√				√					√	√	√						
Survey							√	√					√													
<i>Mushrooms Ate my Furniture</i>																										
Interviews		√				√								√					√	√	√					√
Survey														√					√	√	√					
<i>The Moss Table</i>																										
Interviews									√					√					√	√			√			
Survey														√					√	√			√			
<i>The Cultivation Kitchen</i>																										
Interviews	√	√								√			√	√	√				√							
Survey	√	√											√	√	√											

The conceptual model (details in Chapter 3) was validated by triangulating the results gathered from SPSS and NVIVO. A triangulation table was specifically designed for the conceptual model section, using colour coded buttons (more details in Chapter 6 and Appendix F: Chapter 6 – Triangulations, page 412 - 415). The final visual representations were also designed to show the connection of each FDLO with the main categories and subcategories of the conceptual model (can also be found in Chapter 4 and 5).

From the interviews with FDLOs designers, various “other reasons” were found, but these were not included in the current conceptual model. The various “other reasons” that were categorised under the A6, B6, C6, and D6 can be analysed in view of the conceptual model, for future development. Samples of “other reasons” are included in Table 7.3 below:

Table 7.3: Various other reasons to be considered for new developments of future conceptual models

A6	B6	C6	D6
<ul style="list-style-type: none"> • Practicality reasons • Multipurpose/multifunction furniture • Commercialized products • Space saving • To bring life to the objects • To design small garden pieces • Solve seating need of project • Fitting visual for space/comfort and practicality • Created a culture of work between man and nature • To find some synergy between nature, living organisms, which can give people a service • To decompose the furniture • To welcome insects rather than fighting them 	None included	<ul style="list-style-type: none"> • Growing up with plants • Having no plants inside the house is like missing something • Interest • To promote the strong relationship • To take care of your plants 	<ul style="list-style-type: none"> • Designed for a competition or exhibition • To question • Encapsulating landscape • New or other design genres: <ul style="list-style-type: none"> ○ Deformation ○ Symbiont or symbiosis ○ Permaculture design

As overall general conclusions, Table 7.2 also summarizes other reasons of why designers embedded the living organisms. Category B: *Aesthetic and Semantic*, was not a primary consideration for designers to include living organisms. Based on the findings, most FDLOs here studied were designed more towards *functionality, practicality, experience* and also for *experimental* purposes, but not focused on typical *aesthetic* design considerations, such as physical appearance, colour, shape and form, etcetera. This project evidenced that there is misalignment between designer’s original design intent for the FDLOs (e.g. they mentioned “Function & Practicality”) and the perception on the same FDLOs of the people surveyed (e.g. they did not mention “Function & Practicality”).

Also, as summarized in table 7.1, above, while not necessarily proving or disproving Biophilia and Biophilic Design in FDLOs, in general it can be concluded in this study, and more specifically from the online survey, that: among living organisms, plants were usually preferred to animals. Among plants, green leafy plants were preferred to others, such fungi or moss. Finally, in relation to the furniture pieces, contemporary simple designs were preferred to more complicated antique designs, and finally, in relation to materials, fabrics and wood were usually preferred over materials such as glass or acrylic.

7.4 Recommendations for Future Research

It is known that there are many variables that could affect results related to this research, influencing perceptions both of product and furniture designs, as well as living organisms. For example, designers perceive products differently to other people. It is also well known that perception of living organisms, especially plants or animals, might be influenced by demographics, culture, religion, place where people live (including country, climatic conditions, cities vs. countryside, etcetera), profession, and even ethics and personal beliefs, among others. After conducting this research, many related questions still arise. For example: Why did respondents prefer plants over animals to be embedded in furniture? Is one of the reasons because plants are static, and animals are dynamic and move? Is it because of ethical or humane considerations towards animals being “trapped” in a piece of furniture?

Mindful of the limitations of the study, previously described in chapter 1 (page 7), the purpose of this research was not necessarily to identify the types of living organisms, or the design characteristics of furniture, which generated positive or negative reactions. However, these items, as well as the above questions, are worth of further future research. Other studies could be designed and conducted towards a more in-depth understanding of the interactions between different aspects of both living organisms and furniture designs. For example, a study using identical pieces of furniture with different types of living organisms could definitely provide information about preferences towards living organisms. On the contrary, a study of identical organisms in different types of furniture could evidence the influence of the furniture designs (physical forms, materials and overall appearance) in the perception of these living organisms. These potential variations of the study, and the use of physical furniture pieces rather than just images, are definitely worth of further research and could validate some of the findings of this project in the future. If this study could be conducted using actual prototypes, it might have deeper reactions and emotional responses, as respondents would not only rely on an image and its interpretation (visual stimulus), but could use the 5 senses to explore and perceive the FDLOs.

Another opportunity for further research includes simplifying and further refining the conceptual model. For example, the subcategory “to learn” as a purpose of a FDLO, could be better described by “to educate”.

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Appendix A: Consent Forms

- Informed Consent Form for Survey Participants
- Informed Consent Form for Interviews Participants



Appendix A: Consent Forms

Appendix A

INFORMED CONSENT FORM FOR SURVEY PARTICIPANTS

Researcher

Nurul 'Ayn Ahmad Sayuti
PhD Candidate
Faculty of Arts and Design
University of Canberra ACT 2601
Australia

Project Title: **A Study of Emotion, Influences and Perceptions of Furniture Design with Living Organisms in Relation to Biophilic Design**

The main purpose of this study is to better understand relationships between furniture design, biophilia theory and emotional design through exploration of the influences of furniture designers and perceptions by potential users in regards to furniture which incorporates living organisms such as plants and animals. This study is for academic purposes. The benefit of this study is to create new knowledge in the topics of furniture design, emotional design and biophilic design.

Consent Statement

This research is only for academic purposes and all efforts will be made to keep the information confidential as well as keep the identity and personal data of the participant anonymous and private.

I have read and understood the information provided. I am aware of any conditions that would prevent my participation, and I agree to participate in this project.

I have had the opportunity to ask questions about my participation in this research. All questions I have asked have been answered to my satisfaction.

Participant's Name : _____
Date : _____

Disclaimer: images may include animals such as fish or snakes. If by chance you might be disturbed by these, please let us know beforehand, or you may opt out to participate.

Some of the images have been digitally altered for the purpose of this study, and not all of the products are shown as the designers originally intended or as they're published. All efforts were made to get approvals from the designers of the pieces that were digitally altered.

Do you agree to participate? Yes No

A summary of the research report can be forwarded to you or your representative when published. If you would like to receive a copy of the report, please include your email address below.

Email Address : _____

If you have any questions regarding the questionnaire and survey, please contact the researcher using the address below:

Nurul 'Ayn Ahmad Sayuti
PhD Candidate
Faculty of Arts and Design
University of Canberra ACT 2601
Australia
P: +61406433188
Email: u3092325@uni.canberra.edu.au

For any other queries and concerns, please contact Dr Carlos Montana Hoyos, Supervisor of this project. Email: carlos.montana.hoyos@canberra.edu.au



INFORMED CONSENT FORM FOR INTERVIEW PARTICIPANTS

Researcher

Nurul 'Ayn Ahmad Sayuti
PhD Candidate
Faculty of Arts and Design
University of Canberra ACT 2601
Australia

Project Title: A Study of Emotion, Influences and Perceptions of Furniture Design with Living Organisms in Relation to Biophilic Design

The main purpose of this study is to better understand relationships between furniture design, biophilia theory and emotional design through exploration of the influences of furniture designers and perceptions by potential users in regards to furniture which incorporates living organisms such as plants and animals. This study is for academic purposes. The benefit of this study is to create new knowledge in the topics of furniture design, emotional design and biophilic design.

Consent Statement

This research is only for academic purposes and all efforts will be made to keep the information confidential as well as keep the identity and personal data of the participant anonymous and private.

I know that my interview via Skype will be recorded and transcribed by the researcher or assistant.

I have read and understood the information provided. I am aware of any conditions that would prevent my participation, and I agree to participate in this project.

I have had the opportunity to ask questions about my participation in this research. All questions I have asked have been answered to my satisfaction.

Participant's Name : _____
Date : _____

Do you agree to participate? Yes No

A summary of the research report can be forwarded to you or your representative when published. If you would like to receive a copy of the report, please include your email address below.

Email Address : _____

If you have any questions regarding the interviews survey, please contact the researcher using the address below:

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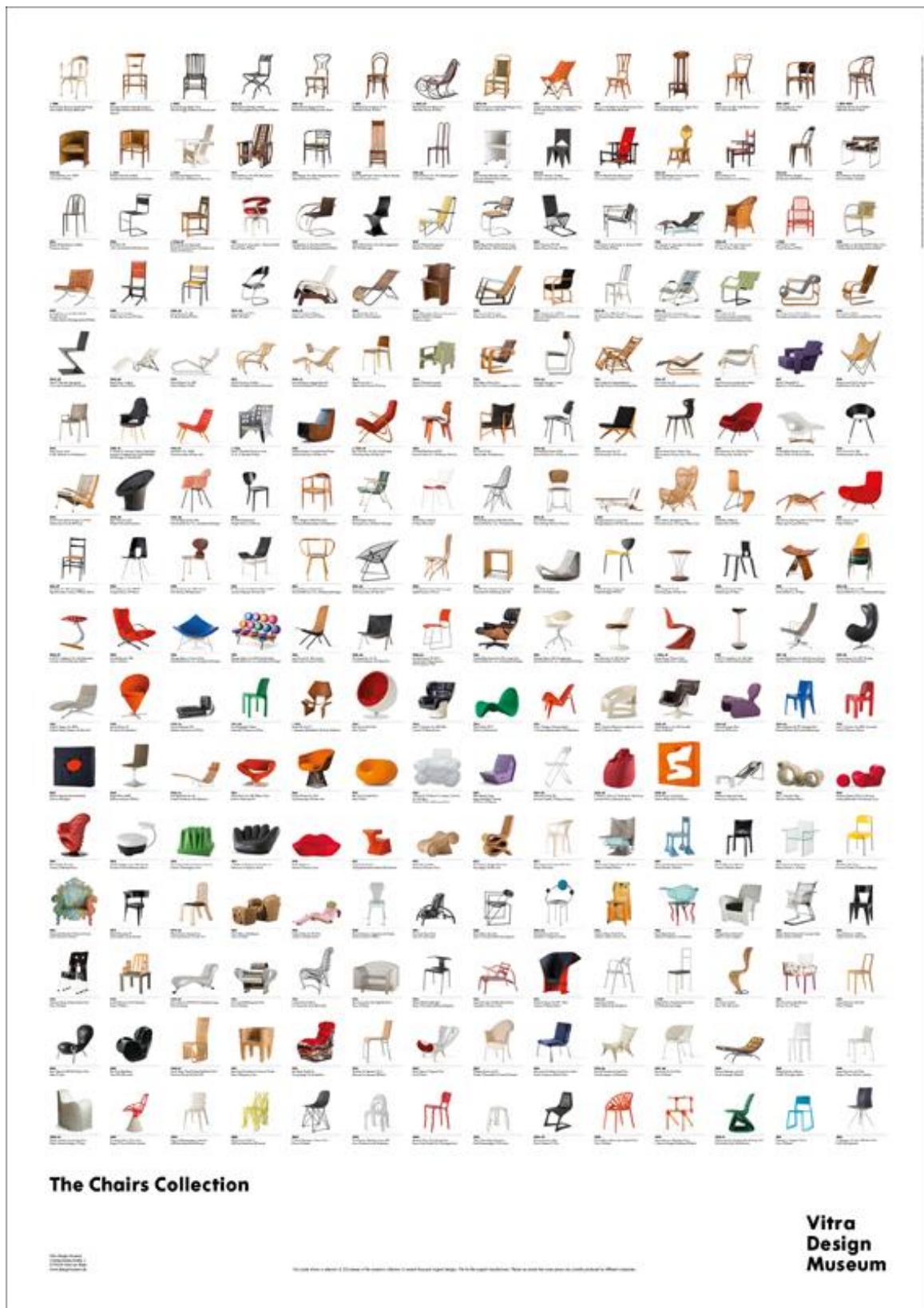
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Appendix B: Chapter 2 – Literature Review

- Vitra Design Museum Chairs Collection
- Studies in architecture or biophilic urbanism
- Terrapin Bright Green

Appendix B: Chapter 2 – Literature Review

Vitra Design Museum Chairs Collection



Retrieved from: <http://www.design-museum.de/en/collection/100-masterpieces.html>,
<http://shop.design-museum.de/en/more/>

Studies by Reeve et al. (2012) and (2013) in architecture or biophilic urbanism

Table 1: Overview of biophilic elements, across scales of application

Element		Forms	Specific Benefits	Common Benefits
Building	Indoor Plants	<ul style="list-style-type: none"> - Pot plants in buildings - Indoor living walls, including pots within a frame (also see Green Walls) - Indoor planted vegetation, such as atriums and large planted installations 	<ul style="list-style-type: none"> - Reduces illness - Increases productivity - Improves air quality 	Revitalises urban environments
	Green Roofs	<ul style="list-style-type: none"> - 'Intensive': Soil deeper than 200mm and vegetation up to the size of trees - 'Extensive': Soil up to 200mm with ground cover vegetation 	<ul style="list-style-type: none"> - Improves building energy efficiency - Water management - Space efficiency - Food production - Sound insulation - Increases roof/wall lifespan - Vertical urban farming 	Reduces urban heat island effect
Neighbourhood	Green Walls	<ul style="list-style-type: none"> - Internal and external green walls - Include: vegetation directly attached to infrastructure (such as ivy), panel systems with substrate (such as preplanted panels with soil), and container or trellis systems. 	<ul style="list-style-type: none"> - Encourages walking, and cycling - Reduces building cooling/ heating energy use - Water management - Food production 	Improves air quality Improves microclimate
	Green Verges	<ul style="list-style-type: none"> - Street trees and canopies - Shade planting for buildings - Green streets and alleys that create cool pervious greenways - Rain gardens and bio-swales integrated into stormwater management plan and consisting of pervious channels - Green permeable sidewalks 	<ul style="list-style-type: none"> - Encourages walking and cycling - Reduces building cooling/ heating energy use - Water management - Food production 	Sequesters carbon/ reduces greenhouse gas emissions Increases biodiversity
	Green Islands	<ul style="list-style-type: none"> - Urban parks and gardens placed close to transportation routes - Community farms close to homes - Residential backyards - Lawns and gardens (public and private) 	<ul style="list-style-type: none"> - Encourages walking and cycling - Food production - Increases community cohesion 	Improves water cycle management Provides amenity
City	Green Corridors	<ul style="list-style-type: none"> - Green corridors (biodiversity corridors) reaching outside the urban area - Highway crossings and migratory routes - Backyard commons - Vegetated buffer zones along coastal areas 	<ul style="list-style-type: none"> - Links biophilic elements - Encourages walking and cycling 	Enhances well-being/ reduces stress Recreation
	Urban Farming	<ul style="list-style-type: none"> - Large scale community gardens and urban farms - Urban and peri-urban agriculture 	<ul style="list-style-type: none"> - Food production - Employment and education 	Reconnects with nature
	Waterways, and water sensitive urban design features	<ul style="list-style-type: none"> - Wetlands (natural and constructed) - Ponds and lakes - Rivers and streams - Vegetated swales, drainage corridors, infiltration basins, etc. - Oceans and associated coastal vegetation 	<ul style="list-style-type: none"> - Water management, treatment and storage - Protects downstream water bodies 	Revitalises cities Increases property value Enhances tourism

(Reeve et al, 2012a)




















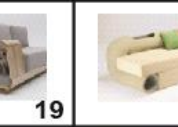
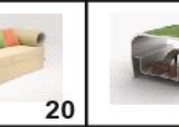


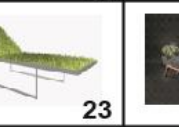























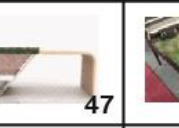
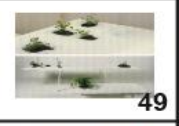







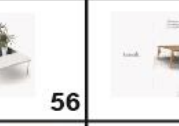



































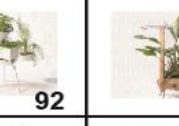

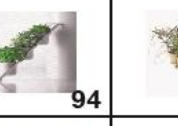
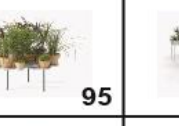






















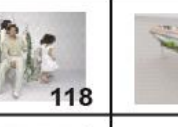











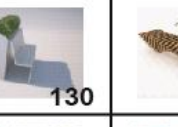


















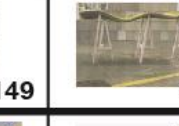






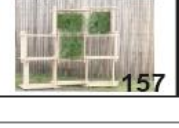

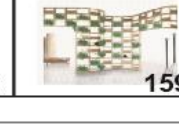







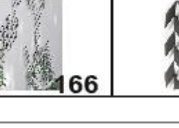

Study by Terrapin Bright Green (2014) discussed the 14 patterns of biophilic design which can be used as a tool for improving human health and wellbeing within the built environment context while also critically discussed the human connection with nature. Related studies on biophilic design compiled by Terrapin Bright Green are as follows:













































































































14 Patterns	*	Stress Reduction	Cognitive Performance	Emotion, Mood & Preference
NATURE IN THE SPACE				
Visual Connection with Nature	* * *	Lowered blood pressure and heart rate (28. Brown, Barton & Gladwell, 2013 ¶; 29. van den Berg, Hartig, & Staats, 2007 ¶; 30. Tsunetsugu & Miyazaki, 2005 ¶)	Improved mental engagement/ attentiveness (31. Biederman & Vessel, 2006 ¶)	Positively impacted attitude and overall happiness (32. Barton & Pretty, 2010 ¶)
Non-Visual Connection with Nature	* *	Reduced systolic blood pressure and stress hormones (33. Park, Tsunetsugu, Kasetani et al., 2009 ¶; 34. Hartig, Evans, Jamner et al., 2003 ¶; 35. Orsega-Smith, Mowen, Payne et al., 2004 ¶; 36. Ulrich, Simons, Losito et al., 1991 ¶)	Positively impacted cognitive performance (37. Mehta, Zhu & Cheema, 2012 ¶; 38. Ljungberg, Neely, & Lundström, 2004 ¶)	Perceived improvements in mental health and tranquility (39. Li, Kobayashi, Inagaki et al., 2012 ¶; 40. Jahncke, et al., 2011 ¶; 41. Tsunetsugu, Park, & Miyazaki, 2010 ¶; 42. Kim, Ren, & Fielding, 2007 ¶; 43. Stigsdøtter & Grahn, 2003 ¶)
Non-Rhythmic Sensory Stimuli	* *	Positively impacted heart rate, systolic blood pressure and sympathetic nervous system activity (44. Li, 2009 ¶; 45. Park et al., 2008 ¶; 46. Kahn et al., 2008 ¶; 47. Beauchamp, et al., 2003 ¶; 48. Ulrich et al., 1991 ¶)	Observed and quantified behavioral measures of attention and exploration (49. Windhager et al., 2011 ¶)	
Thermal & Airflow Variability	* *	Positively impacted comfort, well-being and productivity (50. Heerwagen, 2006 ¶; 51. Tham & Willem, 2005 ¶; 52. Wigò, 2005 ¶)	Positively impacted concentration (53. Hartig et al., 2003 ¶; 54. Hartig et al., 1991 ¶; 55. R. Kaplan & Kaplan, 1989 ¶)	Improved perception of temporal and spatial pleasure (alliesthesia) (56. Parkinson, de Dear & Candido, 2012 ¶; 57. Zhang, Arens, Huizenga & Han, 2010 ¶; 58. Arens, Zhang & Huizenga, 2006 ¶; 59. Zhang, 2003 ¶; 60. de Dear & Brager, 2002 ¶; 61. Heschong, 1979 ¶)
Presence of Water	* *	Reduced stress, increased feelings of tranquility, lower heart rate and blood pressure (62. Alvarsson, Wiens, & Nilsson, 2010 ¶; 63. Pheasant, Fisher, Watts et al., 2010 ¶; 64. Biederman & Vessel, 2006 ¶)	Improved concentration and memory restoration (65. Alvarsson et al., 2010 ¶; 66. Biederman & Vessel, 2006 ¶) Enhanced perception and psychological responsiveness (67. Alvarsson et al., 2010 ¶; 68. Hunter et al., 2010 ¶)	Observed preferences and positive emotional responses (69. Windhager, 2011 ¶; 70. Barton & Pretty, 2010 ¶; 71. White, Smith, Humphreys et al., 2010 ¶; 72. Karmanov & Hamel, 2008 ¶; 73. Biederman & Vessel, 2006 ¶; 74. Heerwagen & Orans, 1993 ¶; 75. Russo & Atzwanger, 2003 ¶; 76. Ulrich, 1983 ¶)
Dynamic & Diffuse Light	* *	Positively impacted circadian system functioning (77. Figuero, Brons, Pittnick et al., 2011 ¶; 78. Beckett & Roden, 2009 ¶) Increased visual comfort (79. Elyezadi, 2012 ¶; 80. Kim & Kim, 2007 ¶)		
Connection with Natural Systems				Enhanced positive health responses; Shifted perception of environment (81. Kellert et al., 2008 ¶)
NATURAL ANALOGUES				
Biomorphic Forms & Patterns	*			Observed view preference (82. Vessel, 2012 ¶; 83. Joye, 2007 ¶)
Material Connection with Nature			Decreased diastolic blood pressure (84. Tsunetsugu, Miyazaki & Sato, 2007 ¶) Improved creative performance (85. Lichtenfeld et al., 2012 ¶)	Improved comfort (86. Tsunetsugu, Miyazaki & Sato, 2007 ¶)
Complexity & Order	* *	Positively impacted perceptual and physiological stress responses (87. Salazar, 2012 ¶; 88. Joye, 2007 ¶; 89. Taylor, 2006 ¶; 90. S. Kaplan, 1988 ¶)		Observed view preference (91. Salazar, 2012 ¶; 92. Hägerhäll, Laike, Taylor et al., 2008 ¶; 93. Hägerhäll, Purcella, & Taylor, 2004 ¶; 94. Taylor, 2006 ¶)
NATURE OF THE SPACE				
Prospect	* * *	Reduced stress (95. Grahn & Stigsdøtter, 2010 ¶)	Reduced boredom, irritation, fatigue (96. Clearwater & Coss, 1991 ¶)	Improved comfort and perceived safety (97. Herzog & Bryce, 2007 ¶; 98. Wang & Taylor, 2006 ¶; 99. Petherick, 2000 ¶)
Refuge	* * *		Improved concentration, attention and perception of safety (100. Grahn & Stigsdøtter, 2010 ¶; 101. Wang & Taylor, 2006 ¶; 102. Petherick, 2000 ¶; 103. Ulrich et al., 1993 ¶)	
Mystery	* *			Induced strong pleasure response (104. Biederman, 2011 ¶; 105. Salimpoor, Benovoy, Larcher et al., 2011 ¶; 106. Ikemi, 2005 ¶; 107. Blood & Zatorre, 2001 ¶)
Risk/Peril	*			Resulted in strong dopamine or pleasure responses (108. Kohno et al., 2013 ¶; 109. Wang & Tsien, 2011 ¶; 110. Zaid et al., 2008 ¶)






























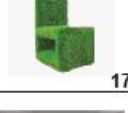



































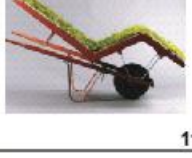

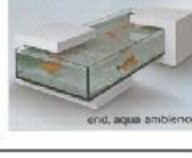















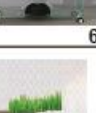

















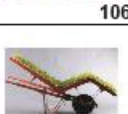





















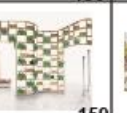







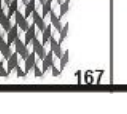





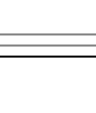
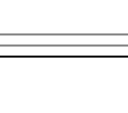
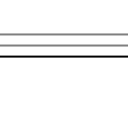
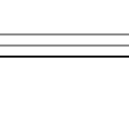
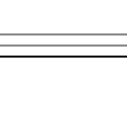
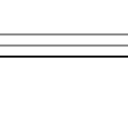


Appendix C: Chapter 3 – Research Methodology

























































































































































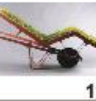

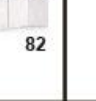




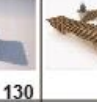




















































- Previously Designed FDLOs Typologies (168 FDLOs)
 - Function and Practicality (A)
 - Aesthetic and Semantic (B)
 - Experience (C)
 - Experimental (D)
- Previously Developed Conceptual Model – Colour Changes
- Previously Developed Conceptual Model – Design Proposal 2
- Previously Developed Conceptual Model - The Iterations
- Table of Detail Explanation of Conceptual Design
- Online Questionnaire Development
- Full Online Questionnaire
- Ethic Application Approval Letter

Appendix C: Chapter 3 - Research Methodology
Previously Designed/ Developed Tables and Figures of FDLOs
168 FDLOs



















Indoor	Chair/ Bench	 1	 2	 3	 4	 5	 6	 7	 8	 9	 10	 11	 12	
		 13	 14	 15	 16	 17	 18	 19	 20	 21	 22	 23	 24	
		 25	 26	 27	 28	 29	 30	 31	 32	 33	 34	 35	 36	
	Table	 37	 38	 39	 40	 41	 42	 43	 44	 45	 46	 47	 48	
		 49	 50	 51	 52	 53	 54	 55	 56	 57	 58	 59	 60	
		 61	 62	 63	 64	 65	 66	 67	 68	 69	 70	 71	 72	
	Others	 73	 74	 75	 76	 77	 78	 79	 80	 81	 82	 83	 84	
		 85	 86	 87	 88	 89	 90	 91	 92	 93	 94	 95	 96	
		 97	 98	 99	 100	 101	 102	 103	 104	 105	 106	 107	 108	
	Outdoor	Chair/ Bench	 109	 110	 111	 112	 113	 114	 115	 116	 117	 118	 119	 120
			 121	 122	 123	 124	 125	 126	 127	 128	 129	 130	 131	 132
 133			 134	 135	 136	 137	 138	 139	 140	 141	 142	 143	 144	
Table		 145	 146	 147	 148	 149	 150	 151	 152	 153	 154	 155	 156	
Others		 157	 158	 159	 160	 161	 162	 163	 164	 165	 166	 167	 168	

Function and Practicality (A)											
A1: to learn	A2: farming or food		A3: purify air or water			A4: generate energy	A5: to encourage hobbies				A6: other reasons
 9	 41	 42	 18	 23	 24	 38	 4	 23	 37	 41	 60
	 43	 44	 27	 28	 30	 47	 42	 44	 49	 52	 75
 13	 49	 57	 33	 34	 36	 60	 57	 58	 63	 65	 81
	 65	 75	 37	 39	 45	 85	 76	 78	 91	 92	 102
 81	 79	 80	 51	 55	 58		 93	 99	 101	 102	 130
	 81	 83	 61	 62	 63		 105	 106	 112	 113	 150
	 89	 99	 64	 66	 67		 118	 126	 129	 135	 159
	 101	 104	 68	 69	 70		 146	 147	 149	 150	 163
	 126	 150	 75	 82	 85		 156	 157	 158	 159	
	 158	 162	 87	 94	 105		 161	 166	 167	 168	
			 106	 107	 108						

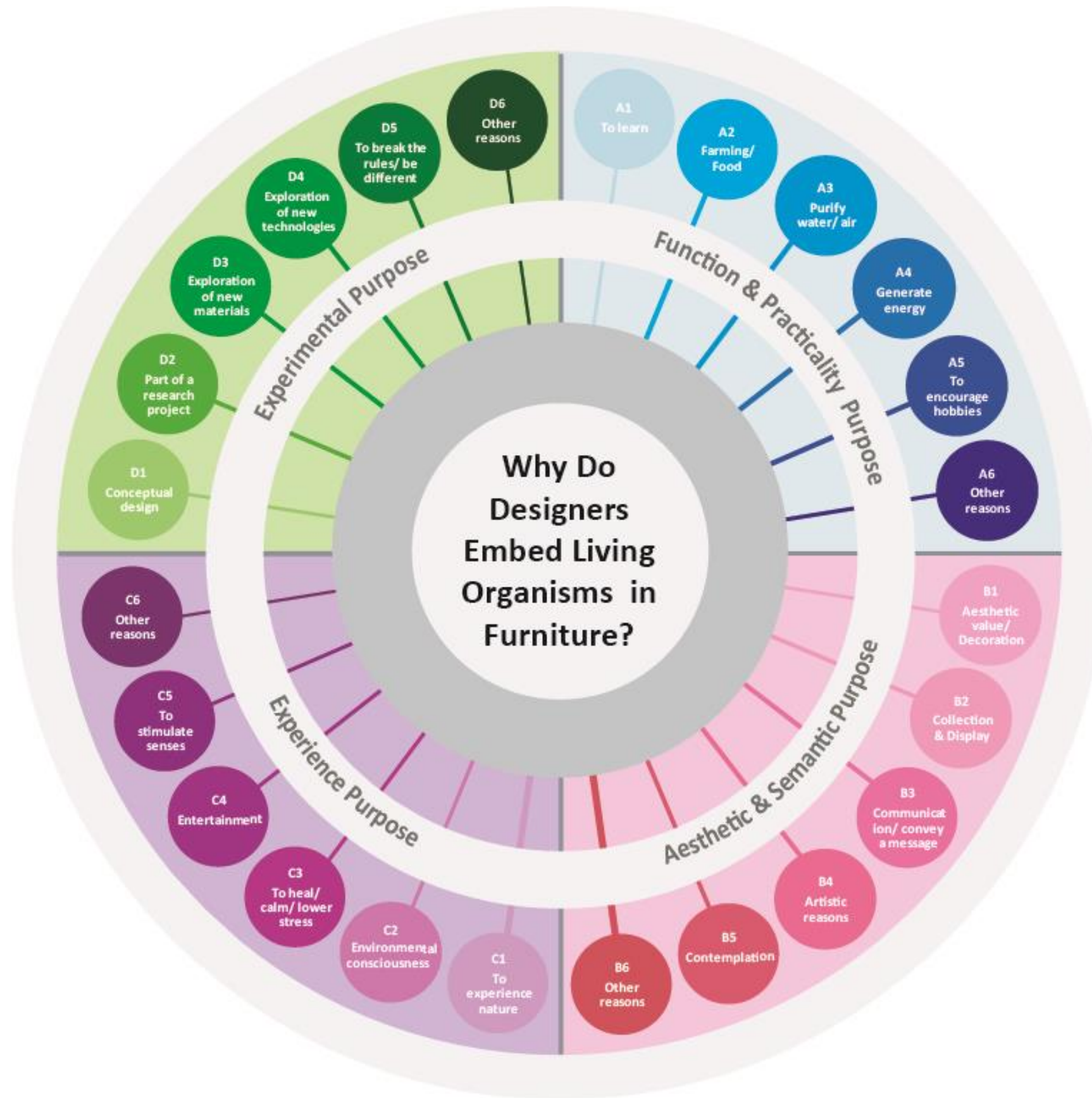
Aesthetic and Semantic (B)													
B1: aesthetic value or decoration			B2: collection and display			B3: communication or to convey a message		B4: artistic reasons		B5: contemplation		B6: other reasons.	
 5	 6	 7	 1	 4	 9	 2	 31	 4	 6	 1	 6	 35	 119
 8	 10	 14	 11	 22	 25	 32	 50	 8	 25	 25	 8	 120	 121
 16	 17	 24	 37	 40	 45	 81	 89	 13	 22	 13	 31	 122	 123
 28	 29	 31	 46	 48	 56	 91	 92	 31	 32	 32	 46	 124	 125
 32	 35	 39	 59	 61	 69	 93	 116	 110	 115	 48	 59	 127	 130
 51	 53	 58	 70	 73	 76	 93		 86	 103	 89	 103	 131	 136
 63	 69	 74	 83	 84	 90			 117				 127	 130
 86	 99	 101	 94	 95	 96							 131	 136
 103	 106	 110	 97	 100	 105							 131	 136
 113	 115	 118	 108	 109	 119			 133	 141	 109		 138	 139
 128	 131	 139	 126	 130	 157							 142	 143
 144	 151	 154	 158	 159	 163			 116	 117			 163	 164
 155	 160	 165	 166	 167	 168							 163	 164

Experience (C)																	
C1: to experience or interact with nature						C2: environmental consciousness		C3: to heal, calm or lower stress		C4: entertainment	C5: to stimulate senses		C6: other reasons				
																	
																	
																	
																	
																	
																	
																	
																	
																	
																	
																	
																	
																	
																	

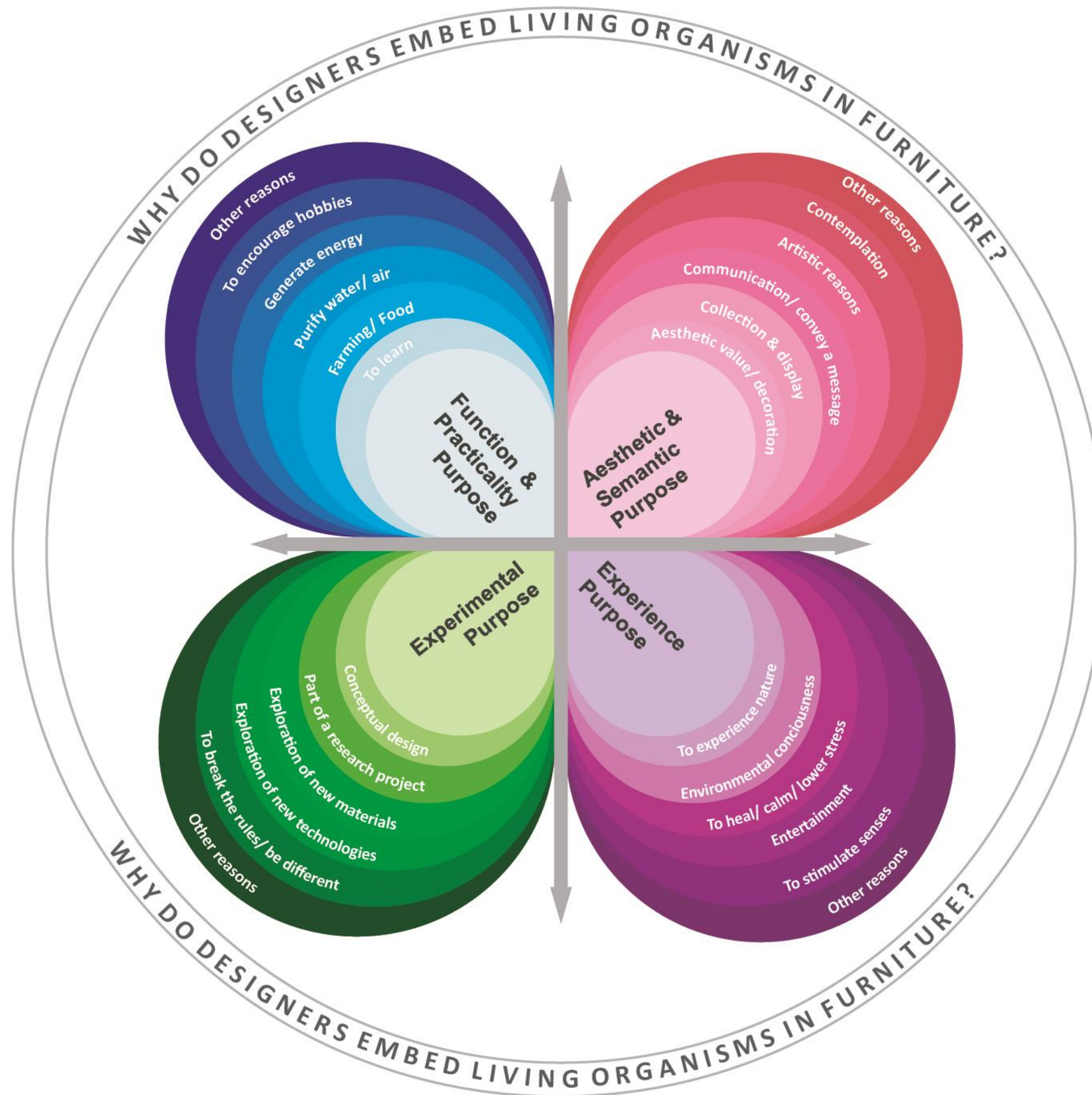
Experimental (D)

D1: conceptual design		D2: part of a research project		D3: exploration of new materials		D4: exploration of new technologies		D5: to break the rules or be different		D6: other reasons.	
 1	 6	 2	 9	 6	 10	 38	 47	 13	 60	 12	 13
 12	 13	 13	 38	 31	 32	 60	 77	 110	 115	 52	 164
 38	 47	 51	 143	 38	 47	 79	 80	 116	 133		
 60	 75			 50	 77	 81	 85	 141	 155		
 77	 78			 89	 150	 89	 162				
 79	 80										
 81	 85										
 89	 121										
 122	 123										
 126	 164										

Previously Developed Conceptual Model – Colour changes



Previously Developed Conceptual Model – Design Proposal 2



Previously Developed Conceptual Model - The Iterations

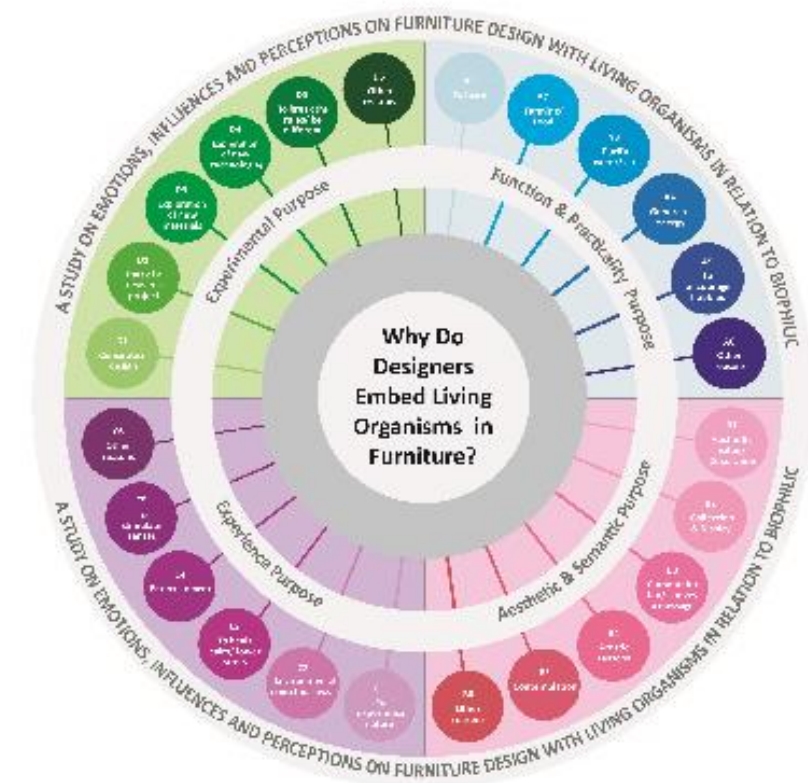
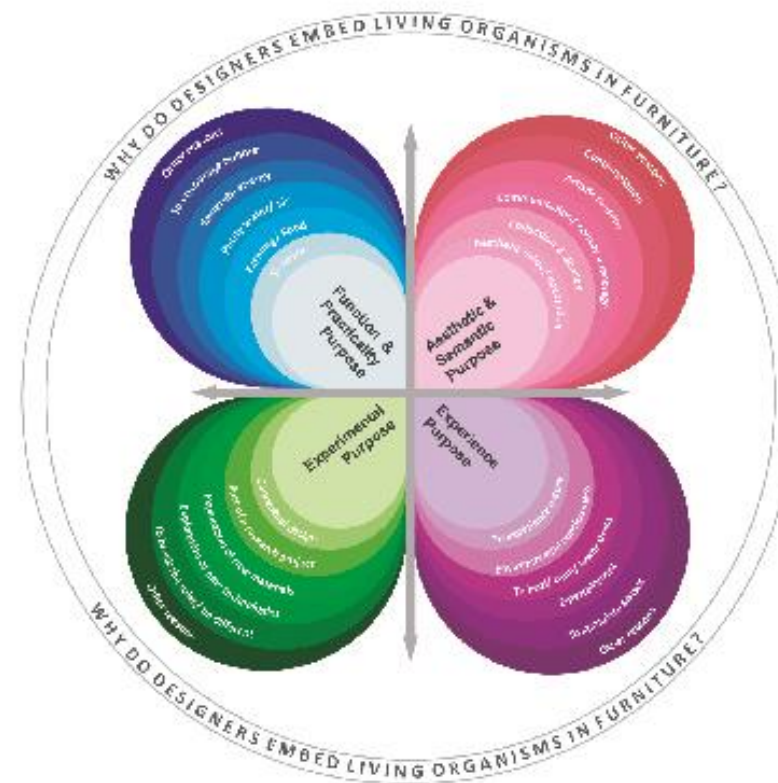


Table of Detail Explanation of Conceptual Design

The detailed explanation of the main categories and subcategories of the conceptual model, and their definitions.

Main category/ Subcategories	The purpose of living organisms as proposed in the conceptual model	The definition (According to Dictionary.com, 2015)
A: Function and Practicality	This main category focuses on practical or pragmatic purposes or how the living organisms in the design function, operate or can be used. In simple words, it is the utility.	Function: noun <ol style="list-style-type: none"> 1. the kind of action or activity proper to a person, thing, or institution; the purpose for which something is designed or exists; role. Verb <ol style="list-style-type: none"> 2. to perform a specified action or activity; work; operate: Practicality: adjective <ol style="list-style-type: none"> 1. of or relating to practice or action 2. consisting of, involving, or resulting from practice or action
A1: to learn	The purpose of the living organisms is to learn from or to get knowledge from. Example: a small terrarium provides knowledge to the viewers.	Learn: Verb <ol style="list-style-type: none"> 1. to acquire knowledge of or skill in by study, instruction, or experience 2. To become informed of or acquainted with; ascertain 3. to acquire knowledge or skill
A2: farming or food	The living organisms are for domestic farming or can provide food supplies for the consumers.	Farming: noun <ol style="list-style-type: none"> 1. the business of operating a farm. Farm: verb <ol style="list-style-type: none"> 1. to cultivate (land) 2. to cultivate the soil; operate a farm Food: noun <ol style="list-style-type: none"> 1. any nourishing substance that is eaten, drunk, or otherwise taken into the body to sustain life, provide energy, promote growth, etc. 2. more or less solid nourishment, as distinguished from liquids.
A3: purify air or water	The living organisms can help to purify the air or water.	Purify: verb (used with object), purified, purifying. <ol style="list-style-type: none"> 1. to make pure; free from anything that debases, pollutes, adulterates, or contaminates 2. to free from foreign, extraneous, or objectionable elements 3. To free from guilt or evil. 4. to clear or purge (usually followed by of or from).
A4: generate energy	The living organisms can help to generate energy (usually electrical power), might assist in reducing the cost or energy consumption.	Generate: verb (used with object), generated, generating. <ol style="list-style-type: none"> 1. to bring into existence; cause to be produce. 2. to create by a vital or natural process. 3. to create and distribute vitally and

		<p>profusely:</p> <ol style="list-style-type: none"> to reproduce; procreate. <p>Energy: noun, plural energies.</p> <ol style="list-style-type: none"> the capacity for vigorous activity; available power: an adequate or abundant amount of such power
A5: to encourage hobbies	Having the living organisms might encourage the consumers to do something they enjoy by interacting with the living elements. For example, gardening, or taking care of pets.	<p>Encourage: verb (used with object), encouraged, encouraging.</p> <ol style="list-style-type: none"> to inspire with courage, spirit, or confidence: to stimulate by assistance, approval, to promote, advance, or foster <p>Hobbies: noun, plural hobbies.</p> <ol style="list-style-type: none"> an activity or interest pursued for pleasure or relaxation and not as a main occupation
B: Aesthetic and Semantic	This main category focuses on the aesthetic value and the meaning of the living organisms in the design.	<p>Aesthetic: adjective</p> <ol style="list-style-type: none"> Relating to the philosophy of aesthetics; concerned with notions such as the beautiful and the ugly. relating to the science of aesthetics; concerned with the study of the mind and emotions in relation to the sense of beauty. Having a sense of the beautiful; characterized by a love of beauty. <p>Semantic: adjective</p> <ol style="list-style-type: none"> of, relating to, or arising from the different meaning of words or other symbols
B1: aesthetic value or decoration	The living organisms can be a decoration, or to give more value to the design, especially regarding a visual appeal.	<p>Value: noun</p> <ol style="list-style-type: none"> relative worth, merit, or importance: the value of a college education; the value of a queen in chess. monetary or material worth, as in commerce or trade: to consider with respect to worth, excellence, usefulness, or importance. <p>Decoration: noun</p> <ol style="list-style-type: none"> something used for decorating; adornment; embellishment: the act of decorating. interior decoration.
B2: collection and display	The living organisms as part of collection (for example, a collection of different types of fish in an aquarium), or displayed (exhibited) for visual enjoyment or contemplation.	<p>Collection: noun</p> <ol style="list-style-type: none"> the act of collecting. something that is collected; a group of objects or an amount of material accumulated in one location, especially for some purpose or as a result of some process the works of art constituting the holdings of an art museum the gathered or exhibited works of a single painter, sculptor, etc.

		<p>Display: verb (used with object)</p> <ol style="list-style-type: none"> 1. to show or exhibit; make visible 2. to reveal; betray 3. to unfold; open out; spread out: 4. to show ostentatiously; flaunt. <p>Semantic: adjective</p> <ol style="list-style-type: none"> 1. of, relating to, or arising from the different meanings of words or other symbol: semantic change; semantic confusion. 2. of or relating to semantics
B3: communication or to convey a message,	The living organisms were embedded into the design as a form of communication or to help to convey a message to someone, making a personal statement (from the designer or creator) and possibly motivating thought or reflection (in the observed or user).	<p>Communication: noun</p> <ol style="list-style-type: none"> 1. the act or process of communicating; fact of being communicated. 2. the imparting or interchange of thoughts, opinions, or information by speech, writing, or signs. 3. something imparted, interchanged, or transmitted. <p>Convey: verb (used with object)</p> <ol style="list-style-type: none"> 1. to carry, bring, or take from one place to another; transport; bear. 2. to communicate; impart; make known: 3. to convey a wish. 4. to lead or conduct, as a channel or medium; transmit. <p>Message: noun</p> <ol style="list-style-type: none"> 1. a communication containing some information, news, advice, request, or the like, sent by messenger, telephone, email, or other means. 2. the inspired utterance of a prophet or sage. 3. the point, moral, or meaning of a gesture, utterance, novel, motion picture, etc.
B4: artistic reasons	The designers embedded the living organisms for the sake of art.	<p>Artistic: adjective</p> <ol style="list-style-type: none"> 1. conforming to the standards of art; satisfying aesthetic requirements 2. showing skill or excellence in execution: 3. exhibiting taste, discriminating judgment, or sensitivity 4. exhibiting an involvement in or appreciation of art, especially the fine arts
B5: contemplation	The living organisms can be used to be observed.	<p>Contemplation: noun</p> <ol style="list-style-type: none"> 1. the act of contemplating; thoughtful observation. 2. full or deep consideration; reflection 3. purpose or intention. 4. prospect or expectation.
C: Experience	This main category focuses on the experiences of the	<p>Experience: noun</p> <ol style="list-style-type: none"> 1. a particular instance of personally

	designers which motivated the design with living organisms, or how consumers encounter and interact with furniture having living organisms in the design	<p>encountering or undergoing something</p> <ol style="list-style-type: none"> 2. the process or fact of personally observing, encountering, or undergoing something: 3. business experience. 4. the observing, encountering, or undergoing of things generally as they occur in the course of time: 5. to learn from experience; the range of human experience. 6. knowledge or practical wisdom gained from what one has observed, encountered, or undergone
C1: to experience or interact with nature	The living organisms can be used as an alternative natural experience indoor or which can help bringing nature closer to humans when there are no living plants or animals nearby, within the urban or built environment.	<p>Interact: verb</p> <ol style="list-style-type: none"> 1. to act one upon another. <p>Nature: noun</p> <ol style="list-style-type: none"> 2. the elements of the natural world, as mountains, trees, animals, or rivers: 3. natural scenery 4. the universe, with all its phenomena
C2: environmental consciousness	The living organisms can help in creating an awareness of taking care of nature and the eco systems, which encourage people to be more prudent about the depletion of resources of the planet.	<p>Environmental: noun, environment</p> <ol style="list-style-type: none"> 1. the aggregate of surrounding things, conditions, or influences; surroundings; milieu. 2. ecology. the air, water, minerals, organisms, and all other external factors surrounding and affecting a given organism at any time. 3. the social and cultural forces that shape the life of a person or a population. 4. an indoor or outdoor setting that is characterized by the presence of environmental art that is itself designed to be site-specific. <p>Consciousness: noun</p> <ol style="list-style-type: none"> 1. the state of being conscious; awareness of one's own existence, sensations, thoughts, surroundings, etc. 2. the thoughts and feelings, collectively, of an individual or of an aggregate of people: 3. the moral consciousness of a nation. 4. full activity of the mind and senses, as in waking life 5. awareness of something for what it is; internal knowledge 6. concern, interest, or acute awareness 7. the mental activity of which a person is aware as contrasted with unconscious mental processes.
C3: to heal, calm	To cure, or help maintains	Heal: verb (used with object)

or lower stress	people's health. Many studies have found that contact with nature and having living elements indoors can help to heal, calm, lower stress or even promote a healthy lifestyle and working environment.	<ol style="list-style-type: none"> 1. to make healthy, whole, or sound; restore to health; free from ailment. 2. to bring to an end or conclusion, as conflicts between people or groups, usually with the strong implication of restoring former amity; settle; reconcile 3. to free from evil; cleanse; purify: 4. to heal the soul. <p>Calm: adjective, calmer, calmest.</p> <ol style="list-style-type: none"> 1. without rough motion; still or nearly still: 2. a calm sea. 3. not windy or stormy 4. free from excitement or passion; tranquil: <p>Stress: noun</p> <ol style="list-style-type: none"> 1. the physical pressure, pull, or other force exerted on one thing by another; strain.
C4: entertainment	The living organisms can be used as a medium of entertainment or a way of having fun.	<p>Entertainment: noun</p> <ol style="list-style-type: none"> 1. the act of entertaining; agreeable occupation for the mind; diversion; amusement: 2. something affording pleasure, diversion, or amusement, especially a performance of some kind
C5: to stimulate senses	The living organisms can help to stimulate senses and producing certain reactions and emotions. For example, the smell of flowers is pleasant for most people.	<p>Stimulate: verb (used with object), stimulated, stimulating.</p> <ol style="list-style-type: none"> 1. to rouse to action or effort, as by encouragement or pressure; spur on; incite: 2. to stimulate his interest in mathematics. 3. Physiology, Medicine/Medical. to excite (a nerve, gland, etc.) to its functional activity. 4. to invigorate (a person) by a food or beverage containing a stimulant, as coffee, tea, or alcoholic liquor. <p>Senses: noun</p> <ol style="list-style-type: none"> 1. any of the faculties, as sight, hearing, smell, taste, or touch, by which humans and animals perceive stimuli originating from outside or inside the body
D: Experimental	This main category focuses on using the living organisms in furniture designs which are experimental or for research purposes, not necessarily for production.	<p>Experimental: adjective</p> <ol style="list-style-type: none"> 1. pertaining to, derived from, or founded on experiment 2. of the nature of an experiment; tentative 3. functioning as an experiment or used for experimentation 4. based on or derived from experience; empirical

D1: conceptual design	The design is in a conceptual stage or idea development stage. The design is meant to be a futuristic concept, and not necessarily a current reality.	<p>Conceptual: adjective</p> <ol style="list-style-type: none"> 1. pertaining to concepts or to the forming of concepts. <p>Conceptual design:</p> <ol style="list-style-type: none"> 1. Description of how a new product will work and meet its performance requirements. (http://www.businessdictionary.com/definition/conceptual-design) 2. is the very first phase of design, in which drawings or solid models are the dominant tools and products (www.ata-e.com/services/conceptual)
D2: part of a research project	The design was done as part of a research project, or part of an investigation into a certain related topic. For example, a piece of furniture can be just a part of a research project on how plants can purify the air.	<p>Research: noun</p> <ol style="list-style-type: none"> 1. diligent and systematic inquiry or investigation into a subject in order to discover or revise facts, theories, applications, etc. 2. a particular instance or piece of research. <p>Project: noun</p> <ol style="list-style-type: none"> 1. something that is contemplated, devised, or planned; plan; scheme. 2. a large or major undertaking, especially one involving considerable money, personnel, and equipment. 3. a specific task of investigation, especially in scholarship. 4. Education: a supplementary, long-term educational assignment necessitating personal initiative, undertaken by an individual student or a group of students. <p>research project: noun</p> <ol style="list-style-type: none"> 1. research into questions posed by scientific theories and hypotheses (http://www.thefreedictionary.com/research+project)
D3: exploration of new materials	The living organisms were embedded into the design as new materials exploration or as an exploration of how currently used materials (such as wood, plastic, etcetera) can be affected by living organisms. For example, bioplastics being transformed by microorganisms.	<p>Exploration: noun</p> <ol style="list-style-type: none"> 1. an act or instance of exploring or investigating; examination. 2. the investigation of unknown regions <p>materials: noun</p> <ol style="list-style-type: none"> 1. the substance or substances of which a thing is made or composed 2. anything that serves as crude or raw matter to be used or developed 3. any constituent element.
D4: exploration of new technologies	The living organisms were embedded into the design as an alternative to explore new technologies.	<p>Technologies: noun,</p> <ol style="list-style-type: none"> 1. the branch of knowledge that deals with the creation and use of technical means and their interrelation with life, society, and the environment, drawing upon such subjects as industrial arts, engineering, applied science, and pure

		<p>science.</p> <ol style="list-style-type: none"> 2. the application of this knowledge for practical ends. 3. the terminology of an art, science, etc.; technical nomenclature. 4. a scientific or industrial process, invention, method, or the like.
D5: to break the rules or be different	The living organisms were embedded to make the design different from other designs or to break the rules of design, and create an unusual, novel, or creative piece of furniture.	<p>break the rules: defy, go against, challenge, disobey</p> <p>different: adjective</p> <ol style="list-style-type: none"> 1. not alike in character or quality; distinct in nature; dissimilar 2. not identical; separate or distinct 3. various; several 4. not ordinary; unusual
A6, B6, C6, D6: other reasons.	This subcategory is a category which can be used to identify other subcategories which are different and not included or highlighted as above. This category helps to introduce new subcategories for a new conceptual model in the future, based on the input of surveys and interviews.	<p>Other: adjective</p> <ol style="list-style-type: none"> 1. additional or further 2. different or distinct from the one or ones already mentioned or implied 3. different in nature or kind 4. being the remaining one of two or more <p>Reasons: noun</p> <ol style="list-style-type: none"> 1. a basis or cause, as for some belief, action, fact, event, etc. 2. a statement presented in justification or explanation of a belief or action 3. the mental powers concerned with forming conclusions, judgments, or inferences 4. sound judgment; good sense

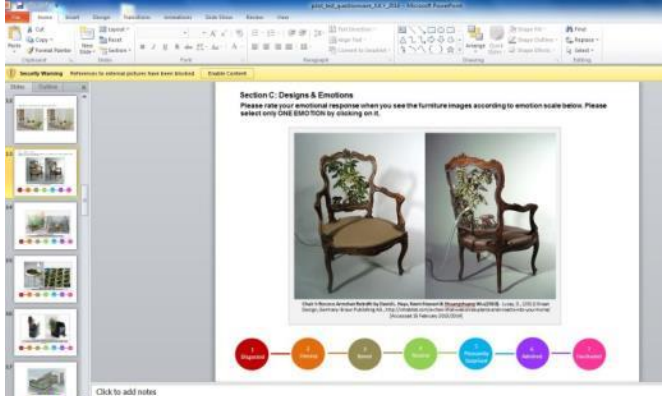
Online Questionnaire Development


The development of the online questionnaire took around 6 months, and a year to gain responses from the respondents. Ten images of selected FDLOs were chosen from the initial observation, which consisted of tables, chairs, shelves, kitchen furniture and an aquarium with planters. These designs were selected for their variety of furniture types, and types of living organisms embedded in the furniture. Due to ethical and copyright issues, 10 designers were contacted for their permission to use and modify freely available images of their FDLOs. 7 designers responded and agreed to let the images of their design be used for this study and 5 of them also agreed to be interviewed.

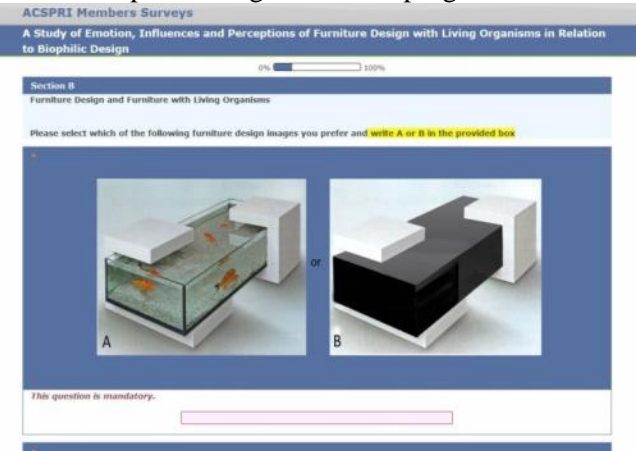

After gathering the images, the researcher started to digitally alter the FDLOs images of the selected designs by taking away the living organisms from the FDLOs, and another 2 were selected from the existing designs which the designers made using different materials. After finishing with the digital alteration of the images, a mock-up of the answer buttons and overall pages of the questionnaires was built using PowerPoint and Adobe Illustrator CS5, to be reviewed and discussed as a pilot test, before the final design in the online survey tools. Around 4 online survey tools or more were tested before the best tool was chosen to be used as the medium to design the survey.

The comparison of the tools which were used to design the survey can be seen in the table below:

Online survey tools comparison

Tools	Advantages	Disadvantages
<p>Power point</p>	<ul style="list-style-type: none"> • As a basic medium to develop and design the online survey • Unlimited designs • Sample of images from the program: 	<ul style="list-style-type: none"> • Need to use other online survey tools to make it online • Only working well on the printed version

<p>Survey Monkey</p>	<ul style="list-style-type: none"> • Design based survey • Cheaper monthly payment (minimum AUD19) • Various question types • Only the free version was tried as the design was not very satisfying • Sample of images from the program: <div style="border: 1px solid #ccc; padding: 5px;"> <p style="text-align: right;">Upgrade to Add More Questions Split Page Here</p> <p>Edit Question ▼ Move Copy Delete</p> <p>Chair I: Rococo Armchair Retrofit by David L. Hays, Kevin Stewart & Shuangshuang Wu.(2010). Lucas, D., (2011) Green Design. Germany: Braun Publishing AG., http://inhabitat.com/a-chair-that-welcomes-plants-and-insects-into-your-home/ [Accessed 15 February 2013/2014]</p>  <p style="text-align: right;">Upgrade to Add More Questions Split Page Here</p> <p>Q8 Edit Question ▼ Add Question Logic Move Copy Delete</p> <p>*8. Please look carefully at each images before answering. Based on the initial</p> </div>	<ul style="list-style-type: none"> • A little complicated to use • CSV, Excel and SPSS only for Gold plan (USD 25 monthly)

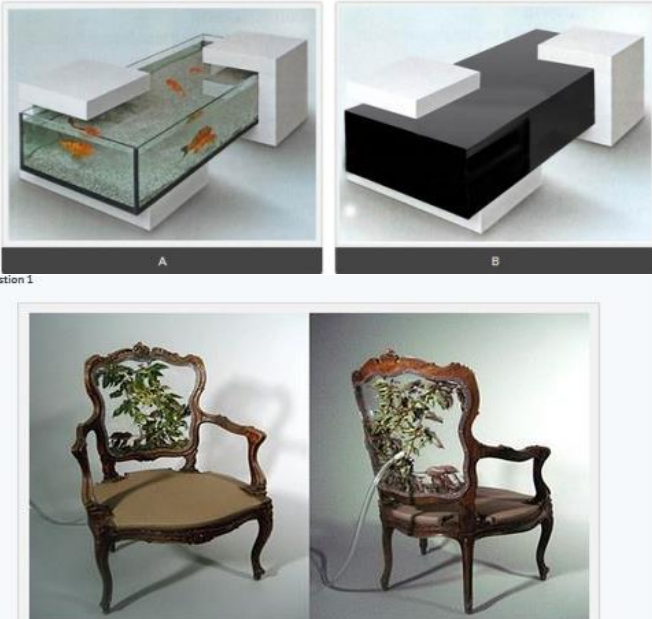
	<p>conceptual model above please choose the best reason by clicking the appropriate boxes. You may choose up to 3 REASONS which you think are the best for each image above.</p> <p> <input type="checkbox"/> A1: To learn <input type="checkbox"/> A2: Farming/ for food <input type="checkbox"/> A3: Purify the air/ water <input type="checkbox"/> A4: Generate energy <input type="checkbox"/> A5: To encourage hobbies <input type="checkbox"/> B1: Aesthetic value/ Decoration <input type="checkbox"/> B2: Collection & Display <input type="checkbox"/> Other (please specify) </p> <p> <input type="checkbox"/> B3: Artistic reasons (to shock/ to provoke etc.) <input type="checkbox"/> C1: To experience nature <input type="checkbox"/> C2: Environmental consciousness <input type="checkbox"/> C3: To heal/ calm/ lower stress <input type="checkbox"/> D1: Conceptual design <input type="checkbox"/> D2: Exploration of new opportunities <input type="checkbox"/> D3: Biomorphic Research </p>	
<p>ACSPRI</p>	<ul style="list-style-type: none"> • Free design based survey (for ACSPRI members, such as University of Canberra) • Free usage and cheaper distribution (AUD50 for usage fee, one-time payment) • No monthly payment • Sample of images from the program:  	<ul style="list-style-type: none"> • Easy to use but with limited question types and choices. • Completed the survey design, but the question types are not user friendly • User needs to key in the answers - requires a long time
<p>SurveyGizmo</p>	<ul style="list-style-type: none"> • Design based survey • Customized question types and with many existing question types to choose from • Interactive • User friendly • Easy to build • CSV and Excel from basic plan (Results for data export and analysis) • SPSS for Pro plan 	<ul style="list-style-type: none"> • A little pricey for monthly payment, but has most features, suitable for interactive, vibrant and colourful survey - Minimum USD22

- Half price student's plans (Yearly)
- Sample of images from the program:

Section B - Design

From the following pairs of images, please select which one you prefer.

Question 1*



Question 1

Please look carefully at the furniture design above, then select which sub categories you think are suitable. You may choose minimum FOUR (4) answers.

*

A1 To learn	B1 Aesthetic value/ Decoration	C1 To experience nature	D1 Conceptual design
Function & Practicality (A1)	Aesthetic & Semantics (B1)	Experience (C1)	Experimental (D1)

- The final survey design turned out as in the Power Point version, and was visually appealing and easy to understand.

Power Point

The initial sample of the questionnaire was built using Power Point, as it is one of the basic Office programs for Windows which can be used to design a visual presentation using basic graphic elements. This software was used to show how the questionnaire design could look like for this study. Vibrant colours for the answer buttons and images for the questionnaires, which are more visual (design language), easy to understand, and fewer words were used.

Surveymonkey.com

Surveymonkey is an online survey tool, which provides services for students and other people to create an online survey that can be used for basic purposes. The researcher only used a free

trial version, and since the free trial version did not offer many answer type options, she proceeded to try other survey tools.

ACSPRI

ACSPRI stands for Australian Consortium for Social and Political Research Incorporated. ACSPRI provides online survey tools for social researchers to use and design a survey research using a Lime survey tool online for free. This service only requires the researchers to pay AUD50 one time, to disseminate the questionnaires online. Even though it is free to use, the design was not user-friendly and after several discussions, the researcher had to find another online survey tool which was easy to be used and could be completed in less than 20 minutes by the respondents.

SurveyGizmo.com

SurveyGizmo is one of the interactive survey tools that provide services for students and other people to design an online survey. This was the final chosen tool, because it was easy to use, offered flexible design, and was the most user-friendly for the respondents.

Full Online Questionnaire

A Study of Emotion, Influences and Perceptions of Furniture Design with Living Organisms in Relation to Biophilic Design

The survey is better viewed on a computer or a tablet pc as the images might be too big for smart phones.

The main purpose of this study, which is part of a PhD research project at the University of Canberra, is to better understand relationships between furniture design, biophilia theory and emotional design through exploration of the influences of furniture designers and perceptions by potential users in regards to furniture which incorporates living organisms such as plants and animals.

This study is for academic purposes only. The benefit of this study is to create new knowledge in the topics of furniture design, emotional design and biophilic design.

This survey is normally completed in 20 minutes. Thank you in advance for participating.

Consent Statement

"I have read and understood the information provided. I am aware of any conditions that would prevent my participation, and I agree to participate in this project. I have had the opportunity to ask questions about my participation in this research. All questions I have asked have been answered to my satisfaction."

As outlined in the informed consent form the results will not be traceable to any particular individual. Complete confidentiality is assured and the survey result will be used for academic purposes only.

Disclaimer: images may include animals such as fish or snakes. If by chance you might be disturbed by these, please let us know beforehand, or you may opt out to participate.

Some of the images have been digitally altered for the purpose of this study and not all of the products are shown as designers intended or as they're published. All efforts were made to get approvals from the designers of the pieces that were digitally altered.

Do you agree to participate? If your answer is YES, please continue to the next section, if your answer in NO, you may close the browser.

- Yes
 No

A summary of the research report can be forwarded to you or your representative when published. If you would like to receive a copy of the report, please include your email address below.

If you have any questions regarding the questionnaires and survey, please contact the researcher using the address below:

Nurul 'Ayn Ahmad Sayuti
Environmental Design
Faculty of Arts and Design
University of Canberra
ACT 2601
Australia
Email: u3092325@uni.canberra.edu.au

For any other queries and concerns, please contact Dr Carlos Montana Hoyos, Supervisor of this project.

Email: carlos.montana.hoyos@canberra.edu.au

Next

Surveys powered by  surveygizmo

Section A - Respondent Background

What is your gender? *

- Male
- Female

What is your age? *

- 18 - 25
- 25 - 30
- 31 - 40
- 41 - 50
- 51 - 60
- more than 60

What is your working background? *

- Advertising/ Media
- Art and Design/ Creative
- Education/ Academic
- Finance/ Banking/ Marketing
- Govt/ Civil Service
- IT/ Computers/ Technologies
- Medical/ Dental
- Technical/ Science/ Engineering
- Student
- Unemployed
- Retired
- Other

Preferences: Which activities do you prefer? *

- Outdoor
- Indoor

Preferences: Do you have pets? *

- Yes
- No

Preferences: What sort of pets do you have? *

- Cat
- Dog
- Fish
- No Pets
- Other

Preferences: Do you take care of plants? *

- Yes
- No

What is your current or previous education background? *

- Postgraduate
- Undergraduate
- Certificate
- Other

What is your continent of origin? *

- Africas
- Americas
- Asia
- Australia and Ocenia
- Europe

Preferences: Which activities do you prefer? *

- Outdoor
- Indoor

Preferences: Do you have pets? *

- Yes
- No

Preferences: What sort of pets do you have? *

- Cat
- Dog
- Fish
- No Pets
- Other

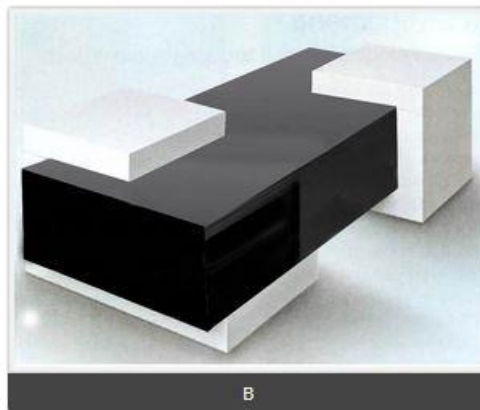
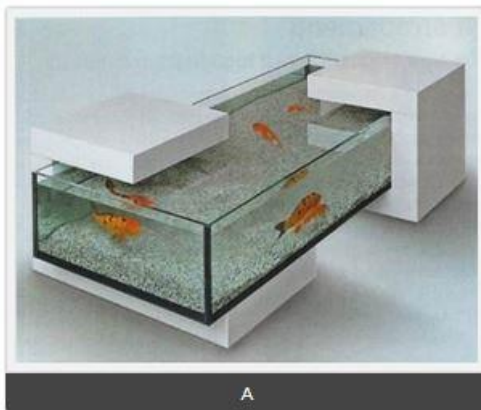
Back

Next

Section B - Design

From the following pairs of images, please select which one you prefer.

Question 1*



Question 2

*



Question 3*



Question 4 *



Question 5 *



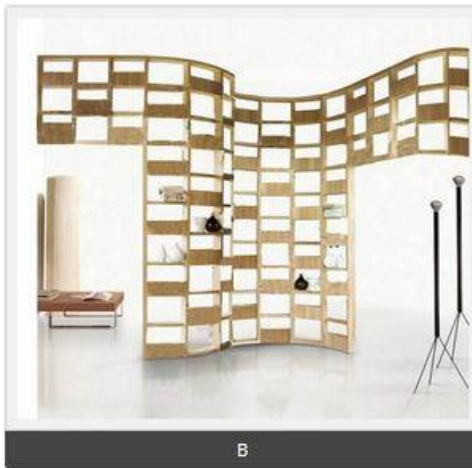
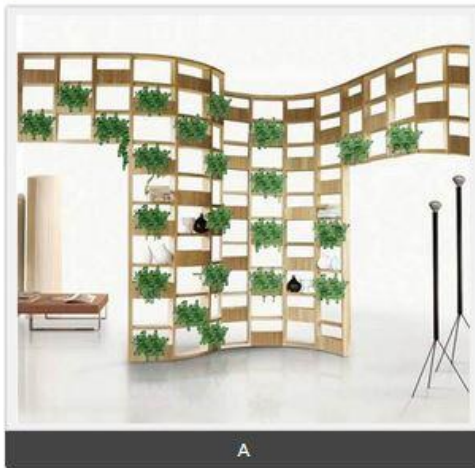
Question 6 *



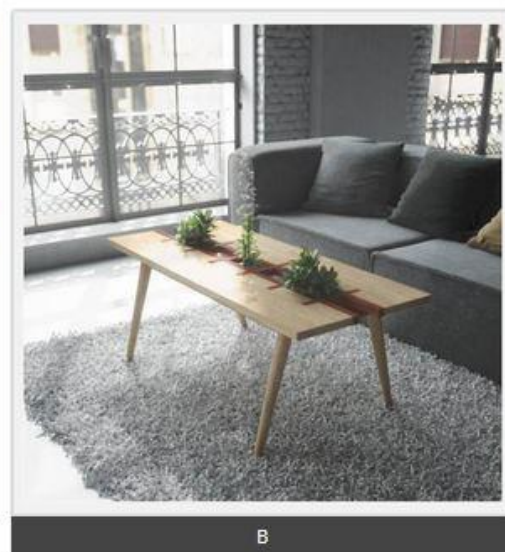
Question 7*



Question 8*



Question 9*



Question 10*



Section C - Emotional Design

Please rate what you feel according to emotion scale below. You may choose only ONE (1) answer.

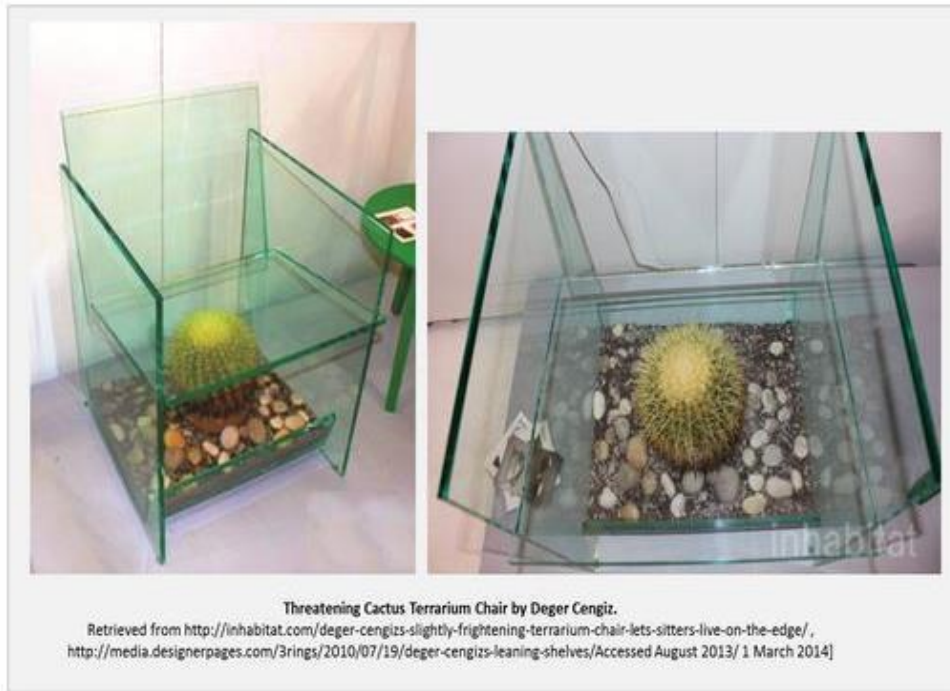
Question 1



*



Question 2



*

- 1
Disgusted
- 2
Uneasy
- 3
Bored
- 4
Neutral
- 5
Pleasantly Surprised
- 6
Admired
- 7
Fascinated

Question 3



*

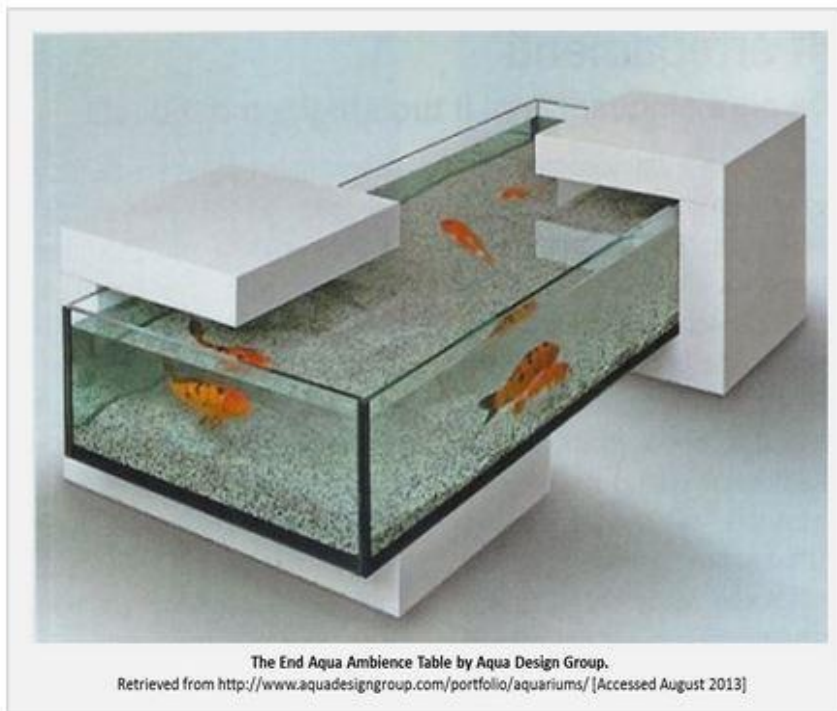
- 1
Disgusted
- 2
Uneasy
- 3
Bored
- 4
Neutral
- 5
Pleasantly Surprised
- 6
Admired
- 7
Fascinated

Question 4



- 1
Disgusted
- 2
Uneasy
- 3
Bored
- 4
Neutral
- 5
Pleasantly Surprised
- 6
Admired
- 7
Fascinated

Question 5



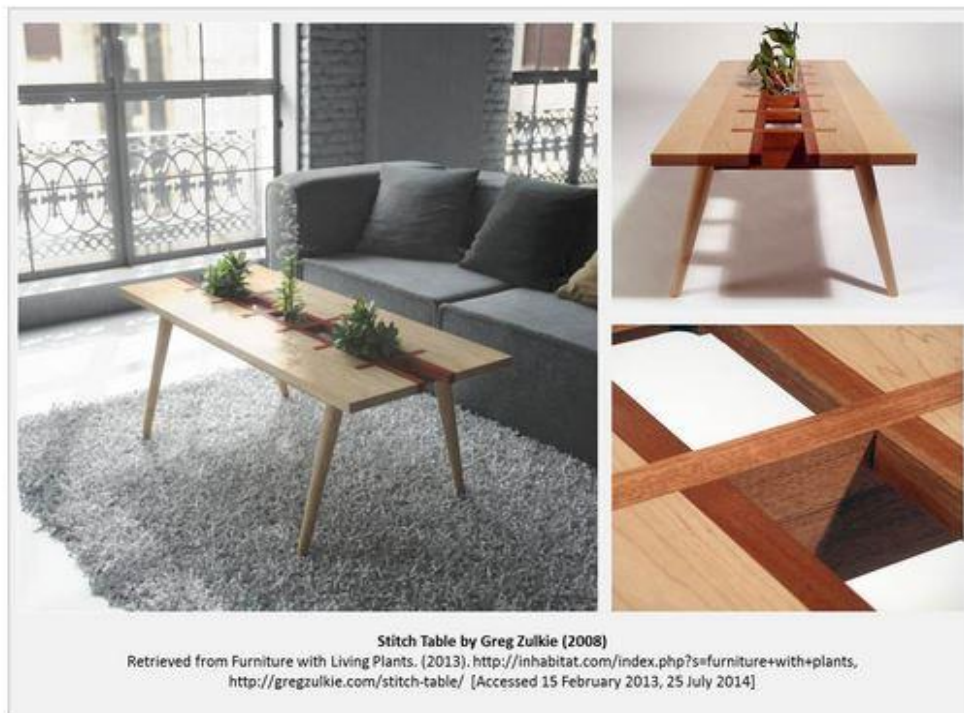
- 1
Disgusted
- 2
Uneasy
- 3
Bored
- 4
Neutral
- 5
Pleasantly Surprised
- 6
Admired
- 7
Fascinated

Question 6



- 1
Disgusted
- 2
Uneasy
- 3
Bored
- 4
Neutral
- 5
Pleasantly Surprised
- 6
Admired
- 7
Fascinated

Question 7



- 1
Disgusted
- 2
Uneasy
- 3
Bored
- 4
Neutral
- 5
Pleasantly Surprised
- 6
Admired
- 7
Fascinated

Question 8



Question 9



Question 10



- 1
Disgusted
- 2
Uneasy
- 3
Bored
- 4
Neutral
- 5
Pleasantly
Surprised
- 6
Admired
- 7
Fascinated

Back Next

Survey Software powered by SurveyGizmo
surveygizmo

Section D - Conceptual Model

The researcher proposed an initial model that classifies furniture with living organisms into 4 main areas (A, B, C and D) and 24 sub-areas.



Table with a Built-in Planter by Emily Wettstein
 Retrieved from <http://www.trendhunter.com/show/planter-furniture> <http://www.emilywettstein.com/built-in-planter-table-no-1/>, <http://Designyoutrust.com/2012/07/planter-table-by-emily-wettstein/>, <http://foodiebeables.blogspot.com.au/2013/04/item-of-day-planter-table-by-emily.html> [Accessed 15 February 2013 & July 2014]

Please look carefully at the furniture design above, then select which sub-categories you think are suitable. You may choose minimum FOUR (4) answers.

<input type="checkbox"/> A1	<input type="checkbox"/> B1	<input checked="" type="checkbox"/> C1	<input checked="" type="checkbox"/> D1
Function & Practicality (A1)	Aesthetic & Semantic (B1)	Experience (C1)	Experimental (D1)
<input checked="" type="checkbox"/> A2	<input type="checkbox"/> B2	<input type="checkbox"/> C2	<input type="checkbox"/> D2
Function & Practicality (A2)	Aesthetic & Semantic (B2)	Experience (C2)	Experimental (D2)
<input type="checkbox"/> A3	<input type="checkbox"/> B3	<input checked="" type="checkbox"/> C3	<input type="checkbox"/> D3
Function & Practicality (A3)	Aesthetic & Semantic (B3)	Experience (C3)	Experimental (D3)
<input type="checkbox"/> A4	<input type="checkbox"/> B4	<input type="checkbox"/> C4	<input type="checkbox"/> D4
Function & Practicality (A4)	Aesthetic & Semantic (B4)	Experience (C4)	Experimental (D4)
<input checked="" type="checkbox"/> A5	<input type="checkbox"/> B5	<input type="checkbox"/> C5	<input type="checkbox"/> D5
Function & Practicality (A5)	Aesthetic & Semantic (B5)	Experience (C5)	Experimental (D5)
<input type="checkbox"/> A6	<input checked="" type="checkbox"/> B6	<input type="checkbox"/> C6	<input type="checkbox"/> D6
Function & Practicality (A6)	Aesthetic & Semantic (B6)	Experience (C6)	Experimental (D6)

Do this for the following questions in this section

Question 1



Chair 1: Rocco Armchair Retrofit by David L. Hays, Kevin Stewart & Shuangshuang Wu. (2010). Lucas, D., (2011) Green Design, Germany: Braun Publishing AG., <http://inhabitat.com/a-chair-that-welcomes-plants-and-insects-into-your-home/> [Accessed 15 February 2013/2014]

Please look carefully at the furniture design above, then select which sub categories you think are suitable. You may choose minimum FOUR (4) answers.

<p>A1 To learn</p> <p>Function & Practicality (A1)</p>	<p>B1 Aesthetic value/ Decoration</p> <p>Aesthetic & Semantic (B1)</p>	<p>C1 To experience nature</p> <p>Experience (C1)</p>	<p>D1 Conceptual design</p> <p>Experimental (D1)</p>
<p>A2 Farming/ Food</p> <p>Function & Practicality (A2)</p>	<p>B2 Collection & Display</p> <p>Aesthetic & Semantic (B2)</p>	<p>C2 Environmental consciousness</p> <p>Experience (C2)</p>	<p>D2 Part of a research project</p> <p>Experimental (D2)</p>
<p>A3 Purify water/ air</p> <p>Function & Practicality (A3)</p>	<p>B3 Communication / convey a message</p> <p>Aesthetic & Semantic (B3)</p>	<p>C3 To heal/ calm/ lower stress</p> <p>Experience (C3)</p>	<p>D3 Exploration of new materials</p> <p>Experimental (D3)</p>
<p>A4 Generate energy</p> <p>Function & Practicality (A4)</p>	<p>B4 Artistic reasons</p> <p>Aesthetic & Semantic (B4)</p>	<p>C4 Entertainment</p> <p>Experience (C4)</p>	<p>D4 Exploration of new technologies</p> <p>Experimental (D4)</p>
<p>A5 To encourage hobbies</p> <p>Function & Practicality (A5)</p>	<p>B5 Contemplation</p> <p>Aesthetic & Semantic (B5)</p>	<p>C5 To stimulate senses</p> <p>Experience (C5)</p>	<p>D5 To break the rules/ be different</p> <p>Experimental (D5)</p>
<p>A6 Other reasons</p> <p>Function & Practicality (A6)</p>	<p>B6 Other reasons</p> <p>Aesthetic & Semantic (B6)</p>	<p>C6 Other reasons</p> <p>Experience (C6)</p>	<p>D6 Other reasons</p> <p>Experimental (D6)</p>

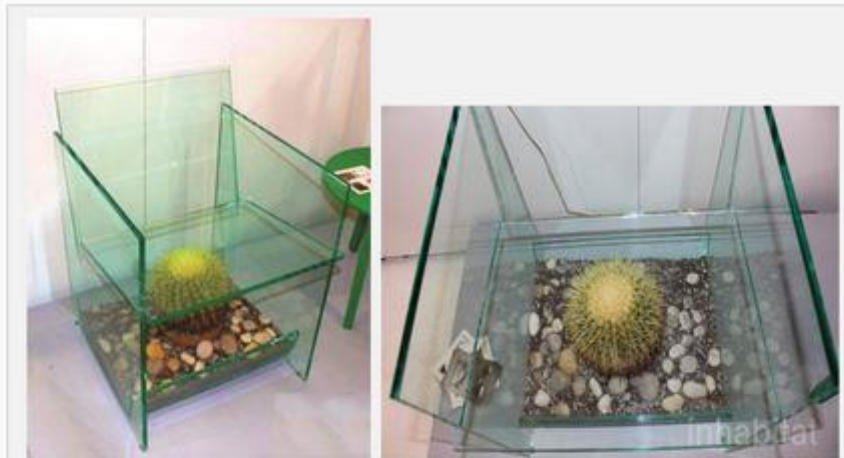
Question 2



Please look carefully at the furniture design above, then select which sub categories you think are suitable. You may choose minimum FOUR (4) answers.

<p>A1 To learn</p> <p>Function & Practicality (A1)</p>	<p>B1 Aesthetic value/ Decoration</p> <p>Aesthetic & Semantic (B1)</p>	<p>C1 To experience nature</p> <p>Experience (C1)</p>	<p>D1 Conceptual design</p> <p>Experimental (D1)</p>
<p>A2 Farming/ Food</p> <p>Function & Practicality (A2)</p>	<p>B2 Collection & Display</p> <p>Aesthetic & Semantic (B2)</p>	<p>C2 Environmental consciousness</p> <p>Experience (C2)</p>	<p>D2 Part of a research project</p> <p>Experimental (D2)</p>
<p>A3 Purify water/ air</p> <p>Function & Practicality (A3)</p>	<p>B3 Communication / convey a message</p> <p>Aesthetic & Semantic (B3)</p>	<p>C3 To heal/ calm/ lower stress</p> <p>Experience (C3)</p>	<p>D3 Exploration of new materials</p> <p>Experimental (D3)</p>
<p>A4 Generate energy</p> <p>Function & Practicality (A4)</p>	<p>B4 Artistic reasons</p> <p>Aesthetic & Semantic (B4)</p>	<p>C4 Entertainment</p> <p>Experience (C4)</p>	<p>D4 Exploration of new technologies</p> <p>Experimental (D4)</p>
<p>A5 To encourage hobbies</p> <p>Function & Practicality (A5)</p>	<p>B5 Contemplation</p> <p>Aesthetic & Semantic (B5)</p>	<p>C5 To stimulate senses</p> <p>Experience (C5)</p>	<p>D5 To break the rules/ be different</p> <p>Experimental (D5)</p>
<p>A6 Other reasons</p> <p>Function & Practicality (A6)</p>	<p>B6 Other reasons</p> <p>Aesthetic & Semantic (B6)</p>	<p>C6 Other reasons</p> <p>Experience (C6)</p>	<p>D6 Other reasons</p> <p>Experimental (D6)</p>

Question 3

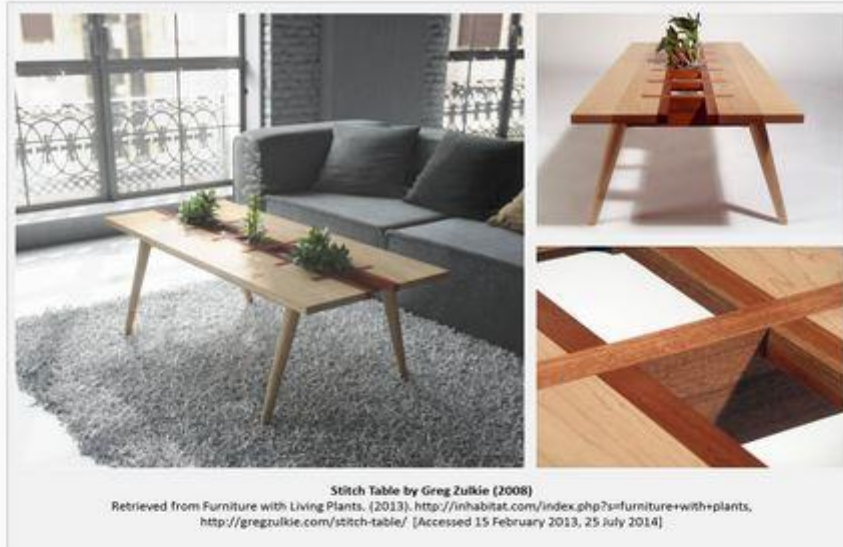


Threatening Cactus Terrarium Chair by Deger Cengiz.
 Retrieved from <http://inhabitat.com/deger-cengiz-slightly-frightening-terrarium-chair-lets-sitters-live-on-the-edge/>,
<http://media.designerpages.com/3rings/2010/07/19/deger-cengizs-leaning-shelves/Accessed August 2013/ 1 March 2014>

Please look carefully at the furniture design above, then select which sub categories you think are suitable. You may choose minimum FOUR (4) answers.

<p>A1 To learn</p> <p>Function & Practicality (A1)</p>	<p>B1 Aesthetic value/ Decoration</p> <p>Aesthetic & Semantic (B1)</p>	<p>C1 To experience nature</p> <p>Experience (C1)</p>	<p>D1 Conceptual design</p> <p>Experimental (D1)</p>
<p>A2 Farming/ Food</p> <p>Function & Practicality (A2)</p>	<p>B2 Collection & Display</p> <p>Aesthetic & Semantic (B2)</p>	<p>C2 Environmental consciousness</p> <p>Experience (C2)</p>	<p>D2 Part of a research project</p> <p>Experimental (D2)</p>
<p>A3 Purify water/ air</p> <p>Function & Practicality (A3)</p>	<p>B3 Communication / convey a message</p> <p>Aesthetic & Semantic (B3)</p>	<p>C3 To heal/ calm/ lower stress</p> <p>Experience (C3)</p>	<p>D3 Exploration of new materials</p> <p>Experimental (D3)</p>
<p>A4 Generate energy</p> <p>Function & Practicality (A4)</p>	<p>B4 Artistic reasons</p> <p>Aesthetic & Semantic (B4)</p>	<p>C4 Entertainment</p> <p>Experience (C4)</p>	<p>D4 Exploration of new technologies</p> <p>Experimental (D4)</p>
<p>A5 To encourage hobbies</p> <p>Function & Practicality (A5)</p>	<p>B5 Contemplation</p> <p>Aesthetic & Semantic (B5)</p>	<p>C5 To stimulate senses</p> <p>Experience (C5)</p>	<p>D5 To break the rules/ be different</p> <p>Experimental (D5)</p>
<p>A6 Other reasons</p> <p>Function & Practicality (A6)</p>	<p>B6 Other reasons</p> <p>Aesthetic & Semantic (B6)</p>	<p>C6 Other reasons</p> <p>Experience (C6)</p>	<p>D6 Other reasons</p> <p>Experimental (D6)</p>

Question 4



Please look carefully at the furniture design above, then select which sub categories you think are suitable. You may choose minimum FOUR (4) answers.

<p>A1 To learn</p> <p>Function & Practicality (A1)</p>	<p>B1 Aesthetic value/ Decoration</p> <p>Aesthetic & Semantic (B1)</p>	<p>C1 To experience nature</p> <p>Experience (C1)</p>	<p>D1 Conceptual design</p> <p>Experimental (D1)</p>
<p>A2 Farming/ Food</p> <p>Function & Practicality (A2)</p>	<p>B2 Collection & Display</p> <p>Aesthetic & Semantic (B2)</p>	<p>C2 Environmental consciousness</p> <p>Experience (C2)</p>	<p>D2 Part of a research project</p> <p>Experimental (D2)</p>
<p>A3 Purify water/ air</p> <p>Function & Practicality (A3)</p>	<p>B3 Communication / convey a message</p> <p>Aesthetic & Semantic (B3)</p>	<p>C3 To heal/ calm/ lower stress</p> <p>Experience (C3)</p>	<p>D3 Exploration of new materials</p> <p>Experimental (D3)</p>
<p>A4 Generate energy</p> <p>Function & Practicality (A4)</p>	<p>B4 Artistic reasons</p> <p>Aesthetic & Semantic (B4)</p>	<p>C4 Entertainment</p> <p>Experience (C4)</p>	<p>D4 Exploration of new technologies</p> <p>Experimental (D4)</p>
<p>A5 To encourage hobbies</p> <p>Function & Practicality (A5)</p>	<p>B5 Contemplation</p> <p>Aesthetic & Semantic (B5)</p>	<p>C5 To stimulate senses</p> <p>Experience (C5)</p>	<p>D5 To break the rules/ be different</p> <p>Experimental (D5)</p>
<p>A6 Other reasons</p> <p>Function & Practicality (A6)</p>	<p>B6 Other reasons</p> <p>Aesthetic & Semantic (B6)</p>	<p>C6 Other reasons</p> <p>Experience (C6)</p>	<p>D6 Other reasons</p> <p>Experimental (D6)</p>

Question 5



The Green wall by Deesawat.

Retrieved from <http://dreamhomeiving.blogspot.com.au/2012/11/wooden-outdoor-furniture-designs-by.html>, (Accessed August 2013)

Please look carefully at the

furniture design above, then select which sub categories you think are suitable. You may choose minimum FOUR (4) answers.

<p>A1 To learn</p> <p>Function & Practicality (A1)</p>	<p>B1 Aesthetic value/ Decoration</p> <p>Aesthetic & Semantic (B1)</p>	<p>C1 To experience nature</p> <p>Experience (C1)</p>	<p>D1 Conceptual design</p> <p>Experimental (D1)</p>
<p>A2 Farming/ Food</p> <p>Function & Practicality (A2)</p>	<p>B2 Collection & Display</p> <p>Aesthetic & Semantic (B2)</p>	<p>C2 Environmental consciousness</p> <p>Experience (C2)</p>	<p>D2 Part of a research project</p> <p>Experimental (D2)</p>
<p>A3 Purify water/ air</p> <p>Function & Practicality (A3)</p>	<p>B3 Communication / convey a message</p> <p>Aesthetic & Semantic (B3)</p>	<p>C3 To heal/ calm/ lower stress</p> <p>Experience (C3)</p>	<p>D3 Exploration of new materials</p> <p>Experimental (D3)</p>
<p>A4 Generate energy</p> <p>Function & Practicality (A4)</p>	<p>B4 Artistic reasons</p> <p>Aesthetic & Semantic (B4)</p>	<p>C4 Entertainment</p> <p>Experience (C4)</p>	<p>D4 Exploration of new technologies</p> <p>Experimental (D4)</p>
<p>A5 To encourage hobbies</p> <p>Function & Practicality (A5)</p>	<p>B5 Contemplation</p> <p>Aesthetic & Semantic (B5)</p>	<p>C5 To stimulate senses</p> <p>Experience (C5)</p>	<p>D5 To break the rules/ be different</p> <p>Experimental (D5)</p>
<p>A6 Other reasons</p> <p>Function & Practicality (A6)</p>	<p>B6 Other reasons</p> <p>Aesthetic & Semantic (B6)</p>	<p>C6 Other reasons</p> <p>Experience (C6)</p>	<p>D6 Other reasons</p> <p>Experimental (D6)</p>

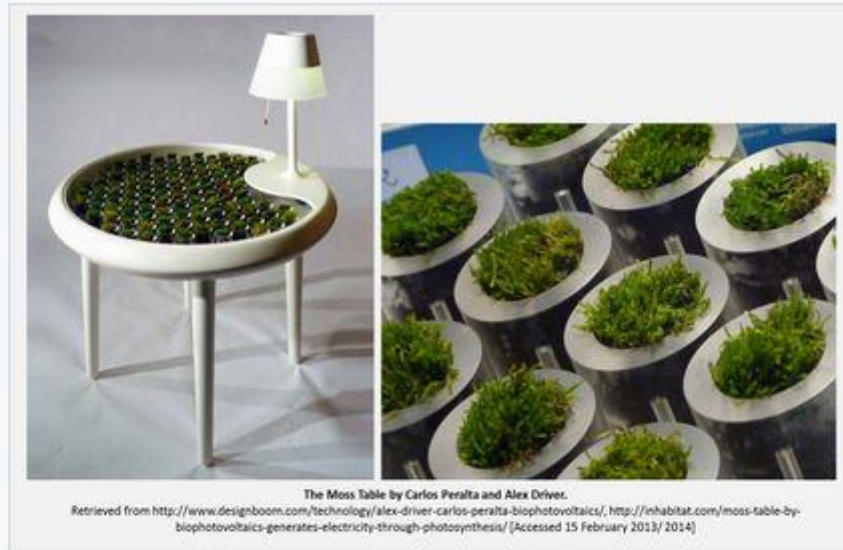
Question 6



Please look carefully at the furniture design above, then select which sub categories you think are suitable. You may choose minimum FOUR (4) answers.

<p>A1 To learn</p> <p>Function & Practicality (A1)</p>	<p>B1 Aesthetic value/ Decoration</p> <p>Aesthetic & Semantic (B1)</p>	<p>C1 To experience nature</p> <p>Experience (C1)</p>	<p>D1 Conceptual design</p> <p>Experimental (D1)</p>
<p>A2 Farming/ Food</p> <p>Function & Practicality (A2)</p>	<p>B2 Collection & Display</p> <p>Aesthetic & Semantic (B2)</p>	<p>C2 Environmental consciousness</p> <p>Experience (C2)</p>	<p>D2 Part of a research project</p> <p>Experimental (D2)</p>
<p>A3 Purify water/ air</p> <p>Function & Practicality (A3)</p>	<p>B3 Communication / convey a message</p> <p>Aesthetic & Semantic (B3)</p>	<p>C3 To heal/ calm/ lower stress</p> <p>Experience (C3)</p>	<p>D3 Exploration of new materials</p> <p>Experimental (D3)</p>
<p>A4 Generate energy</p> <p>Function & Practicality (A4)</p>	<p>B4 Artistic reasons</p> <p>Aesthetic & Semantic (B4)</p>	<p>C4 Entertainment</p> <p>Experience (C4)</p>	<p>D4 Exploration of new technologies</p> <p>Experimental (D4)</p>
<p>A5 To encourage hobbies</p> <p>Function & Practicality (A5)</p>	<p>B5 Contemplation</p> <p>Aesthetic & Semantic (B5)</p>	<p>C5 To stimulate senses</p> <p>Experience (C5)</p>	<p>D5 To break the rules/ be different</p> <p>Experimental (D5)</p>
<p>A6 Other reasons</p> <p>Function & Practicality (A6)</p>	<p>B6 Other reasons</p> <p>Aesthetic & Semantic (B6)</p>	<p>C6 Other reasons</p> <p>Experience (C6)</p>	<p>D6 Other reasons</p> <p>Experimental (D6)</p>

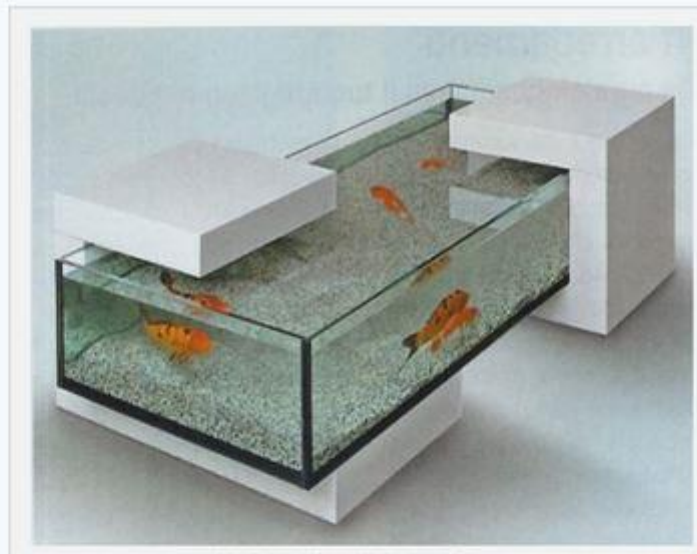
Question 7



Please look carefully at the furniture design above, then select which sub categories you think are suitable. You may choose minimum FOUR (4) answers.

<p>A1 To learn</p> <p>Function & Practicality (A1)</p>	<p>B1 Aesthetic value/ Decoration</p> <p>Aesthetic & Semantic (B1)</p>	<p>C1 To experience nature</p> <p>Experience (C1)</p>	<p>D1 Conceptual design</p> <p>Experimental (D1)</p>
<p>A2 Farming/ Food</p> <p>Function & Practicality (A2)</p>	<p>B2 Collection & Display</p> <p>Aesthetic & Semantic (B2)</p>	<p>C2 Environmental consciousness</p> <p>Experience (C2)</p>	<p>D2 Part of a research project</p> <p>Experimental (D2)</p>
<p>A3 Purify water/ air</p> <p>Function & Practicality (A3)</p>	<p>B3 Communication / convey a message</p> <p>Aesthetic & Semantic (B3)</p>	<p>C3 To heal/ calm/ lower stress</p> <p>Experience (C3)</p>	<p>D3 Exploration of new materials</p> <p>Experimental (D3)</p>
<p>A4 Generate energy</p> <p>Function & Practicality (A4)</p>	<p>B4 Artistic reasons</p> <p>Aesthetic & Semantic (B4)</p>	<p>C4 Entertainment</p> <p>Experience (C4)</p>	<p>D4 Exploration of new technologies</p> <p>Experimental (D4)</p>
<p>A5 To encourage hobbies</p> <p>Function & Practicality (A5)</p>	<p>B5 Contemplation</p> <p>Aesthetic & Semantic (B5)</p>	<p>C5 To stimulate senses</p> <p>Experience (C5)</p>	<p>D5 To break the rules/ be different</p> <p>Experimental (D5)</p>
<p>A6 Other reasons</p> <p>Function & Practicality (A6)</p>	<p>B6 Other reasons</p> <p>Aesthetic & Semantic (B6)</p>	<p>C6 Other reasons</p> <p>Experience (C6)</p>	<p>D6 Other reasons</p> <p>Experimental (D6)</p>

Question 8



The End Aqua Ambience Table by Aqua Design Group.
Retrieved from <http://www.aquadesigngroup.com/portfolio/aquariums/> [Accessed August 2013]

Please look carefully at the furniture design above, then select which sub categories you think are suitable. You may choose minimum FOUR (4) answers.

<p>A1 To learn</p> <p>Function & Practicality (A1)</p>	<p>B1 Aesthetic value/ Decoration</p> <p>Aesthetic & Semantic (B1)</p>	<p>C1 To experience nature</p> <p>Experience (C1)</p>	<p>D1 Conceptual design</p> <p>Experimental (D1)</p>
<p>A2 Farming/ Food</p> <p>Function & Practicality (A2)</p>	<p>B2 Collection & Display</p> <p>Aesthetic & Semantic (B2)</p>	<p>C2 Environmental consciousness</p> <p>Experience (C2)</p>	<p>D2 Part of a research project</p> <p>Experimental (D2)</p>
<p>A3 Purify water/ air</p> <p>Function & Practicality (A3)</p>	<p>B3 Communication / convey a message</p> <p>Aesthetic & Semantic (B3)</p>	<p>C3 To heal/ calm/ lower stress</p> <p>Experience (C3)</p>	<p>D3 Exploration of new materials</p> <p>Experimental (D3)</p>
<p>A4 Generate energy</p> <p>Function & Practicality (A4)</p>	<p>B4 Artistic reasons</p> <p>Aesthetic & Semantic (B4)</p>	<p>C4 Entertainment</p> <p>Experience (C4)</p>	<p>D4 Exploration of new technologies</p> <p>Experimental (D4)</p>
<p>A5 To encourage hobbies</p> <p>Function & Practicality (A5)</p>	<p>B5 Contemplation</p> <p>Aesthetic & Semantic (B5)</p>	<p>C5 To stimulate senses</p> <p>Experience (C5)</p>	<p>D5 To break the rules/ be different</p> <p>Experimental (D5)</p>
<p>A6 Other reasons</p> <p>Function & Practicality (A6)</p>	<p>B6 Other reasons</p> <p>Aesthetic & Semantic (B6)</p>	<p>C6 Other reasons</p> <p>Experience (C6)</p>	<p>D6 Other reasons</p> <p>Experimental (D6)</p>

Question 9



Local River by Mathieu Lehanneur and Anthony van den Bossche (2008).
 Fairs M., (2009). Green Design. Dubai: Carlton Books Limited., <http://www.designboom.com/design/local-river-by-mathieu-lehanneur-with-anthony-van-den-bossche/>, <http://www.treehugger.com/sustainable-product-design/local-river-by-mathieu-lehanneur.html>, <http://drumofglass.blogspot.com.au/2011/04/matthieu-lehanneur.html>, <http://drumofglass.blogspot.com.au/2011/04/matthieu-lehanneur.html> (Accessed February & August 2014)

Please look carefully at the furniture design above, then select which sub categories you think are suitable. You may choose minimum FOUR (4) answers.

<p>A1 To learn</p> <p>Function & Practicality (A1)</p>	<p>B1 Aesthetic value/ Decoration</p> <p>Aesthetic & Semantic (B1)</p>	<p>C1 To experience nature</p> <p>Experience (C1)</p>	<p>D1 Conceptual design</p> <p>Experimental (D1)</p>
<p>A2 Farming/ Food</p> <p>Function & Practicality (A2)</p>	<p>B2 Collection & Display</p> <p>Aesthetic & Semantic (B2)</p>	<p>C2 Environmental consciousness</p> <p>Experience (C2)</p>	<p>D2 Part of a research project</p> <p>Experimental (D2)</p>
<p>A3 Purify water/ air</p> <p>Function & Practicality (A3)</p>	<p>B3 Communication / convey a message</p> <p>Aesthetic & Semantic (B3)</p>	<p>C3 To heal/ calm/ lower stress</p> <p>Experience (C3)</p>	<p>D3 Exploration of new materials</p> <p>Experimental (D3)</p>
<p>A4 Generate energy</p> <p>Function & Practicality (A4)</p>	<p>B4 Artistic reasons</p> <p>Aesthetic & Semantic (B4)</p>	<p>C4 Entertainment</p> <p>Experience (C4)</p>	<p>D4 Exploration of new technologies</p> <p>Experimental (D4)</p>
<p>A5 To encourage hobbies</p> <p>Function & Practicality (A5)</p>	<p>B5 Contemplation</p> <p>Aesthetic & Semantic (B5)</p>	<p>C5 To stimulate senses</p> <p>Experience (C5)</p>	<p>D5 To break the rules/ be different</p> <p>Experimental (D5)</p>
<p>A6 Other reasons</p> <p>Function & Practicality (A6)</p>	<p>B6 Other reasons</p> <p>Aesthetic & Semantic (B6)</p>	<p>C6 Other reasons</p> <p>Experience (C6)</p>	<p>D6 Other reasons</p> <p>Experimental (D6)</p>

Question 10



Cultivation Kitchen INAX (2008).

Japan Good Design Award Book, (2008). Retrieved from <http://www.designstudiocrac.com/English/fcty1-en.htm> [Accessed 24 May 2013].
<http://spatialinteractions.wordpress.com/2011/10/01/cultivation-kitchen/> [Accessed 5 March 2013].

Please look carefully at the furniture design above, then select which sub categories you think are suitable. You may choose minimum FOUR (4) answers.

<p>A1 To learn</p> <p>Function & Practicality (A1)</p>	<p>B1 Aesthetic value/ Decoration</p> <p>Aesthetic & Semantic (B1)</p>	<p>C1 To experience nature</p> <p>Experience (C1)</p>	<p>D1 Conceptual design</p> <p>Experimental (D1)</p>
<p>A2 Farming/ Food</p> <p>Function & Practicality (A2)</p>	<p>B2 Collection & Display</p> <p>Aesthetic & Semantic (B2)</p>	<p>C2 Environmental consciousness</p> <p>Experience (C2)</p>	<p>D2 Part of a research project</p> <p>Experimental (D2)</p>
<p>A3 Purify water/ air</p> <p>Function & Practicality (A3)</p>	<p>B3 Communication / convey a message</p> <p>Aesthetic & Semantic (B3)</p>	<p>C3 To heal/ calm/ lower stress</p> <p>Experience (C3)</p>	<p>D3 Exploration of new materials</p> <p>Experimental (D3)</p>
<p>A4 Generate energy</p> <p>Function & Practicality (A4)</p>	<p>B4 Artistic reasons</p> <p>Aesthetic & Semantic (B4)</p>	<p>C4 Entertainment</p> <p>Experience (C4)</p>	<p>D4 Exploration of new technologies</p> <p>Experimental (D4)</p>
<p>A5 To encourage hobbies</p> <p>Function & Practicality (A5)</p>	<p>B5 Contemplation</p> <p>Aesthetic & Semantic (B5)</p>	<p>C5 To stimulate senses</p> <p>Experience (C5)</p>	<p>D5 To break the rules/ be different</p> <p>Experimental (D5)</p>
<p>A6 Other reasons</p> <p>Function & Practicality (A6)</p>	<p>B6 Other reasons</p> <p>Aesthetic & Semantic (B6)</p>	<p>C6 Other reasons</p> <p>Experience (C6)</p>	<p>D6 Other reasons</p> <p>Experimental (D6)</p>

Section E - Biophilic Design

How do you prefer to experience nature? *



Do you like to have living organisms (such as plants or animals) inside your house? *



Having natural elements and living organisms indoors can:

A. Release stress/ calm you *



B. Create awareness of nature and ecological impact *



C. Foster a sense of care (as living organisms need to be watered or fed) *



D. Be educational (especially for children) *



E. Be dangerous and inconvenient, as in the case of allergies *



F. Be not desirable, as they are usually messy, dirty, or require much of my time *



Would you like to have a piece of furniture with living organisms inside your house? *

Yes

No

Please select which type of living plant you would prefer to be embedded into a furniture design piece. *

<input type="radio"/> A Green & leafy	<input type="radio"/> B Flowery	<input type="radio"/> C Fruit plant	<input type="radio"/> D Moss	<input type="radio"/> E Cacti	<input type="radio"/> F No Living Plants
---	---	---	--	---	--

Please select which type of living animal you would prefer to be embedded with due care into a furniture design piece. *

<input type="radio"/> A Mammals	<input type="radio"/> B Reptilians	<input type="radio"/> C Amphibians	<input type="radio"/> D Insects	<input type="radio"/> E Birds	<input type="radio"/> F Fish	<input type="radio"/> G No Living Animals
---	--	--	---	---	--	---

Which plant do you least prefer? *

<input type="radio"/> A Green & leafy	<input type="radio"/> B Flowery	<input type="radio"/> C Fruit plant	<input type="radio"/> D Moss	<input type="radio"/> E Cacti
---	---	---	--	---

Which animal do you least prefer? *

<input type="radio"/> A Mammals	<input type="radio"/> B Reptilians	<input type="radio"/> C Amphibians	<input type="radio"/> D Insects	<input type="radio"/> E Birds	<input type="radio"/> F Fish
---	--	--	---	---	--

END OF QUESTIONNAIRES

Thank you for your cooperation and taking the time to answer this questionnaire

A Study of Emotion, Influences and Perceptions of Furniture Design with Living Organisms in Relation to Biophilic Design

Thank You!

For any information regarding the research please contact:
 Nurul Ayn Ahmad Sayuti
 Environmental Design
 Faculty of Art and Design
 University of Canberra
 ACT 2601
 Australia
 Email: 03092325@uni.canberra.edu.au



Ethic Application Approval Letter



21 May 2014

APPROVED - Project number 14-108

Ms Nurul 'Ayn Ahmad Sayuti
Faculty of Arts & Design
University of Canberra
Canberra ACT 2601

Dear Ayn,

The Human Research Ethics Committee has considered your application to conduct research with human subjects for the project titled **A study of emotions, influences and perceptions of furniture design with living organisms in relation to biophilic design.**

Approval is granted until 30 June 2016.

The following general conditions apply to your approval.

These requirements are determined by University policy and the *National Statement on Ethical Conduct in Human Research* (National Health and Medical Research Council, 2007).

Monitoring:	You must, in conjunction with your supervisor, assist the Committee to monitor the conduct of approved research by completing and promptly returning project review forms, which will be sent to you at the end of your project and, in the case of extended research, at least annually during the approval period.
Discontinuation of research:	You must, in conjunction with your supervisor, inform the Committee, giving reasons, if the research is not conducted or is discontinued before the expected date of completion.
Extension of approval:	If your project will not be complete by the expiry date stated above, you must apply in writing for extension of approval. Application should be made before current approval expires; should specify a new completion date; should include reasons for your request.
Retention and storage of data:	University policy states that all research data must be stored securely, on University premises, for a minimum of five years. You must ensure that all records are transferred to the University when the project is complete.
Contact details and notification of changes:	All email contact should use the UC email address. You should advise the Committee of any change of address during or soon after the approval period including, if appropriate, email address(es).

Yours sincerely
Human Research Ethics Committee

Hendryk Flaegel
Research Ethics & Compliance Officer
Research Services Office
T (02) 6201 5220 F (02) 6201 5466
E hendryk.flaegel@canberra.edu.au

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Postal Address:
University of Canberra ACT 2601 Australia
Location:
University Drive Bruce ACT

Australian Government Higher Education Registered
Provider Number (CRICOS): 00212K

Appendix D: Chapter 4 – Quantitative Results

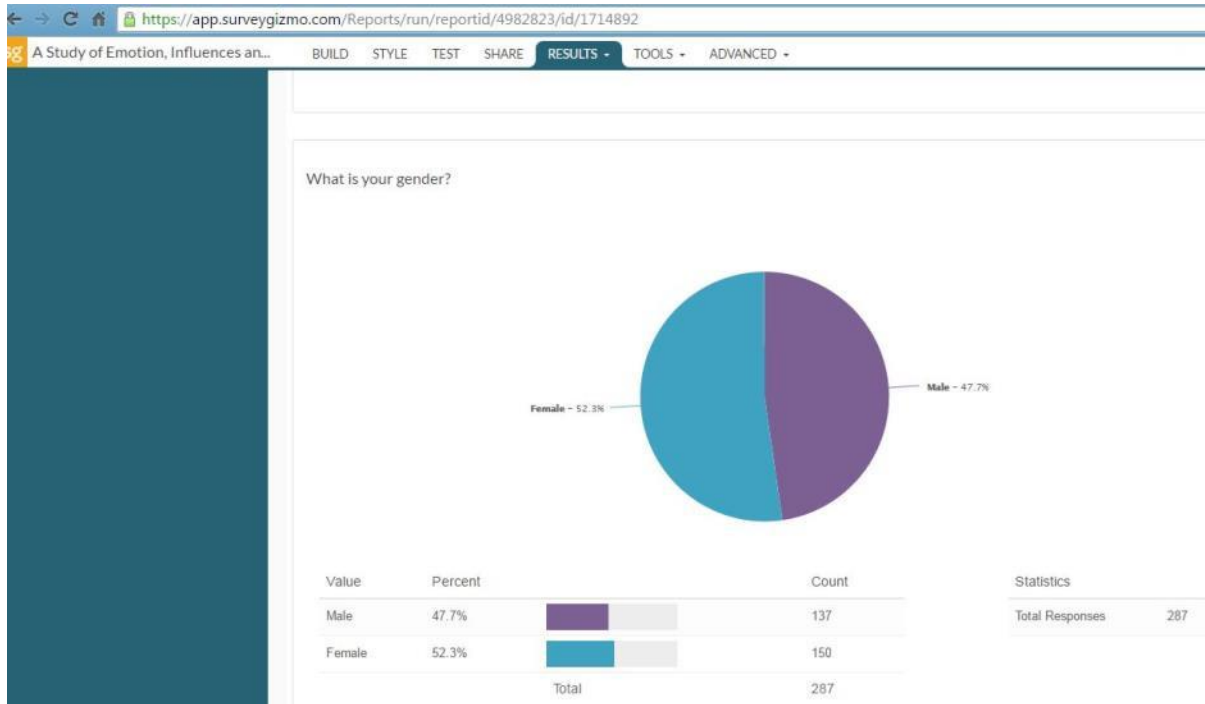
- Full Results from SurveyGizmo.com
287 respondents (overall respondents)
 - Section A: Respondent Background
 - Section B: Design Preference
 - Section C: Emotional Design
 - Section D: Conceptual Model
 - Section E: Biophilic Design
- Results from Chapter 4: Section D 4th Data Set
 - Section D – Question 1
 - Section D – Question 5
- Results from Chapter 4: Section D 2nd Data Set
 - Section D – Question 4
 - Section D – Question 5
 - Section D – Question 8
 - Summary of Section D
 - Conceptual Model Analysis for Stratified Group
(Art and Design/Creative, Education/Academic, Student)
 - Section E: Biophilic Design
- Full Results for 4th Data Set
 - Australian Designers and International Designers
 - Section A: Respondent Background
 - Section B: Design Preference
 - Section C: Emotional Design
 - Section D: Conceptual Model
 - Section E: Biophilic Design
- Full Results for 2nd Data Set
 - Stratification Group (Designers, Educators and Students)
 - Section A: Respondent Background
 - Section B: Design Preference
 - Section C: Emotional Design
 - Section D: Conceptual Model
 - Section E: Biophilic Design

Appendix D: Chapter 4 – Quantitative Results

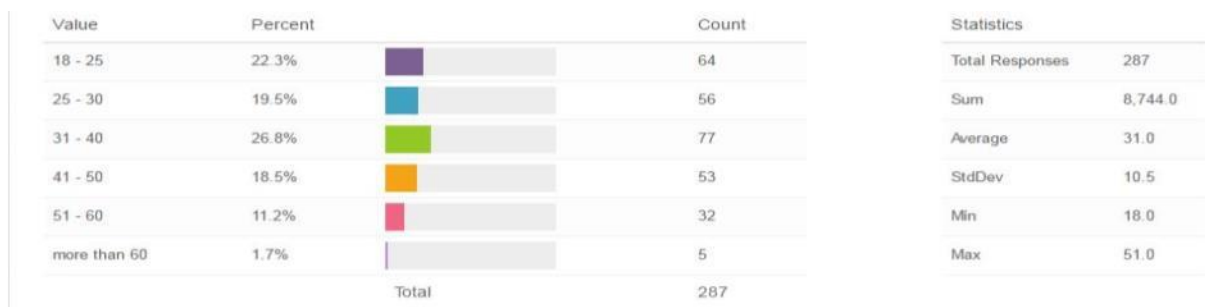
The SurveyGizmo.com results

Overall Respondents (287 respondents)

Section A: Respondent Background



What is your age?



What is your working background?

Value	Percent	Count
Advertising/ Media	1.1%	3
Art and Design/ Creative	30.0%	86
Education/ Academic	28.5%	76
Finance/ Banking/ Marketing	2.1%	6
Govt/ Civil Service	4.2%	12
IT/ Computers/ Technologies	4.9%	14
Medical/ Dental	1.4%	4
Technical/ Science/ Engineering	4.2%	12
Student	18.8%	54
Unemployed	1.4%	4
Retired	0.4%	1
Other	5.2%	15
Total		287

Statistics	
Total Responses	287

What is your current or previous education background?

Value	Percent	Count
Postgraduate	65.9%	189
Undergraduate	27.5%	79
Certificate	4.5%	13
Other	2.1%	6
Total		287

Statistics	
Total Responses	287

What is your continent of origin?

Value	Percent	Count
Africas	2.8%	8
Americas	11.5%	33
Asia	54.4%	156
Australia and Ocenia	22.0%	63
Europe	9.4%	27
Total		287

Statistics	
Total Responses	287

Preferences: Which activities do you prefer?

Value	Percent	Count
Outdoor	60.6%	174
Indoor	39.4%	113
Total		287

Statistics	
Total Responses	287

Preferences: Do you have pets?

Value	Percent	Count
Yes	49.1%	141
No	50.9%	146
Total		287

Statistics	
Total Responses	287

Preferences: What sort of pets do you have?

Value	Percent	Count
Cat	23.7%	68
Dog	12.5%	36
Fish	4.9%	14
No Pets	47.4%	136
Other	11.5%	33
Total		287

Statistics	
Total Responses	287

Preferences: Do you take care of plants?

Value	Percent	Count
Yes	65.2%	187
No	34.8%	100
Total		287

Statistics	
Total Responses	287

Section B: Design Preference

Question 1

Value	Percent	Count
A	63.8%	183
B	36.2%	104
Total		287

Statistics	
Total Responses	287

Question 2

Value	Percent	Count
A	48.8%	140
B	51.2%	147
Total		287

Statistics	
Total Responses	287

Question 3

Value	Percent	Count
A	30.7%	88
B	69.3%	199
Total		287

Statistics	
Total Responses	287

Question 4

Value	Percent	Count
A	54.9%	107
B	45.1%	88
Total		195

Statistics	
Total Responses	195

Question 5

Value	Percent	Count
A	79.4%	228
B	20.6%	59
Total		287

Statistics	
Total Responses	287

Question 6

Value	Percent	Count
A	39.4%	113
B	60.6%	174
Total		287

Statistics	
Total Responses	287

Question 7

Value	Percent	Count
A	22.0%	63
B	78.1%	224
Total		287

Statistics	
Total Responses	287

Question 8

Value	Percent	Count
A	69.0%	198
B	31.0%	89
Total		287

Statistics	
Total Responses	287

Question 9

Value	Percent	Count
A	22.0%	63
B	78.1%	224
Total		287

Statistics	
Total Responses	287

Question 10

Value	Percent	Count
A	54.4%	156
B	45.6%	131
Total		287

Statistics	
Total Responses	287

Section C: Emotional Design

Question 1

Value	Percent	Count
1	5.9%	17
2	26.8%	77
3	9.1%	26
4	22.0%	63
5	26.1%	75
6	3.1%	9
7	7.0%	20
Total		287

Statistics	
Total Responses	287
Sum	1,070.0
Average	3.7
StdDev	1.6
Min	1.0
Max	7.0

Question 2

Value	Percent	Count
1	5.6%	16
2	41.1%	118
3	9.4%	27
4	16.7%	48
5	16.7%	48
6	5.9%	17
7	4.5%	13
Total		287

Statistics	
Total Responses	287
Sum	958.0
Average	3.3
StdDev	1.6
Min	1.0
Max	7.0

Question 3

Value	Percent	Count
1	1.4%	4
2	9.4%	27
3	7.3%	21
4	18.8%	54
5	27.9%	80
6	21.3%	61
7	13.9%	40
Total		287

Statistics	
Total Responses	287
Sum	1,383.0
Average	4.8
StdDev	1.5
Min	1.0
Max	7.0

Question 4

Value	Percent	Count
1	4.5%	13
2	23.3%	67
3	7.0%	20
4	19.9%	57
5	24.0%	69
6	11.5%	33
7	9.8%	28
Total		287

Statistics	
Total Responses	287
Sum	1,174.0
Average	4.1
StdDev	1.7
Min	1.0
Max	7.0

Question 5

Value	Percent	Count
1	1.1%	3
2	8.7%	25
3	7.0%	20
4	16.0%	46
5	18.8%	54
6	27.9%	80
7	20.6%	59
Total		287

Statistics	
Total Responses	287
Sum	1,460.0
Average	5.1
StdDev	1.6
Min	1.0
Max	7.0

Question 6

Value	Percent	Count
1	20.6%	59
2	23.0%	66
3	4.5%	13
4	18.8%	54
5	18.1%	52
6	10.1%	29
7	4.9%	14
Total		287

Statistics	
Total Responses	287
Sum	978.0
Average	3.4
StdDev	1.9
Min	1.0
Max	7.0

Question 7

Value	Percent	Count
1	0.0%	0
2	2.8%	8
3	4.5%	13
4	17.1%	49
5	23.7%	68
6	32.8%	94
7	19.2%	55
Total		287

Statistics	
Total Responses	287
Sum	1,540.0
Average	5.4
StdDev	1.3
Min	2.0
Max	7.0

Question 8

Value	Percent	Count
1	0.0%	0
2	4.5%	13
3	5.2%	15
4	21.6%	62
5	16.4%	47
6	31.4%	90
7	20.9%	60
Total		287

Statistics	
Total Responses	287
Sum	1,514.0
Average	5.3
StdDev	1.4
Min	2.0
Max	7.0

Question 9

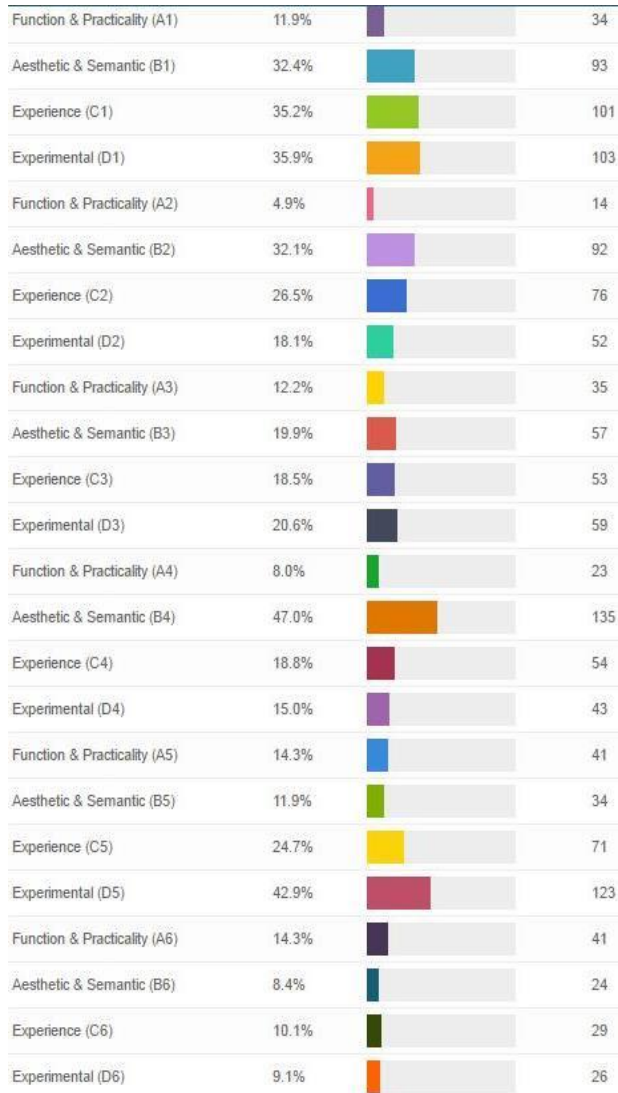


Question 10

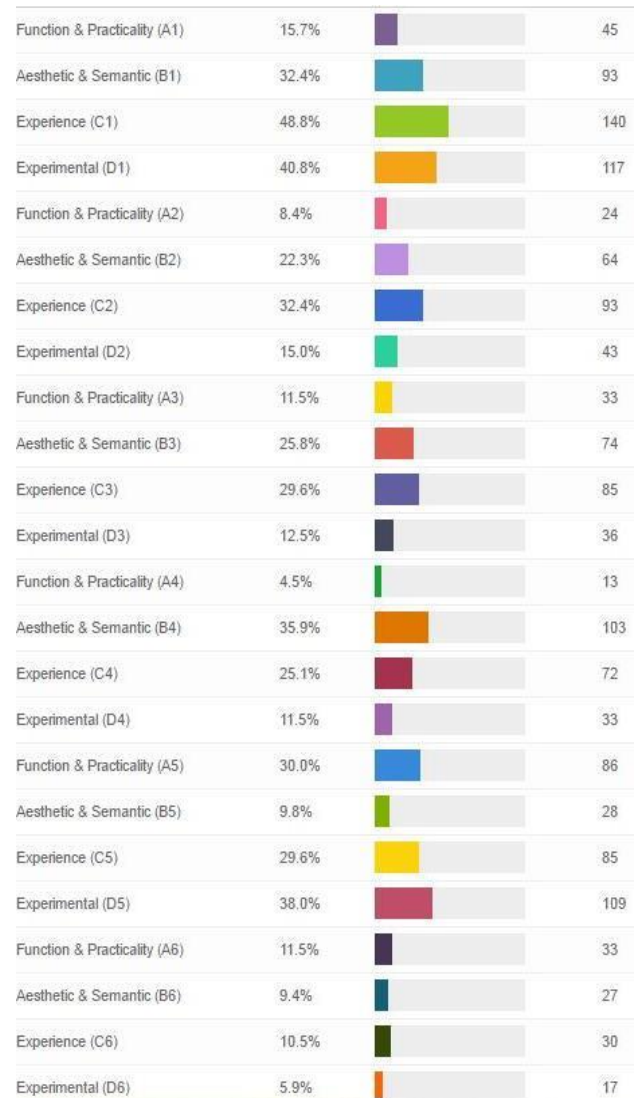


Section D: Conceptual Model

Question 1



Question 2



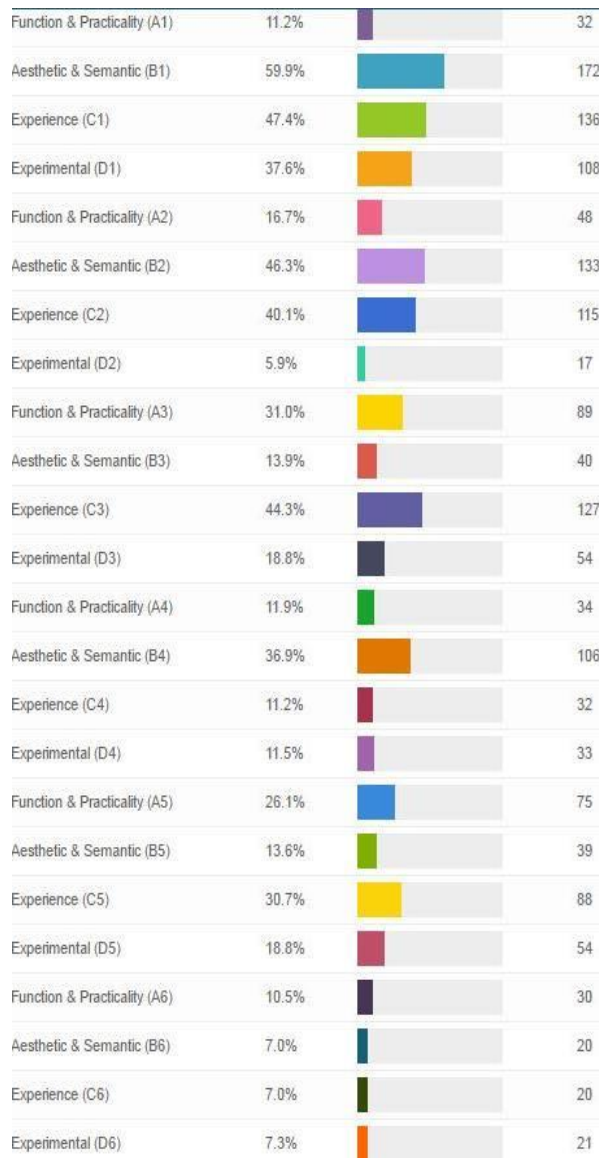
Question 3

Function & Practicality (A1)	12.2%		35
Aesthetic & Semantic (B1)	34.2%		98
Experience (C1)	31.4%		90
Experimental (D1)	39.4%		113
Function & Practicality (A2)	5.9%		17
Aesthetic & Semantic (B2)	35.2%		101
Experience (C2)	20.6%		59
Experimental (D2)	17.8%		51
Function & Practicality (A3)	7.3%		21
Aesthetic & Semantic (B3)	20.2%		58
Experience (C3)	14.3%		41
Experimental (D3)	25.4%		73
Function & Practicality (A4)	3.8%		11
Aesthetic & Semantic (B4)	48.4%		139
Experience (C4)	23.7%		68
Experimental (D4)	9.8%		28
Function & Practicality (A5)	19.5%		56
Aesthetic & Semantic (B5)	10.5%		30
Experience (C5)	32.1%		92
Experimental (D5)	49.5%		142
Function & Practicality (A6)	15.7%		45
Aesthetic & Semantic (B6)	9.1%		26
Experience (C6)	10.8%		31
Experimental (D6)	9.1%		26

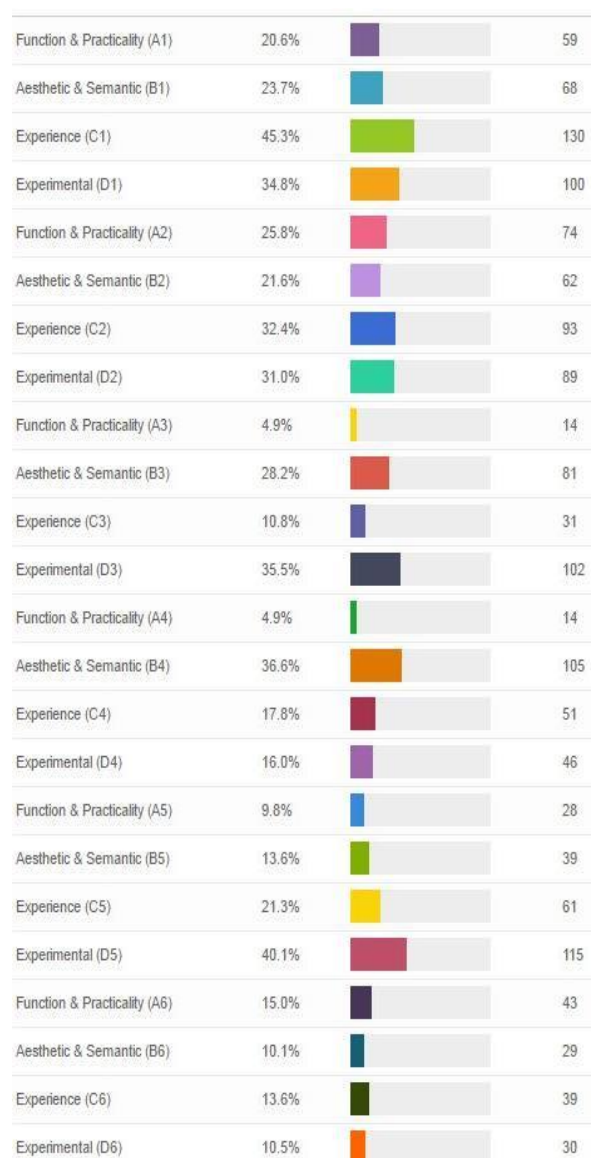
Question 4

Function & Practicality (A1)	10.5%		30
Aesthetic & Semantic (B1)	63.8%		183
Experience (C1)	46.0%		132
Experimental (D1)	35.5%		102
Function & Practicality (A2)	13.6%		39
Aesthetic & Semantic (B2)	34.5%		99
Experience (C2)	39.0%		112
Experimental (D2)	6.3%		18
Function & Practicality (A3)	22.7%		65
Aesthetic & Semantic (B3)	13.9%		40
Experience (C3)	43.9%		126
Experimental (D3)	17.4%		50
Function & Practicality (A4)	7.7%		22
Aesthetic & Semantic (B4)	39.7%		114
Experience (C4)	12.9%		37
Experimental (D4)	8.0%		23
Function & Practicality (A5)	25.1%		72
Aesthetic & Semantic (B5)	15.7%		45
Experience (C5)	31.0%		89
Experimental (D5)	19.5%		56
Function & Practicality (A6)	9.4%		27
Aesthetic & Semantic (B6)	9.1%		26
Experience (C6)	7.3%		21
Experimental (D6)	8.4%		24

Question 5



Question 6



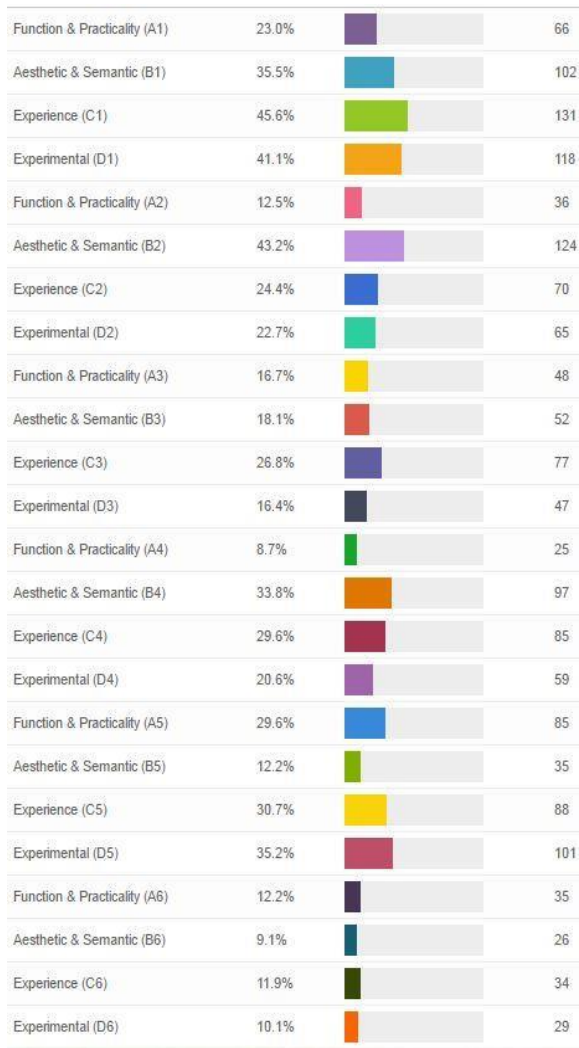
Question 7

Function & Practicality (A1)	18.8%		54
Aesthetic & Semantic (B1)	47.4%		136
Experience (C1)	43.2%		124
Experimental (D1)	38.0%		109
Function & Practicality (A2)	17.1%		49
Aesthetic & Semantic (B2)	35.5%		102
Experience (C2)	37.3%		107
Experimental (D2)	23.0%		66
Function & Practicality (A3)	20.6%		59
Aesthetic & Semantic (B3)	19.9%		57
Experience (C3)	30.7%		88
Experimental (D3)	28.6%		82
Function & Practicality (A4)	13.6%		39
Aesthetic & Semantic (B4)	36.6%		105
Experience (C4)	11.9%		34
Experimental (D4)	26.1%		75
Function & Practicality (A5)	17.4%		50
Aesthetic & Semantic (B5)	11.2%		32
Experience (C5)	31.0%		89
Experimental (D5)	28.2%		81
Function & Practicality (A6)	9.8%		28
Aesthetic & Semantic (B6)	6.6%		19
Experience (C6)	8.7%		25
Experimental (D6)	8.0%		23

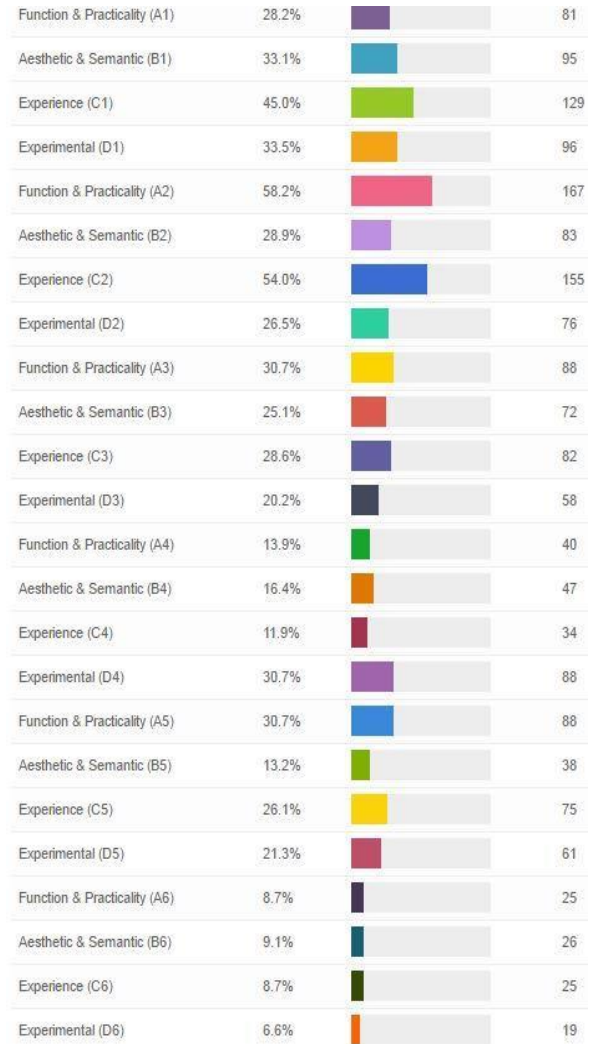
Question 8

Function & Practicality (A1)	16.4%		47
Aesthetic & Semantic (B1)	58.2%		167
Experience (C1)	46.3%		133
Experimental (D1)	39.4%		113
Function & Practicality (A2)	6.3%		18
Aesthetic & Semantic (B2)	42.9%		123
Experience (C2)	21.6%		62
Experimental (D2)	10.1%		29
Function & Practicality (A3)	13.2%		38
Aesthetic & Semantic (B3)	10.5%		30
Experience (C3)	53.7%		154
Experimental (D3)	16.4%		47
Function & Practicality (A4)	8.0%		23
Aesthetic & Semantic (B4)	36.9%		106
Experience (C4)	39.0%		112
Experimental (D4)	13.2%		38
Function & Practicality (A5)	35.2%		101
Aesthetic & Semantic (B5)	18.8%		54
Experience (C5)	28.9%		83
Experimental (D5)	29.6%		85
Function & Practicality (A6)	9.4%		27
Aesthetic & Semantic (B6)	5.9%		17
Experience (C6)	7.7%		22
Experimental (D6)	9.4%		27

Question 9



Question 10



Section E: Biophilic Design

Question 1

Value	Percent	Count
1	3.1%	9
2	39.4%	113
3	57.5%	165
Total		287

Statistics	
Total Responses	287
Sum	730.0
Average	2.5
StdDev	0.6
Min	1.0
Max	3.0

Question 2

Value	Percent	Count
1	2.4%	7
2	7.0%	20
3	15.0%	43
4	43.9%	126
5	31.7%	91
Total		287

Statistics	
Total Responses	287
Sum	1,135.0
Average	4.0
StdDev	1.0
Min	1.0
Max	5.0

Question 3

Value	Percent	Count
1	0.7%	2
2	5.9%	17
3	10.5%	30
4	48.4%	139
5	34.5%	99
Total		287

Statistics	
Total Responses	287
Sum	1,177.0
Average	4.1
StdDev	0.9
Min	1.0
Max	5.0

Question 4

Value	Percent	Count
1	1.4%	4
2	9.1%	26
3	13.2%	38
4	55.1%	158
5	21.3%	61
Total		287

Statistics	
Total Responses	287
Sum	1,107.0
Average	3.9
StdDev	0.9
Min	1.0
Max	5.0

Question 5

Value	Percent	Count
1	0.4%	1
2	5.6%	16
3	11.5%	33
4	55.1%	158
5	27.5%	79
Total		287

Statistics	
Total Responses	287
Sum	1,159.0
Average	4.0
StdDev	0.8
Min	1.0
Max	5.0

Question 6

Value	Percent	Count
1	0.7%	2
2	3.5%	10
3	9.8%	28
4	50.5%	145
5	35.5%	102
Total		287

Statistics	
Total Responses	287
Sum	1,196.0
Average	4.2
StdDev	0.8
Min	1.0
Max	5.0

Question 7

Value	Percent	Count
1	4.9%	14
2	24.0%	69
3	32.4%	93
4	30.0%	86
5	8.7%	25
Total		287

Statistics	
Total Responses	287
Sum	900.0
Average	3.1
StdDev	1.0
Min	1.0
Max	5.0

Question 8

Value	Percent	Count
1	10.5%	30
2	22.0%	63
3	33.5%	96
4	26.8%	77
5	7.3%	21
Total		287

Statistics	
Total Responses	287
Sum	857.0
Average	3.0
StdDev	1.1
Min	1.0
Max	5.0

Question 9

Value	Percent	Count
Yes	64.5%	185
No	35.5%	102
Total		287

Statistics	
Total Responses	287

Question 10

Value	Percent	Count
A	48.1%	138
B	13.2%	38
C	6.3%	18
D	7.7%	22
E	5.9%	17
F	18.8%	54
Total		287

Statistics	
Total Responses	287

Question 11

Value	Percent	Count
A	9.1%	26
B	1.7%	5
C	2.4%	7
D	4.2%	12
E	2.4%	7
F	34.8%	100
G	45.3%	130
Total		287

Statistics	
Total Responses	287

Question 12

Value	Percent	Count
A	14.6%	42
B	15.3%	44
C	18.8%	54
D	23.3%	67
E	27.9%	80
Total		287

Statistics	
Total Responses	287

Question 13

Value	Percent	Count
A	11.2%	32
B	31.0%	89
C	9.1%	26
D	28.6%	82
E	7.3%	21
F	12.9%	37
Total		287

Statistics	
Total Responses	287

Results from Chapter 4: 4th Data Set – Australian and International Designers

Section D

Question 1: Conceptual Model (The Retrofitted Rococo Chair)

Table 4.14 illustrates the percentage of 24 subcategories of the Conceptual Model for Question 1 and is organized with the highest percentage of the lowest percentage of responses towards the 24 subcategories. As can be seen, the highest subcategory was D5: to break the rules/be different, from both Australian and International designers with 70.40% and 50.80%, respectively, for the Retrofitted Rococo Chair. It can also be seen that there are similar patterns in choosing the other 3 highest subcategories by both designer groups, which are B4: Artistic reasons, D1: Conceptual design and B2: Collection and Display. The lowest percentage was A2: Farming /Food with no responses from Australian designers and a low percentage response from International designers (4.6%). Interestingly, from the images, it can be seen that the chair has a small tube installed and connected to the outdoor to invite small insects such as ants to live indoor and inside the chair. The top 10 answers of each subcategory are highlighted in yellow.

Table 4.14: Summary of overall results as percentage of frequency for the subcategory of Conceptual Model for Question 1.

The Retrofitted Rococo Chair					
Australian Designer			International Designers		
1		70.40%	13		14.80%
2		63.00%	14		11.10%
3		63.00%	15		11.10%
4		33.30%	16		11.10%
5		22.20%	17		7.40%
6		22.20%	18		7.40%
7		22.20%	19		3.70%
8		18.50%	20		3.70%
9		18.50%	21		3.70%
10		18.50%	22		0%
11		14.80%	23		0%
12		14.80%	24		0%
1		50.80%	13		16.90%
2		44.60%	14		16.90%
3		41.50%	15		15.40%
4		35.40%	16		13.80%
5		33.80%	17		12.30%
6		30.80%	18		10.80%
7		27.70%	19		10.80%
8		23.10%	20		10.80%
9		23.10%	21		7.70%
10		18.50%	22		6.20%
11		18.50%	23		4.60%
12		16.90%	24		4.60%

Question 5: Conceptual Model (The Greenwall)

Table 4.15 shows the percentage and summary results for the Greenwall, outdoor wall shelves that can be used as a vertical garden to display small plants. Based on the result, both designer groups agreed that this FDLOs was designed for BI: Aesthetic reason/ Decoration, which scored the highest responses from Australian designers (77.80%) and 66.20% from International designers. The lowest responses are for C4: Entertainment, A4: Generate Energy and D2: Part of a research project with 0% responses from the Australian Designers. While 6.20% of International designers pointed at D4: Exploration of new technologies, B6: Other reasons, A4: Generate Energy and D2: Part of a research project. In Table 4.15, it can also be seen that both groups have agreed on several subcategories as can be seen in rows highlighted in grey; row 13 -16, 19, 20, 23, and 24. The subcategories that are in the same position includes, B5: Contemplation, B3: Communication, A1: To learn, A6: Other reasons, C6: Other reasons D6: Other reasons, A4: Generate Energy and D2: Part of a research project.

Table 4.15: Summary of overall results as percentage of frequency for the subcategory of Conceptual Model for Question 5

The Greenwall					
Australian Designer			International Designers		
1		77.80%	13		7.40%
2		55.60%	14		7.40%
3		44.40%	15		7.40%
4		40.70%	16		7.40%
5		37.00%	17		7.40%
6		33.30%	18		3.70%
7		29.60%	19		3.70%
8		25.90%	20		3.70%
9		22.20%	21		3.70%
10		18.50%	22		0%
11		14.80%	23		0%
12		7.40%	24		0%
1		66.20%	13		16.90%
2		47.70%	14		15.40%
3		44.60%	15		15.40%
4		43.10%	16		13.80%
5		35.40%	17		13.80%
6		33.80%	18		12.30%
7		33.80%	19		10.80%
8		33.80%	20		10.80%
9		29.20%	21		6.20%
10		24.60%	22		6.20%
11		18.50%	23		6.20%
12		16.90%	24		6.20%

Result from Chapter 4: 2nd Data Set – Stratified Group

Section D: Conceptual Design

As explained previously, this section was designed to gather information on respondent's opinion about the images of FDLOs to the Conceptual Model developed in this project, which consisted of 4 main categories and 24 subcategories. For brevity and to avoid repetition, only the 3 most relevant questions will be discussed in this section; i.e., Questions 4, 5, and 8. These 3 questions received the highest responses on the subcategories of the Conceptual Model. Each question will be discussed briefly followed by a summary table of the stratified group. Other questions and results can be viewed in the Appendix D: 2nd Data Set, page 311 – 357. The top 10 answers are highlighted in yellow. The similarity of answers (subcategories) can be seen in the grey shaded boxes in the tables for each respondent group.

Question 4: Conceptual Model (The Stitch Table)

As illustrated in Table 4.39 below, the highest percentage for the subcategory is B1: Aesthetic Value/Decoration for all respondents; 69.20%, 61.50% and 70.40% for the 3 groups of respondents; the Art and Design/Creative, Education/Academic and Students, respectively. There are similar patterns in the ranking that are shaded in grey: ranking 14th for Art and Design/Creative and Education/Academic respondents. Boxes 2, 17, 21, 23 shows similar ranking for Art and Design/Creative and Student and similar ranking in boxes 5, 6, 7, 19 and 24 for Education/Academic and Student.

















































Table 4.39: Percentage and frequency of overall responses to question 4 for the subcategories of the Conceptual Model




The Stitch Table						
	1 	2 	3 	4 	5 	6
	69.20%	52.30%	38.50%	38.50%	35.40%	33.80%
	7 	8 	9 	10 	11 	12
	33.80%	27.70%	23.10%	20.00%	20.00%	20.00%
Art & Design	13 	14 	15 	16 	17 	18
	18.50%	13.80%	12.30%	12.30%	10.80%	10.80%
	19 	20 	21 	22 	23 	24
	10.80%	9.20%	7.70%	7.70%	7.70%	1.50%
	1 	2 	3 	4 	5 	6
	61.50%	51.30%	50.00%	47.40%	44.90%	37.20%
	7 	8 	9 	10 	11 	12
	33.30%	26.90%	25.60%	25.60%	20.50%	19.20%
Education	13 	14 	15 	16 	17 	18
	16.70%	16.70%	15.40%	12.80%	12.80%	10.30%
	19 	20 	21 	22 	23 	24
	10.30%	10.30%	9.00%	7.70%	6.40%	6.40%
	1 	2 	3 	4 	5 	6
	70.40%	48.10%	46.30%	44.40%	40.70%	37.00%
	7 	8 	9 	10 	11 	12
Student	33.30%	29.60%	27.80%	25.90%	16.70%	14.80%
	13 	14 	15 	16 	17 	18
	14.80%	14.80%	13.00%	11.10%	11.10%	9.30%
	19 	20 	21 	22 	23 	24
	9.30%	9.30%	7.40%	3.70%	3.70%	1.90%

Question 5: Conceptual Model (The Greenwall)

Table 4.40 below shows a summary of responses in percentage to subcategories of the *Greenwall*. It can be seen that all respondents chose the same subcategories of B1: Aesthetic Value/Decoration and C1: To Experience Nature. These subcategories ranked as the two highest responses for this question. Apart from that, there were no similarities in responses by percentage ranking for other subcategories.

Table 4.40: Percentage and frequency of overall responses to question 5 for the subcategories of the Conceptual Model

The Greenwall						
	1	2	3	4	5	6
						
	66.20%	47.70%	44.60%	43.10%	35.40%	33.80%
	7	8	9	10	11	12
						
	33.80%	33.80%	29.20%	24.60%	18.50%	16.90%
Art & Design	13	14	15	16	17	18
						
	16.90%	15.40%	15.40%	13.80%	13.80%	12.30%
	19	20	21	22	23	24
						
	10.80%	10.80%	6.20%	6.20%	6.20%	6.20%
	1	2	3	4	5	6
						
	57.70%	52.60%	52.60%	43.60%	42.30%	42.30%
	7	8	9	10	11	12
						
	37.20%	34.60%	29.50%	25.60%	25.60%	21.80%
Education	13	14	15	16	17	18
						
	17.90%	16.70%	14.10%	14.10%	12.80%	10.30%
	19	20	21	22	23	24
						
	9.00%	7.70%	7.70%	7.70%	7.70%	6.40%

	1		2		3		4		5		6	
		63.00%		50.00%		50.00%		48.10%		46.30%		44.40%
	7		8		9		10		11		12	
Student		38.90%		33.30%		29.60%		24.10%		20.40%		18.50%
	13		14		15		16		17		18	
		18.50%		14.80%		14.80%		14.80%		11.10%		11.10%
	19		20		21		22		23		24	
		9.30%		9.30%		9.30%		7.40%		3.70%		1.90%

Question 8: Conceptual Model (The Aqua Table)

As illustrated in the Table 4.41 below, Art and Design/Creative and Education/Academic respondents chose B1: Aesthetic Value/Decoration (69.20% and 60.30%, respectively). However, the Student group chose C3: To Heal/Calm/Release Stress subcategory for this question (59.30%). There were similar answer patterns in the ranking, which shaded in grey as can be seen in the Table 4.41. Art and Design/Creative, Education/Academic and Student groups have similar responses that can be ranked as 7, 10, and 13, respectively. Similar answers between Art and Design/Creative group and Education/Academic group were ranked 7, 10, 11, and 13. Finally, between Art and Design/Creative group and Student group, similar answers were ranked 4, 5, 6, 7, 8, 9, 10, 13, 18 and 19. Education/Academic group and Student group have a similar ranking in boxes 7, 10, 13 and 14.

Table 4.41: Percentage and frequency of overall responses to question 8 for the subcategories of the Conceptual Model

The Aqua Table						
	1	2	3	4	5	6
	69.20%	49.20%	46.20%	46.20%	44.60%	41.50%
	7	8	9	10	11	12
	38.50%	33.80%	32.30%	29.20%	26.20%	21.50%
Art & Design	13	14	15	16	17	18
	16.90%	16.90%	15.40%	15.40%	13.80%	10.80%
	19	20	21	22	23	24
	10.80%	9.20%	7.70%	6.20%	4.60%	1.50%
	1	2	3	4	5	6
	60.30%	52.60%	47.40%	42.30%	39.70%	37.20%
	7	8	9	10	11	12
	35.90%	32.10%	28.20%	25.60%	23.10%	23.10%
Education	13	14	15	16	17	18
	21.80%	16.70%	14.10%	14.10%	10.30%	10.30%
	19	20	21	22	23	24
	10.30%	10.30%	10.30%	9.00%	7.70%	6.40%
	1	2	3	4	5	6
	59.30%	55.60%	53.70%	48.10%	44.40%	44.40%
	7	8	9	10	11	12
	44.40%	38.90%	35.20%	33.30%	31.50%	22.20%
Student	13	14	15	16	17	18
	20.40%	14.80%	11.10%	9.30%	9.30%	9.30%
	19	20	21	22	23	24
	9.30%	9.30%	7.40%	5.60%	3.70%	3.70%






















It is important to note that of these 3 relevant FDLOs, 2 are tables, and 1 is a wall. This might suggest the type of furniture where people prefer to add a living organism, such as tables, walls, or furniture that can be “observed” rather than more utilitarian pieces of furniture where there might be a closer contact with the living organisms, as chairs or beds. This can also be related to Aesthetic Value/Decoration being the most important subcategories.

Summary of Section D

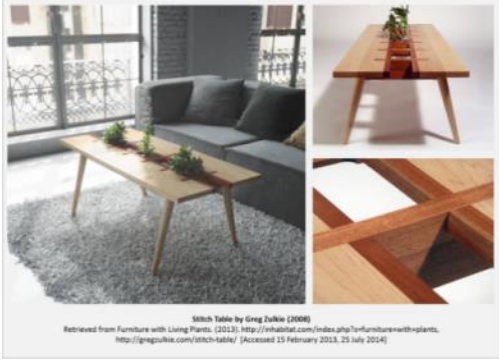

As explained before, the colour coding helps to identify the main category and its subcategories of the FDLOs. Also, the table is linked to the final Conceptual Model, where the green hues represent the Experimental category, purples represent the Experience category, oranges represent the Aesthetic and Semantic category, and the blues represent the Function and Practicality category. For example, Q1: The Rococo Retrofitted Chair; it can be seen that there are 3 green hues, 3 purple hues and 3 orange hues for the Art and Design/Creative. As a relation to the Conceptual Model, the chair can be categorised under Experimental, Experience, and Aesthetic and Semantic category. The table also shows the relevant main categories for each FDLO. Highlighted in red are the similar responses (subcategories) from the respondents.


Conceptual Model Analysis for Stratified Group (Art and Design/Creative, Education/Academic, Student)



Table 4.42: Summary of the top 10 responses for each FDLO, linked to subcategories of the Conceptual Model that defines the main category where the FDLOs can be classified according to respondents’ perceptions


FDLOs/ Questions	Subcategories of the Conceptual Model – from Online Survey					
<p>Q1: The Retrofitted Rococo Chair</p>  <p><small>Chair 1: Rococo Armchair Retrofit by David L. Hays, Kevin Stewart & Shuangshuang Wu (2010), Lucas D. (2011) Green Design, Germany: Braun Publishing AG., http://inhabitat.com/a-chair-that-welcomes-plants-and-insects-into-your-home/ (Accessed 15 February 2013/2014)</small></p>	Art and Design/Creative					
						
<p>Aesthetic and Semantic purpose: B4, B2, B1, B3 Experimental purpose: D5, D1, D2 Experience purpose: C1, C4, C5</p>						
Education/Academic						
						

	<p>Aesthetic and Semantic purpose: B4, B2, B1, B3 Experience purpose: C1, C2, C5 Experimental purpose: D5, D1, D3</p> <table border="1"> <tr> <td>Student</td> <td>B1 Aesthetic value/ Decoration</td> <td>C1 To experience nature</td> <td>B4 Artistic reasons</td> <td>D5 To break the rules/ be different</td> <td>C2 Environmental consciousness</td> </tr> <tr> <td></td> <td>C5 To stimulate senses</td> <td>B2 Collection & Display</td> <td>D1 Conceptual design</td> <td>C3 To heal/ calm/ lower stress</td> <td>A5 To encourage hobbies</td> </tr> </table> <p>Experience purpose: C1, C2, C5, C3 Aesthetic & Semantic purpose: B1, B4, B2</p>	Student	B1 Aesthetic value/ Decoration	C1 To experience nature	B4 Artistic reasons	D5 To break the rules/ be different	C2 Environmental consciousness		C5 To stimulate senses	B2 Collection & Display	D1 Conceptual design	C3 To heal/ calm/ lower stress	A5 To encourage hobbies																		
Student	B1 Aesthetic value/ Decoration	C1 To experience nature	B4 Artistic reasons	D5 To break the rules/ be different	C2 Environmental consciousness																										
	C5 To stimulate senses	B2 Collection & Display	D1 Conceptual design	C3 To heal/ calm/ lower stress	A5 To encourage hobbies																										
<p>Q2: Life within Object</p>  <p><small>'La Vida en los Objetos' (Life within Objects) by Martín Acuña Barroto, Spain. (2013). Furniture with Living Plants. (2013). Retrieved from http://inhabitat.com/index.php?option=com_content&view=article&id=10000-furniture-with-living-plants. http://inhabitat.com/martin-acuna-furniture-creates-a-cosy-home-for-plants-and-animals/ (Accessed 13 February 2015). http://www.decodice.net/2008/12/08/la-vida-en-los-objetos/ (Accessed 1 March 2014).</small></p>	<p>Art and Design/ Creative</p> <table border="1"> <tr> <td>C1 To experience nature</td> <td>D5 To break the rules/ be different</td> <td>D1 Conceptual design</td> <td>C3 To heal/ calm/ lower stress</td> <td>C2 Environmental consciousness</td> </tr> <tr> <td>C4 Entertainment</td> <td>A5 To encourage hobbies</td> <td>C5 To stimulate senses</td> <td>B1 Aesthetic value/ Decoration</td> <td>B4 Artistic reasons</td> </tr> </table> <p>Experience purpose: C1, C3, C4, C5, C2</p> <p>Education/ Academic</p> <table border="1"> <tr> <td>C1 To experience nature</td> <td>D1 Conceptual design</td> <td>C2 Environmental consciousness</td> <td>B4 Artistic reasons</td> <td>D5 To break the rules/ be different</td> </tr> <tr> <td>B1 Aesthetic value/ Decoration</td> <td>A5 To encourage hobbies</td> <td>C5 To stimulate senses</td> <td>B3 Communication /convey message</td> <td>C3 To heal/ calm/ lower stress</td> </tr> </table> <p>Experience purpose: C1, C2, C5, C3 Aesthetic and Semantic purpose: B4, B1, B3</p> <p>Student</p> <table border="1"> <tr> <td>C1 To experience nature</td> <td>D1 Conceptual design</td> <td>B4 Artistic reasons</td> <td>C2 Environmental consciousness</td> <td>B1 Aesthetic value/ Decoration</td> </tr> <tr> <td>D5 To break the rules/ be different</td> <td>A5 To encourage hobbies</td> <td>C3 To heal/ calm/ lower stress</td> <td>B2 Collection & Display</td> <td>C4 Entertainment</td> </tr> </table> <p>Experience purpose: C1, C2, C3, C4 Aesthetic and Semantic purpose: B4, B1, B2</p>	C1 To experience nature	D5 To break the rules/ be different	D1 Conceptual design	C3 To heal/ calm/ lower stress	C2 Environmental consciousness	C4 Entertainment	A5 To encourage hobbies	C5 To stimulate senses	B1 Aesthetic value/ Decoration	B4 Artistic reasons	C1 To experience nature	D1 Conceptual design	C2 Environmental consciousness	B4 Artistic reasons	D5 To break the rules/ be different	B1 Aesthetic value/ Decoration	A5 To encourage hobbies	C5 To stimulate senses	B3 Communication /convey message	C3 To heal/ calm/ lower stress	C1 To experience nature	D1 Conceptual design	B4 Artistic reasons	C2 Environmental consciousness	B1 Aesthetic value/ Decoration	D5 To break the rules/ be different	A5 To encourage hobbies	C3 To heal/ calm/ lower stress	B2 Collection & Display	C4 Entertainment
C1 To experience nature	D5 To break the rules/ be different	D1 Conceptual design	C3 To heal/ calm/ lower stress	C2 Environmental consciousness																											
C4 Entertainment	A5 To encourage hobbies	C5 To stimulate senses	B1 Aesthetic value/ Decoration	B4 Artistic reasons																											
C1 To experience nature	D1 Conceptual design	C2 Environmental consciousness	B4 Artistic reasons	D5 To break the rules/ be different																											
B1 Aesthetic value/ Decoration	A5 To encourage hobbies	C5 To stimulate senses	B3 Communication /convey message	C3 To heal/ calm/ lower stress																											
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D5 To break the rules/ be different	A5 To encourage hobbies	C3 To heal/ calm/ lower stress	B2 Collection & Display	C4 Entertainment																											
<p>Q3: The Threatening Cactus</p>  <p><small>Threatening Cactus Terrarium Chair by Deger Cangil. Retrieved from http://inhabitat.com/deger-cangil-creates-a-threatening-terrarium-chair-lets-others-live-on-the-edge/. http://media.designpages.com/3/images/2012/07/26/deger-cangil-creates-a-threatening-terrarium-chair (Accessed August 2015) March 2014.</small></p>	<p>Art and Design/ Creative</p> <table border="1"> <tr> <td>D5 To break the rules/ be different</td> <td>D1 Conceptual design</td> <td>B4 Artistic reasons</td> <td>C5 To stimulate senses</td> <td>B1 Aesthetic value/ Decoration</td> </tr> <tr> <td>C4 Entertainment</td> <td>B2 Collection & Display</td> <td>C1 To experience nature</td> <td>B3 Communication /convey message</td> <td>D3 Exploration of new materials</td> </tr> </table> <p>Aesthetic and Semantic purpose: B4, B1, B2, B3 Experimental purpose: D5, D1, D3 Experience purpose: C5, C4, C1</p> <p>Education/ Academic</p> <table border="1"> <tr> <td>D5 To break the rules/ be different</td> <td>B4 Artistic reasons</td> <td>B1 Aesthetic value/ Decoration</td> <td>C1 To experience nature</td> <td>D1 Conceptual design</td> </tr> <tr> <td>B2 Collection & Display</td> <td>C5 To stimulate senses</td> <td>C2 Environmental consciousness</td> <td>D3 Exploration of new materials</td> <td>D2 Part of a research project</td> </tr> </table> <p>Experimental purpose: D5, D1, D3, D2 Aesthetic & Semantic purpose: B4, B1, B2 Experience purpose: C1, C5, C2</p>	D5 To break the rules/ be different	D1 Conceptual design	B4 Artistic reasons	C5 To stimulate senses	B1 Aesthetic value/ Decoration	C4 Entertainment	B2 Collection & Display	C1 To experience nature	B3 Communication /convey message	D3 Exploration of new materials	D5 To break the rules/ be different	B4 Artistic reasons	B1 Aesthetic value/ Decoration	C1 To experience nature	D1 Conceptual design	B2 Collection & Display	C5 To stimulate senses	C2 Environmental consciousness	D3 Exploration of new materials	D2 Part of a research project										
D5 To break the rules/ be different	D1 Conceptual design	B4 Artistic reasons	C5 To stimulate senses	B1 Aesthetic value/ Decoration																											
C4 Entertainment	B2 Collection & Display	C1 To experience nature	B3 Communication /convey message	D3 Exploration of new materials																											
D5 To break the rules/ be different	B4 Artistic reasons	B1 Aesthetic value/ Decoration	C1 To experience nature	D1 Conceptual design																											
B2 Collection & Display	C5 To stimulate senses	C2 Environmental consciousness	D3 Exploration of new materials	D2 Part of a research project																											

	Student	B4 Artistic reasons	B2 Collection & Display	D5 To break the rules/ be different	B1 Aesthetic value/ Decoration	C1 To experience nature
		D1 Conceptual design	C5 To stimulate senses	D3 Exploration of new materials	A5 To encourage hobbies	C2 Environmental consciousness
		Aesthetic and Semantic purpose: B4, B2, B1 Experimental purpose: D5, D1, D3 Experience purpose: C1, C5, C2				
<p>Q4: The Stitch Table</p>  <p><small>Stitch Table by Greg Zulke (2008) Retrieved from Furniture with Living Plants. (2013). http://inhabitat.com/index.php/Furniturewithlivingplants. http://gregzulke.com/stitch-table/ [Accessed 23 February 2013, 23 July 2014].</small></p>	Art and Design/ Creative	B1 Aesthetic value/ Decoration	C1 To experience nature	D1 Conceptual design	C5 To stimulate senses	B2 Collection & Display
		C3 To heal/ calm/ lower stress	A5 To encourage hobbies	B4 Artistic reasons	D5 To break the rules/ be different	C2 Environmental consciousness
		Experience purpose: C1, C5, C3, C2 Aesthetic and Semantic purpose: B1, B2, B4				
	Education/ Academic	B1 Aesthetic value/ Decoration	C2 Environmental consciousness	C1 To experience nature	C3 To heal/ calm/ lower stress	B4 Artistic reasons
		D1 Conceptual design	B2 Collection & Display	A5 To encourage hobbies	C5 To stimulate senses	D5 To break the rules/ be different
		Experience purpose: C2, C1, C3, C5 Aesthetic and Semantic purpose: B1, B4, B2				
	Student	B1 Aesthetic value/ Decoration	C1 To experience nature	C3 To heal/ calm/ lower stress	C2 Environmental consciousness	B4 Artistic reasons
		D1 Conceptual design	B2 Collection & Display	C5 To stimulate senses	A3 Purify water/ air	A5 To encourage hobbies
		Experience purpose: C1, C3, C2, C5 Aesthetic and Semantic purpose: B1, B4, B2				
<p>Q5: The Greenwall</p>  <p><small>The Green wall by The Green Wall. Retrieved from http://www.greenwalling.blogspot.com.au/2012/11/love-the-green-wall-furniture-designs-by.html [Accessed August 2013].</small></p>	Art and Design/ Creative	B1 Aesthetic value/ Decoration	C1 To experience nature	C3 To heal/ calm/ lower stress	B2 Collection & Display	D1 Conceptual design
		C2 Environmental consciousness	A5 To encourage hobbies	C5 To stimulate senses	B4 Artistic reasons	A3 Purify water/ air
		Experience purpose: C1, C3, C5, C2 Aesthetic and Semantic purpose: B1, B2, B4				
	Education/ Academic	B1 Aesthetic value/ Decoration	C1 To experience nature	B2 Collection & Display	C3 To heal/ calm/ lower stress	C2 Environmental consciousness
		B4 Artistic reasons	A3 Purify water/ air	D1 Conceptual design	C5 To stimulate senses	A5 To encourage hobbies
		Experience purpose: C1, C3, C2, C5 Aesthetic and Semantic purpose: B1, B2, B4				

	Student	B1 Aesthetic value/ Decoration	C1 To experience nature	C3 To heal/ calm/ lower stress	C2 Environmental consciousness	B2 Collection & Display
		D1 Conceptual design	B4 Artistic reasons	A5 To encourage hobbies	A3 Purify water/ air	A2 Farming/ Food
	<p>Experience purpose: C1, C3, C2 Aesthetic and Semantic purpose: B1, B2, B4 Function and Practicality purpose: A5, A3, A2</p>					
<p>Q6: Mushrooms Ate My Furniture</p>  <p>Mushrooms Ate My Furniture by Shinwei Rhode Yen. Retrieved from http://webecost.momtastic.com/2010/11/15/its-alive-13-examples-of-green-growing-furniture/, http://www.designboom.com/design/mushrooms-ate-my-furniture-by-shinwei-rhode-yen/, [Accessed 25 February 2013, 25 July 2014]</p>	Art and Design/ Creative	C1 To experience nature	D1 Conceptual design	D3 Exploration of new materials	D5 To break the rules/ be different	B4 Artistic reasons
		B3 Communication /convey message	D2 Part of a research project	B1 Aesthetic value/ Decoration	C2 Environmental consciousness	A2 Farming/ Food
	<p>Experimental purpose: D5, D2, D1, D3 Experience purpose: C5, C1, C2</p>					
	Education/ Academic	C1 To experience nature	D3 Exploration of new materials	D5 To break the rules/ be different	C2 Environmental consciousness	D2 Part of a research project
		B4 Artistic reasons	B3 Communication /convey message	D1 Conceptual design	B2 Collection & Display	D4 Exploration of new technologies
	<p>Experimental purpose: D3, D5, D2, D1, D4 Aesthetic and Semantic purpose: B4, B3, B2,</p>					
	Student	C1 To experience nature	B4 Artistic reasons	D5 To break the rules/ be different	C2 Environmental consciousness	D3 Exploration of new materials
		B3 Communication /convey message	A2 Farming/ Food	D1 Conceptual design	C5 To stimulate senses	D2 Part of a research project
	<p>Experimental purpose: D5, D3, D1, D2 Experience purpose: C1, C2, C5</p>					
<p>Q7: The Moss Table</p>  <p>The Moss Table by Carlos Perrella and Alex Green. Retrieved from http://www.designboom.com/technology/alex-green-carlos-perrella-biophotovoltaic/, http://vhabitat.com/moss-table-by-biophotovoltaic-generates-electricity-through-photosynthesis/, [Accessed 15 February 2013/ 2014]</p>	Art and Design/ Creative	B1 Aesthetic value/ Decoration	D1 Conceptual design	C5 To stimulate senses	D4 Exploration of new technologies	C1 To experience nature
		D3 Exploration of new materials	B2 Collection & Display	C2 Environmental consciousness	B4 Artistic reasons	D2 Part of a research project
	<p>Experimental purpose: D1, D4, D3, D2 Experience purpose: C5, C1, C2 Aesthetic and Semantic purpose: B1, B2, B4</p>					
	Education/ Academic	B1 Aesthetic value/ Decoration	C1 To experience nature	C2 Environmental consciousness	D1 Conceptual design	B2 Collection & Display
		B4 Artistic reasons	C3 To heal/ calm/ lower stress	D5 To break the rules/ be different	D3 Exploration of new materials	C5 To stimulate senses

	<p>Experience purpose: C1, C2, C3, C5 Aesthetic and Semantic purpose: B1, B2, B4 Experimental purpose: D1, D5, D3</p> <table border="1"> <tr> <td>Student</td> <td>C1 To experience nature</td> <td>B1 Aesthetic value/ Decoration</td> <td>B2 Collection & Display</td> <td>B4 Artistic reasons</td> <td>D1 Conceptual design</td> </tr> <tr> <td></td> <td>C2 Environmental consciousness</td> <td>C5 To stimulate senses</td> <td>D3 Exploration of new materials</td> <td>C3 To heal/ calm/ lower stress</td> <td>D5 To break the rules/ be different</td> </tr> </table> <p>Experience purpose: C1, C2, C5, C3 Aesthetic and Semantic purpose: B1, B2, B4 Experimental purpose: D1, D3, D5</p>	Student	C1 To experience nature	B1 Aesthetic value/ Decoration	B2 Collection & Display	B4 Artistic reasons	D1 Conceptual design		C2 Environmental consciousness	C5 To stimulate senses	D3 Exploration of new materials	C3 To heal/ calm/ lower stress	D5 To break the rules/ be different																		
Student	C1 To experience nature	B1 Aesthetic value/ Decoration	B2 Collection & Display	B4 Artistic reasons	D1 Conceptual design																										
	C2 Environmental consciousness	C5 To stimulate senses	D3 Exploration of new materials	C3 To heal/ calm/ lower stress	D5 To break the rules/ be different																										
<p>Q8: The Aqua Table</p>  <p>The End Aqua Ambience Table by Aqua Design Group. Retrieved from http://www.aquadesigngroup.com/portfolio/aquariums/ (Accessed August 2013)</p>	<p>Art and Design/ Creative</p> <table border="1"> <tr> <td>B1 Aesthetic value/ Decoration</td> <td>C1 To experience nature</td> <td>C3 To heal/ calm/ lower stress</td> <td>C4 Entertainment</td> <td>B2 Collection & Display</td> </tr> <tr> <td>D1 Conceptual design</td> <td>A5 To encourage hobbies</td> <td>B4 Artistic reasons</td> <td>D5 To break the rules/ be different</td> <td>C5 To stimulate senses</td> </tr> </table> <p>Experience purpose: C1, C3, C4, C5 Aesthetic and Semantic purpose: B1, B2, B4</p> <p>Education/ Academic</p> <table border="1"> <tr> <td>B1 Aesthetic value/ Decoration</td> <td>C3 To heal/ calm/ lower stress</td> <td>C1 To experience nature</td> <td>B2 Collection & Display</td> <td>D1 Conceptual design</td> </tr> <tr> <td>B4 Artistic reasons</td> <td>A5 To encourage hobbies</td> <td>D5 To break the rules/ be different</td> <td>C4 Entertainment</td> <td>C5 To stimulate senses</td> </tr> </table> <p>Experience purpose: C3, C1, C4, C5 Aesthetic and Semantic purpose: B1, B2, B4</p> <p>Student</p> <table border="1"> <tr> <td>C3 To heal/ calm/ lower stress</td> <td>C1 To experience nature</td> <td>B1 Aesthetic value/ Decoration</td> <td>C4 Entertainment</td> <td>B2 Collection & Display</td> </tr> <tr> <td>D1 Conceptual design</td> <td>A5 To encourage hobbies</td> <td>B4 Artistic reasons</td> <td>D5 To break the rules/ be different</td> <td>C5 To stimulate senses</td> </tr> </table> <p>Experience purpose: C3, C1, C4, C5 Aesthetic and Semantic purpose: B1, B2, B4</p>	B1 Aesthetic value/ Decoration	C1 To experience nature	C3 To heal/ calm/ lower stress	C4 Entertainment	B2 Collection & Display	D1 Conceptual design	A5 To encourage hobbies	B4 Artistic reasons	D5 To break the rules/ be different	C5 To stimulate senses	B1 Aesthetic value/ Decoration	C3 To heal/ calm/ lower stress	C1 To experience nature	B2 Collection & Display	D1 Conceptual design	B4 Artistic reasons	A5 To encourage hobbies	D5 To break the rules/ be different	C4 Entertainment	C5 To stimulate senses	C3 To heal/ calm/ lower stress	C1 To experience nature	B1 Aesthetic value/ Decoration	C4 Entertainment	B2 Collection & Display	D1 Conceptual design	A5 To encourage hobbies	B4 Artistic reasons	D5 To break the rules/ be different	C5 To stimulate senses
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<p>Q9: Local River</p>  <p>Local River by Matthew Lehmann and Anthony van den Bosch (2008). Parks M., (2009). Green Design. Dubai: Carbon Books Limited., http://www.designboom.com/design/local-river-by-matthew-lehmann-and-anthony-van-den-bosch/, http://www.matthewlehmann.com/usable-table-product-design/local-river-by-matthew-lehmann-and-anthony-van-den-bosch/, http://www.matthewlehmann.com.au/2013/12/04/matthew-lehmann-and-anthony-van-den-bosch/, http://www.matthewlehmann.com.au/2013/12/04/matthew-lehmann-and-anthony-van-den-bosch/ (Accessed February 8, August 2014)</p>	<p>Art and Design/ Creative</p> <table border="1"> <tr> <td>D1 Conceptual design</td> <td>C1 To experience nature</td> <td>B2 Collection & Display</td> <td>D5 To break the rules/ be different</td> <td>B4 Artistic reasons</td> </tr> <tr> <td>B1 Aesthetic value/ Decoration</td> <td>C4 Entertainment</td> <td>C5 To stimulate senses</td> <td>A5 To encourage hobbies</td> <td>C3 To heal/ calm/ lower stress</td> </tr> </table> <p>Experience purpose: C1, C4, C5, C3 Aesthetic and Semantic purpose: B2, B4, B1</p> <p>Education/ Academic</p> <table border="1"> <tr> <td>C1 To experience nature</td> <td>B2 Collection & Display</td> <td>D5 To break the rules/ be different</td> <td>A5 To encourage hobbies</td> <td>D1 Conceptual design</td> </tr> <tr> <td>B1 Aesthetic value/ Decoration</td> <td>B4 Artistic reasons</td> <td>C3 To heal/ calm/ lower stress</td> <td>C5 To stimulate senses</td> <td>D4 Exploration of new technologies</td> </tr> </table>	D1 Conceptual design	C1 To experience nature	B2 Collection & Display	D5 To break the rules/ be different	B4 Artistic reasons	B1 Aesthetic value/ Decoration	C4 Entertainment	C5 To stimulate senses	A5 To encourage hobbies	C3 To heal/ calm/ lower stress	C1 To experience nature	B2 Collection & Display	D5 To break the rules/ be different	A5 To encourage hobbies	D1 Conceptual design	B1 Aesthetic value/ Decoration	B4 Artistic reasons	C3 To heal/ calm/ lower stress	C5 To stimulate senses	D4 Exploration of new technologies										
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<p>Experience purpose: C1, C3, C5 Aesthetic and Semantic purpose: B2, B1, B4 Experimental purpose: D5, D2, D4</p>							
Student		B1 Aesthetic value/ Decoration	B2 Collection & Display	C1 To experience nature	B4 Artistic reasons	A5 To encourage hobbies	
		D1 Conceptual design	C4 Entertainment	C3 To heal/ calm/ lower stress	C5 To stimulate senses	D5 To break the rules/ be different	
<p>Experience purpose: C1, C4, C3, C5 Aesthetic and Semantic purpose: B1, B2, B4</p>							
<p>Q10: The Cultivation Kitchen</p>  <p><small>Cultivation Kitchens INAX (2008). Japan Good Design Award Book, (2008). Retrieved from http://www.designaward.com/English/Italy-en.htm (Accessed 24 May 2018). http://openaccess.gatech.edu/bitstream/handle/2013/10703/cultivation-kitchen/ (Accessed 5 March 2018).</small></p>	Art and Design/ Creative		A2 Farming/ Food	C2 Environmental consciousness	D2 Part of a research project	C1 To experience nature	D1 Conceptual design
			B1 Aesthetic value/ Decoration	D4 Exploration of new technologies	A3 Purify water/ air	A1 To learn	B3 Communication /convey message
	<p>Function and Practicality purpose: A2, A1, A3 Experimental purpose: D2, D1, D4</p>						
	Education/ Academic		A2 Farming/ Food	C2 Environmental consciousness	C1 To experience nature	D1 Conceptual design	C3 To heal/ calm/ lower stress
		B1 Aesthetic value/ Decoration	D4 Exploration of new technologies	A3 Purify water/ air	A5 To encourage hobbies	B2 Collection & Display	
<p>Function and Practicality purpose: A2, A3, A5 Experience purpose: C2, C1, C3</p>							
Student		A2 Farming/ Food	C2 Environmental consciousness	C1 To experience nature	A5 To encourage hobbies	C3 To heal/ calm/ lower stress	
		B1 Aesthetic value/ Decoration	B2 Collection & Display	A1 To learn	C5 To stimulate senses	A3 Purify water/ air	
<p>Function and Practicality purpose: A2, A5, A1, A3, Experience purpose: C2, C1, C3, C5</p>							

Section E: Biophilic Design

As stated previously, this section was designed to retrieve information on biophilic design, or how respondents experience nature and living organisms. For brevity, only the main examples of questions are discussed in this section. Other questions can be found in the Appendix D: 2nd Data Set, page 356 – 366.

Question 2

Table 4.43a: Percentage and frequency of responses to question 2; Biophilic design

What is your working background?			Frequency	Percentage
Art and Design/ Creative	Valid	1 (Strongly Disagree)	0	0
		2 (Disagree)	4	6.2
		3 (Neither Agree or Disagree)	5	7.7
		4 (Agree)	32	49.2
		5 (Strongly Agree)	24	36.9
		Total	65	100.0
Education/ Academic	Valid	1 (Strongly Disagree)	4	5.1
		2 (Disagree)	10	12.8
		3 (Neither Agree or Disagree)	15	19.2
		4 (Agree)	35	44.9
		5 (Strongly Agree)	14	17.9
		Total	78	100.0
Student	Valid	2 (Disagree)	4	7.4
		3 (Neither Agree or Disagree)	12	22.2
		4 (Agree)	19	35.2
		5 (Strongly Agree)	19	35.2
				Total

Table 4.43b: The Likert scale type output (using SPSS software) for responses to Question 2 of stratified groups

		Statistics	
Art and Design/ Creative	N	Valid	65
		Missing	0
	Mean		4.17
	Std. Error of Mean		.102
	Std. Deviation		.821
	Variance		.674
Education/ Academic	N	Valid	78
		Missing	0
	Mean		3.58
	Std. Error of Mean		.123
	Std. Deviation		1.087
	Variance		1.182
Student	N	Valid	54
		Missing	0
	Mean		3.98
	Std. Error of Mean		.128
	Std. Deviation		.942
	Variance		.886
		Minimum	2

Tables 4.43a and 4.43b above show the percentage and frequency of responses to question 2 about respondent's preferences in regards to having living organisms, including pets (animals) and any plants indoors. It can be seen that the highest percentages of respondents from the 3 corresponding groups answered "Agree".

Question 3

Table 4.44: Percentage and frequency of responses to question 3; Biophilic design

What is your working background?			Frequency	Percentage
Art and Design/ Creative	Valid	2 (Disagree)	2	3.1
		3 (Neither Agree or Disagree)	7	10.8
		4 (Agree)	34	52.3
		5 (Strongly Agree)	22	33.8
		Total	65	100.0
Education/ Academic	Valid	1 (Strongly Disagree)	1	1.3
		2 (Disagree)	9	11.5
		3 (Neither Agree or Disagree)	11	14.1
		4 (Agree)	38	48.7
		5 (Strongly Agree)	19	24.4
Total	78	100.0		
Student	Valid	2 (Disagree)	3	5.6
		3 (Neither Agree or Disagree)	5	9.3
		4 (Agree)	25	46.3
		5 (Strongly Agree)	21	38.9
		Total	54	100.0

As illustrated in Table 4.44 above, the highest percentages from the 3 groups of respondents "Agree" (52.30%, 48.70% and 46.30% of Art and Design/ Creativity, Education/Academic and Student, respectively). This suggests that the majority of respondents that formed the 3 groups "Agree" and think or believe that having natural elements indoor can release stress and brings calmness.

Question 4

Table 4.45: Percentage and frequency of responses to question 4; Biophilic design

What is your working background?			Frequency	Percentage
Art and Design/ Creative	Valid	1 (Strongly Disagree)	1	1.5
		2 (Disagree)	2	3.1
		3 (Neither Agree or Disagree)	9	13.8
		4 (Agree)	41	63.1
		5 (Strongly Agree)	12	18.5
Total	65	100.0		
Education/ Academic	Valid	2 (Disagree)	7	9.0
		3 (Neither Agree or Disagree)	8	10.3
		4 (Agree)	47	60.3
		5 (Strongly Agree)	16	20.5
		Total	78	100.0
Student	Valid	1 (Strongly Disagree)	1	1.9
		2 (Disagree)	6	11.1
		3 (Neither Agree or Disagree)	4	7.4
		4 (Agree)	31	57.4
		5 (Strongly Agree)	12	22.2
Total	54	100.0		

Table 4.45 above shows the frequency and percentage of answers to the question that asked respondents if they think that having natural elements and living organisms indoor can create awareness of nature and ecological impact. More than half (63.10 %) of respondents from the Art and Design/Creative group, 60.30% from the Education/Academic group and 57.40% of the students group "Agree" with this statement.

Question 5

Table 4.46: Percentage and frequency of responses to question 5; Biophilic design

What is your working background?			Frequency	Percentage
Art and Design/ Creative	Valid	1 (Strongly Disagree)	1	1.5
		2 (Disagree)	1	1.5
		3 (Neither Agree or Disagree)	7	10.8
		4 (Agree)	37	56.9
		5 (Strongly Agree)	19	29.2
Total			65	100.0
Education/ Academic	Valid	2 (Disagree)	6	7.7
		3 (Neither Agree or Disagree)	12	15.4
		4 (Agree)	44	56.4
		5 (Strongly Agree)	16	20.5
Total			78	100.0
Student	Valid	2 (Disagree)	2	3.7
		3 (Neither Agree or Disagree)	5	9.3
		4 (Agree)	30	55.6
		5 (Strongly Agree)	17	31.5
Total			54	100.0

As shown in the table 4.46 above, the highest percentages of responses to question 5 were 56.9%, 56.4% and 55.6% of Art and Design/Creativity, Education/Academic, and Students, respectively. They “Agree” that having natural elements and living organisms indoor can foster a sense of care as living organisms need to be watered or fed.

Question 6

Table 4.47: Percentage and frequency of responses to question 6; Biophilic design

What is your working background?			Frequency	Percentage
Art and Design/ Creative	Valid	1 (Strongly Disagree)	1	1.5
		2 (Disagree)	2	3.1
		3 (Neither Agree or Disagree)	5	7.7
		4 (Agree)	31	47.7
		5 (Strongly Agree)	26	40.0
Total			65	100.0
Education/ Academic	Valid	2 (Disagree)	4	5.1
		3 (Neither Agree or Disagree)	8	10.3
		4 (Agree)	37	47.4
		5 (Strongly Agree)	29	37.2
Total			78	100.0
Student	Valid	1 (Strongly Disagree)	1	1.9
		2 (Disagree)	1	1.9
		3 (Neither Agree or Disagree)	4	7.4
		4 (Agree)	31	57.4
		5 (Strongly Agree)	17	31.5
Total			54	100.0

Table 4.47 above shows the frequency and percentage of responses to question 6, which asked if having natural elements and living organisms indoor can be educational, especially for children. All respondents chose “Agree” with the highest percentage of 47.7%, 47.4% and 57.4% of Art and Design/Creativity, Education/Academic, and Students, respectively. It is interesting that the Student group responded by almost 10 percent higher than the other two

groups. This could suggest that the perceptions might vary according to age and occupation of among groups.

Question 7

Table 4.48: Percentage and frequency of responses to question 7; Biophilic design

What is your working background?			Frequency	Percentage
Art and Design/ Creative	Valid	1 (Strongly Disagree)	4	6.2
		2 (Disagree)	22	33.8
		3 (Neither Agree or Disagree)	20	30.8
		4 (Agree)	14	21.5
		5 (Strongly Agree)	5	7.7
		Total	65	100.0
Education/ Academic	Valid	1 (Strongly Disagree)	2	2.6
		2 (Disagree)	14	17.9
		3 (Neither Agree or Disagree)	19	24.4
		4 (Agree)	33	42.3
		5 (Strongly Agree)	10	12.8
Total	78	100.0		
Student	Valid	1 (Strongly Disagree)	4	7.4
		2 (Disagree)	11	20.4
		3 (Neither Agree or Disagree)	18	33.3
		4 (Agree)	17	31.5
		5 (Strongly Agree)	4	7.4
		Total	54	100.0

As illustrated in Table 4.48 above, the highest percentages of responses were 42.30% for “Agree” by the Education/Academic group, 33.80% for “Disagree” by the Art and Design/ Creative group, and 33.30% by the Student group for “Neither agree nor disagree.” From this data, it is shown that the respondents have different opinions on this question about having natural elements and living organisms indoor that can be dangerous and inconvenient, as in a case of allergies.

Question 8

Table 4.49: Percentage and frequency of responses to question 8; Biophilic design

What is your working background?			Frequency	Percentage
Art and Design/ Creative	Valid	1 (Strongly Disagree)	11	16.9
		2 (Disagree)	10	15.4
		3 (Neither Agree or Disagree)	18	27.7
		4 (Agree)	24	36.9
		5 (Strongly Agree)	2	3.1
		Total	65	100.0
Education/ Academic	Valid	1 (Strongly Disagree)	8	10.3
		2 (Disagree)	11	14.1
		3 (Neither Agree or Disagree)	24	30.8
		4 (Agree)	25	32.1
		5 (Strongly Agree)	10	12.8
Total	78	100.0		
Student	Valid	1 (Strongly Disagree)	2	3.7
		2 (Disagree)	16	29.6
		3 (Neither Agree or Disagree)	22	40.7
		Total	40	100.0

4 (Agree)	11	20.4
5 (Strongly Agree)	3	5.6
Total	54	100.0

Table 4.49 shows the highest percentage of responses (40.70%) of “Neither agree or disagree” with the students, 36.90% “Agree” from the Art and Design/Creative and 32.10% the Education/Academic respondents. The respondents here also have a different agreement for this question on having natural elements and living organisms indoor that might not be desirable, as they are usually messy, dirty or require much of time.

The mean value and Mann–Whitney U Test on Question 3 to Question 8

As explained previously in the results of the fourth data set, this table below shows the mean and standard deviation as well as a standard error of means of responses to questions 3-8. The Likert scale employed in this part of the questionnaire is a 5- point scale. Responses with a mean close to the value 3 would indicate that about half of the respondents agreed while the other half disagreed. As illustrated in Table 4.50 below, it can be seen that there were mixed opinions for all of the questions as the lowest mean value was more than 2.9 as highlighted in green and yellow.

Table 4.50: The Likert scale type output (using SPSS software) for Questions 3 to 8 for the stratified groups

Having natural elements and living organisms indoors can:			Statistics					
			Question 3: A. Release stress/ calm you	Question 4: B. Create awareness of nature and ecological impact	Question 5: C. Foster a sense of care (as living organisms need to be watered or fed)	Question 6: D. Be educational (especially for children)	Question 7: E. Be dangerous and inconvenient, as in case of allergies	Question 8: F. Be not desirable, as they are usually messy, dirty or require much of my time
Art and Design/ Creative	N	Valid	65	65	65	65	65	65
		Missing	0	0	0	0	0	0
	Mean		4.17	3.94	4.11	4.22	2.91	2.94
	Std. Error of Mean		.092	.095	.096	.104	.131	.144
	Std. Deviation		.741	.768	.773	.838	1.057	1.158
Education/ Academic	N	Valid	78	78	78	78	78	78
		Missing	0	0	0	0	0	0
	Mean		3.83	3.92	3.90	4.17	3.45	3.23
	Std. Error of Mean		.110	.093	.092	.092	.115	.131
	Std. Deviation		.973	.818	.815	.813	1.015	1.161
Student	N	Valid	54	54	54	54	54	54
		Missing	0	0	0	0	0	0
	Mean		4.19	3.87	4.15	4.15	3.11	2.94
	Std. Error of Mean		.112	.130	.100	.107	.144	.128
	Std. Deviation		.826	.953	.737	.787	1.058	.940

According to Field (2009) and Pallant (2011), it is realized that the Likert scale response data are usually regarded as non-parametric statistics, which is not normally distributed and require the relevant statistical test. In this case, the Mann-Whitney U test was executed to

ascertain if there were any significant differences between the 3 different groups of responses. Based on the Table 4.51 below, Question 7 shows a significantly different Asymp. Sig., even though the p-value is more than 0.05. Referring to the Question 7 (page 162), the respondents have different views about this question, where they “Agree”, “Disagree” and “Neither agree or disagree.”

Table 4.51: Example of the Kruskal-Wallis test applied to questions 3-8 of Section E; Biophilic design (SPSS output)

Having natural elements and living organisms indoors can:	Test Statistics ^{a,b}					
	Question 3: A. Release stress/ calm you	Question 4: B. Create awareness of nature and ecological impact	Question 5: C. Foster a sense of care (as living organisms need to be watered or fed)	Question 6: D. Be educational (especially for children)	Question 7: E. Be dangerous and inconvenient, as in case of allergies	Question 8: F. Be not desirable, as they are usually messy, dirty or require much of my time
Chi-Square	6.033	.003	4.199	.492	10.080	3.546
df	2	2	2	2	2	2
Asymp. Sig.	.049	.999	.123	.782	.006	.170
a. Kruskal Wallis Test						
b. Grouping Variable: What is your working background?						

Question 9

Table 4.52: Percentage and frequency of responses to question 9; Biophilic design

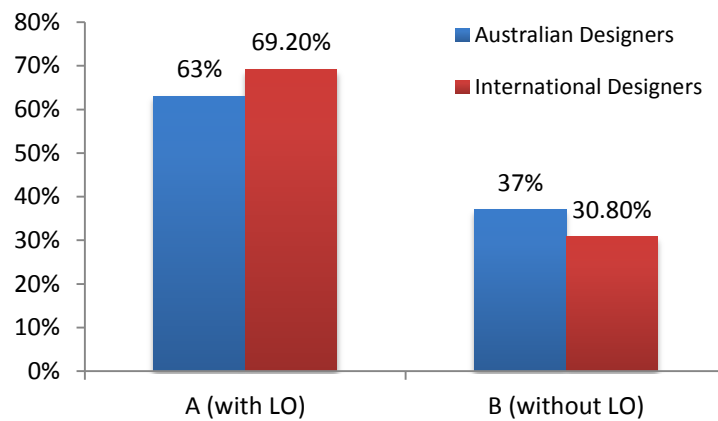
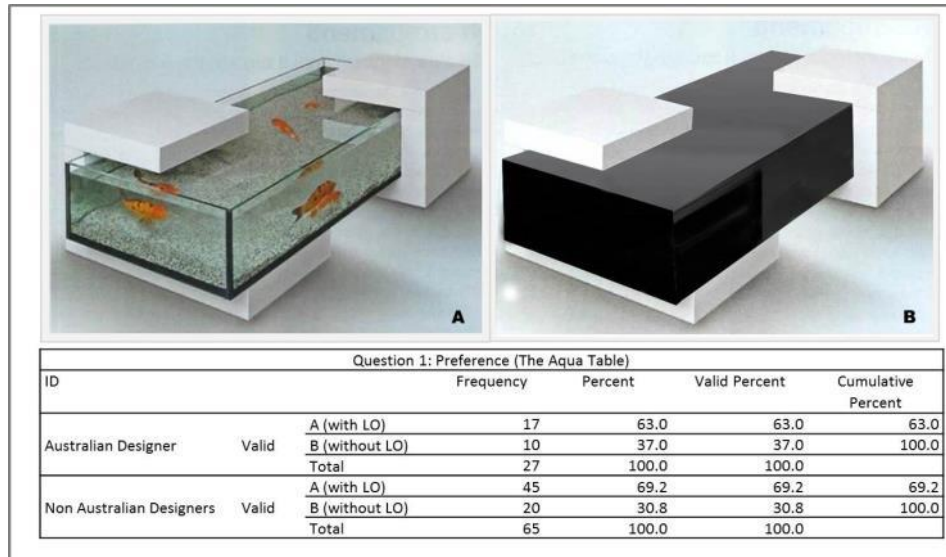
What is your working background?		Frequency		Valid Percent	
Art and Design/ Creative	Valid	Yes	42	64.6	
		No	23	35.4	
		Total	65	100.0	
Education/ Academic	Valid	Yes	47	60.3	
		No	31	39.7	
		Total	78	100.0	
Student	Valid	Yes	42	77.8	
		No	12	22.2	
		Total	54	100.0	

Table 4.52 illustrates the responses to question 9, on the preference of the respondents towards having the FDLOs inside their house. Most respondents from the 3 groups; Art and Design/Creativity (64.6%), Education/Academic (60.3%), and Students were the most (77.8%) who would like to own FDLOs.

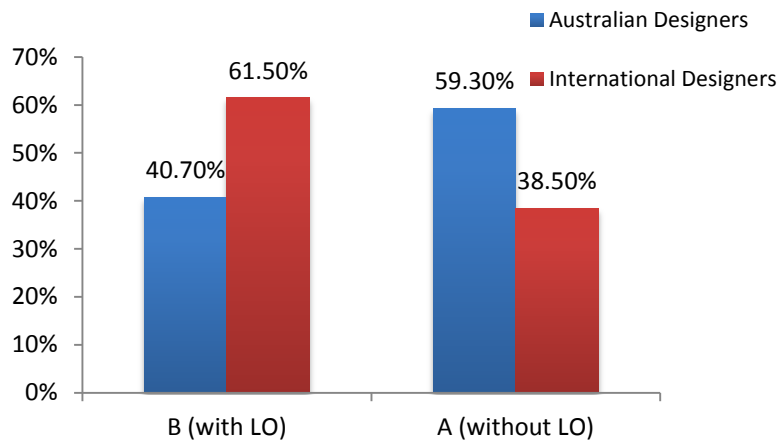
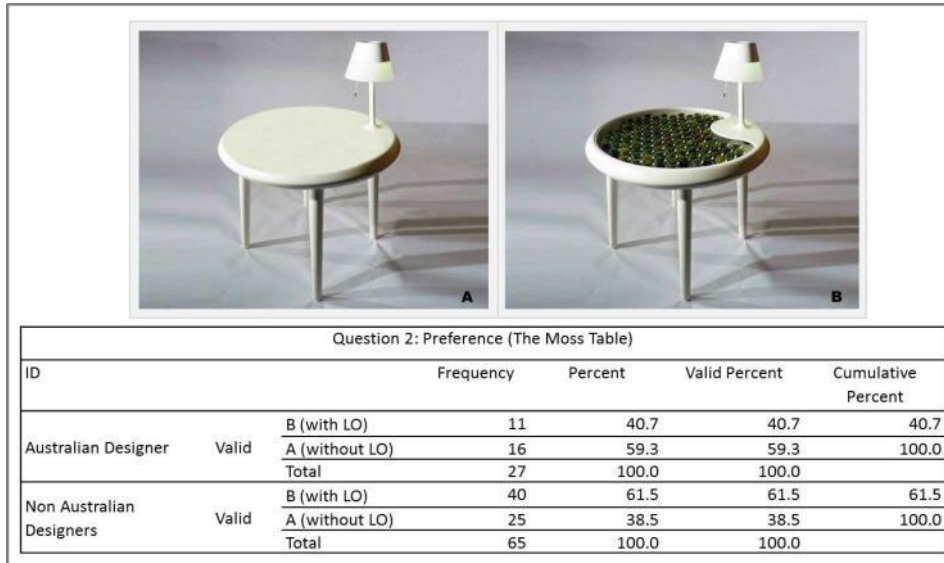
Full Results for 4th Data Set - Australian Designer and International Designers

Section B: Design Preference

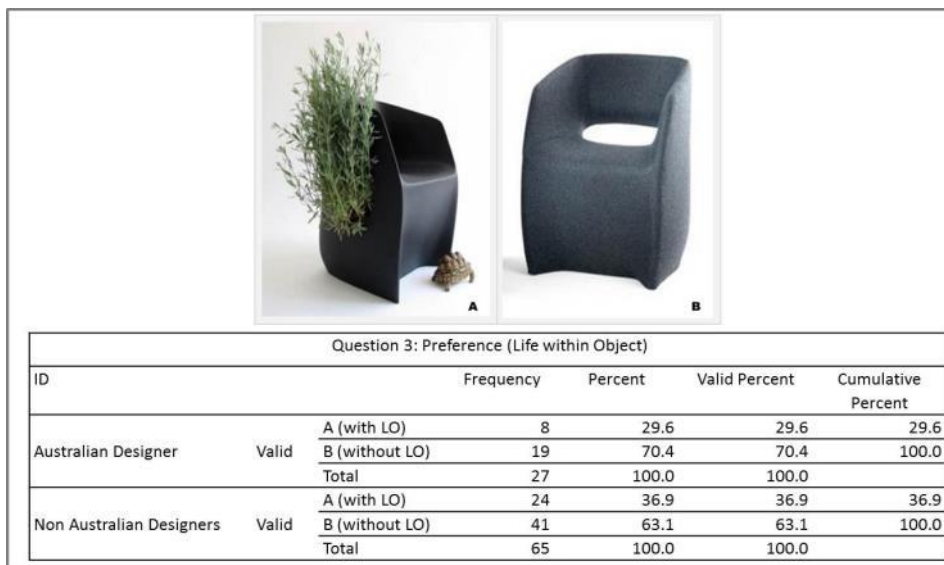
Question 1

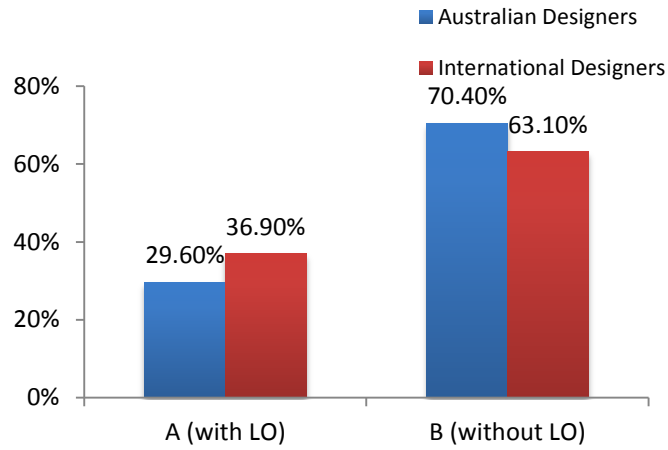


Question 2



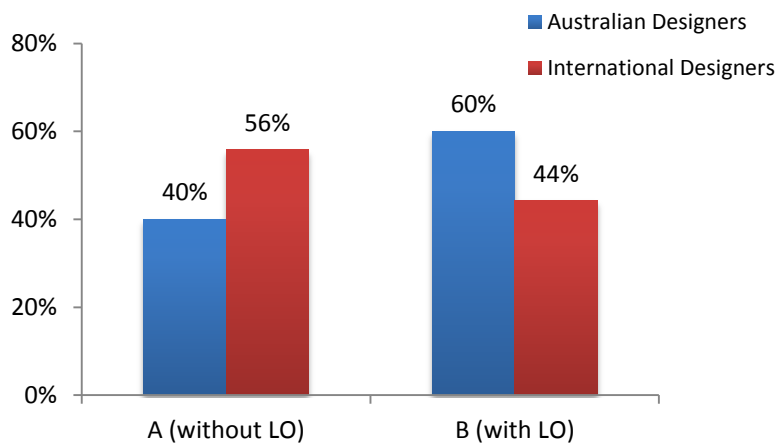
Question 3



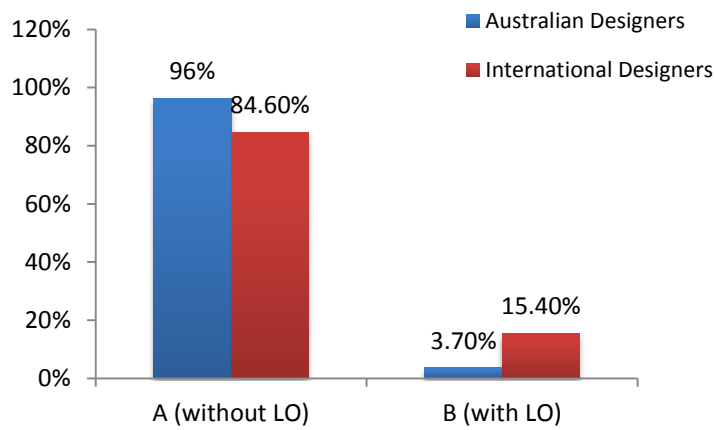
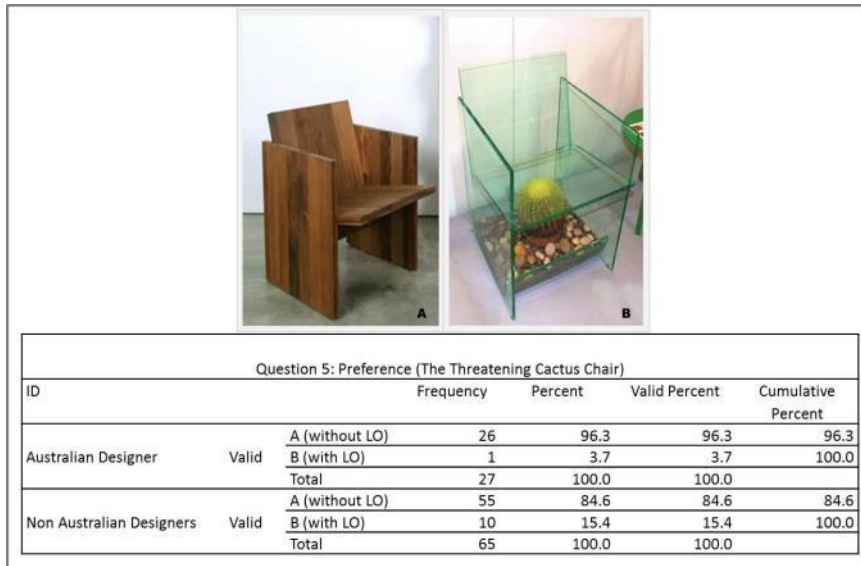


Question 4

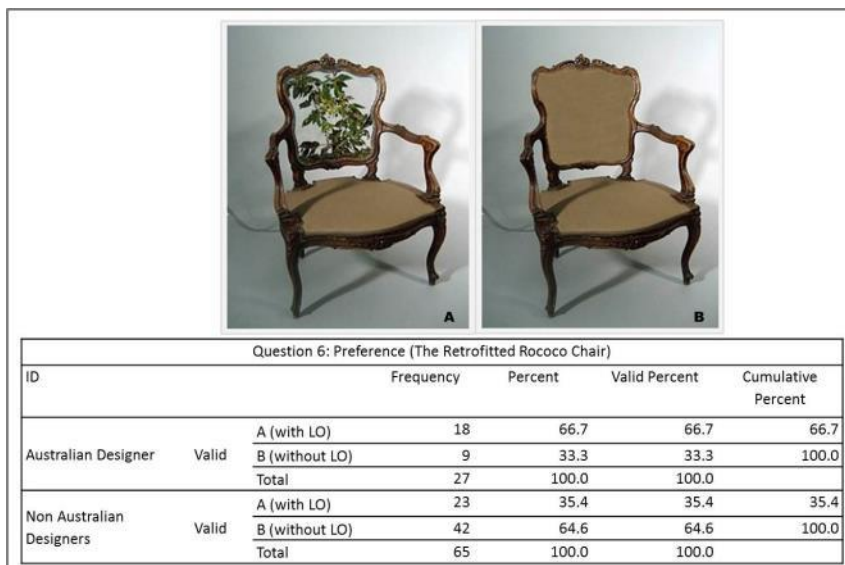
ID	Frequency	Percent	Valid Percent	Cumulative Percent
Australian Designer	A (without LO)	10	37.0	40.0
	B (with LO)	15	55.6	60.0
	Total	25	92.6	100.0
	Missing System	2	7.4	
	Total	27	100.0	
Non Australian Designers	A (without LO)	29	44.6	55.8
	B (with LO)	23	35.4	44.2
	Total	52	80.0	100.0
	Missing System	13	20.0	
	Total	65	100.0	

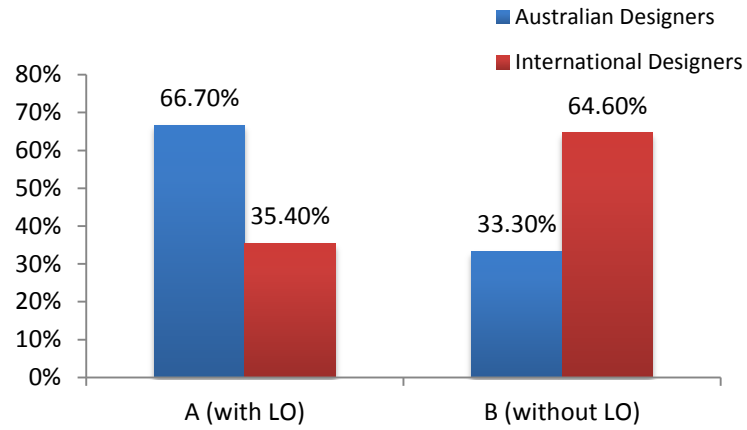


Question 5





Question 6

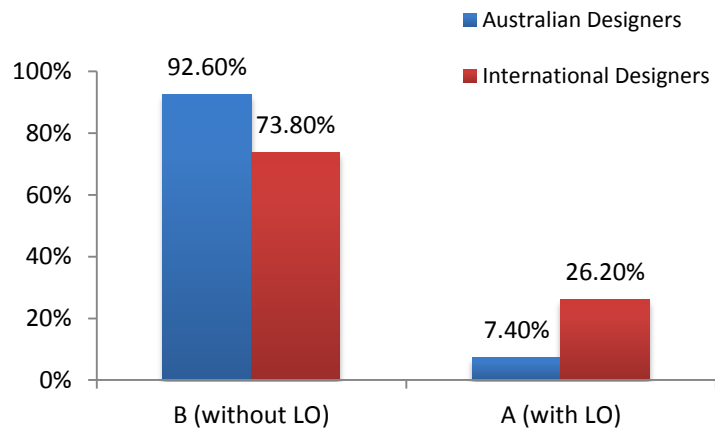




Question 7

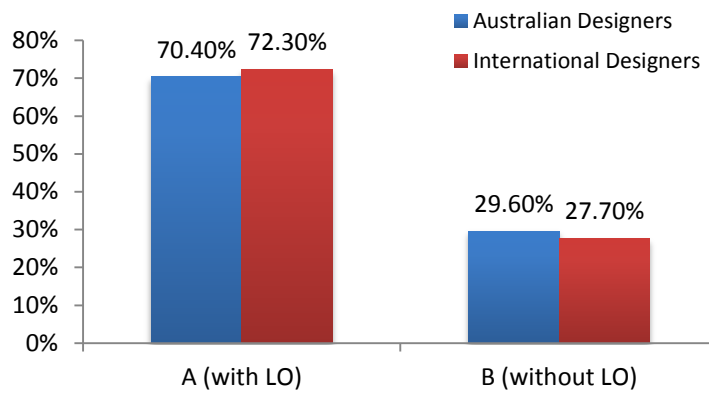
Question 7: Preference (Mushrooms Ate My Furniture)						
ID		Frequency	Percent	Valid Percent	Cumulative Percent	
Australian Designer	Valid	B (without LO)	25	92.6	92.6	
		A (with LO)	2	7.4	7.4	100.0
		Total	27	100.0	100.0	
Non Australian Designers	Valid	B (without LO)	48	73.8	73.8	
		A (with LO)	17	26.2	26.2	100.0
		Total	65	100.0	100.0	



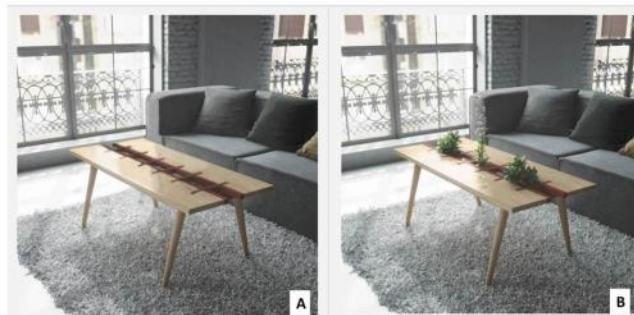
Question 8



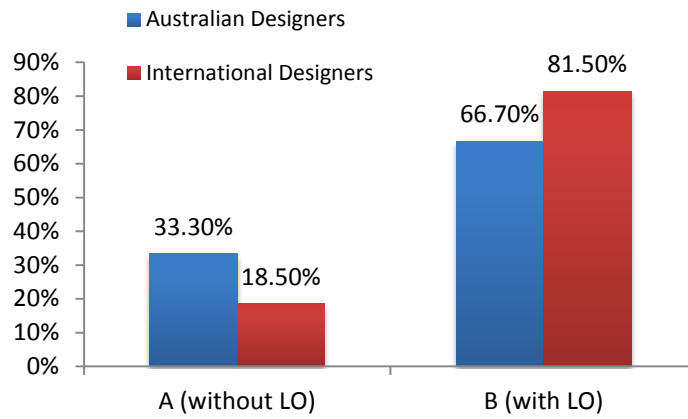
Question 8: Preference (The Greenwall)						
ID			Frequency	Percent	Valid Percent	Cumulative Percent
Australian Designer	Valid	A (with LO)	19	70.4	70.4	70.4
		B (without LO)	8	29.6	29.6	100.0
		Total	27	100.0	100.0	
Non Australian Designers	Valid	A (with LO)	47	72.3	72.3	72.3
		B (without LO)	18	27.7	27.7	100.0
		Total	65	100.0	100.0	



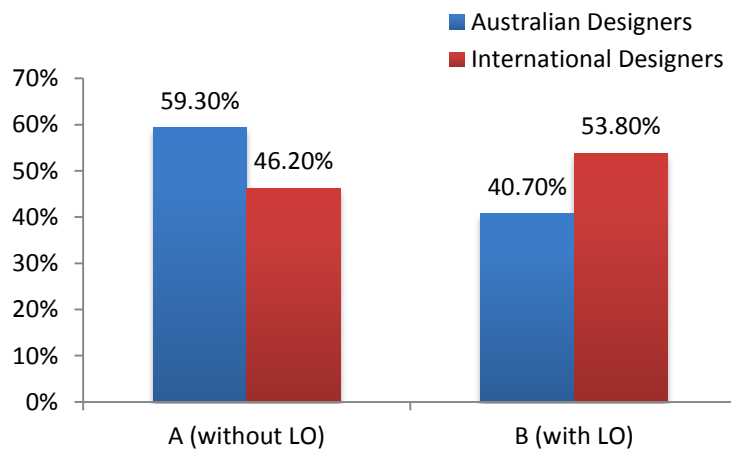
Question 9



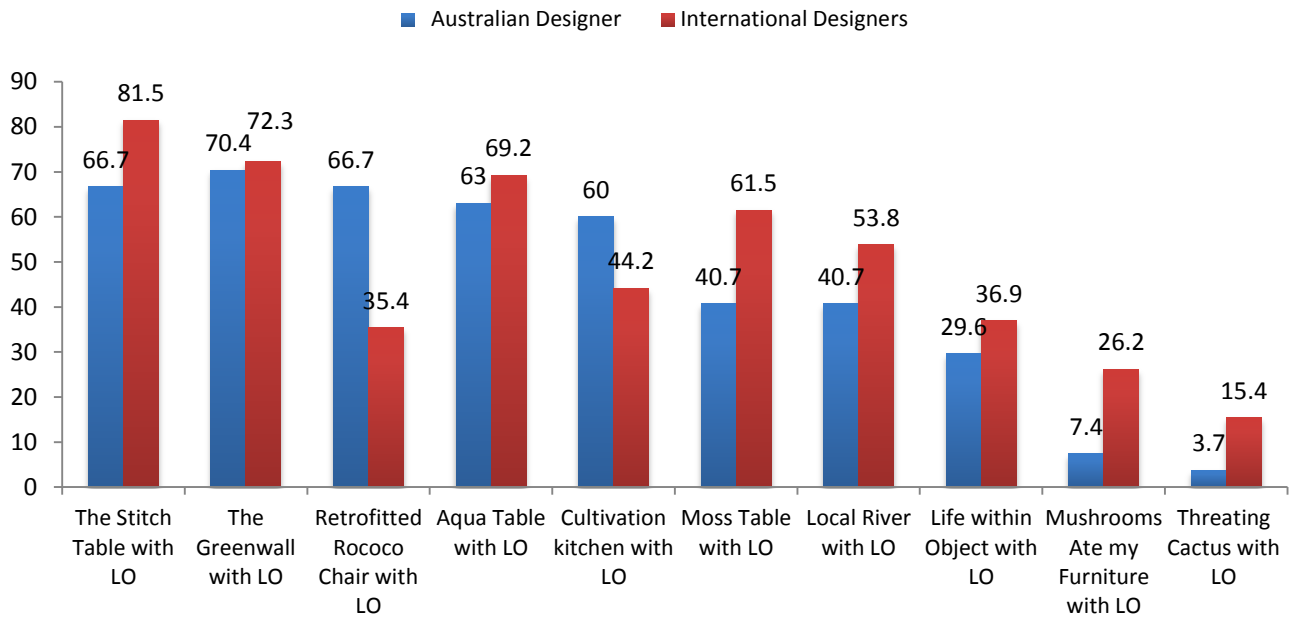
Question 9: Preference (The Stitch Table)						
ID			Frequency	Percent	Valid Percent	Cumulative Percent
Australian Designer	Valid	A (without LO)	9	33.3	33.3	33.3
		B (with LO)	18	66.7	66.7	100.0
		Total	27	100.0	100.0	
Non Australian Designers	Valid	A (without LO)	12	18.5	18.5	18.5
		B (with LO)	53	81.5	81.5	100.0
		Total	65	100.0	100.0	



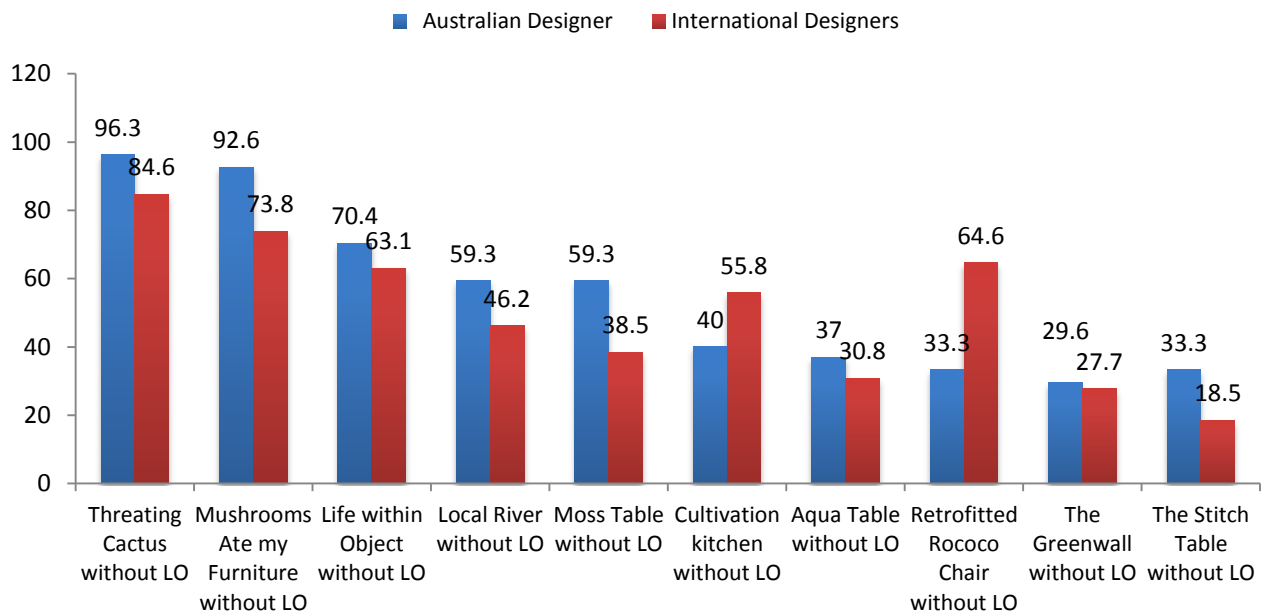
Question 10



Design Preference: FDLO

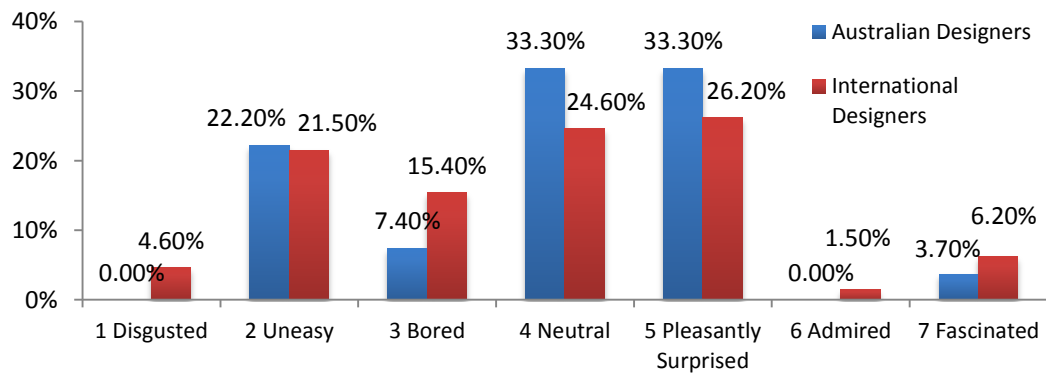
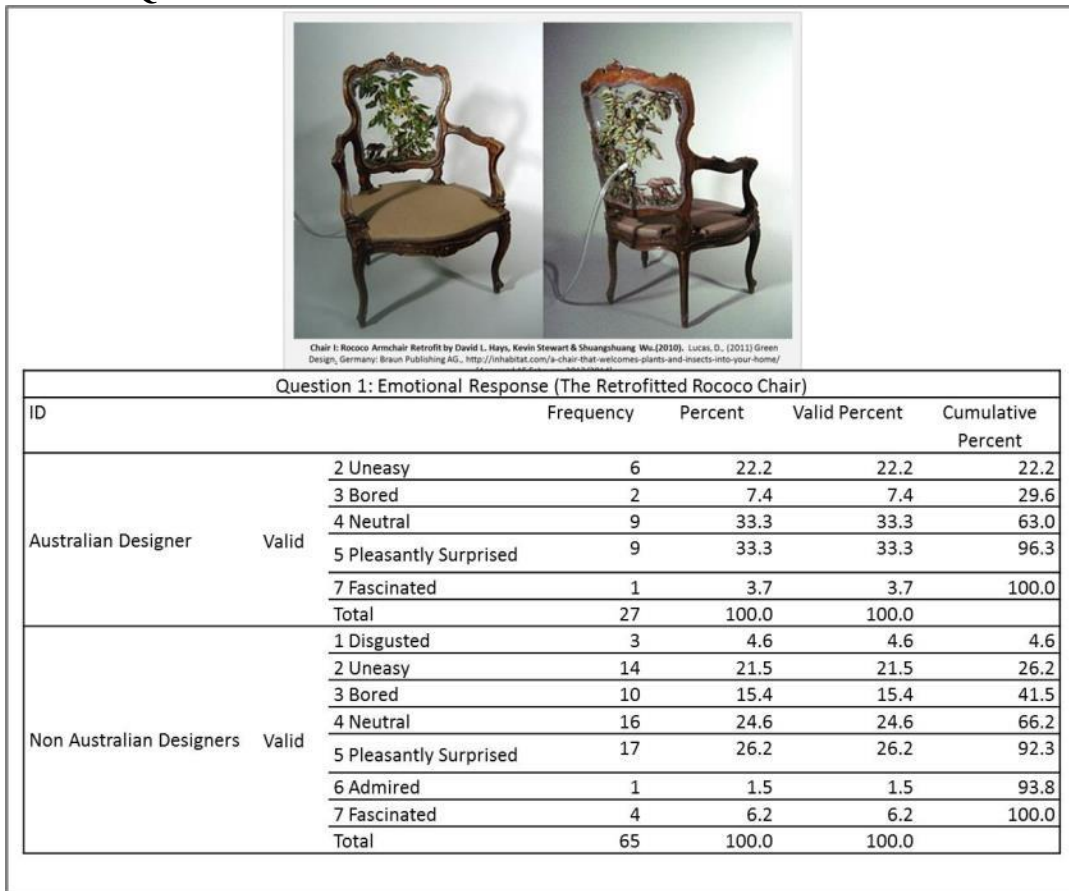


Design Preference: FDWLO



Section C: Emotional Design

Question 1: The Retrofitted Rococo Chair

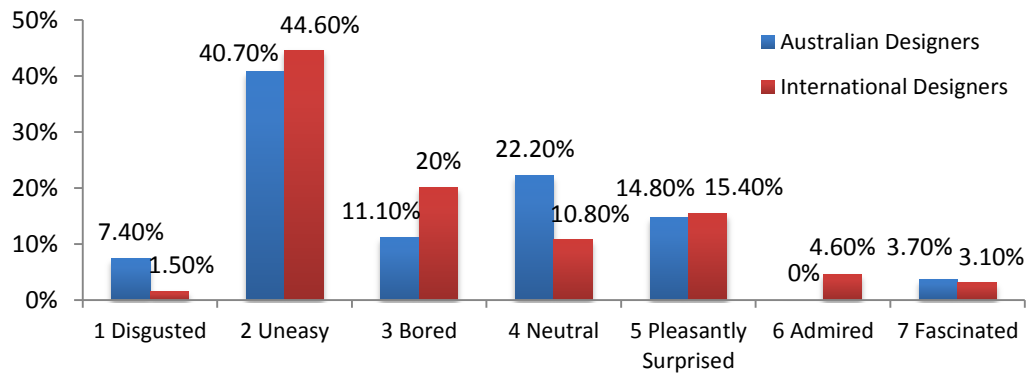


Question 2: The Threatening Cactus Chair

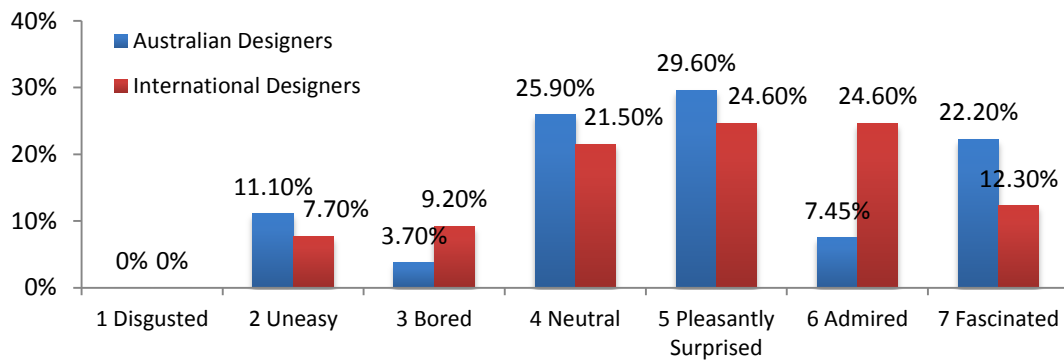
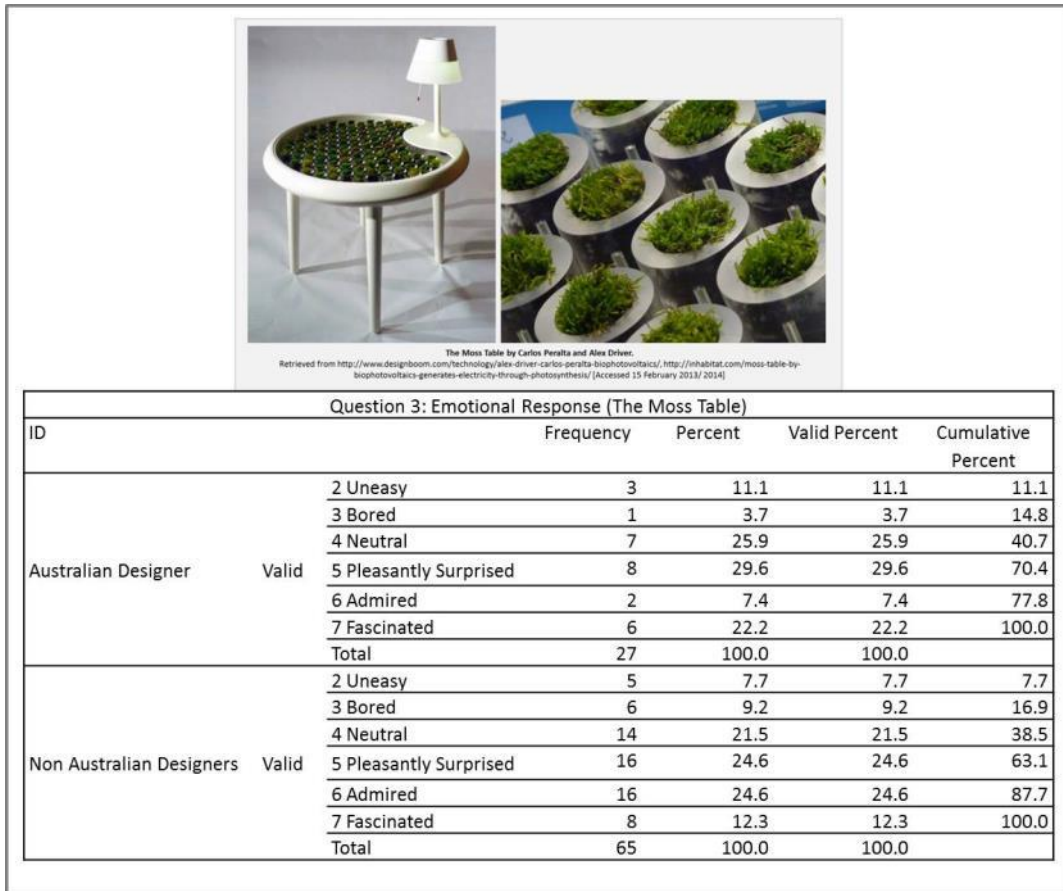


Threatening Cactus Terrarium Chair by Deger Cengiz.
 Retrieved from <http://inhabitat.com/deger-cengizs-digitaly-frightening-terrarium-chair-lets-litters-live-on-the-edge/>,
<http://media.designerpages.com/3rings/2010/07/19/deger-cengizs-leaning-shelves/Accessed August 2013/ 1 March 2014>

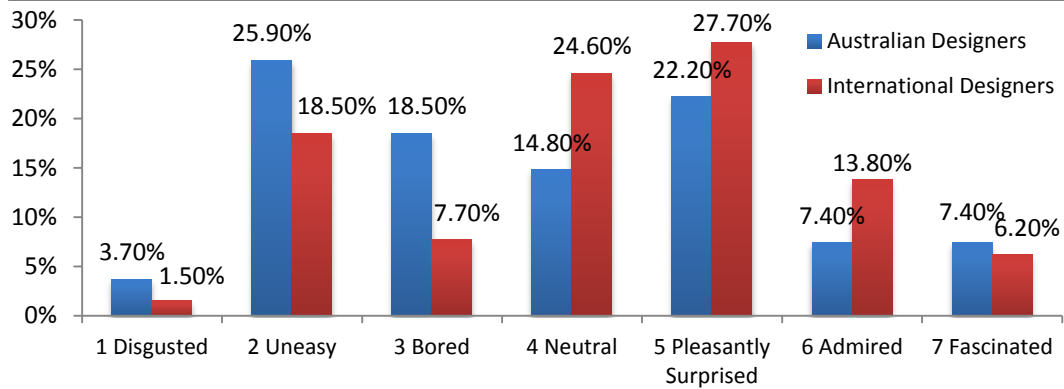
Question 2: Emotional Response (The Threatening Cactus Chair)					
ID		Frequency	Percent	Valid Percent	Cumulative Percent
Australian Designer	Valid	1 Disgusted	2	7.4	7.4
		2 Uneasy	11	40.7	48.1
		3 Bored	3	11.1	59.3
		4 Neutral	6	22.2	81.5
		5 Pleasantly Surprised	4	14.8	96.3
		7 Fascinated	1	3.7	100.0
		Total	27	100.0	100.0
Non Australian Designers	Valid	1 Disgusted	1	1.5	1.5
		2 Uneasy	29	44.6	46.2
		3 Bored	13	20.0	66.2
		4 Neutral	7	10.8	76.9
		5 Pleasantly Surprised	10	15.4	92.3
		6 Admired	3	4.6	96.9
		7 Fascinated	2	3.1	100.0
	Total	65	100.0	100.0	



Question 3: The Moss Table



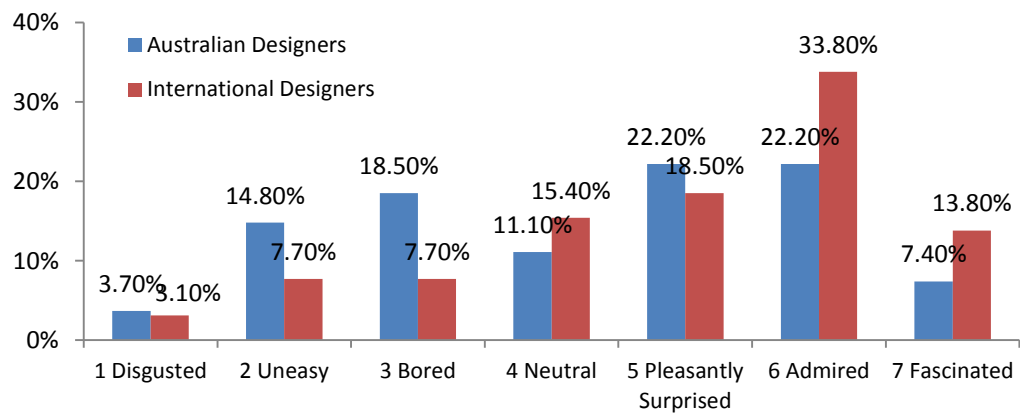
Question 4: Life within Object



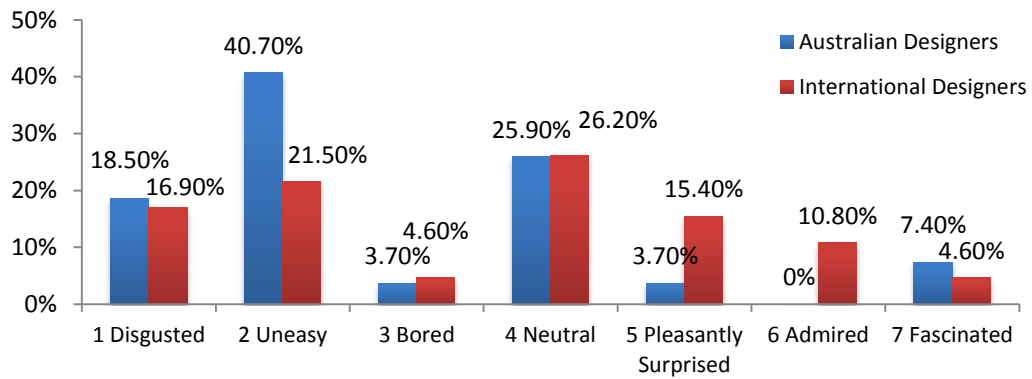
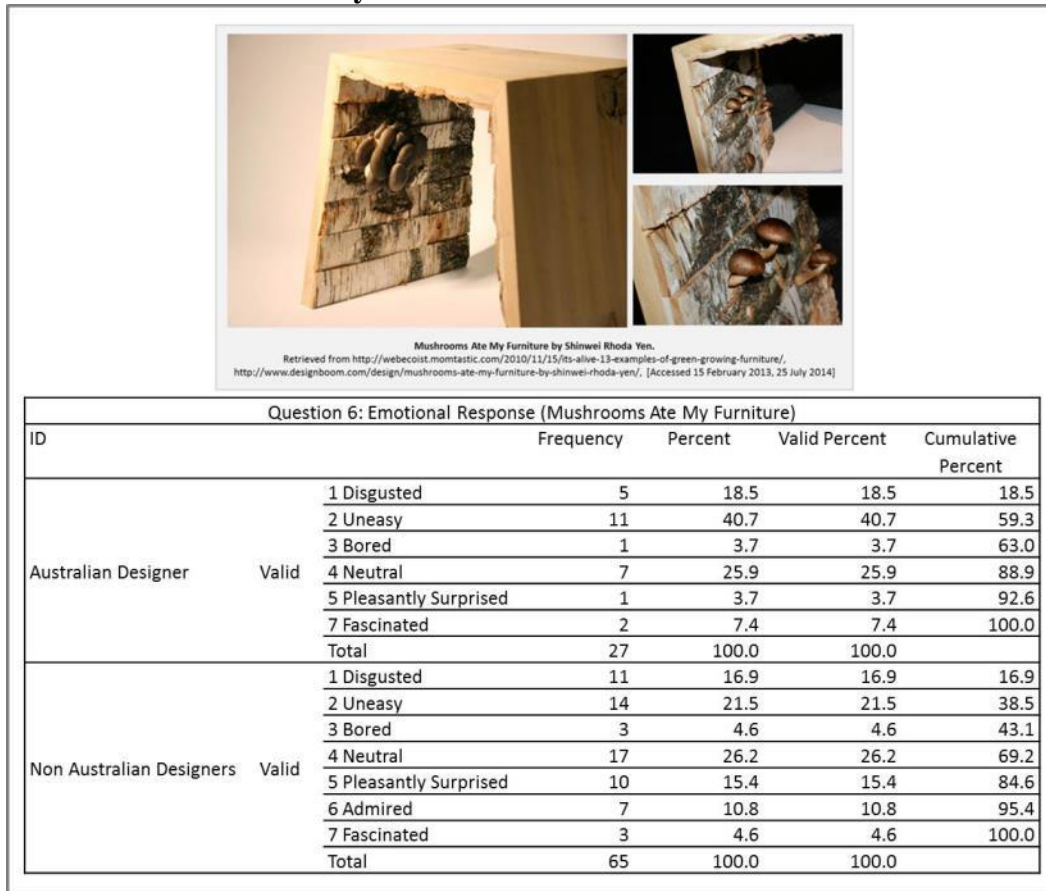
Question 5: The Aqua Table



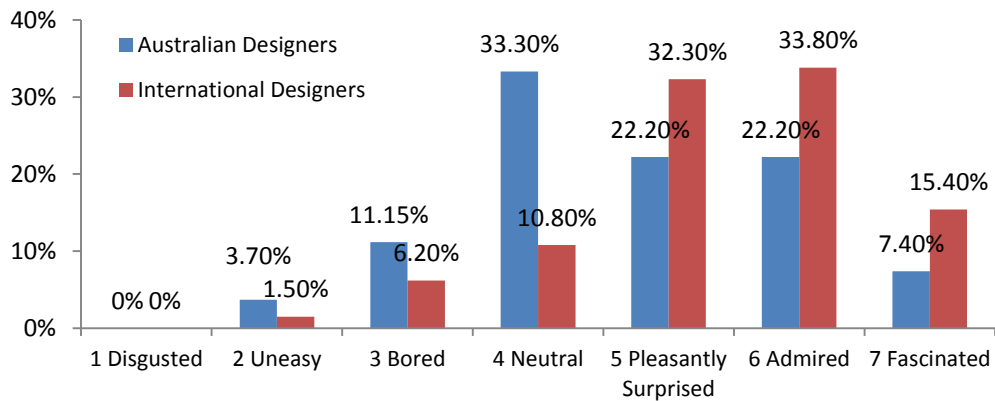
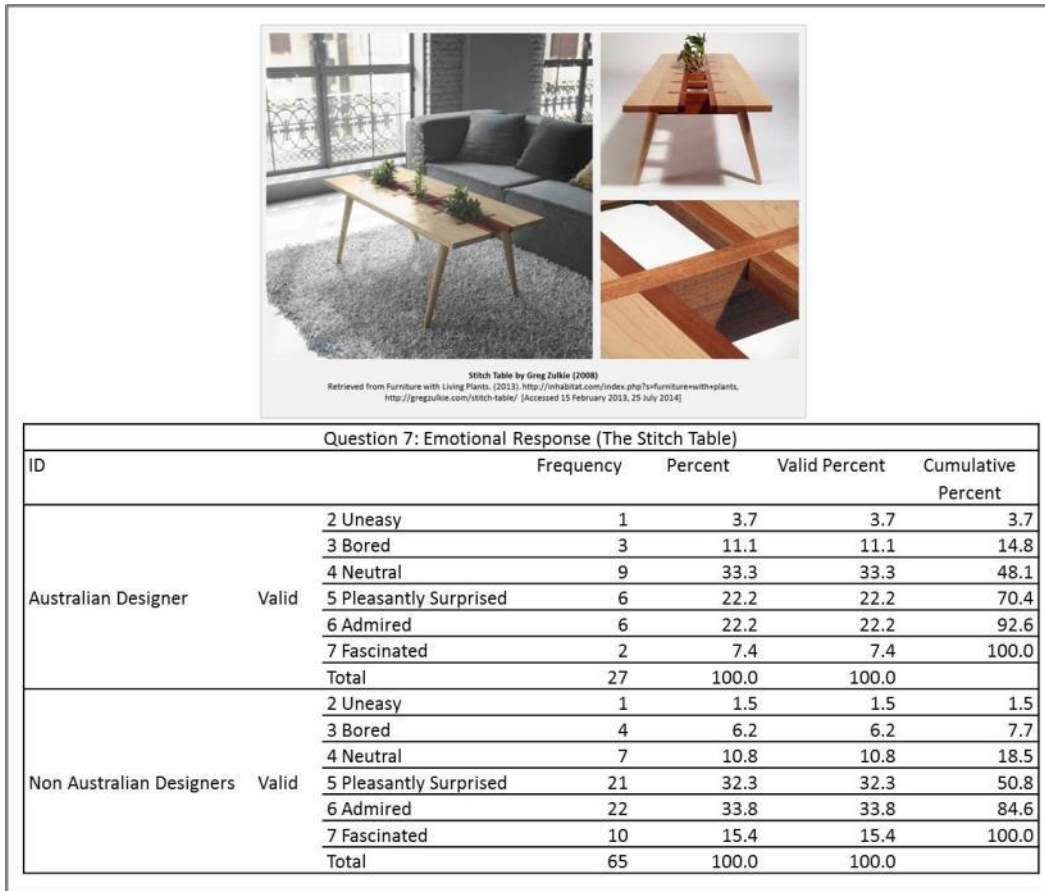
Question 5: Emotional Response (The Aqua Table)					
ID		Frequency	Percent	Valid Percent	Cumulative Percent
Australian Designer	Valid	1 Disgusted	1	3.7	3.7
		2 Uneasy	4	14.8	14.8
		3 Bored	5	18.5	18.5
		4 Neutral	3	11.1	11.1
		5 Pleasantly Surprised	6	22.2	22.2
		6 Admired	6	22.2	22.2
		7 Fascinated	2	7.4	7.4
		Total	27	100.0	100.0
Non Australian Designers	Valid	1 Disgusted	2	3.1	3.1
		2 Uneasy	5	7.7	10.8
		3 Bored	5	7.7	18.5
		4 Neutral	10	15.4	33.8
		5 Pleasantly Surprised	12	18.5	52.3
		6 Admired	22	33.8	86.2
		7 Fascinated	9	13.8	100.0
		Total	65	100.0	100.0



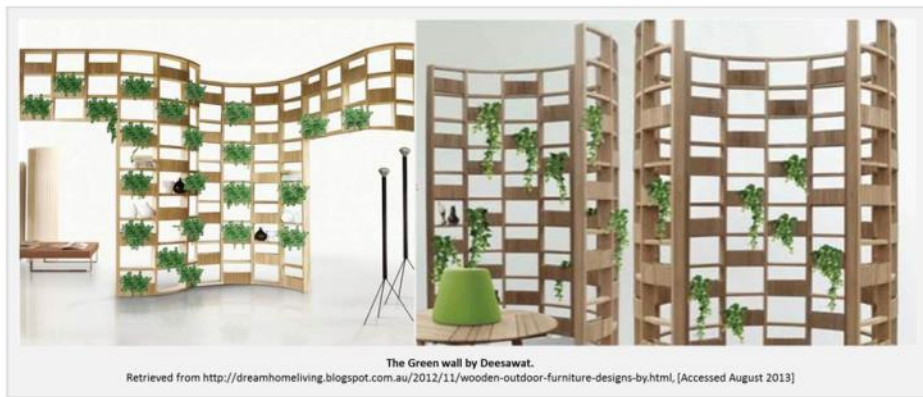
Question 6: Mushrooms Ate My Furniture



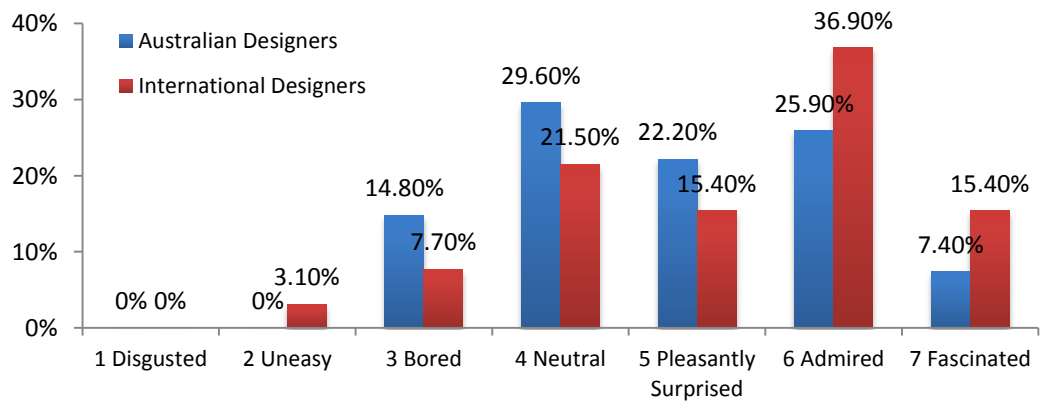
Question 7: The Stitch Table



Question 8: The Greenwall



Question 8: Emotional Response (The Greenwall)						
ID		Frequency	Percent	Valid Percent	Cumulative Percent	
Australian Designer	Valid	3 Bored	4	14.8	14.8	14.8
		4 Neutral	8	29.6	29.6	44.4
		5 Pleasantly Surprised	6	22.2	22.2	66.7
		6 Admired	7	25.9	25.9	92.6
		7 Fascinated	2	7.4	7.4	100.0
		Total	27	100.0	100.0	
Non Australian Designers	Valid	2 Uneasy	2	3.1	3.1	3.1
		3 Bored	5	7.7	7.7	10.8
		4 Neutral	14	21.5	21.5	32.3
		5 Pleasantly Surprised	10	15.4	15.4	47.7
		6 Admired	24	36.9	36.9	84.6
		7 Fascinated	10	15.4	15.4	100.0
Total	65	100.0	100.0			

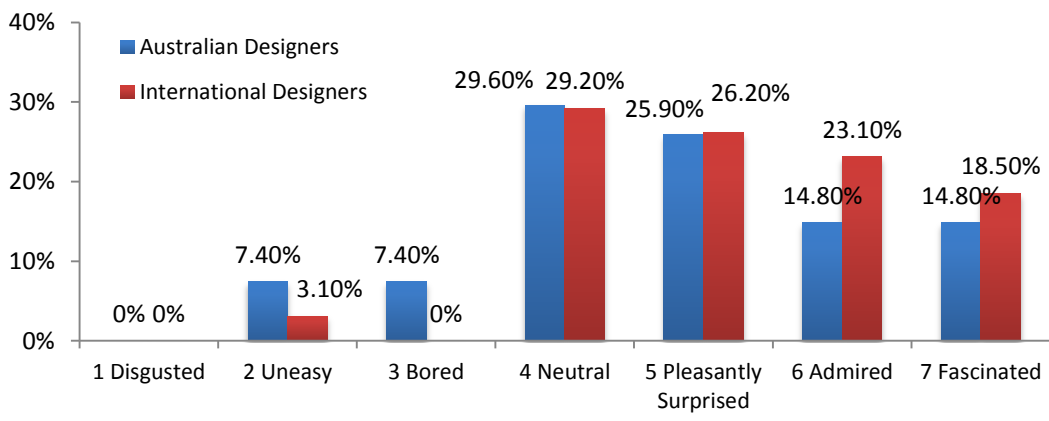


Question 9: The Cultivation Kitchen




Cultivation Kitchen IMAK (2008).
 Japan Good Design Award Book, (2008). Retrieved from <http://www.designstudiocrac.com/English/fcty1-en.htm> [Accessed 24 May 2013].
<http://spatialinteractions.wordpress.com/2011/10/01/cultivation-kitchen/> [Accessed 5 March 2013].

Question 9: Emotional Response (The Cultivation Kitchen)						
ID		Frequency	Percent	Valid Percent	Cumulative Percent	
Australian Designer	Valid	2 Uneasy	2	7.4	7.4	7.4
		3 Bored	2	7.4	7.4	14.8
		4 Neutral	8	29.6	29.6	44.4
		5 Pleasantly Surprised	7	25.9	25.9	70.4
		6 Admired	4	14.8	14.8	85.2
		7 Fascinated	4	14.8	14.8	100.0
		Total	27	100.0	100.0	
Non Australian Designers	Valid	2 Uneasy	2	3.1	3.1	3.1
		4 Neutral	19	29.2	29.2	32.3
		5 Pleasantly Surprised	17	26.2	26.2	58.5
		6 Admired	15	23.1	23.1	81.5
		7 Fascinated	12	18.5	18.5	100.0
Total	65	100.0	100.0			

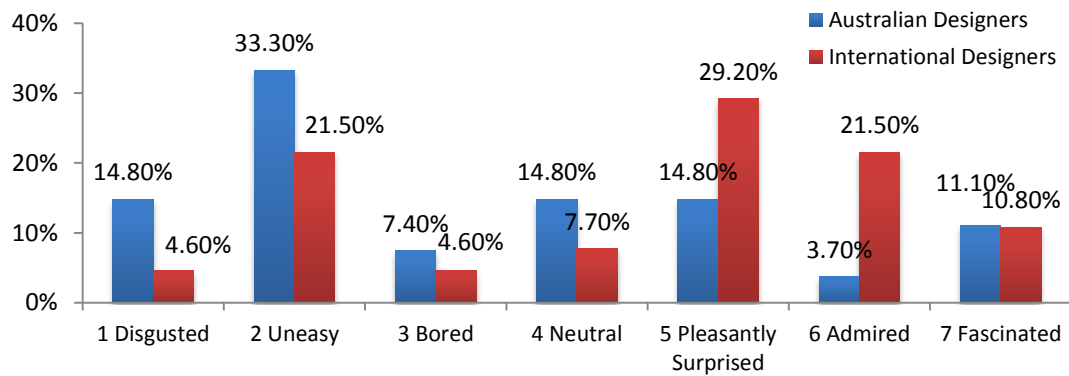


Question 10: The Local River

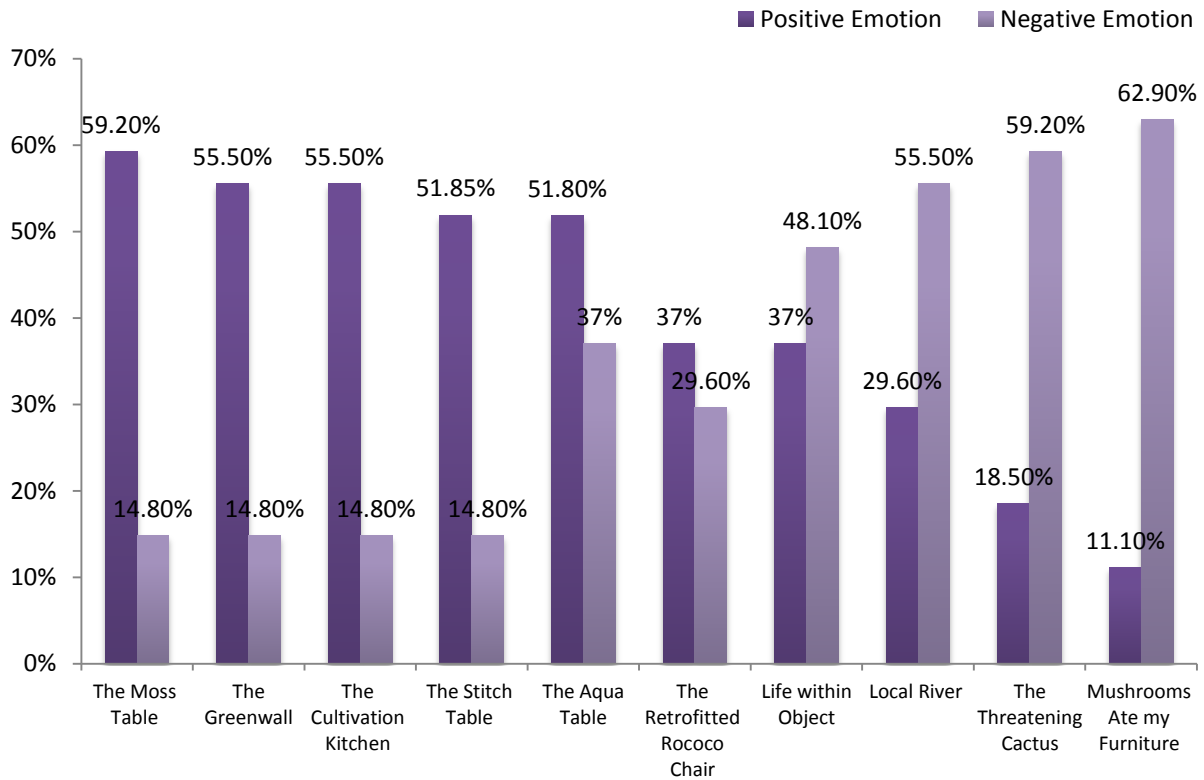


Local River by Mathieu Lehanneur and Anthony van den Bosch (2009).
 Fairs M., (2009). Green Design. Dubai: Carlton Books Limited. <http://www.designboom.com/design/local-river-by-mathieu-lehanneur-with-anthony-van-den-bosch/>, <http://www.treethugger.com/sustainable-product-design/local-river-by-mathieu-lehanneur.html>, <http://drumofglass.blogspot.com.au/2011/04/mathieu-lehanneur.html>, <http://drumofglass.blogspot.com.au/2011/04/mathieu-lehanneur.html> (Accessed February 8 August 2014)

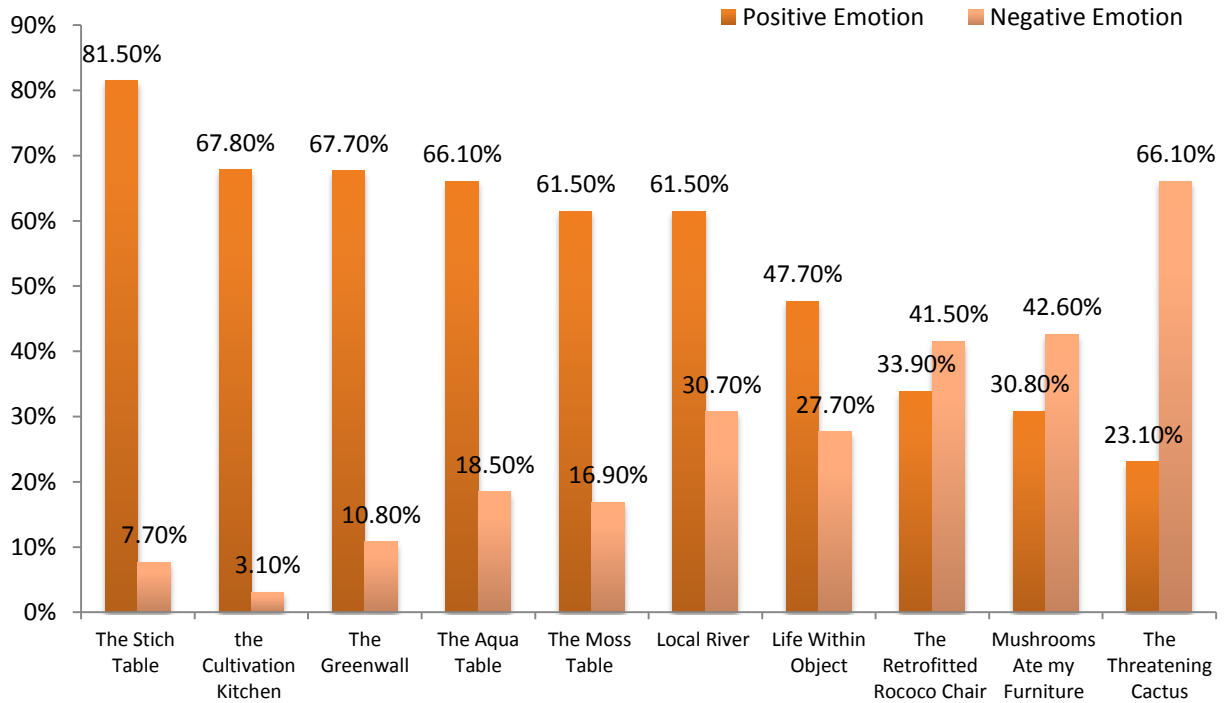
Question 10: Emotional Response (Local River)					
ID		Frequency	Percent	Valid Percent	Cumulative Percent
Australian Designer	Valid	1 Disgusted	4	14.8	14.8
		2 Uneasy	9	33.3	33.3
		3 Bored	2	7.4	7.4
		4 Neutral	4	14.8	14.8
		5 Pleasantly Surprised	4	14.8	14.8
		6 Admired	1	3.7	3.7
		7 Fascinated	3	11.1	11.1
		Total	27	100.0	100.0
Non Australian Designers	Valid	1 Disgusted	3	4.6	4.6
		2 Uneasy	14	21.5	21.5
		3 Bored	3	4.6	4.6
		4 Neutral	5	7.7	7.7
		5 Pleasantly Surprised	19	29.2	29.2
		6 Admired	14	21.5	21.5
		7 Fascinated	7	10.8	10.8
		Total	65	100.0	100.0



Australian Designers - Emotional Design



International Designers - Emotional Design



Section D: Conceptual Model



Question 1: Conceptual Model (The Retrofitted Rococo Chair)

The Retrofitted Rococo Chair		Conceptual Model – Subcategories							
		Function & Practicality Purpose A1 To Learn		Aesthetic & Semantic Purpose B1 Aesthetic Value/ Decoration Frequency/ Percent		Experience Purpose C1 To Experience Nature		Experimental Purpose D1 Conceptual Design	
Respondent									
Australian Designers (27)		2	7.4%	3	11.1%	5	18.5%	17	63.0%
International Designers (65)		11	16.9%	22	33.8%	20	30.8%	27	41.5%
		A2 Farming/ Food		B2 Collection & Display		C2 Environmental Consciousness		D2 Part of a Research Project	
Australian Designers (27)		0	0%	9	33.3%	6	22.2%	6	22.2%
International Designers (65)		3	4.6%	23	35.4%	11	16.9%	15	23.1%
		A3 Purify Water/ Air		B3 Communication/ Conveying a Message		C3 To Heal/ Calm/ Lower Stress		D3 Exploration of New Materials	
Australian Designers (27)		0	0%	4	14.8%	3	11.1%	5	18.5%
International Designers (65)		7	10.8%	12	18.5%	7	10.8%	11	16.9%
		A4 Generate Energy		B4 Artistic Reasons		C4 Entertainment		D4 Exploration of New Technologies	
Australian Designers (27)		0	0%	17	63.0%	5	18.5%	4	14.8%
International Designers (65)		4	6.2%	29	44.6%	18	27.7%	5	7.7%
		A5 To Encourage Hobbies		B5 Contemplation		C5 To Stimulate Senses		D5 To Break the Rules/ Be Different	
Australian Designers (27)		2	7.4%	3	11.1%	6	22.2%	19	70.4%
International Designers (65)		7	10.8%	10	15.4%	15	23.1%	33	50.8%
		A6 Other Reasons		B6 Other Reasons		C6 Other Reasons		D6 Other Reasons	
Australian Designers (27)		4	14.8%	1	3.7%	1	3.7%	1	3.7%
International Designers (65)		12	18.5%	8	12.3%	9	13.8%	3	4.6%

The Retrofitted Rococo Chair											
Australian Designers				International Designers							
1		70.40%	13		14.80%	1		50.80%	13		16.90%
2		63.00%	14		11.10%	2		44.60%	14		16.90%
3		63.00%	15		11.10%	3		41.50%	15		15.40%
4		33.30%	16		11.10%	4		35.40%	16		13.80%
5		22.20%	17		7.40%	5		33.80%	17		12.30%
6		22.20%	18		7.40%	6		30.80%	18		10.80%
7		22.20%	19		3.70%	7		27.70%	19		10.80%
8		18.50%	20		3.70%	8		23.10%	20		10.80%
9		18.50%	21		3.70%	9		23.10%	21		7.70%
10		18.50%	22		0%	10		18.50%	22		6.20%
11		14.80%	23		0%	11		18.50%	23		4.60%
12		14.80%	24		0%	12		16.90%	24		4.60%

Question 2: Conceptual Model (Life within Object)

Life within Object	Conceptual Model – Subcategories							
	Function & Practicality Purpose A1 To Learn		Aesthetic & Semantic Purpose B1 Aesthetic Value/ Decoration		Experience Purpose C1 To Experience Nature		Experimental Purpose D1 Conceptual Design	
Respondent	Frequency/ Percent							
Australian Designers (27)	6	22.2%	8	29.6%	13	48.1%	16	59.3%
International Designers (65)	9	13.8%	20	30.8%	34	52.3%	24	36.9%
	A2 Farming/ Food		B2 Collection & Display		C2 Environmental Consciousness		D2 Part of a Research Project	
Australian Designers (27)	3	11.1%	4	14.8%	3	11.1%	3	11.1%
International Designers (65)	7	10.8%	19	29.2%	21	32.3%	9	13.8%
	A3 Purify Water/ Air		B3 Communication/ Conveying a Message		C3 To Heal/ Calm/ Lower Stress		D3 Exploration of New Materials	
Australian Designers (27)	2	7.4%	5	18.5%	6	22.2%	1	3.7%
International Designers (65)	4	6.2%	15	23.1%	22	33.8%	7	10.8%
	A4 Generate Energy		B4 Artistic Reasons		C4 Entertainment		D4 Exploration of New Technologies	
Australian Designers (27)	0	0%	8	29.6%	5	18.5%	1	3.7%
International Designers (65)	1	1.5%	19	29.2%	21	32.3%	5	7.7%
	A5 To Encourage Hobbies		B5 Contemplation		C5 To Stimulate Senses		D5 To Break the Rules/ Be Different	
Australian Designers (27)	8	29.6%	2	7.4%	8	29.6%	11	40.7%
International Designers (65)	21	32.3%	10	15.4%	21	32.3%	31	47.7%
	A6 Other Reasons		B6 Other Reasons		C6 Other Reasons		D6 Other Reasons	
Australian Designers (27)	3	11.1%	2	7.4%	3	11.1%	3	11.1%
International Designers (65)	11	16.9%	7	10.8%	9	13.8%	2	3.1%

Life within Object											
Australian Designers				International Designers							
1		59.30%	13		11.10%	1		52.30%	13		16.90%
2		48.10%	14		11.10%	2		47.70%	14		15.40%
3		40.70%	15		11.10%	3		36.90%	15		13.80%
4		29.60%	16		11.10%	4		33.80%	16		13.80%
5		29.60%	17		11.10%	5		32.30%	17		13.80%
6		29.60%	18		11.10%	6		32.30%	18		10.80%
7		29.60%	19		7%	7		32.30%	19		10.80%
8		22.20%	20		7.40%	8		32.30%	20		10.80%
9		22.20%	21		7.40%	9		30.80%	21		7.70%
10		18.50%	22		3.70%	10		29.20%	22		6.20%
11		18.50%	23		3.70%	11		29.20%	23		3.10%
12		14.80%	24		0%	12		23.10%	24		1.50%

Question 3: Conceptual Model (The Threatening Cactus Chair)

Conceptual Model – Subcategories								
The Threatening Cactus Chair Respondent	Function & Practicality Purpose		Aesthetic & Semantic Purpose		Experience Purpose		Experimental Purpose	
	A1 To Learn		B1 Aesthetic Value/ Decoration		C1 To Experience Nature		D1 Conceptual Design	
Frequency/ Percent								
Australian Designers (27)	2	7.4%	4	14.8%	4	14.8%	15	55.6%
International Designers (65)	8	12.3%	22	33.8%	17	26.2%	33	50.8%
	A2 Farming/ Food		B2 Collection & Display		C2 Environmental Consciousness		D2 Part of a Research Project	
Australian Designers (27)	0	0%	6	22.2%	0	0%	7	25.9%
International Designers (65)	3	4.6%	21	32.3%	10	15.4%	12	18.5%
	A3 Purify Water/ Air		B3 Communication/ Conveying a Message		C3 To Heal/ Calm/ Lower Stress		D3 Exploration of New Materials	
Australian Designers (27)	0	0%	11	40.7%	2	7.4%	4	14.8%
International Designers (65)	4	6.2%	15	23.1%	7	10.8%	14	21.5%
	A4 Generate Energy		B4 Artistic Reasons		C4 Entertainment		D4 Exploration of New Technologies	
Australian Designers (27)	0	0%	16	59.3%	6	22.2%	0	0%
International Designers (65)	2	3.1%	31	47.7%	22	33.8%	6	9.2%
	A5 To Encourage Hobbies		B5 Contemplation		C5 To Stimulate Senses		D5 To Break the Rules/ Be Different	
Australian Designers (27)	3	11.1%	2	7.4%	9	33.3%	17	63.0%
International Designers (65)	11	16.9%	8	12.3%	26	40.0%	33	50.8%
	A6 Other Reasons		B6 Other Reasons		C6 Other Reasons		D6 Other Reasons	
Australian Designers (27)	5	18.5%	0	0%	2	7.4%	1	3.7%
International Designers (65)	11	16.9%	9	13.8%	4	6.2%	7	10.8%

The Threatening Cactus Chair											
Australian Designers				International Designers							
1	 D5 To break the rules/ be different	63.00%	13	 A5 To encourage hobbies	11.10%	1	 D5 To break the rules/ be different	50.80%	13	 A5 To encourage hobbies	16.90%
2	 B4 Artistic reasons	59.30%	14	 B5 Contemplation	7.40%	2	 D1 Conceptual design	50.80%	14	 C2 Environmental consciousness	15.40%
3	 D1 Conceptual design	55.60%	15	 A1 To learn	7.40%	3	 B4 Artistic reasons	47.70%	15	 B6 Other reasons	13.80%
4	 B3 Communication /convey message	40.70%	16	 C3 To heal/ calm/ lower stress	7.40%	4	 C5 To stimulate senses	40.00%	16	 B5 Contemplation	12.30%
5	 C5 To stimulate senses	33.30%	17	 C6 Other reasons	7.40%	5	 B1 Aesthetic value/ Decoration	33.80%	17	 A1 To learn	12.30%
6	 D2 Part of a research project	25.90%	18	 D6 Other reasons	3.70%	6	 C4 Entertainment	33.80%	18	 C3 To heal/ calm/ lower stress	10.80%
7	 C4 Entertainment	22.20%	19	 C2 Environmental consciousness	0%	7	 B2 Collection & Display	32.30%	19	 D6 Other reasons	10.80%
8	 B2 Collection & Display	22.20%	20	 B6 Other reasons	0%	8	 C1 To experience nature	26.20%	20	 D4 Exploration of new technologies	9.20%
9	 A6 Other reasons	18.50%	21	 D4 Exploration of new technologies	0%	9	 B3 Communication /convey message	23.10%	21	 C6 Other reasons	6.20%
10	 B1 Aesthetic value/ Decoration	14.80%	22	 A3 Purify water/ air	0%	10	 D3 Exploration of new materials	21.50%	22	 A3 Purify water/ air	6.20%
11	 C1 To experience nature	14.80%	23	 A2 Farming/ Food	0%	11	 D2 Part of a research project	18.50%	23	 A2 Farming/ Food	4.60%
12	 D3 Exploration of new materials	14.80%	24	 A4 Generate energy	0%	12	 A6 Other reasons	16.90%	24	 A4 Generate energy	3.10%












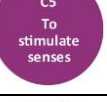














Question 4: Conceptual Model (The Stitch Table)

The Stitch Table	Conceptual Model – Subcategories							
	Function & Practicality Purpose A1 To Learn		Aesthetic & Semantic Purpose B1 Aesthetic Value/ Decoration Frequency/ Percent		Experience Purpose C1 To Experience Nature		Experimental Purpose D1 Conceptual Design	
Respondent								
Australian Designers (27)	1	3.7%	15	55.6%	11	40.7%	10	37.0%
International Designers (65)	6	9.2%	45	69.2%	34	52.3%	25	38.5%
	A2 Farming/ Food		B2 Collection & Display		C2 Environmental Consciousness		D2 Part of a Research Project	
Australian Designers (27)	6	22.2%	13	48.1%	6	22.2%	2	7.4%
International Designers (65)	8	12.3%	23	35.4%	13	20.0%	5	7.7%
	A3 Purify Water/ Air		B3 Communication/ Conveying a Message		C3 To Heal/ Calm/ Lower Stress		D3 Exploration of New Materials	
Australian Designers (27)	8	29.6%	2	7.4%	12	44.4%	3	11.1%
International Designers (65)	8	12.3%	9	13.8%	22	33.8%	13	20.0%
	A4 Generate Energy		B4 Artistic Reasons		C4 Entertainment		D4 Exploration of New Technologies	
Australian Designers (27)	1	3.7%	12	44.4%	2	7.4%	1	3.7%
International Designers (65)	5	7.7%	18	27.7%	12	18.5%	1	1.5%
	A5 To Encourage Hobbies		B5 Contemplation		C5 To Stimulate Senses		D5 To Break the Rules/ Be Different	
Australian Designers (27)	4	14.8%	4	14.8%	6	22.2%	4	14.8%
International Designers (65)	22	33.8%	13	20.0%	25	38.5%	15	23.1%
	A6 Other Reasons		B6 Other Reasons		C6 Other Reasons		D6 Other Reasons	
Australian Designers (27)	2	7.4%	2	7.4%	0	0%	5	18.5%
International Designers (65)	7	10.8%	7	10.8%	5	7.7%	7	10.8%

The Stitch Table											
Australian Designers				International Designers							
1		55.60%	13		14.80%	1		69.20%	13		18.50%
2		48.10%	14		14.80%	2		52.30%	14		13.80%
3		44.40%	15		11.10%	3		38.50%	15		12.30%
4		44.40%	16		7.40%	4		38.50%	16		12.30%
5		40.70%	17		7.40%	5		35.40%	17		10.80%
6		37.00%	18		7.40%	6		33.80%	18		10.80%
7		29.60%	19		7.40%	7		33.80%	19		10.80%
8		22.20%	20		7.40%	8		27.70%	20		9.20%
9		22.20%	21		3.70%	9		23.10%	21		7.70%
10		22.20%	22		3.70%	10		20.00%	22		7.70%
11		18.50%	23		3.70%	11		20.00%	23		7.70%
12		14.80%	24		0%	12		20.00%	24		1.50%








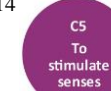







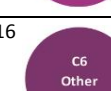



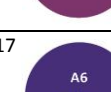













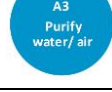













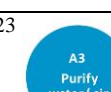
Question 5: Conceptual Model (The Greenwall)

The Greenwall Respondent		Conceptual Model – Subcategories							
		Function & Practicality Purpose A1 To Learn		Aesthetic & Semantic Purpose B1 Aesthetic Value/ Decoration		Experience Purpose C1 To Experience Nature		Experimental Purpose D1 Conceptual Design	
		Frequency/ Percent							
Australian Designers (27)		2	7.4%	21	77.8%	11	40.7%	12	44.4%
International Designers (65)		10	15.4%	43	66.2%	31	47.7%	23	35.4%
		A2 Farming/ Food		B2 Collection & Display		C2 Environmental Consciousness		D2 Part of a Research Project	
Australian Designers (27)		5	18.5%	15	55.6%	6	22.2%	0	0%
International Designers (65)		11	16.9%	28	43.1%	22	33.8%	4	6.2%
		A3 Purify Water/ Air		B3 Communication/ Conveying a Message		C3 To Heal/ Calm/ Lower Stress		D3 Exploration of New Materials	
Australian Designers (27)		7	25.9%	2	7.4%	10	37.0%	1	3.7%
International Designers (65)		16	24.6%	10	15.4%	29	44.6%	9	13.8%
		A4 Generate Energy		B4 Artistic Reasons		C4 Entertainment		D4 Exploration of New Technologies	
Australian Designers (27)		0	0%	8	29.6%	0	0%	2	7.4%
International Designers (65)		4	6.2%	19	29.2%	8	12.3%	4	6.2%
		A5 To Encourage Hobbies		B5 Contemplation		C5 To Stimulate Senses		D5 To Break the Rules/ Be Different	
Australian Designers (27)		2	7.4%	2	7.4%	9	33.3%	4	14.8%
International Designers (65)		22	33.8%	11	16.9%	22	33.8%	12	18.5%
		A6 Other Reasons		B6 Other Reasons		C6 Other Reasons		D6 Other Reasons	
Australian Designers (27)		2	7.4%	1	3.7%	1	3.7%	1	3.7%
International Designers (65)		9	13.8%	4	6.2%	7	10.8%	7	10.8%

The Greenwall											
Australian Designers				International Designers							
1		77.80%	13		7.40%	1		66.20%	13		16.90%
2		55.60%	14		7.40%	2		47.70%	14		15.40%
3		44.40%	15		7.40%	3		44.60%	15		15.40%
4		40.70%	16		7.40%	4		43.10%	16		13.80%
5		37.00%	17		7.40%	5		35.40%	17		13.80%
6		33.30%	18		3.70%	6		33.80%	18		12.30%
7		29.60%	19		3.70%	7		33.80%	19		10.80%
8		25.90%	20		3.70%	8		33.80%	20		10.80%
9		22.20%	21		3.70%	9		29.20%	21		6.20%
10		18.50%	22		0%	10		24.60%	22		6.20%
11		14.80%	23		0%	11		18.50%	23		6.20%
12		7.40%	24		0%	12		16.90%	24		6.20%












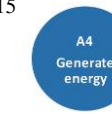
















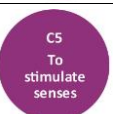


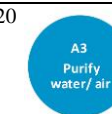



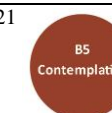



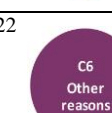







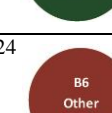
Question 6: Conceptual Model (Mushrooms Ate My Furniture)

Mushrooms Ate My Furniture		Conceptual Model – Subcategories							
		Function & Practicality Purpose		Aesthetic & Semantic Purpose		Experience Purpose		Experimental Purpose	
Respondent		A1 To Learn		B1 Aesthetic Value/ Decoration		C1 To Experience Nature		D1 Conceptual Design	
		Frequency/ Percent							
Australian Designers (27)		4	14.8%	4	14.8%	7	25.9%	11	40.7%
International Designers (65)		16	24.6%	19	29.2%	34	52.3%	32	49.2%
		A2 Farming/ Food		B2 Collection & Display		C2 Environmental Consciousness		D2 Part of a Research Project	
Australian Designers (27)		8	29.6%	5	18.5%	5	18.5%	12	44.4%
International Designers (65)		17	26.2%	14	21.5%	18	27.7%	19	29.2%
		A3 Purify Water/ Air		B3 Communication/ Conveying a Message		C3 To Heal/ Calm/ Lower Stress		D3 Exploration of New Materials	
Australian Designers (27)		2	7.4%	10	37.0%	0	0%	9	33.3%
International Designers (65)		4	6.2%	20	30.8%	5	7.7%	23	35.4%
		A4 Generate Energy		B4 Artistic Reasons		C4 Entertainment		D4 Exploration of New Technologies	
Australian Designers (27)		0	0%	9	33.3%	5	18.5%	4	14.8%
International Designers (65)		1	1.5%	21	32.3%	12	18.5%	10	15.4%
		A5 To Encourage Hobbies		B5 Contemplation		C5 To Stimulate Senses		D5 To Break the Rules/ Be Different	
Australian Designers (27)		3	11.1%	1	3.7%	8	29.6%	17	63.0%
International Designers (65)		4	6.2%	13	20.0%	12	18.5%	22	33.8%
		A6 Other Reasons		B6 Other Reasons		C6 Other Reasons		D6 Other Reasons	
Australian Designers (27)		5	18.5%	2	7.4%	1	3.7%	3	11.1%
International Designers (65)		11	16.9%	7	10.8%	12	18.5%	7	10.8%

Mushrooms Ate My Furniture											
Australian Designers				International Designers							
1		63.00%	13		18.50%	1		52.30%	13		20.00%
2		44.40%	14		14.80%	2		49.20%	14		18.50%
3		40.70%	15		14.80%	3		35.40%	15		18.50%
4		37.00%	16		14.80%	4		33.80%	16		18.50%
5		33.30%	17		11.10%	5		32.30%	17		16.90%
6		33.30%	18		11.10%	6		30.80%	18		15.40%
7		29.60%	19		7.40%	7		29.20%	19		10.80%
8		29.60%	20		7.40%	8		29.20%	20		10.80%
9		25.90%	21		3.70%	9		27.70%	21		7.70%
10		18.50%	22		3.70%	10		26.20%	22		6.20%
11		18.50%	23		0%	11		24.60%	23		6.20%
12		18.50%	24		0%	12		21.50%	24		1.50%

















































Question 7: Conceptual Model (The Moss Table)

		Conceptual Model – Subcategories							
The Moss Table		Function & Practicality Purpose A1 To Learn		Aesthetic & Semantic Purpose B1 Aesthetic Value/ Decoration		Experience Purpose C1 To Experience Nature		Experimental Purpose D1 Conceptual Design	
Respondent		Frequency/ Percent							
Australian Designers (27)		6	22.2%	13	48.1%	8	29.6%	14	51.9%
International Designers (65)		13	20.0%	34	52.3%	22	33.8%	27	41.5%
		A2 Farming/ Food		B2 Collection & Display		C2 Environmental Consciousness		D2 Part of a Research Project	
Australian Designers (27)		2	7.4%	5	18.5%	5	18.5%	5	18.5%
International Designers (65)		9	13.8%	20	30.8%	19	29.2%	19	29.2%
		A3 Purify Water/ Air		B3 Communication/ Conveying a Message		C3 To Heal/ Calm/ Lower Stress		D3 Exploration of New Materials	
Australian Designers (27)		7	25.9%	4	14.8%	9	33.3%	7	25.9%
International Designers (65)		8	12.3%	15	23.1%	18	27.7%	21	32.3%
		A4 Generate Energy		B4 Artistic Reasons		C4 Entertainment		D4 Exploration of New Technologies	
Australian Designers (27)		2	7.4%	11	40.7%	2	7.4%	9	33.3%
International Designers (65)		13	20.0%	19	29.2%	12	18.5%	23	35.4%
		A5 To Encourage Hobbies		B5 Contemplation		C5 To Stimulate Senses		D5 To Break the Rules/ Be Different	
Australian Designers (27)		2	7.4%	3	11.1%	7	25.9%	12	44.4%
International Designers (65)		12	18.5%	8	12.3%	23	35.4%	18	27.7%
		A6 Other Reasons		B6 Other Reasons		C6 Other Reasons		D6 Other Reasons	
Australian Designers (27)		1	3.7%	0	0%	0	0%	2	7.4%
International Designers (65)		13	20.0%	3	4.6%	6	9.2%	5	7.7%

The Moss Table											
Australian Designers				International Designers							
1		51.90%	13		18.50%	1		52.30%	13		23.10%
2		48.10%	14		18.50%	2		41.50%	14		20.00%
3		44.40%	15		14.80%	3		35.40%	15		20.00%
4		40.70%	16		11.10%	4		35.40%	16		20.00%
5		33.30%	17		7.40%	5		33.80%	17		18.50%
6		33.30%	18		7.40%	6		32.30%	18		18.50%
7		29.60%	19		7.40%	7		30.80%	19		13.80%
8		25.90%	20		7.40%	8		29.20%	20		12.30%
9		25.90%	21		7.40%	9		29.20%	21		12.30%
10		25.90%	22		3.70%	10		29.20%	22		9.20%
11		22.20%	23		0%	11		27.70%	23		7.70%
12		18.50%	24		0%	12		27.70%	24		4.60%

















































Question 8: Conceptual Model (The Aqua Table)

Respondent	Conceptual Model – Subcategories							
	Function & Practicality Purpose A1 To Learn		Aesthetic & Semantic Purpose B1 Aesthetic Value/ Decoration Frequency/ Percent		Experience Purpose C1 To Experience Nature		Experimental Purpose D1 Conceptual Design	
Australian Designers (27)	4	14.8%	16	59.3%	11	40.7%	11	40.7%
International Designers (65)	14	21.5%	45	69.2%	32	49.2%	27	41.5%
	A2 Farming/ Food		B2 Collection & Display		C2 Environmental Consciousness		D2 Part of a Research Project	
Australian Designers (27)	0	0%	11	40.7%	0	0%	2	7.4%
International Designers (65)	4	6.2%	29	44.6%	10	15.4%	7	10.8%
	A3 Purify Water/ Air		B3 Communication/ Conveying a Message		C3 To Heal/ Calm/ Lower Stress		D3 Exploration of New Materials	
Australian Designers (27)	0	0%	0	0%	16	59.3%	0	0%
International Designers (65)	5	7.7%	11	16.9%	30	46.2%	11	16.9%
	A4 Generate Energy		B4 Artistic Reasons		C4 Entertainment		D4 Exploration of New Technologies	
Australian Designers (27)	0	0%	6	22.2%	11	40.7%	3	11.1%
International Designers (65)	1	1.5%	22	33.8%	30	46.2%	7	10.8%
	A5 To Encourage Hobbies		B5 Contemplation		C5 To Stimulate Senses		D5 To Break the Rules/ Be Different	
Australian Designers (27)	8	29.6%	4	14.8%	2	7.4%	6	22.2%
International Designers (65)	25	38.5%	17	26.2%	19	29.2%	21	32.3%
	A6 Other Reasons		B6 Other Reasons		C6 Other Reasons		D6 Other Reasons	
Australian Designers (27)	2	7.4%	0	0%	1	3.7%	3	11.1%
International Designers (65)	9	13.8%		4.6%	6	9.2%	10	15.4%

The Aqua Table											
Australian Designers				International Designers							
1		59.30%	13		11.10%	1		69.20%	13		16.90%
2		59.30%	14		7.40%	2		49.20%	14		16.90%
3		40.70%	15		7.40%	3		46.20%	15		15.40%
4		40.70%	16		7.40%	4		46.20%	16		15.40%
5		40.70%	17		3.70%	5		44.60%	17		13.80%
6		40.70%	18		0%	6		41.50%	18		10.80%
7		29.60%	19		0%	7		38.50%	19		10.80%
8		22.20%	20		0%	8		33.80%	20		9.20%
9		22.20%	21		0%	9		32.30%	21		7.70%
10		14.80%	22		0%	10		29.20%	22		6.20%
11		14.80%	23		0%	11		26.20%	23		4.60%
12		11.10%	24		0%	12		21.50%	24		1.50%
















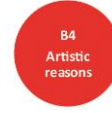


















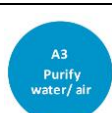





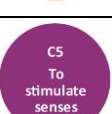







Question 9: Conceptual Model (Local River)

Conceptual Model – Subcategories								
Respondent	Function & Practicality Purpose A1 To Learn		Aesthetic & Semantic Purpose B1 Aesthetic Value/ Decoration		Experience Purpose C1 To Experience Nature		Experimental Purpose D1 Conceptual Design	
	Frequency/ Percent							
Australian Designers (27)	7	25.9%	8	29.6%	12	44.4%	17	63.0%
International Designers (65)	16	24.6%	21	32.3%	28	43.1%	35	53.8%
	A2 Farming/ Food		B2 Collection & Display		C2 Environmental Consciousness		D2 Part of a Research Project	
Australian Designers (27)	0	0%	8	29.6%	4	14.8%	9	33.3%
International Designers (65)	9	13.8%	27	41.5%	12	18.5%	17	26.2%
	A3 Purify Water/ Air		B3 Communication/ Conveying a Message		C3 To Heal/ Calm/ Lower Stress		D3 Exploration of New Materials	
Australian Designers (27)	2	7.4%	4	14.8%	4	14.8%	3	11.1%
International Designers (65)	10	15.4%	16	24.6%	17	26.2%	8	12.3%
	A4 Generate Energy		B4 Artistic Reasons		C4 Entertainment		D4 Exploration of New Technologies	
Australian Designers (27)	0	0%	5	18.5%	4	14.8%	2	7.4%
International Designers (65)	5	7.7%	25	38.5%	19	29.2%	9	13.8%
	A5 To Encourage Hobbies		B5 Contemplation		C5 To Stimulate Senses		D5 To Break the Rules/ Be Different	
Australian Designers (27)	8	29.6%	2	7.4%	9	33.3%	11	40.7%
International Designers (65)	17	26.2%	8	12.3%	18	27.7%	26	40.0%
	A6 Other Reasons		B6 Other Reasons		C6 Other Reasons		D6 Other Reasons	
Australian Designers (27)	1	3.7%	2	7.4%	0	0%	0	0%
International Designers (65)	14	21.5%	7	10.8%	10	15.4%	8	12.3%

Local River											
Australian Designers				International Designers							
1		63.00%	13		14.80%	1		53.80%	13		24.60%
2		44.40%	14		14.80%	2		43.10%	14		21.50%
3		40.70%	15		11.10%	3		41.50%	15		18.50%
4		33.30%	16		7.40%	4		40.00%	16		15.40%
5		33.30%	17		7.40%	5		38.50%	17		15.40%
6		29.60%	18		7.40%	6		32.30%	18		13.80%
7		29.60%	19		7.40%	7		29.20%	19		13.80%
8		29.60%	20		3.70%	8		27.70%	20		12.30%
9		25.90%	21		0%	9		26.20%	21		12.30%
10		18.50%	22		0%	10		26.20%	22		12.30%
11		14.80%	23		0%	11		26.20%	23		10.80%
12		14.80%	24		0%	12		24.60%	24		7.70%

Question 10: Conceptual Model (The Cultivation Kitchen)

Conceptual Model – Subcategories								
Respondent	Function & Practicality Purpose A1 To Learn		Aesthetic & Semantic Purpose B1 Aesthetic Value/ Decoration		Experience Purpose C1 To Experience Nature		Experimental Purpose D1 Conceptual Design	
	Frequency/ Percent							
Australian Designers (27)	10	37.0%	4	14.8%	7	25.9%	11	40.7%
International Designers (65)	20	30.8%	22	33.8%	24	36.9%	22	33.8%
	A2 Farming/ Food		B2 Collection & Display		C2 Environmental Consciousness		D2 Part of a Research Project	
Australian Designers (27)	23	85.2%	8	29.6%	15	55.6%	4	14.8%
International Designers (65)	40	61.5%	17	26.2%	32	49.2%	26	40.0%
	A3 Purify Water/ Air		B3 Communication/ Conveying a Message		C3 To Heal/ Calm/ Lower Stress		D3 Exploration of New Materials	
Australian Designers (27)	9	33.3%	5	18.5%	4	14.8%	1	3.7%
International Designers (65)	20	30.8%	20	30.8%	16	24.6%	11	16.9%
	A4 Generate Energy		B4 Artistic Reasons		C4 Entertainment		D4 Exploration of New Technologies	
Australian Designers (27)	1	3.7%	2	7.4%	1	3.7%	6	22.2%
International Designers (65)	8	12.3%	11	16.9%	6	9.2%	22	33.8%
	A5 To Encourage Hobbies		B5 Contemplation		C5 To Stimulate Senses		D5 To Break the Rules/ Be Different	
Australian Designers (27)	7	25.9%	0	0%	5	18.5%	4	14.8%
International Designers (65)	17	26.2%	10	15.4%	16	24.6%	11	16.9%
	A6 Other Reasons		B6 Other Reasons		C6 Other Reasons		D6 Other Reasons	
Australian Designers (27)	1	3.7%	2	7.4%	1	3.7%	0	0%
International Designers (65)	9	13.8%	6	9.2%	4	6.2%	5	7.7%

The Cultivation Kitchen											
Australian Designers				International Designers							
1		85.20%	13		14.80%	1		61.50%	13		24.60%
2		55.60%	14		14.80%	2		49.20%	14		24.60%
3		40.70%	15		14.80%	3		40.00%	15		16.90%
4		37.00%	16		7.40%	4		36.90%	16		16.90%
5		33.30%	17		7.40%	5		33.80%	17		16.90%
6		29.60%	18		3.70%	6		33.80%	18		15.40%
7		25.90%	19		3.70%	7		33.80%	19		13.80%
8		25.90%	20		3.70%	8		30.80%	20		12.30%
9		22.20%	21		3.70%	9		30.80%	21		9.20%
10		18.50%	22		3.70%	10		30.80%	22		9.20%
11		18.50%	23		0%	11		26.20%	23		7.70%
12		14.80%	24		0%	12		26.20%	24		6.20%

Full Results for 2nd Data Set - Stratification Group (Designers, Educators and Students)

Section B: Design Preferences

Question 1: Preference (The Aqua Table)						
What is your working background?			Frequency	Percent	Valid Percent	Cumulative Percent
Art and Design/ Creative	Valid	B (without LO)	20	30.8	30.8	30.8
		A (with LO)	45	69.2	69.2	100.0
		Total	65	100.0	100.0	
Education/ Academic	Valid	B (without LO)	33	42.3	42.3	42.3
		A (with LO)	45	57.7	57.7	100.0
		Total	78	100.0	100.0	
Student	Valid	B (without LO)	21	38.9	38.9	38.9
		A (with LO)	33	61.1	61.1	100.0
		Total	54	100.0	100.0	

Question 2: Preference (The Moss Table)						
What is your working background?			Frequency	Percent	Valid Percent	Cumulative Percent
Art and Design/ Creative	Valid	A (without LO)	25	38.5	38.5	38.5
		B (with LO)	40	61.5	61.5	100.0
		Total	65	100.0	100.0	
Education/ Academic	Valid	A (without LO)	37	47.4	47.4	47.4
		B (with LO)	41	52.6	52.6	100.0
		Total	78	100.0	100.0	
Student	Valid	A (without LO)	24	44.4	44.4	44.4
		B (with LO)	30	55.6	55.6	100.0
		Total	54	100.0	100.0	

Question 3: Preference (Life within Object)						
What is your working background?			Frequency	Percent	Valid Percent	Cumulative Percent
Art and Design/ Creative	Valid	B (without LO)	41	63.1	63.1	63.1
		A (with LO)	24	36.9	36.9	100.0
		Total	65	100.0	100.0	
Education/ Academic	Valid	B (without LO)	62	79.5	79.5	79.5
		A (with LO)	16	20.5	20.5	100.0
		Total	78	100.0	100.0	
Student	Valid	B (without LO)	37	68.5	68.5	68.5
		A (with LO)	17	31.5	31.5	100.0
		Total	54	100.0	100.0	

Question 4: Preference (The Cultivation Kitchen)						
What is your working background?			Frequency	Percent	Valid Percent	Cumulative Percent
Art and Design/ Creative	Valid	B (without LO)	23	35.4	44.2	44.2
		A (with LO)	29	44.6	55.8	100.0
		Total	52	80.0	100.0	
	Missing	System	13	20.0		
Education/ Academic	Valid	B (without LO)	22	28.2	48.9	48.9
		A (with LO)	23	29.5	51.1	100.0
		Total	45	57.7	100.0	
	Missing	System	33	42.3		
Student	Valid	B (without LO)	13	24.1	37.1	37.1
		A (with LO)	22	40.7	62.9	100.0
		Total	35	64.8	100.0	
	Missing	System	19	35.2		
Total		54	100.0			

Question 5: Preference (The Threatening Cactus Chair)						
What is your working background?			Frequency	Percent	Valid Percent	Cumulative Percent
Art and Design/ Creative	Valid	B (with LO)	10	15.4	15.4	15.4
		A (without LO)	55	84.6	84.6	100.0
		Total	65	100.0	100.0	
Education/ Academic	Valid	B (with LO)	17	21.8	21.8	21.8
		A (without LO)	61	78.2	78.2	100.0
		Total	78	100.0	100.0	
Student	Valid	B (with LO)	13	24.1	24.1	24.1
		A (without LO)	41	75.9	75.9	100.0
		Total				

		Total	54	100.0	100.0	
Question 6: Preference (The Retrofitted Rococo Chair)						
What is your working background?			Frequency	Percent	Valid Percent	Cumulative Percent
Art and Design/ Creative	Valid	B (without LO)	42	64.6	64.6	64.6
		A (with LO)	23	35.4	35.4	100.0
		Total	65	100.0	100.0	
Education/ Academic	Valid	B (without LO)	50	64.1	64.1	64.1
		A (with LO)	28	35.9	35.9	100.0
		Total	78	100.0	100.0	
Student	Valid	B (without LO)	36	66.7	66.7	66.7
		A (with LO)	18	33.3	33.3	100.0
		Total	54	100.0	100.0	
Question 7: Preference (Mushrooms Ate My Furniture)						
What is your working background?			Frequency	Percent	Valid Percent	Cumulative Percent
Art and Design/ Creative	Valid	A (with LO)	17	26.2	26.2	26.2
		B (without LO)	48	73.8	73.8	100.0
		Total	65	100.0	100.0	
Education/ Academic	Valid	A (with LO)	16	20.5	20.5	20.5
		B (without LO)	62	79.5	79.5	100.0
		Total	78	100.0	100.0	
Student	Valid	A (with LO)	10	18.5	18.5	18.5
		B (without LO)	44	81.5	81.5	100.0
		Total	54	100.0	100.0	
Question 8: Preference (The Greenwall)						
What is your working background?			Frequency	Percent	Valid Percent	Cumulative Percent
Art and Design/ Creative	Valid	B (without LO)	18	27.7	27.7	27.7
		A (with LO)	47	72.3	72.3	100.0
		Total	65	100.0	100.0	
Education/ Academic	Valid	B (without LO)	23	29.5	29.5	29.5
		A (with LO)	55	70.5	70.5	100.0
		Total	78	100.0	100.0	
Student	Valid	B (without LO)	17	31.5	31.5	31.5
		A (with LO)	37	68.5	68.5	100.0
		Total	54	100.0	100.0	
Question 9: Preference (The Stitch Table)						
What is your working background?			Frequency	Percent	Valid Percent	Cumulative Percent
Art and Design/ Creative	Valid	B (with LO)	53	81.5	81.5	81.5
		A (without LO)	12	18.5	18.5	100.0
		Total	65	100.0	100.0	
Education/ Academic	Valid	B (with LO)	56	71.8	71.8	71.8
		A (without LO)	22	28.2	28.2	100.0
		Total	78	100.0	100.0	
Student	Valid	B (with LO)	45	83.3	83.3	83.3
		A (without LO)	9	16.7	16.7	100.0
		Total	54	100.0	100.0	
Question 10: Preference (Local River)						
What is your working background?			Frequency	Percent	Valid Percent	Cumulative Percent
Art and Design/ Creative	Valid	B (with LO)	35	53.8	53.8	53.8
		A (without LO)	30	46.2	46.2	100.0
		Total	65	100.0	100.0	
Education/ Academic	Valid	B (with LO)	26	33.3	33.3	33.3
		A (without LO)	52	66.7	66.7	100.0
		Total	78	100.0	100.0	
Student	Valid	B (with LO)	30	55.6	55.6	55.6
		A (without LO)	24	44.4	44.4	100.0
		Total	54	100.0	100.0	

Section C: Emotional Design

Question 1: Emotional Response (The Retrofitted Rococo Chair)						
What is your working background?			Frequency	Percent	Valid Percent	Cumulative Percent
Art and Design/ Creative	Valid	1 Disgusted	3	4.6	4.6	4.6
		2 Uneasy	14	21.5	21.5	26.2
		3 Bored	10	15.4	15.4	41.5
		4 Neutral	16	24.6	24.6	66.2
		5 Pleasantly Surprised	17	26.2	26.2	92.3
		6 Admired	1	1.5	1.5	93.8
		7 Fascinated	4	6.2	6.2	100.0
Total			65	100.0	100.0	
Education/ Academic	Valid	1 Disgusted	4	5.1	5.1	5.1
		2 Uneasy	23	29.5	29.5	34.6
		3 Bored	7	9.0	9.0	43.6
		4 Neutral	14	17.9	17.9	61.5
		5 Pleasantly Surprised	23	29.5	29.5	91.0
		6 Admired	3	3.8	3.8	94.9
		7 Fascinated	4	5.1	5.1	100.0
Total			78	100.0	100.0	
Student	Valid	1 Disgusted	3	5.6	5.6	5.6
		2 Uneasy	14	25.9	25.9	31.5
		3 Bored	2	3.7	3.7	35.2
		4 Neutral	14	25.9	25.9	61.1
		5 Pleasantly Surprised	12	22.2	22.2	83.3
		6 Admired	2	3.7	3.7	87.0
		7 Fascinated	7	13.0	13.0	100.0
Total			54	100.0	100.0	

Question 2: Emotional Response (The Threatening Cactus Chair)						
What is your working background?			Frequency	Percent	Valid Percent	Cumulative Percent
Art and Design/ Creative	Valid	1 Disgusted	1	1.5	1.5	1.5
		2 Uneasy	29	44.6	44.6	46.2
		3 Bored	13	20.0	20.0	66.2
		4 Neutral	7	10.8	10.8	76.9
		5 Pleasantly Surprised	10	15.4	15.4	92.3
		6 Admired	3	4.6	4.6	96.9
		7 Fascinated	2	3.1	3.1	100.0
Total			65	100.0	100.0	
Education/ Academic	Valid	1 Disgusted	5	6.4	6.4	6.4
		2 Uneasy	33	42.3	42.3	48.7
		3 Bored	4	5.1	5.1	53.8
		4 Neutral	17	21.8	21.8	75.6
		5 Pleasantly Surprised	10	12.8	12.8	88.5
		6 Admired	5	6.4	6.4	94.9
		7 Fascinated	4	5.1	5.1	100.0
Total			78	100.0	100.0	
Student	Valid	1 Disgusted	3	5.6	5.6	5.6
		2 Uneasy	23	42.6	42.6	48.1
		3 Bored	1	1.9	1.9	50.0
		4 Neutral	8	14.8	14.8	64.8
		5 Pleasantly Surprised	12	22.2	22.2	87.0
		6 Admired	4	7.4	7.4	94.4
		7 Fascinated	3	5.6	5.6	100.0
Total			54	100.0	100.0	

Question 3: Emotional Response (The Moss Table)						
What is your working background?			Frequency	Percent	Valid Percent	Cumulative Percent
Art and Design/ Creative	Valid	2 Uneasy	5	7.7	7.7	7.7
		3 Bored	6	9.2	9.2	16.9
		4 Neutral	14	21.5	21.5	38.5
		5 Pleasantly Surprised	16	24.6	24.6	63.1
		6 Admired	16	24.6	24.6	87.7
		7 Fascinated	8	12.3	12.3	100.0
		Total	65	100.0	100.0	
Education/ Academic	Valid	1 Disgusted	1	1.3	1.3	1.3
		2 Uneasy	8	10.3	10.3	11.5
		3 Bored	4	5.1	5.1	16.7
		4 Neutral	9	11.5	11.5	28.2
		5 Pleasantly Surprised	26	33.3	33.3	61.5
		6 Admired	20	25.6	25.6	87.2
		7 Fascinated	10	12.8	12.8	100.0
		Total	78	100.0	100.0	
Student	Valid	1 Disgusted	1	1.9	1.9	1.9
		2 Uneasy	4	7.4	7.4	9.3
		3 Bored	4	7.4	7.4	16.7
		4 Neutral	11	20.4	20.4	37.0
		5 Pleasantly Surprised	16	29.6	29.6	66.7
		6 Admired	12	22.2	22.2	88.9
		7 Fascinated	6	11.1	11.1	100.0
		Total	54	100.0	100.0	

Question 4: Emotional Response (Life within Object)						
What is your working background?			Frequency	Percent	Valid Percent	Cumulative Percent
Art and Design/ Creative	Valid	1 Disgusted	1	1.5	1.5	1.5
		2 Uneasy	12	18.5	18.5	20.0
		3 Bored	5	7.7	7.7	27.7
		4 Neutral	16	24.6	24.6	52.3
		5 Pleasantly Surprised	18	27.7	27.7	80.0
		6 Admired	9	13.8	13.8	93.8
		7 Fascinated	4	6.2	6.2	100.0
		Total	65	100.0	100.0	
Education/ Academic	Valid	1 Disgusted	5	6.4	6.4	6.4
		2 Uneasy	19	24.4	24.4	30.8
		3 Bored	3	3.8	3.8	34.6
		4 Neutral	15	19.2	19.2	53.8
		5 Pleasantly Surprised	18	23.1	23.1	76.9
		6 Admired	10	12.8	12.8	89.7
		7 Fascinated	8	10.3	10.3	100.0
		Total	78	100.0	100.0	
Student	Valid	1 Disgusted	2	3.7	3.7	3.7
		2 Uneasy	16	29.6	29.6	33.3
		3 Bored	3	5.6	5.6	38.9
		4 Neutral	12	22.2	22.2	61.1
		5 Pleasantly Surprised	8	14.8	14.8	75.9
		6 Admired	5	9.3	9.3	85.2
		7 Fascinated	8	14.8	14.8	100.0
		Total	54	100.0	100.0	

Question 5: Emotional Response (The Aqua Table)						
What is your working background?			Frequency	Percent	Valid Percent	Cumulative Percent
Art and Design/ Creative	Valid	1 Disgusted	2	3.1	3.1	3.1
		2 Uneasy	5	7.7	7.7	10.8
		3 Bored	5	7.7	7.7	18.5
		4 Neutral	10	15.4	15.4	33.8
		5 Pleasantly Surprised	12	18.5	18.5	52.3
		6 Admired	22	33.8	33.8	86.2
		7 Fascinated	9	13.8	13.8	100.0
		Total	65	100.0	100.0	
Education/ Academic	Valid	2 Uneasy	7	9.0	9.0	9.0
		3 Bored	7	9.0	9.0	17.9
		4 Neutral	11	14.1	14.1	32.1
		5 Pleasantly Surprised	12	15.4	15.4	47.4
		6 Admired	22	28.2	28.2	75.6
		7 Fascinated	19	24.4	24.4	100.0
		Total	78	100.0	100.0	
Student	Valid	2 Uneasy	2	3.7	3.7	3.7
		3 Bored	3	5.6	5.6	9.3
		4 Neutral	12	22.2	22.2	31.5
		5 Pleasantly Surprised	13	24.1	24.1	55.6
		6 Admired	12	22.2	22.2	77.8
		7 Fascinated	12	22.2	22.2	100.0
		Total	54	100.0	100.0	

Question 6: Emotional Response (Mushrooms Ate My Furniture)						
What is your working background?			Frequency	Percent	Valid Percent	Cumulative Percent
Art and Design/ Creative	Valid	1 Disgusted	11	16.9	16.9	16.9
		2 Uneasy	14	21.5	21.5	38.5
		3 Bored	3	4.6	4.6	43.1
		4 Neutral	17	26.2	26.2	69.2
		5 Pleasantly Surprised	10	15.4	15.4	84.6
		6 Admired	7	10.8	10.8	95.4
		7 Fascinated	3	4.6	4.6	100.0
		Total	65	100.0	100.0	
Education/ Academic	Valid	1 Disgusted	19	24.4	24.4	24.4
		2 Uneasy	14	17.9	17.9	42.3
		3 Bored	2	2.6	2.6	44.9
		4 Neutral	8	10.3	10.3	55.1
		5 Pleasantly Surprised	20	25.6	25.6	80.8
		6 Admired	12	15.4	15.4	96.2
		7 Fascinated	3	3.8	3.8	100.0
Total	78	100.0	100.0			
Student	Valid	1 Disgusted	10	18.5	18.5	18.5
		2 Uneasy	15	27.8	27.8	46.3
		3 Bored	3	5.6	5.6	51.9
		4 Neutral	12	22.2	22.2	74.1
		5 Pleasantly Surprised	9	16.7	16.7	90.7
		6 Admired	4	7.4	7.4	98.1
		7 Fascinated	1	1.9	1.9	100.0
Total	54	100.0	100.0			

Question 7: Emotional Response (The Stitch Table)						
What is your working background?			Frequency	Percent	Valid Percent	Cumulative Percent
Art and Design/ Creative	Valid	2 Uneasy	1	1.5	1.5	1.5
		3 Bored	4	6.2	6.2	7.7
		4 Neutral	7	10.8	10.8	18.5
		5 Pleasantly Surprised	21	32.3	32.3	50.8
		6 Admired	22	33.8	33.8	84.6
		7 Fascinated	10	15.4	15.4	100.0
		Total	65	100.0	100.0	
Education/ Academic	Valid	2 Uneasy	4	5.1	5.1	5.1
		3 Bored	2	2.6	2.6	7.7
		4 Neutral	16	20.5	20.5	28.2
		5 Pleasantly Surprised	14	17.9	17.9	46.2
		6 Admired	29	37.2	37.2	83.3
		7 Fascinated	13	16.7	16.7	100.0
		Total	78	100.0	100.0	
Student	Valid	3 Bored	1	1.9	1.9	1.9
		4 Neutral	10	18.5	18.5	20.4
		5 Pleasantly Surprised	18	33.3	33.3	53.7
		6 Admired	14	25.9	25.9	79.6
		7 Fascinated	11	20.4	20.4	100.0
		Total	54	100.0	100.0	

Question 8: Emotional Response (The Greenwall)						
What is your working background?			Frequency	Percent	Valid Percent	Cumulative Percent
Art and Design/ Creative	Valid	2 Uneasy	2	3.1	3.1	3.1
		3 Bored	5	7.7	7.7	10.8
		4 Neutral	14	21.5	21.5	32.3
		5 Pleasantly Surprised	10	15.4	15.4	47.7
		6 Admired	24	36.9	36.9	84.6
		7 Fascinated	10	15.4	15.4	100.0
		Total	65	100.0	100.0	
Education/ Academic	Valid	2 Uneasy	3	3.8	3.8	3.8
		3 Bored	2	2.6	2.6	6.4
		4 Neutral	19	24.4	24.4	30.8
		5 Pleasantly Surprised	13	16.7	16.7	47.4
		6 Admired	27	34.6	34.6	82.1
		7 Fascinated	14	17.9	17.9	100.0
		Total	78	100.0	100.0	
Student	Valid	2 Uneasy	1	1.9	1.9	1.9
		3 Bored	2	3.7	3.7	5.6
		4 Neutral	9	16.7	16.7	22.2
		5 Pleasantly Surprised	10	18.5	18.5	40.7
		6 Admired	17	31.5	31.5	72.2
		7 Fascinated	15	27.8	27.8	100.0
		Total	54	100.0	100.0	

Question 9: Emotional Response (The Cultivation Kitchen)						
What is your working background?			Frequency	Percent	Valid Percent	Cumulative Percent
Art and Design/ Creative	Valid	2 Uneasy	2	3.1	3.1	3.1
		4 Neutral	19	29.2	29.2	32.3
		5 Pleasantly Surprised	17	26.2	26.2	58.5
		6 Admired	15	23.1	23.1	81.5
		7 Fascinated	12	18.5	18.5	100.0
		Total	65	100.0	100.0	
		Education/ Academic	Valid	1 Disgusted	1	1.3
2 Uneasy	4			5.1	5.1	6.4
3 Bored	3			3.8	3.8	10.3
4 Neutral	16			20.5	20.5	30.8
5 Pleasantly Surprised	15			19.2	19.2	50.0
6 Admired	17			21.8	21.8	71.8
7 Fascinated	22			28.2	28.2	100.0
Student	Valid	Total	78	100.0	100.0	
		2 Uneasy	4	7.4	7.4	7.4
		3 Bored	2	3.7	3.7	11.1
		4 Neutral	11	20.4	20.4	31.5
		5 Pleasantly Surprised	11	20.4	20.4	51.9
		6 Admired	13	24.1	24.1	75.9
		7 Fascinated	13	24.1	24.1	100.0
Total	54	100.0	100.0			

		Question 10: Emotional Response (Local River)				
What is your working background?		Frequency	Percent	Valid Percent	Cumulative Percent	
Art and Design/ Creative	Valid	1 Disgusted	3	4.6	4.6	4.6
		2 Uneasy	14	21.5	21.5	26.2
		3 Bored	3	4.6	4.6	30.8
		4 Neutral	5	7.7	7.7	38.5
		5 Pleasantly Surprised	19	29.2	29.2	67.7
		6 Admired	14	21.5	21.5	89.2
		7 Fascinated	7	10.8	10.8	100.0
		Total	65	100.0	100.0	
Education/ Academic	Valid	1 Disgusted	13	16.7	16.7	16.7
		2 Uneasy	20	25.6	25.6	42.3
		3 Bored	1	1.3	1.3	43.6
		4 Neutral	11	14.1	14.1	57.7
		5 Pleasantly Surprised	11	14.1	14.1	71.8
		6 Admired	12	15.4	15.4	87.2
		7 Fascinated	10	12.8	12.8	100.0
		Total	78	100.0	100.0	
Student	Valid	1 Disgusted	5	9.3	9.3	9.3
		2 Uneasy	10	18.5	18.5	27.8
		4 Neutral	8	14.8	14.8	42.6
		5 Pleasantly Surprised	14	25.9	25.9	68.5
		6 Admired	10	18.5	18.5	87.0
		7 Fascinated	7	13.0	13.0	100.0
		Total	54	100.0	100.0	

Section D: Conceptual Design

Question 1: Conceptual Model (The Retrofitted Rococo Chair)

The Retrofitted Rococo Chair Respondent	Conceptual Model – Subcategories							
	Function & Practicality Purpose A1 To Learn		Aesthetic & Semantic Purpose B1 Aesthetic Value/ Decoration		Experience Purpose C1 To Experience Nature		Experimental Purpose D1 Conceptual Design	
	Frequency/ Percent							
Art and Design/ Creative (65)	11	16.9%	22	33.8%	20	30.8%	27	41.5%
Education/ Academic (78)	13	16.7%	25	32.1%	35	44.9%	25	32.1%
Student (54)	4	7.4%	25	46.3%	24	44.4%	14	25.9%
	A2 Farming/ Food		B2 Collection & Display		C2 Environmental Consciousness		D2 Part of a Research Project	
Art and Design/ Creative (65)	3	4.6%	23	35.4%	11	16.9%	15	23.1%
Education/ Academic (78)	4	5.1%	25	32.1%	22	28.2%	15	19.2%
Student (54)	4	7.4%	15	27.8%	18	33.3%	4	7.4%
	A3 Purify Water/ Air		B3 Communication/ Conveying a Message		C3 To Heal/ Calm/ Lower Stress		D3 Exploration of New Materials	
Art and Design/ Creative (65)	7	10.8%	12	18.5%	7	10.8%	11	16.9%
Education/ Academic (78)	10	12.8%	18	23.1%	16	20.5%	19	24.4%
Student (54)	11	20.4%	9	16.7%	13	24.1%	8	14.8%
	A4 Generate Energy		B4 Artistic Reasons		C4 Entertainment		D4 Exploration of New Technologies	
Art and Design/ Creative (65)	4	6.2%	29	44.6%	18	27.7%	5	7.7%
Education/ Academic (78)	6	7.7%	35	44.9%	10	12.8%	16	20.5%
Student (54)	6	11.1%	22	40.7%	8	14.8%	8	14.8%
	A5 To Encourage Hobbies		B5 Contemplation		C5 To Stimulate Senses		D5 To Break the Rules/ Be Different	
Art and Design/ Creative (65)	7	10.8%	10	15.4%	15	23.1%	33	50.8%
Education/ Academic (78)	14	17.9%	12	15.4%	21	26.9%	28	35.9%
Student (54)	13	24.1%	3	5.6%	16	29.6%	21	38.9%
	A6 Other Reasons		B6 Other Reasons		C6 Other Reasons		D6 Other Reasons	
Art and Design/ Creative (65)	12	18.5%	8	12.3%	9	13.8%	3	4.6%
Education/ Academic (78)	10	12.8%	5	6.4%	5	6.4%	9	11.5%
Student (54)	5	9.3%	5	9.3%	5	9.3%	4	7.4%

The Retrofitted Rococo Chair						
	1 	2 	3 	4 	5 	6
	50.80%	44.60%	41.50%	35.40%	33.80%	30.80%
	7 	8 	9 	10 	11 	12
	27.70%	23.10%	23.10%	18.50%	18.50%	16.90%
Art & Design	13 	14 	15 	16 	17 	18
	16.90%	16.90%	15.40%	13.80%	12.30%	10.80%
	19 	20 	21 	22 	23 	24
	10.80%	10.80%	7.70%	6.20%	4.60%	4.60%
	1 	2 	3 	4 	5 	6
	44.90%	44.90%	35.90%	32.10%	32.10%	32.10%
	7 	8 	9 	10 	11 	12
	28.20%	26.90%	24.40%	23.10%	20.50%	20.50%
Education	13 	14 	15 	16 	17 	18
	19.20%	17.90%	16.70%	15.40%	12.80%	12.80%
	19 	20 	21 	22 	23 	24
	12.80%	11.50%	7.70%	6.40%	6.40%	5.10%
	1 	2 	3 	4 	5 	6
	46.30%	44.40%	40.70%	38.90%	33.30%	29.60%
	7 	8 	9 	10 	11 	12
Student	27.80%	25.90%	24.10%	24.10%	20.40%	16.70%
	13 	14 	15 	16 	17 	18
	14.80%	14.80%	14.80%	11.10%	9.30%	9.30%
	19 	20 	21 	22 	23 	24
	9.30%	7.40%	7.40%	7.40%	7.40%	5.60%

Question 2: Conceptual Model (Life within Object)

Life within Object	Conceptual Model – Subcategories							
	Function & Practicality Purpose		Aesthetic & Semantic Purpose		Experience Purpose		Experimental Purpose	
Respondent	A1 To Learn		B1 Aesthetic Value/ Decoration		C1 To Experience Nature		D1 Conceptual Design	
	Frequency/ Percent							
Art and Design/ Creative (65)	9	13.8%	20	30.8%	34	52.3%	24	36.9%
Education/ Academic (78)	16	20.5%	25	32.1%	39	50.0%	35	44.9%
Student (54)	8	14.8%	20	37.0%	30	55.6%	21	38.9%
	A2 Farming/ Food		B2 Collection & Display		C2 Environmental Consciousness		D2 Part of a Research Project	
Art and Design/ Creative (65)	7	10.8%	19	29.2%	21	32.3%	9	13.8%
Education/ Academic (78)	7	9.0%	12	15.4%	28	35.9%	14	17.9%
Student (54)	5	9.3%	15	27.8%	20	37.0%	8	14.8%
	A3 Purify Water/ Air		B3 Communication/ Conveying a Message		C3 To Heal/ Calm/ Lower Stress		D3 Exploration of New Materials	
Art and Design/ Creative (65)	4	6.2%	15	23.1%	22	33.8%	7	10.8%
Education/ Academic (78)	7	9.0%	23	29.5%	21	26.9%	16	20.5%
Student (54)	10	18.5%	13	24.1%	16	29.6%	4	7.4%
	A4 Generate Energy		B4 Artistic Reasons		C4 Entertainment		D4 Exploration of New Technologies	
Art and Design/ Creative (65)	1	1.5%	19	29.2%	21	32.3%	5	7.7%
Education/ Academic (78)	4	5.1%	27	34.6%	15	19.2%	9	11.5%
Student (54)	7	13.0%	21	38.9%	14	25.9%	7	13.0%
	A5 To Encourage Hobbies		B5 Contemplation		C5 To Stimulate Senses		D5 To Break the Rules/ Be Different	
Art and Design/ Creative (65)	21	32.3%	10	15.4%	21	32.3%	31	47.7%
Education/ Academic (78)	23	29.5%	6	7.7%	23	29.5%	26	33.3%
Student (54)	19	35.2%	4	7.4%	12	22.2%	19	35.2%
	A6 Other Reasons		B6 Other Reasons		C6 Other Reasons		D6 Other Reasons	
Art and Design/ Creative (65)	11	16.9%	7	10.8%	9	13.8%	2	3.1%
Education/ Academic (78)	9	11.5%	9	11.5%	6	7.7%	7	9.0%
Student (54)	4	7.4%	5	9.3%	3	5.6%	2	3.7%

Life within Object						
	1 	2 	3 	4 	5 	6
	52.30%	47.70%	36.90%	33.80%	32.30%	32.30%
	7 	8 	9 	10 	11 	12
	32.30%	32.30%	30.80%	29.20%	29.20%	23.10%
Art & Design	13 	14 	15 	16 	17 	18
	16.90%	15.40%	13.80%	13.80%	13.80%	10.80%
	19 	20 	21 	22 	23 	24
	10.80%	10.80%	7.70%	6.20%	3.10%	1.50%
	1 	2 	3 	4 	5 	6
	50.00%	44.90%	35.90%	34.60%	33.30%	32.10%
	7 	8 	9 	10 	11 	12
	29.50%	29.50%	29.50%	26.90%	20.50%	20.50%
Education	13 	14 	15 	16 	17 	18
	19.20%	17.90%	15.40%	11.50%	11.50%	11.50%
	19 	20 	21 	22 	23 	24
	9.00%	9.00%	9.00%	7.70%	7.70%	5.10%
	1 	2 	3 	4 	5 	6
	55.60%	38.90%	38.90%	37.00%	37.00%	35.20%
	7 	8 	9 	10 	11 	12
Student	35.20%	29.60%	27.80%	25.90%	24.10%	22.20%
	13 	14 	15 	16 	17 	18
	18.50%	14.80%	14.80%	13.00%	13.00%	9.30%
	19 	20 	21 	22 	23 	24
	9.30%	7.40%	7.40%	7.40%	5.60%	3.70%

Question 3: Conceptual Model (The Threatening Cactus Chair)

The Threatening Cactus Chair	Conceptual Model – Subcategories							
	Function & Practicality Purpose A1 To Learn		Aesthetic & Semantic Purpose B1 Aesthetic Value/ Decoration		Experience Purpose C1 To Experience Nature		Experimental Purpose D1 Conceptual Design	
Respondent	Frequency/ Percent							
Art and Design/ Creative (65)	8	12.3%	22	33.8%	17	26.2%	33	50.8%
Education/ Academic (78)	7	9.0%	32	41.0%	31	39.7%	27	34.6%
Student (54)	11	20.4%	24	44.4%	20	37.0%	19	35.2%
	A2 Farming/ Food		B2 Collection & Display		C2 Environmental Consciousness		D2 Part of a Research Project	
Art and Design/ Creative (65)	3	4.6%	21	32.3%	10	15.4%	12	18.5%
Education/ Academic (78)	5	6.4%	25	32.1%	23	29.5%	17	21.8%
Student (54)	8	14.8%	25	46.3%	11	20.4%	6	11.1%
	A3 Purify Water/ Air		B3 Communication/ Conveying a Message		C3 To Heal/ Calm/ Lower Stress		D3 Exploration of New Materials	
Art and Design/ Creative (65)	4	6.2%	15	23.1%	7	10.8%	14	21.5%
Education/ Academic (78)	4	5.1%	13	16.7%	12	15.4%	22	28.2%
Student (54)	6	11.1%	8	14.8%	10	18.5%	14	25.9%
	A4 Generate Energy		B4 Artistic Reasons		C4 Entertainment		D4 Exploration of New Technologies	
Art and Design/ Creative (65)	2	3.1%	31	47.7%	22	33.8%	6	9.2%
Education/ Academic (78)	4	5.1%	35	44.9%	10	12.8%	12	15.4%
Student (54)	3	5.6%	25	46.3%	10	18.5%	6	11.1%
	A5 To Encourage Hobbies		B5 Contemplation		C5 To Stimulate Senses		D5 To Break the Rules/ Be Different	
Art and Design/ Creative (65)	11	16.9%	8	12.3%	26	40.0%	33	50.8%
Education/ Academic (78)	14	17.9%	9	11.5%	23	29.5%	38	48.7%
Student (54)	14	25.9%	6	11.1%	17	31.5%	24	44.4%
	A6 Other Reasons		B6 Other Reasons		C6 Other Reasons		D6 Other Reasons	
Art and Design/ Creative (65)	11	16.9%	9	13.8%	4	6.2%	7	10.8%
Education/ Academic (78)	13	16.7%	8	10.3%	8	10.3%	9	11.5%
Student (54)	6	11.1%	5	9.3%	6	11.1%	4	7.4%

The Threatening Cactus Chair						
	1 	2 	3 	4 	5 	6
	50.80%	50.80%	47.70%	40.00%	33.80%	33.80%
	7 	8 	9 	10 	11 	12
	32.30%	26.20%	23.10%	21.50%	18.50%	16.90%
Art & Design	13 	14 	15 	16 	17 	18
	16.90%	15.40%	13.80%	12.30%	12.30%	10.80%
	19 	20 	21 	22 	23 	24
	10.80%	9.20%	6.20%	6.20%	4.60%	3.10%
	1 	2 	3 	4 	5 	6
	48.70%	44.90%	41.00%	39.70%	34.60%	32.10%
	7 	8 	9 	10 	11 	12
	29.50%	29.50%	28.20%	21.80%	17.90%	16.70%
Education	13 	14 	15 	16 	17 	18
	16.70%	15.40%	15.40%	12.80%	11.50%	11.50%
	19 	20 	21 	22 	23 	24
	10.30%	10.30%	9.00%	6.40%	5.10%	5.10%
	1 	2 	3 	4 	5 	6
	46.30%	46.30%	44.40%	44.40%	37.00%	35.20%
	7 	8 	9 	10 	11 	12
Student	31.50%	25.90%	25.90%	20.40%	20.40%	18.50%
	13 	14 	15 	16 	17 	18
	18.50%	14.80%	14.80%	11.10%	11.10%	11.10%
	19 	20 	21 	22 	23 	24
	11.10%	11.10%	11.10%	9.30%	7.40%	5.60%

Question 4: Conceptual Model (The Stitch Table)

Conceptual Model – Subcategories									
The Stitch Table Respondent	Function & Practicality Purpose A1 To Learn		Aesthetic & Semantic Purpose B1 Aesthetic Value/ Decoration		Experience Purpose C1 To Experience Nature		Experimental Purpose D1 Conceptual Design		
	Frequency	Percent	Frequency	Percent	Frequency	Percent	Frequency	Percent	
Art and Design/ Creative (65)	6	9.2%	45	69.2%	34	52.3%	25	38.5%	
Education/ Academic (78)	10	12.8%	48	61.5%	39	50.0%	29	37.2%	
Student (54)	9	16.7%	38	70.4%	26	48.1%	20	37.0%	
	A2 Farming/ Food		B2 Collection & Display		C2 Environmental Consciousness		D2 Part of a Research Project		
Art and Design/ Creative (65)	8	12.3%	23	35.4%	13	20.0%	5	7.7%	
Education/ Academic (78)	12	15.4%	26	33.3%	40	51.3%	5	6.4%	
Student (54)	8	14.8%	18	33.3%	24	44.4%	5	9.3%	
	A3 Purify Water/ Air		B3 Communication/ Conveying a Message		C3 To Heal/ Calm/ Lower Stress		D3 Exploration of New Materials		
Art and Design/ Creative (65)	8	12.3%	9	13.8%	22	33.8%	13	20.0%	
Education/ Academic (78)	16	20.5%	13	16.7%	37	47.4%	15	19.2%	
Student (54)	15	27.8%	6	11.1%	25	46.3%	8	14.8%	
	A4 Generate Energy		B4 Artistic Reasons		C4 Entertainment		D4 Exploration of New Technologies		
Art and Design/ Creative (65)	5	7.7%	18	27.7%	12	18.5%	1	1.5%	
Education/ Academic (78)	8	10.3%	35	44.9%	10	12.8%	7	9.0%	
Student (54)	4	7.4%	22	40.7%	5	9.3%	7	13.0%	
	A5 To Encourage Hobbies		B5 Contemplation		C5 To Stimulate Senses		D5 To Break the Rules/ Be Different		
Art and Design/ Creative (65)	22	33.8%	13	20.0%	25	38.5%	15	23.1%	
Education/ Academic (78)	21	26.9%	13	16.7%	20	25.6%	20	25.6%	
Student (54)	14	25.9%	2	3.7%	16	29.6%	8	14.8%	
	A6 Other Reasons		B6 Other Reasons		C6 Other Reasons		D6 Other Reasons		
Art and Design/ Creative (65)	7	10.8%	7	10.8%	5	7.7%	7	10.8%	
Education/ Academic (78)	8	10.3%	8	10.3%	6	7.7%	5	6.4%	
Student (54)	6	11.1%	5	9.3%	2	3.7%	1	1.9%	

The Stitch Table												
	1		2		3		4		5		6	
		69.20%		52.30%		38.50%		38.50%		35.40%		33.80%
	7		8		9		10		11		12	
		33.80%		27.70%		23.10%		20.00%		20.00%		20.00%
Art & Design	13		14		15		16		17		18	
		18.50%		13.80%		12.30%		12.30%		10.80%		10.80%
	19		20		21		22		23		24	
		10.80%		9.20%		7.70%		7.70%		7.70%		1.50%
	1		2		3		4		5		6	
		61.50%		51.30%		50.00%		47.40%		44.90%		37.20%
	7		8		9		10		11		12	
		33.30%		26.90%		25.60%		25.60%		20.50%		19.20%
Education	13		14		15		16		17		18	
		16.70%		16.70%		15.40%		12.80%		12.80%		10.30%
	19		20		21		22		23		24	
		10.30%		10.30%		9.00%		7.70%		6.40%		6.40%
	1		2		3		4		5		6	
		70.40%		48.10%		46.30%		44.40%		40.70%		37.00%
	7		8		9		10		11		12	
		33.30%		29.60%		27.80%		25.90%		16.70%		14.80%
Student	13		14		15		16		17		18	
		14.80%		14.80%		13.00%		11.10%		11.10%		9.30%
	19		20		21		22		23		24	
		9.30%		9.30%		7.40%		3.70%		3.70%		1.90%

Question 5: Conceptual Model (The Greenwall)

The Greenwall Respondent	Conceptual Model – Subcategories							
	Function & Practicality Purpose A1 To Learn		Aesthetic & Semantic Purpose B1 Aesthetic Value/ Decoration		Experience Purpose C1 To Experience Nature		Experimental Purpose D1 Conceptual Design	
			Frequency/ Percent					
Art and Design/ Creative (65)	10	15.4%	43	66.2%	31	47.7%	23	35.4%
Education/ Academic (78)	6	7.7%	45	57.7%	41	52.6%	27	34.6%
Student (54)	6	11.1%	34	63.0%	27	50.0%	24	44.4%
	A2 Farming/ Food		B2 Collection & Display		C2 Environmental Consciousness		D2 Part of a Research Project	
Art and Design/ Creative (65)	11	16.9%	28	43.1%	22	33.8%	4	6.2%
Education/ Academic (78)	11	14.1%	41	52.6%	33	42.3%	6	7.7%
Student (54)	13	24.1%	25	46.3%	26	48.1%	5	9.3%
	A3 Purify Water/ Air		B3 Communication/ Conveying a Message		C3 To Heal/ Calm/ Lower Stress		D3 Exploration of New Materials	
Art and Design/ Creative (65)	16	24.6%	10	15.4%	29	44.6%	9	13.8%
Education/ Academic (78)	29	37.2%	13	16.7%	34	43.6%	20	25.6%
Student (54)	16	29.6%	8	14.8%	27	50.0%	10	18.5%
	A4 Generate Energy		B4 Artistic Reasons		C4 Entertainment		D4 Exploration of New Technologies	
Art and Design/ Creative (65)	4	6.2%	19	29.2%	8	12.3%	4	6.2%
Education/ Academic (78)	11	14.1%	33	42.3%	6	7.7%	14	17.9%
Student (54)	6	11.1%	21	38.9%	8	14.8%	8	14.8%
	A5 To Encourage Hobbies		B5 Contemplation		C5 To Stimulate Senses		D5 To Break the Rules/ Be Different	
Art and Design/ Creative (65)	22	33.8%	11	16.9%	22	33.8%	12	18.5%
Education/ Academic (78)	20	25.6%	10	12.8%	23	29.5%	17	21.8%
Student (54)	18	33.3%	5	9.3%	11	20.4%	10	18.5%
	A6 Other Reasons		B6 Other Reasons		C6 Other Reasons		D6 Other Reasons	
Art and Design/ Creative (65)	9	13.8%	4	6.2%	7	10.8%	7	10.8%
Education/ Academic (78)	8	10.3%	7	9.0%	5	6.4%	6	7.7%
Student (54)	5	9.3%	4	7.4%	1	1.9%	2	3.7%

The Greenwall												
	1		2		3		4		5		6	
		66.20%		47.70%		44.60%		43.10%		35.40%		33.80%
	7		8		9		10		11		12	
		33.80%		33.80%		29.20%		24.60%		18.50%		16.90%
Art & Design	13		14		15		16		17		18	
		16.90%		15.40%		15.40%		13.80%		13.80%		12.30%
	19		20		21		22		23		24	
		10.80%		10.80%		6.20%		6.20%		6.20%		6.20%
	1		2		3		4		5		6	
		57.70%		52.60%		52.60%		43.60%		42.30%		42.30%
	7		8		9		10		11		12	
		37.20%		34.60%		29.50%		25.60%		25.60%		21.80%
Education	13		14		15		16		17		18	
		17.90%		16.70%		14.10%		14.10%		12.80%		10.30%
	19		20		21		22		23		24	
		9.00%		7.70%		7.70%		7.70%		7.70%		6.40%
	1		2		3		4		5		6	
		63.00%		50.00%		50.00%		48.10%		46.30%		44.40%
	7		8		9		10		11		12	
		38.90%		33.30%		29.60%		24.10%		20.40%		18.50%
Student	13		14		15		16		17		18	
		18.50%		14.80%		14.80%		14.80%		11.10%		11.10%
	19		20		21		22		23		24	
		9.30%		9.30%		9.30%		7.40%		3.70%		1.90%

Question 6: Conceptual Model (Mushrooms Ate My Furniture)

Respondent	Conceptual Model – Subcategories							
	Function & Practicality Purpose A1 To Learn		Aesthetic & Semantic Purpose B1 Aesthetic Value/ Decoration		Experience Purpose C1 To Experience Nature		Experimental Purpose D1 Conceptual Design	
			Frequency/ Percent					
Art and Design/ Creative (65)	16	24.6%	19	29.2%	34	52.3%	32	49.2%
Education/ Academic (78)	17	21.8%	18	23.1%	40	51.3%	20	25.6%
Student (54)	12	22.2%	12	22.2%	25	46.3%	14	25.9%
	A2 Farming/ Food		B2 Collection & Display		C2 Environmental Consciousness		D2 Part of a Research Project	
Art and Design/ Creative (65)	17	26.2%	14	21.5%	18	27.7%	19	29.2%
Education/ Academic (78)	16	20.5%	19	24.4%	30	38.5%	27	34.6%
Student (54)	15	27.8%	11	20.4%	18	33.3%	12	22.2%
	A3 Purify Water/ Air		B3 Communication/ Conveying a Message		C3 To Heal/ Calm/ Lower Stress		D3 Exploration of New Materials	
Art and Design/ Creative (65)	4	6.2%	20	30.8%	5	7.7%	23	35.4%
Education/ Academic (78)	3	3.8%	21	26.9%	9	11.5%	34	43.6%
Student (54)	3	5.6%	15	27.8%	9	16.7%	17	31.5%
	A4 Generate Energy		B4 Artistic Reasons		C4 Entertainment		D4 Exploration of New Technologies	
Art and Design/ Creative (65)	1	1.5%	21	32.3%	12	18.5%	10	15.4%
Education/ Academic (78)	6	7.7%	22	28.2%	10	12.8%	19	24.4%
Student (54)	2	3.7%	25	46.3%	12	22.2%	6	11.1%
	A5 To Encourage Hobbies		B5 Contemplation		C5 To Stimulate Senses		D5 To Break the Rules/ Be Different	
Art and Design/ Creative (65)	4	6.2%	13	20.0%	12	18.5%	22	33.8%
Education/ Academic (78)	7	9.0%	9	11.5%	12	15.4%	31	39.7%
Student (54)	8	14.8%	10	18.5%	13	24.1%	20	37.0%
	A6 Other Reasons		B6 Other Reasons		C6 Other Reasons		D6 Other Reasons	
Art and Design/ Creative (65)	11	16.9%	7	10.8%	12	18.5%	7	10.8%
Education/ Academic (78)	10	12.8%	9	11.5%	9	11.5%	8	10.3%
Student (54)	8	14.8%	5	9.3%	7	13.0%	6	11.1%

Mushrooms Ate My Furniture						
	1	2	3	4	5	6
	52.30%	49.20%	35.40%	33.80%	32.30%	30.80%
	7	8	9	10	11	12
	29.20%	29.20%	27.70%	26.20%	24.60%	21.50%
Art & Design	13	14	15	16	17	18
	20.00%	18.50%	18.50%	18.50%	16.90%	15.40%
	19	20	21	22	23	24
	10.80%	10.80%	7.70%	6.20%	6.20%	1.50%
	1	2	3	4	5	6
	51.30%	43.60%	39.70%	38.50%	34.60%	28.20%
	7	8	9	10	11	12
	26.90%	25.60%	24.40%	24.40%	23.10%	21.80%
Education	13	14	15	16	17	18
	20.50%	15.40%	12.80%	12.80%	11.50%	11.50%
	19	20	21	22	23	24
	11.50%	11.50%	10.30%	9.00%	7.70%	3.80%
	1	2	3	4	5	6
	46.30%	46.30%	37.00%	33.30%	31.50%	27.80%
	7	8	9	10	11	12
Student	27.80%	25.90%	24.10%	22.20%	22.20%	22.20%
	13	14	15	16	17	18
	22.20%	20.40%	18.50%	16.70%	14.80%	14.80%
	19	20	21	22	23	24
	13.00%	11.10%	11.10%	9.30%	5.60%	3.70%

Question 7: Conceptual Model (The Moss Table)

Respondent	Conceptual Model – Subcategories							
	Function & Practicality Purpose A1 To Learn		Aesthetic & Semantic Purpose B1 Aesthetic Value/ Decoration		Experience Purpose C1 To Experience Nature		Experimental Purpose D1 Conceptual Design	
			Frequency/ Percent					
Art and Design/ Creative (65)	13	20.0%	34	52.3%	22	33.8%	27	41.5%
Education/ Academic (78)	16	20.5%	39	50.0%	39	50.0%	28	35.9%
Student (54)	8	14.8%	27	50.0%	29	53.7%	20	37.0%
	A2 Farming/ Food		B2 Collection & Display		C2 Environmental Consciousness		D2 Part of a Research Project	
Art and Design/ Creative (65)	9	13.8%	20	30.8%	19	29.2%	19	29.2%
Education/ Academic (78)	17	21.8%	27	34.6%	39	50.0%	18	23.1%
Student (54)	13	24.1%	24	44.4%	18	33.3%	13	24.1%
	A3 Purify Water/ Air		B3 Communication/ Conveying a Message		C3 To Heal/ Calm/ Lower Stress		D3 Exploration of New Materials	
Art and Design/ Creative (65)	8	12.3%	15	23.1%	18	27.7%	21	32.3%
Education/ Academic (78)	20	25.6%	17	21.8%	24	30.8%	23	29.5%
Student (54)	9	16.7%	7	13.0%	15	27.8%	17	31.5%
	A4 Generate Energy		B4 Artistic Reasons		C4 Entertainment		D4 Exploration of New Technologies	
Art and Design/ Creative (65)	13	20.0%	19	29.2%	12	18.5%	23	35.4%
Education/ Academic (78)	10	12.8%	27	34.6%	5	6.4%	20	25.6%
Student (54)	5	9.3%	22	40.7%	5	9.3%	8	14.8%
	A5 To Encourage Hobbies		B5 Contemplation		C5 To Stimulate Senses		D5 To Break the Rules/ Be Different	
Art and Design/ Creative (65)	12	18.5%	8	12.3%	23	35.4%	18	27.7%
Education/ Academic (78)	16	20.5%	10	12.8%	20	25.6%	24	30.8%
Student (54)	8	14.8%	5	9.3%	17	31.5%	13	24.1%
	A6 Other Reasons		B6 Other Reasons		C6 Other Reasons		D6 Other Reasons	
Art and Design/ Creative (65)	13	20.0%	3	4.6%	6	9.2%	5	7.7%
Education/ Academic (78)	7	9.0%	6	7.7%	7	9.0%	9	11.5%
Student (54)	2	3.7%	6	11.1%	3	5.6%	2	3.7%

The Moss Table												
	1		2		3		4		5		6	
		52.30%	41.50%	35.40%	35.40%	33.80%	32.30%					
	7		8		9		10		11		12	
		30.80%	29.20%	29.20%	29.20%	27.70%	27.70%					
Art & Design	13		14		15		16		17		18	
		23.10%	20.00%	20.00%	20.00%	18.50%	18.50%					
	19		20		21		22		23		24	
		13.80%	12.30%	12.30%	9.20%	7.70%	4.60%					
	1		2		3		4		5		6	
		50.00%	50.00%	50.00%	35.90%	34.60%	34.60%					
	7		8		9		10		11		12	
		30.80%	30.80%	29.50%	25.60%	25.60%	25.60%					
Education	13		14		15		16		17		18	
		23.10%	21.80%	21.80%	20.50%	20.50%	12.80%					
	19		20		21		22		23		24	
		12.80%	11.50%	9.00%	9.00%	7.70%	6.40%					
	1		2		3		4		5		6	
		53.70%	50.00%	44.40%	40.70%	37.00%	33.30%					
	7		8		9		10		11		12	
Student		31.50%	31.50%	27.80%	24.10%	24.10%	24.10%					
	13		14		15		16		17		18	
		16.70%	14.80%	14.80%	14.80%	13.00%	11.10%					
	19		20		21		22		23		24	
		9.30%	9.30%	9.30%	5.60%	3.70%	3.70%					

Question 8: Conceptual Model (The Aqua Table)

Respondent	Conceptual Model – Subcategories							
	Function & Practicality Purpose A1 To Learn		Aesthetic & Semantic Purpose B1 Aesthetic Value/ Decoration		Experience Purpose C1 To Experience Nature		Experimental Purpose D1 Conceptual Design	
			Frequency/ Percent					
Art and Design/ Creative (65)	14	21.5%	45	69.2%	32	49.2%	27	41.5%
Education/ Academic (78)	13	16.7%	47	60.3%	37	47.4%	31	39.7%
Student (54)	8	14.8%	29	53.7%	30	55.6%	24	44.4%
	A2 Farming/ Food		B2 Collection & Display		C2 Environmental Consciousness		D2 Part of a Research Project	
Art and Design/ Creative (65)	4	6.2%	29	44.6%	10	15.4%	7	10.8%
Education/ Academic (78)	5	6.4%	33	42.3%	18	23.1%	8	10.3%
Student (54)	5	9.3%	24	44.4%	17	31.5%	5	9.3%
	A3 Purify Water/ Air		B3 Communication/ Conveying a Message		C3 To Heal/ Calm/ Lower Stress		D3 Exploration of New Materials	
Art and Design/ Creative (65)	5	7.7%	11	16.9%	30	46.2%	11	16.9%
Education/ Academic (78)	11	14.1%	6	7.7%	41	52.6%	17	21.8%
Student (54)	12	22.2%	5	9.3%	32	59.3%	11	20.4%
	A4 Generate Energy		B4 Artistic Reasons		C4 Entertainment		D4 Exploration of New Technologies	
Art and Design/ Creative (65)	1	1.5%	22	33.8%	30	46.2%	7	10.8%
Education/ Academic (78)	8	10.3%	29	37.2%	22	28.2%	11	14.1%
Student (54)	6	11.1%	21	38.9%	26	48.1%	5	9.3%
	A5 To Encourage Hobbies		B5 Contemplation		C5 To Stimulate Senses		D5 To Break the Rules/ Be Different	
Art and Design/ Creative (65)	25	38.5%	17	26.2%	19	29.2%	21	32.3%
Education/ Academic (78)	28	35.9%	18	23.1%	20	25.6%	25	32.1%
Student (54)	24	44.4%	5	9.3%	18	33.3%	19	35.2%
	A6 Other Reasons		B6 Other Reasons		C6 Other Reasons		D6 Other Reasons	
Art and Design/ Creative (65)	9	13.8%	3	4.6%	6	9.2%	10	15.4%
Education/ Academic (78)	8	10.3%	8	10.3%	7	9.0%	8	10.3%
Student (54)	4	7.4%	3	5.6%	2	3.7%	2	3.7%

The Aqua Table						
	1		2		3	
		69.20%		49.20%		46.20%
	4		5		6	
		46.20%		44.60%		41.50%
	7		8		9	
		38.50%		33.80%		32.30%
	10		11		12	
		29.20%		26.20%		21.50%
Art & Design	13		14		15	
		16.90%		16.90%		15.40%
	16		17		18	
		15.40%		13.80%		10.80%
	19		20		21	
		10.80%		9.20%		7.70%
	22		23		24	
		6.20%		4.60%		1.50%
	1		2		3	
		60.30%		52.60%		47.40%
	4		5		6	
		42.30%		39.70%		37.20%
	7		8		9	
		35.90%		32.10%		28.20%
	10		11		12	
		25.60%		23.10%		23.10%
Education	13		14		15	
		21.80%		16.70%		14.10%
	16		17		18	
		14.10%		10.30%		10.30%
	19		20		21	
		10.30%		10.30%		10.30%
	22		23		24	
		9.00%		7.70%		6.40%
	1		2		3	
		59.30%		55.60%		53.70%
	4		5		6	
		48.10%		44.40%		44.40%
	7		8		9	
		44.40%		38.90%		35.20%
	10		11		12	
		33.30%		31.50%		22.20%
Student	13		14		15	
		20.40%		14.80%		11.10%
	16		17		18	
		9.30%		9.30%		9.30%
	19		20		21	
		9.30%		9.30%		7.40%
	22		23		24	
		5.60%		3.70%		3.70%

Question 9: Conceptual Model (Local River)

Respondent	Conceptual Model – Subcategories							
	Function & Practicality Purpose A1 To Learn		Aesthetic & Semantic Purpose B1 Aesthetic Value/ Decoration Frequency/ Percent		Experience Purpose C1 To Experience Nature		Experimental Purpose D1 Conceptual Design	
Art and Design/ Creative (65)	16	24.6%	21	32.3%	28	43.1%	35	53.8%
Education/ Academic (78)	15	19.2%	22	28.2%	36	46.2%	23	29.5%
Student (54)	16	29.6%	30	55.6%	29	53.7%	19	35.2%
	A2 Farming/ Food		B2 Collection & Display		C2 Environmental Consciousness		D2 Part of a Research Project	
Art and Design/ Creative (65)	9	13.8%	27	41.5%	12	18.5%	17	26.2%
Education/ Academic (78)	8	10.3%	34	43.6%	19	24.4%	18	23.1%
Student (54)	10	18.5%	30	55.6%	16	29.6%	6	11.1%
	A3 Purify Water/ Air		B3 Communication/ Conveying a Message		C3 To Heal/ Calm/ Lower Stress		D3 Exploration of New Materials	
Art and Design/ Creative (65)	10	15.4%	16	24.6%	17	26.2%	8	12.3%
Education/ Academic (78)	12	15.4%	16	20.5%	21	26.9%	18	23.1%
Student (54)	12	22.2%	8	14.8%	19	35.2%	9	16.7%
	A4 Generate Energy		B4 Artistic Reasons		C4 Entertainment		D4 Exploration of New Technologies	
Art and Design/ Creative (65)	5	7.7%	25	38.5%	19	29.2%	9	13.8%
Education/ Academic (78)	9	11.5%	21	26.9%	19	24.4%	20	25.6%
Student (54)	4	7.4%	25	46.3%	19	35.2%	12	22.2%
	A5 To Encourage Hobbies		B5 Contemplation		C5 To Stimulate Senses		D5 To Break the Rules/ Be Different	
Art and Design/ Creative (65)	17	26.2%	8	12.3%	18	27.7%	26	40.0%
Education/ Academic (78)	24	30.8%	11	14.1%	20	25.6%	29	37.2%
Student (54)	21	38.9%	10	18.5%	17	31.5%	16	29.6%
	A6 Other Reasons		B6 Other Reasons		C6 Other Reasons		D6 Other Reasons	
Art and Design/ Creative (65)	14	21.5%	7	10.8%	10	15.4%	8	12.3%
Education/ Academic (78)	9	11.5%	10	12.8%	12	15.4%	13	16.7%
Student (54)	3	5.6%	4	7.4%	3	5.6%	2	3.7%

Local River	1		2		3		4		5		6	
		53.80%	43.10%	41.50%	40.00%	38.50%	32.30%					
	7		8		9		10		11		12	
	29.20%	27.70%	26.20%	26.20%	26.20%	24.60%						
Art & Design	13		14		15		16		17		18	
		24.60%	21.50%	18.50%	15.40%	15.40%	13.80%					
	19		20		21		22		23		24	
	13.80%	12.30%	12.30%	12.30%	10.80%	7.70%						
	1		2		3		4		5		6	
		46.20%	43.60%	37.20%	30.80%	29.50%	28.20%					
	7		8		9		10		11		12	
	26.90%	26.90%	25.60%	25.60%	24.40%	24.40%						
Education	13		14		15		16		17		18	
		23.10%	23.10%	20.50%	19.20%	16.70%	15.40%					
	19		20		21		22		23		24	
	15.40%	14.10%	12.80%	11.50%	11.50%	10.30%						
	1		2		3		4		5		6	
		55.60%	55.60%	53.70%	46.30%	38.90%	35.20%					
	7		8		9		10		11		12	
	35.20%	35.20%	31.50%	29.60%	29.60%	29.60%						
Student	13		14		15		16		17		18	
		22.20%	22.20%	18.50%	18.50%	16.70%	14.80%					
	19		20		21		22		23		24	
	11.10%	7.40%	7.40%	5.60%	5.60%	3.70%						

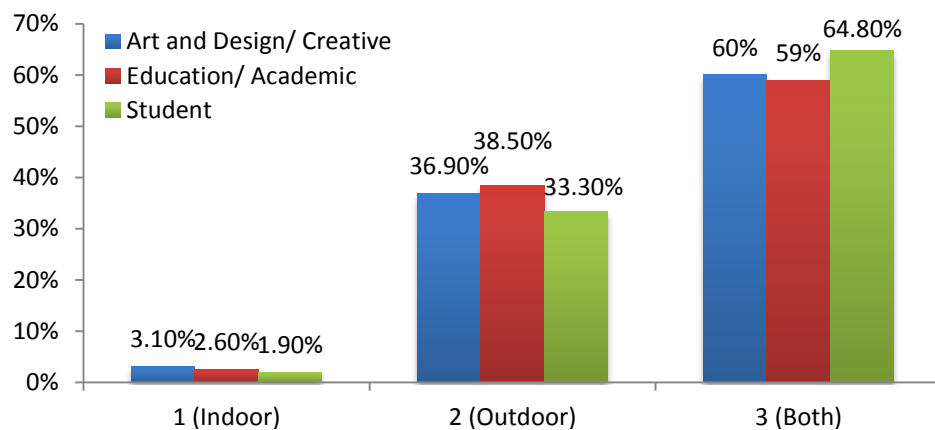
Question 10: Conceptual Model (The Cultivation Kitchen)

Respondent	Conceptual Model – Subcategories							
	Function & Practicality Purpose A1 To Learn		Aesthetic & Semantic Purpose B1 Aesthetic Value/ Decoration Frequency/ Percent		Experience Purpose C1 To Experience Nature		Experimental Purpose D1 Conceptual Design	
Art and Design/ Creative (65)	20	30.8%	22	33.8%	24	36.9%	22	33.8%
Education/ Academic (78)	20	25.6%	28	35.9%	39	50.0%	29	37.2%
Student (54)	20	37.0%	20	37.0%	28	51.9%	13	24.1%
	A2 Farming/ Food		B2 Collection & Display		C2 Environmental Consciousness		D2 Part of a Research Project	
Art and Design/ Creative (65)	40	61.5%	17	26.2%	32	49.2%	26	40.0%
Education/ Academic (78)	45	57.7%	22	28.2%	43	55.1%	20	25.6%
Student (54)	33	61.1%	20	37.0%	29	53.7%	10	18.5%
	A3 Purify Water/ Air		B3 Communication/ Conveying a Message		C3 To Heal/ Calm/ Lower Stress		D3 Exploration of New Materials	
Art and Design/ Creative (65)	20	30.8%	20	30.8%	16	24.6%	11	16.9%
Education/ Academic (78)	24	30.8%	18	23.1%	28	35.9%	20	25.6%
Student (54)	17	31.5%	11	20.4%	21	38.9%	13	24.1%
	A4 Generate Energy		B4 Artistic Reasons		C4 Entertainment		D4 Exploration of New Technologies	
Art and Design/ Creative (65)	8	12.3%	11	16.9%	6	9.2%	22	33.8%
Education/ Academic (78)	14	17.9%	10	12.8%	10	12.8%	26	33.3%
Student (54)	8	14.8%	14	25.9%	7	13.0%	13	24.1%
	A5 To Encourage Hobbies		B5 Contemplation		C5 To Stimulate Senses		D5 To Break the Rules/ Be Different	
Art and Design/ Creative (65)	17	26.2%	10	15.4%	16	24.6%	11	16.9%
Education/ Academic (78)	23	29.5%	16	20.5%	19	24.4%	20	25.6%
Student (54)	23	42.6%	4	7.4%	20	37.0%	14	25.9%
	A6 Other Reasons		B6 Other Reasons		C6 Other Reasons		D6 Other Reasons	
Art and Design/ Creative (65)	9	13.8%	6	9.2%	4	6.2%	5	7.7%
Education/ Academic (78)	5	6.4%	7	9.0%	9	11.5%	5	6.4%
Student (54)	5	9.3%	7	13.0%	4	7.4%	3	5.6%

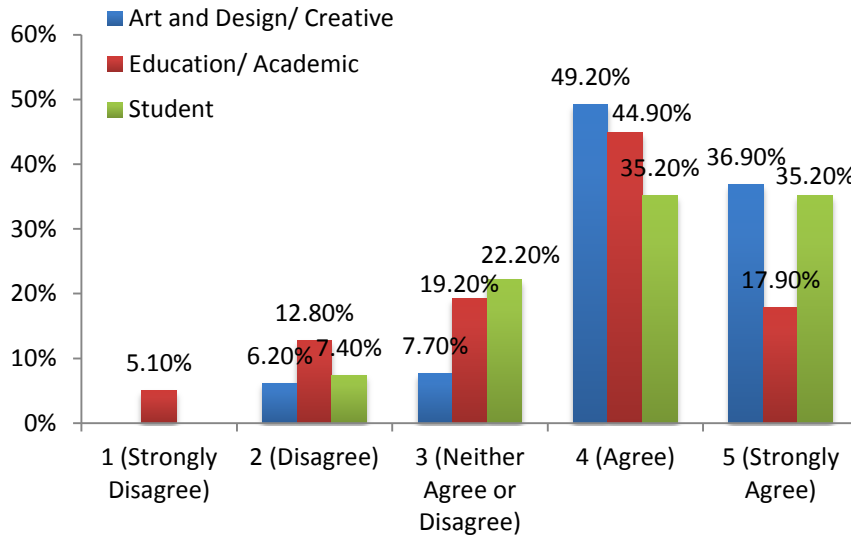
The Cultivation Kitchen						
	1	2	3	4	5	6
	61.50%	49.20%	40.00%	36.90%	33.80%	33.80%
	7	8	9	10	11	12
	33.80%	30.80%	30.80%	30.80%	26.20%	26.20%
Art & Design	13	14	15	16	17	18
	24.60%	24.60%	16.90%	16.90%	16.90%	15.40%
	19	20	21	22	23	24
	13.80%	12.30%	9.20%	9.20%	7.70%	6.20%
	1	2	3	4	5	6
	57.70%	55.10%	50.00%	37.20%	35.90%	35.90%
	7	8	9	10	11	12
	33.30%	30.80%	29.50%	28.20%	25.60%	25.60%
Education	13	14	15	16	17	18
	25.60%	25.60%	24.40%	23.10%	20.50%	17.90%
	19	20	21	22	23	24
	12.80%	12.80%	11.50%	9.00%	6.40%	6.40%
	1	2	3	4	5	6
	61.10%	53.70%	51.90%	42.60%	38.90%	37.00%
	7	8	9	10	11	12
	37.00%	37.00%	37.00%	31.50%	25.90%	25.90%
Student	13	14	15	16	17	18
	24.10%	24.10%	24.10%	20.40%	18.50%	14.80%
	19	20	21	22	23	24
	13.00%	13.00%	9.30%	7.40%	7.40%	5.60%

Section E: Biophilic Design

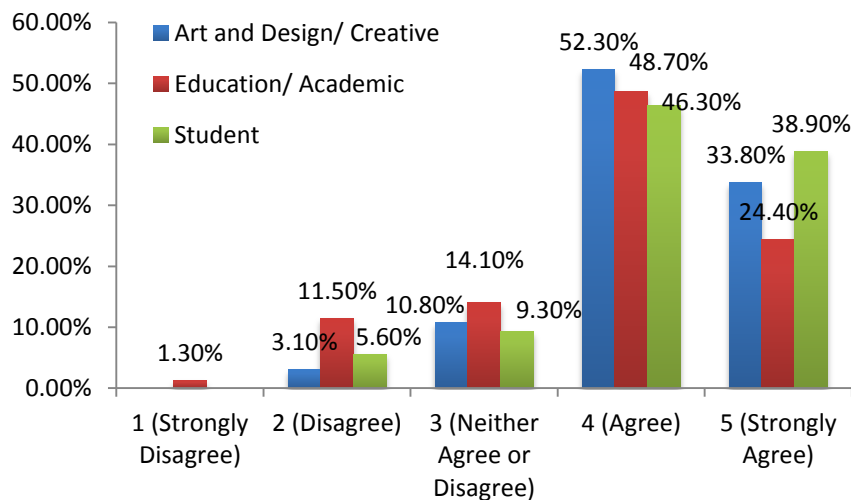
Question 1: Biophilic Design (How do you prefer to experience nature?)						
What is your working background?			Frequency	Percent	Valid Percent	Cumulative Percent
Art and Design/ Creative	Valid	1 (Indoor)	2	3.1	3.1	3.1
		2 (Outdoor)	24	36.9	36.9	40.0
		3 (Both)	39	60.0	60.0	100.0
		Total	65	100.0	100.0	
Education/ Academic	Valid	1 (Indoor)	2	2.6	2.6	2.6
		2 (Outdoor)	30	38.5	38.5	41.0
		3 (Both)	46	59.0	59.0	100.0
		Total	78	100.0	100.0	
Student	Valid	1 (Indoor)	1	1.9	1.9	1.9
		2 (Outdoor)	18	33.3	33.3	35.2
		3 (Both)	35	64.8	64.8	100.0
		Total	54	100.0	100.0	



Question 2: Biophilic Design (Do you like to have living organisms (such as plants or animals) inside your house?)						
What is your working background?			Frequency	Percent	Valid Percent	Cumulative Percent
Art and Design/ Creative	Valid	2 (Disagree)	4	6.2	6.2	6.2
		3 (Neither Agree or Disagree)	5	7.7	7.7	13.8
		4 (Agree)	32	49.2	49.2	63.1
		5 (Strongly Agree)	24	36.9	36.9	100.0
		Total	65	100.0	100.0	
Education/ Academic	Valid	1 (Strongly Disagree)	4	5.1	5.1	5.1
		2 (Disagree)	10	12.8	12.8	17.9
		3 (Neither Agree or Disagree)	15	19.2	19.2	37.2
		4 (Agree)	35	44.9	44.9	82.1
		5 (Strongly Agree)	14	17.9	17.9	100.0
Total	78	100.0	100.0			
Student	Valid	2 (Disagree)	4	7.4	7.4	7.4
		3 (Neither Agree or Disagree)	12	22.2	22.2	29.6
		4 (Agree)	19	35.2	35.2	64.8
		5 (Strongly Agree)	19	35.2	35.2	100.0
		Total	54	100.0	100.0	

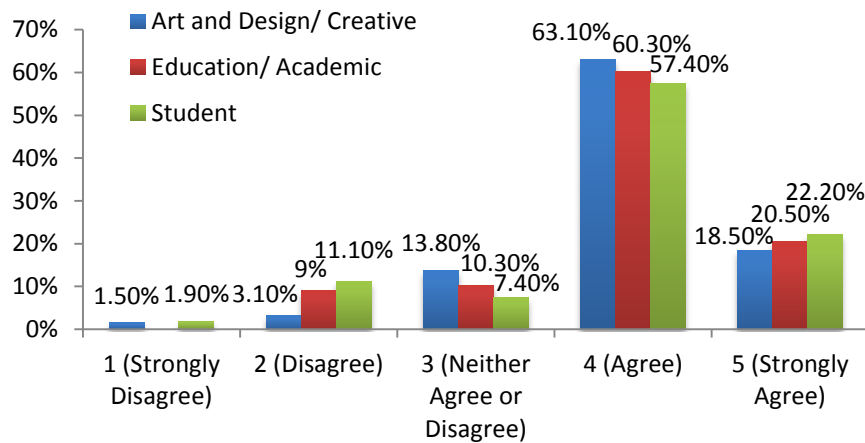


Question 3: Biophilic Design (Having natural elements and living organisms indoors can: A. Release stress/ calm you)						
What is your working background?			Frequency	Percent	Valid Percent	Cumulative Percent
Art and Design/ Creative	Valid	2 (Disagree)	2	3.1	3.1	3.1
		3 (Neither Agree or Disagree)	7	10.8	10.8	13.8
		4 (Agree)	34	52.3	52.3	66.2
		5 (Strongly Agree)	22	33.8	33.8	100.0
		Total	65	100.0	100.0	
Education/ Academic	Valid	1 (Strongly Disagree)	1	1.3	1.3	1.3
		2 (Disagree)	9	11.5	11.5	12.8
		3 (Neither Agree or Disagree)	11	14.1	14.1	26.9
		4 (Agree)	38	48.7	48.7	75.6
		5 (Strongly Agree)	19	24.4	24.4	100.0
Total	78	100.0	100.0			
Student	Valid	2 (Disagree)	3	5.6	5.6	5.6
		3 (Neither Agree or Disagree)	5	9.3	9.3	14.8
		4 (Agree)	25	46.3	46.3	61.1
		5 (Strongly Agree)	21	38.9	38.9	100.0
		Total	54	100.0	100.0	



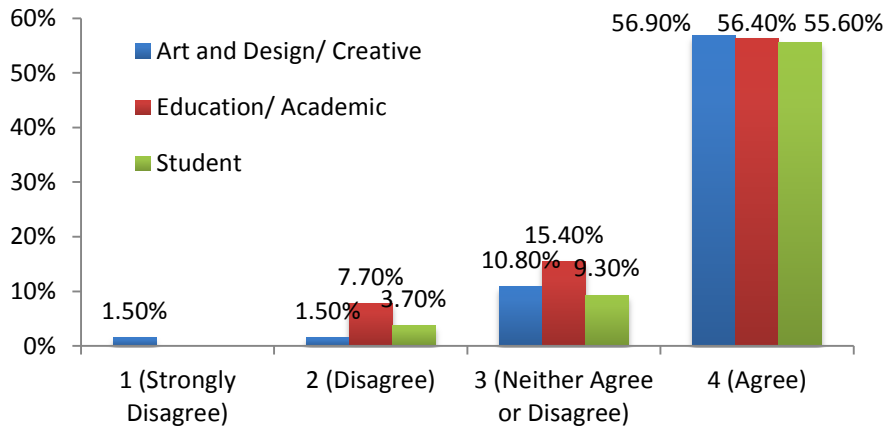
Question 4: Biophilic Design (Having natural elements and living organisms indoors can: B. Create awareness of nature and ecological impact)

What is your working background?			Frequency	Percent	Valid Percent	Cumulative Percent
Art and Design/ Creative	Valid	1 (Strongly Disagree)	1	1.5	1.5	1.5
		2 (Disagree)	2	3.1	3.1	4.6
		3 (Neither Agree or Disagree)	9	13.8	13.8	18.5
		4 (Agree)	41	63.1	63.1	81.5
		5 (Strongly Agree)	12	18.5	18.5	100.0
		Total	65	100.0	100.0	
Education/ Academic	Valid	2 (Disagree)	7	9.0	9.0	9.0
		3 (Neither Agree or Disagree)	8	10.3	10.3	19.2
		4 (Agree)	47	60.3	60.3	79.5
		5 (Strongly Agree)	16	20.5	20.5	100.0
		Total	78	100.0	100.0	
Student	Valid	1 (Strongly Disagree)	1	1.9	1.9	1.9
		2 (Disagree)	6	11.1	11.1	13.0
		3 (Neither Agree or Disagree)	4	7.4	7.4	20.4
		4 (Agree)	31	57.4	57.4	77.8
		5 (Strongly Agree)	12	22.2	22.2	100.0
		Total	54	100.0	100.0	



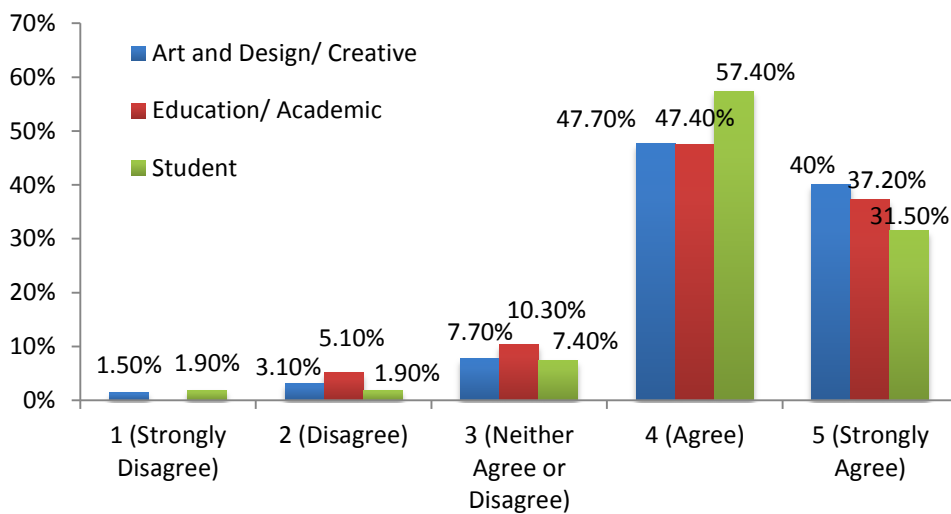
Question 5: Biophilic Design (Having natural elements and living organisms indoors can: C. Foster a sense of care (as living organisms need to be watered or fed))

What is your working background?			Frequency	Percent	Valid Percent	Cumulative Percent
Art and Design/ Creative	Valid	1 (Strongly Disagree)	1	1.5	1.5	1.5
		2 (Disagree)	1	1.5	1.5	3.1
		3 (Neither Agree or Disagree)	7	10.8	10.8	13.8
		4 (Agree)	37	56.9	56.9	70.8
		5 (Strongly Agree)	19	29.2	29.2	100.0
		Total	65	100.0	100.0	
Education/ Academic	Valid	2 (Disagree)	6	7.7	7.7	7.7
		3 (Neither Agree or Disagree)	12	15.4	15.4	23.1
		4 (Agree)	44	56.4	56.4	79.5
		5 (Strongly Agree)	16	20.5	20.5	100.0
		Total	78	100.0	100.0	
Student	Valid	2 (Disagree)	2	3.7	3.7	3.7
		3 (Neither Agree or Disagree)	5	9.3	9.3	13.0
		4 (Agree)	30	55.6	55.6	68.5
		5 (Strongly Agree)	17	31.5	31.5	100.0
		Total	54	100.0	100.0	



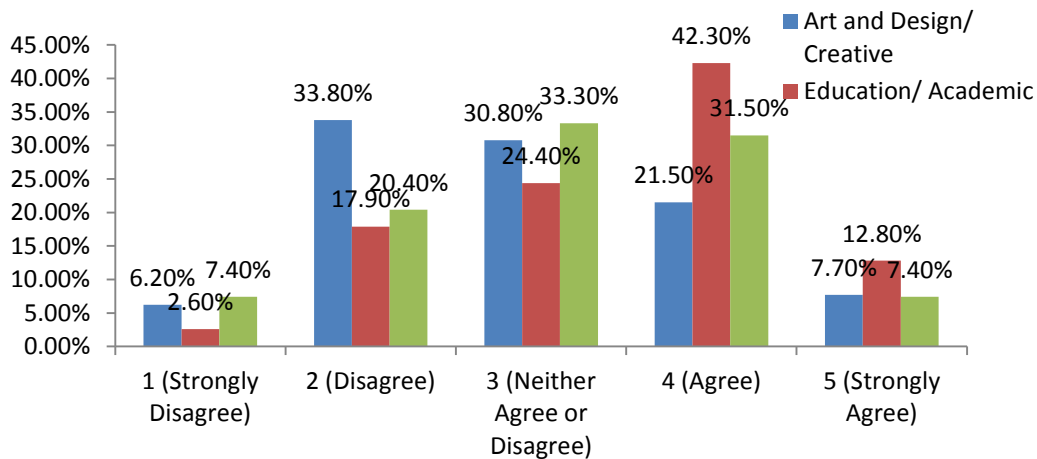
Question 6: Biophilic Design (Having natural elements and living organisms indoors can: D. Be educational (especially for children))

What is your working background?			Frequency	Percent	Valid Percent	Cumulative Percent
Art and Design/ Creative	Valid	1 (Strongly Disagree)	1	1.5	1.5	1.5
		2 (Disagree)	2	3.1	3.1	4.6
		3 (Neither Agree or Disagree)	5	7.7	7.7	12.3
		4 (Agree)	31	47.7	47.7	60.0
		5 (Strongly Agree)	26	40.0	40.0	100.0
		Total	65	100.0	100.0	
Education/ Academic	Valid	2 (Disagree)	4	5.1	5.1	5.1
		3 (Neither Agree or Disagree)	8	10.3	10.3	15.4
		4 (Agree)	37	47.4	47.4	62.8
		5 (Strongly Agree)	29	37.2	37.2	100.0
		Total	78	100.0	100.0	
Student	Valid	1 (Strongly Disagree)	1	1.9	1.9	1.9
		2 (Disagree)	1	1.9	1.9	3.7
		3 (Neither Agree or Disagree)	4	7.4	7.4	11.1
		4 (Agree)	31	57.4	57.4	68.5
		5 (Strongly Agree)	17	31.5	31.5	100.0
		Total	54	100.0	100.0	



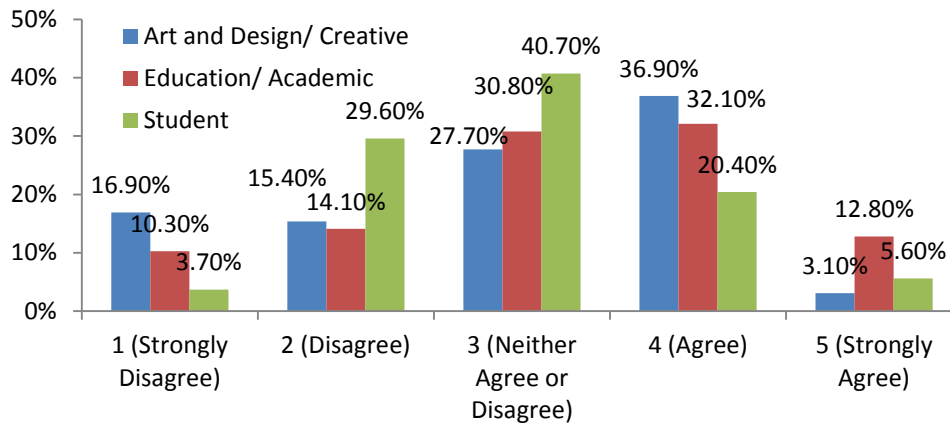
Question 7: Biophilic Design (Having natural elements and living organisms indoors can: E. Be dangerous and inconvenient, as in case of allergies)

What is your working background?			Frequency	Percent	Valid Percent	Cumulative Percent
Art and Design/ Creative	Valid	1 (Strongly Disagree)	4	6.2	6.2	6.2
		2 (Disagree)	22	33.8	33.8	40.0
		3 (Neither Agree or Disagree)	20	30.8	30.8	70.8
		4 (Agree)	14	21.5	21.5	92.3
		5 (Strongly Agree)	5	7.7	7.7	100.0
		Total	65	100.0	100.0	
Education/ Academic	Valid	1 (Strongly Disagree)	2	2.6	2.6	2.6
		2 (Disagree)	14	17.9	17.9	20.5
		3 (Neither Agree or Disagree)	19	24.4	24.4	44.9
		4 (Agree)	33	42.3	42.3	87.2
		5 (Strongly Agree)	10	12.8	12.8	100.0
		Total	78	100.0	100.0	
Student	Valid	1 (Strongly Disagree)	4	7.4	7.4	7.4
		2 (Disagree)	11	20.4	20.4	27.8
		3 (Neither Agree or Disagree)	18	33.3	33.3	61.1
		4 (Agree)	17	31.5	31.5	92.6
		5 (Strongly Agree)	4	7.4	7.4	100.0
		Total	54	100.0	100.0	



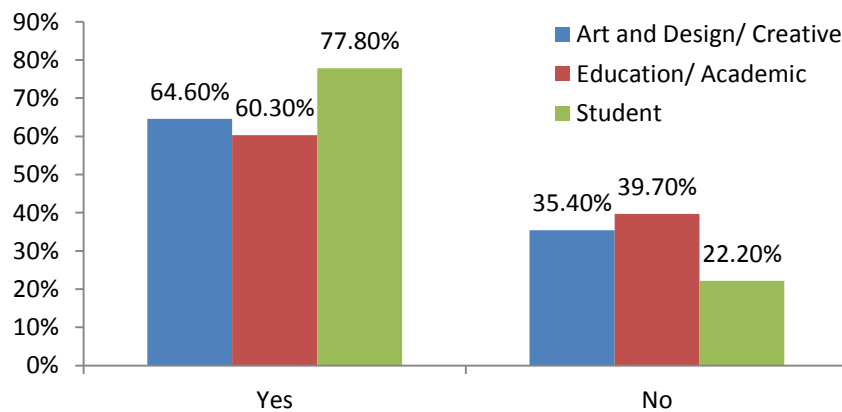
Question 8: Biophilic Design (Having natural elements and living organisms indoors can: F. Be not desirable, as they are usually messy, dirty or require much of my time)

What is your working background?			Frequency	Percent	Valid Percent	Cumulative Percent
Art and Design/ Creative	Valid	1 (Strongly Disagree)	11	16.9	16.9	16.9
		2 (Disagree)	10	15.4	15.4	32.3
		3 (Neither Agree or Disagree)	18	27.7	27.7	60.0
		4 (Agree)	24	36.9	36.9	96.9
		5 (Strongly Agree)	2	3.1	3.1	100.0
		Total	65	100.0	100.0	
Education/ Academic	Valid	1 (Strongly Disagree)	8	10.3	10.3	10.3
		2 (Disagree)	11	14.1	14.1	24.4
		3 (Neither Agree or Disagree)	24	30.8	30.8	55.1
		4 (Agree)	25	32.1	32.1	87.2
		5 (Strongly Agree)	10	12.8	12.8	100.0
		Total	78	100.0	100.0	
Student	Valid	1 (Strongly Disagree)	2	3.7	3.7	3.7
		2 (Disagree)	16	29.6	29.6	33.3
		3 (Neither Agree or Disagree)	22	40.7	40.7	74.1
		4 (Agree)	11	20.4	20.4	94.4
		5 (Strongly Agree)	3	5.6	5.6	100.0
		Total	54	100.0	100.0	



Question 9: Biophilic Design (Would you like to have a piece of furniture with living organisms inside your house?)

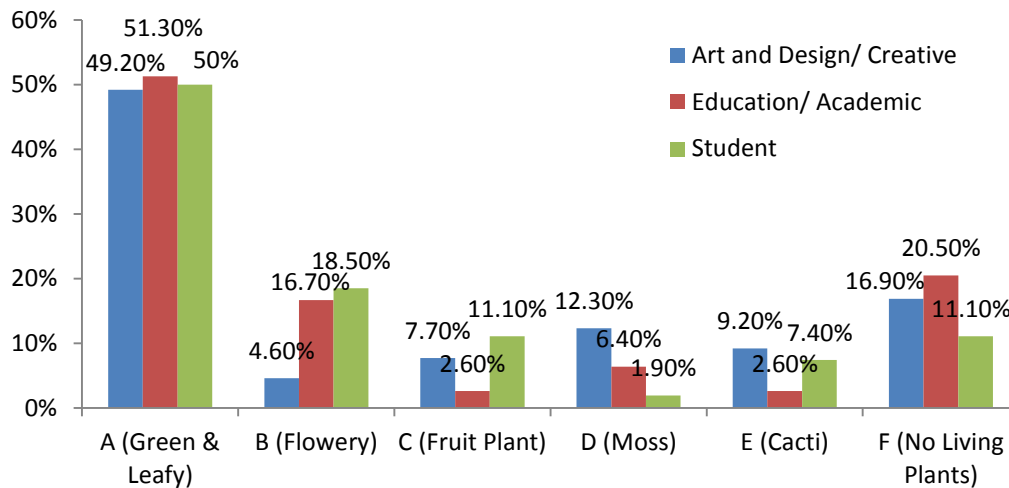
What is your working background?			Frequency	Percent	Valid Percent	Cumulative Percent
Art and Design/ Creative	Valid	Yes	42	64.6	64.6	64.6
		No	23	35.4	35.4	100.0
		Total	65	100.0	100.0	
Education/ Academic	Valid	Yes	47	60.3	60.3	60.3
		No	31	39.7	39.7	100.0
		Total	78	100.0	100.0	
Student	Valid	Yes	42	77.8	77.8	77.8
		No	12	22.2	22.2	100.0
		Total	54	100.0	100.0	



Question 10: Biophilic Design (Type of plant you prefer)

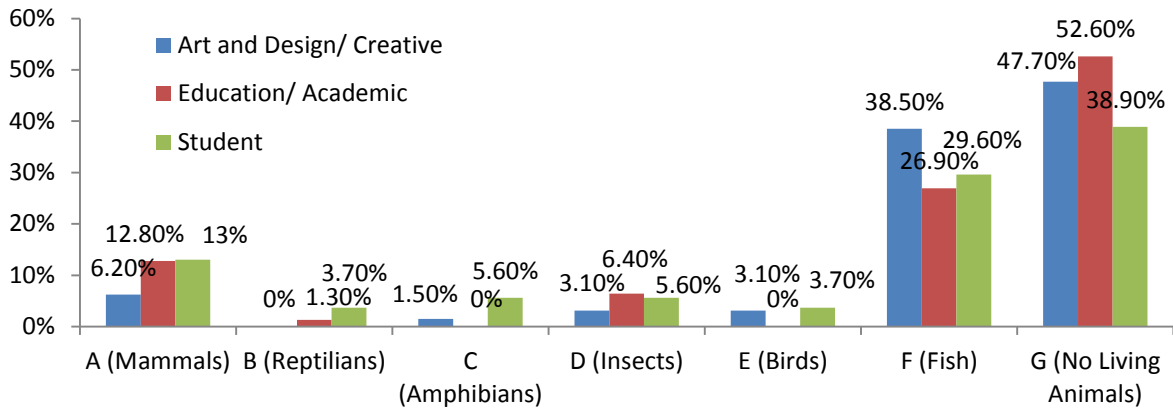
What is your working background?			Frequency	Percent	Valid Percent	Cumulative Percent
Art and Design/ Creative	Valid	A (Green & Leafy)	32	49.2	49.2	49.2
		B (Flowery)	3	4.6	4.6	53.8
		C (Fruit Plant)	5	7.7	7.7	61.5
		D (Moss)	8	12.3	12.3	73.8
		E (Cacti)	6	9.2	9.2	83.1
		F (No Living Plants)	11	16.9	16.9	100.0
		Total	65	100.0	100.0	
Education/ Academic	Valid	A (Green & Leafy)	40	51.3	51.3	51.3
		B (Flowery)	13	16.7	16.7	67.9
		C (Fruit Plant)	2	2.6	2.6	70.5
		D (Moss)	5	6.4	6.4	76.9
		E (Cacti)	2	2.6	2.6	79.5
		F (No Living Plants)	16	20.5	20.5	100.0

Student	Valid	Total	78	100.0	100.0	
		A (Green & Leafy)	27	50.0	50.0	50.0
		B (Flowery)	10	18.5	18.5	68.5
		C (Fruit Plant)	6	11.1	11.1	79.6
		D (Moss)	1	1.9	1.9	81.5
		E (Cacti)	4	7.4	7.4	88.9
		F (No Living Plants)	6	11.1	11.1	100.0
		Total	54	100.0	100.0	



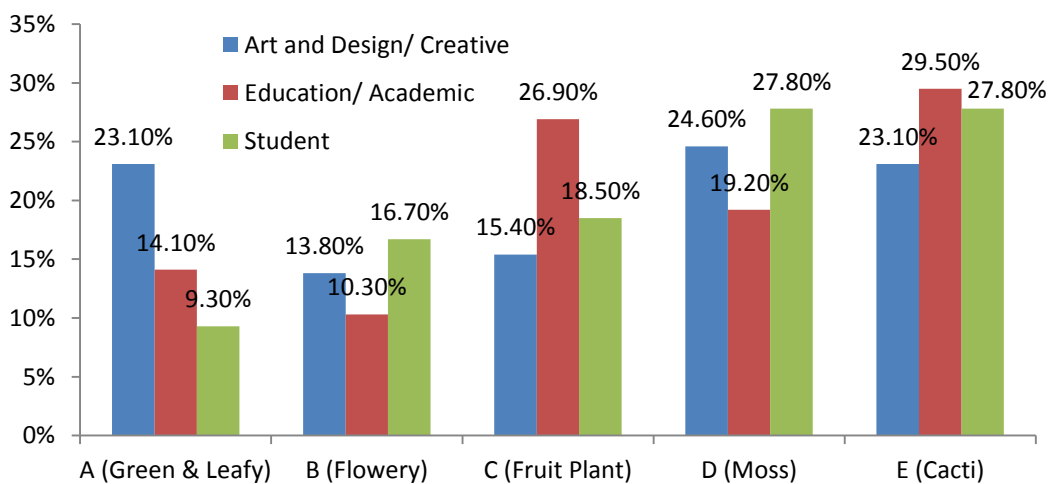
Question 11: Biophilic Design (Type of animal you prefer)

What is your working background?			Frequency	Percent	Valid Percent	Cumulative Percent
Art and Design/ Creative	Valid	A (Mammals)	4	6.2	6.2	6.2
		C (Amphibians)	1	1.5	1.5	7.7
		D (Insects)	2	3.1	3.1	10.8
		E (Birds)	2	3.1	3.1	13.8
		F (Fish)	25	38.5	38.5	52.3
		G (No Living Animals)	31	47.7	47.7	100.0
		Total	65	100.0	100.0	
Education/ Academic	Valid	A (Mammals)	10	12.8	12.8	12.8
		B (Reptilians)	1	1.3	1.3	14.1
		D (Insects)	5	6.4	6.4	20.5
		F (Fish)	21	26.9	26.9	47.4
		G (No Living Animals)	41	52.6	52.6	100.0
		Total	78	100.0	100.0	
Student	Valid	A (Mammals)	7	13.0	13.0	13.0
		B (Reptilians)	2	3.7	3.7	16.7
		C (Amphibians)	3	5.6	5.6	22.2
		D (Insects)	3	5.6	5.6	27.8
		E (Birds)	2	3.7	3.7	31.5
		F (Fish)	16	29.6	29.6	61.1
		G (No Living Animals)	21	38.9	38.9	100.0
		Total	54	100.0	100.0	



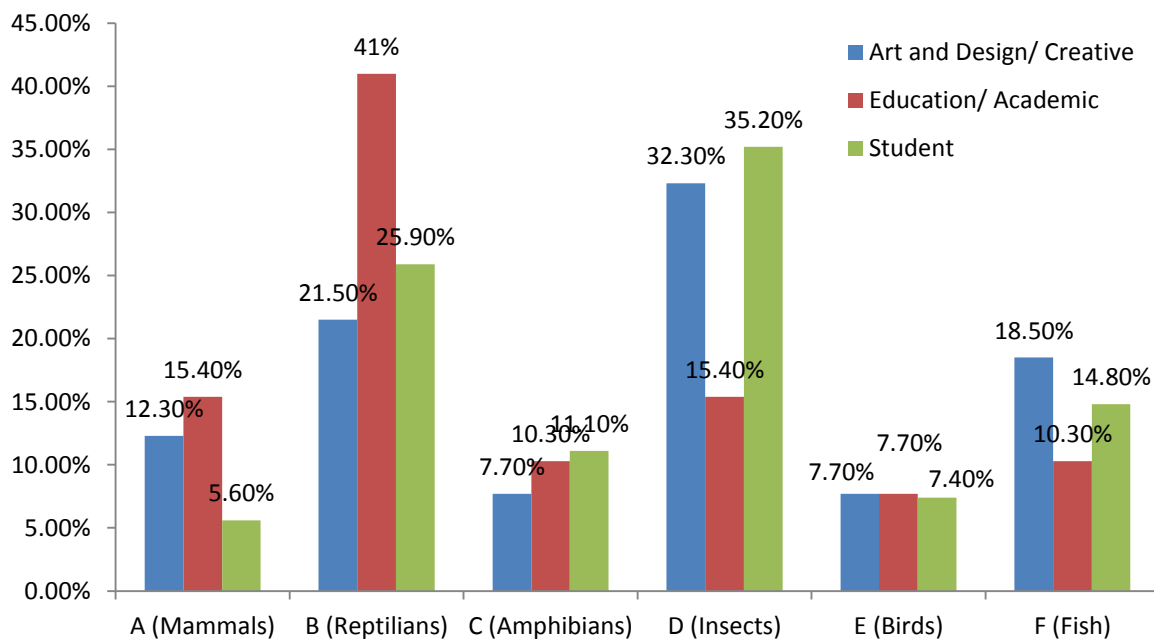
Question 12: Biophilic Design (Type of plant you least prefer)

What is your working background?			Frequency	Percent	Valid Percent	Cumulative Percent
Art and Design/ Creative	Valid	B (Flowery)	9	13.8	13.8	13.8
		A (Green & Leafy)	15	23.1	23.1	36.9
		C (Fruit Plant)	10	15.4	15.4	52.3
		D (Moss)	16	24.6	24.6	76.9
		E (Cacti)	15	23.1	23.1	100.0
		Total	65	100.0	100.0	
Education/ Academic	Valid	B (Flowery)	8	10.3	10.3	10.3
		A (Green & Leafy)	11	14.1	14.1	24.4
		C (Fruit Plant)	21	26.9	26.9	51.3
		D (Moss)	15	19.2	19.2	70.5
		E (Cacti)	23	29.5	29.5	100.0
		Total	78	100.0	100.0	
Student	Valid	B (Flowery)	9	16.7	16.7	16.7
		A (Green & Leafy)	5	9.3	9.3	25.9
		C (Fruit Plant)	10	18.5	18.5	44.4
		D (Moss)	15	27.8	27.8	72.2
		E (Cacti)	15	27.8	27.8	100.0
		Total	54	100.0	100.0	



Question 13: Biophilic Design (Type of animal you least prefer)

What is your working background?			Frequency	Percent	Valid Percent	Cumulative Percent
Art and Design/ Creative	Valid	A (Mammals)	8	12.3	12.3	12.3
		B (Reptilians)	14	21.5	21.5	33.8
		C (Amphibians)	5	7.7	7.7	41.5
		D (Insects)	21	32.3	32.3	73.8
		E (Birds)	5	7.7	7.7	81.5
		F (Fish)	12	18.5	18.5	100.0
		Total	65	100.0	100.0	
Education/ Academic	Valid	A (Mammals)	12	15.4	15.4	15.4
		B (Reptilians)	32	41.0	41.0	56.4
		C (Amphibians)	8	10.3	10.3	66.7
		D (Insects)	12	15.4	15.4	82.1
		E (Birds)	6	7.7	7.7	89.7
		F (Fish)	8	10.3	10.3	100.0
		Total	78	100.0	100.0	
Student	Valid	A (Mammals)	3	5.6	5.6	5.6
		B (Reptilians)	14	25.9	25.9	31.5
		C (Amphibians)	6	11.1	11.1	42.6
		D (Insects)	19	35.2	35.2	77.8
		E (Birds)	4	7.4	7.4	85.2
		F (Fish)	8	14.8	14.8	100.0
		Total	54	100.0	100.0	



Appendix E: Chapter 5- Qualitative Results

- Results from Chapter 5 – Highest themes
 - Theme 2: Main purpose for designing the project
 - Theme 3: Reasons for using living organisms
 - Theme 4: Inspiration of FDLOs
 - Theme 5: Responses of viewers towards FDLOs
- Full results from NVIVO – 17 interviews with FDLO designers

The full interviews transcribed for this study are not included in this Appendix because of the massive size of the files. The table in this Appendix has been simplified; it contains most of the qualitative data gathered from the interviews using the NVIVO software.

Appendix E: Chapter 5- Qualitative Results

Results from Chapter 5

Results that are shown in this Appendix are the further information for Qualitative data for Chapter 5. For the sake of brevity only the selected results are shown in this thesis.

Theme 2: Main purpose for designing the project

Child and Grandchild Nodes (Conceptual Model/ Subcategories)	Responses Count	Percentage	Designers
A: Function and Practicality	28	45.90%	
A1: To Learn	1	1.64%	TH_JAP (1)
A2: Farming or Food	7	11.48%	EW_USA, MA_CAN, PVH_NOR, TH_JAP (4)
A3: Purify water or air	2	3.28%	JL_USA, MA_CAN (2)
A4: Generate Energy	4	6.56%	CP_UK (1)
A5: To encourage hobbies	0	0	
A6: Other reasons <ul style="list-style-type: none"> – to question the decision between interior and exterior/relation between landscape and architecture/architecture as an object/encapsulating landscape – small space – multipurpose furniture design – symbiosis concept for balcony/small furnishing concept – solve seating need – to create furniture with purpose/to decompose by fungus 	14	22.95%	DLH_USA, GZ_USA, MH_GER, NF_USA, PVH_NOR, SWR_SWE (6)
B: Aesthetic and Semantic	7	11.48%	
B1: Aesthetic value or decoration	3	4.92%	JL_USA, MA_CAN (2)
B2: Collection and display	2	3.28%	DB_ICE, GZ_USA (2)
B3: Communication or convey message	2	3.28%	CP_UK (1)
B4: Artistic reasons	0	0	
B5: Contemplation	0	0	
B6: Other reasons	0	0	
C: Experience	13	21.31%	
C1: To experience nature	6	9.84%	DLH_USA, MA_CAN, NR_FRA, NU_USA, TH_JAP (5)
C2: Environmental consciousness	3	4.92%	NU_USA, SWR_SWE (2)
C3: To heal or calm or lower stress	2	3.28%	JL_USA, MA_CAN (2)
C4: Entertainment	0	0	
C5: To stimulate senses	1	1.64%	DLH_USA (1)
C6: Other reasons <ul style="list-style-type: none"> – to promote strong relationship between human and animals 	1	1.64%	KHJ_SK (1)
D: Experimental	13	21.31%	
D1: Conceptual design	0	0	
D2: Part of a research project	6	9.84%	AG_MEX, CP_UK, DLH_USA, GZ_USA, KL_GER, SWR_SWE (6)
D3: Exploration of new materials	3	4.92%	DLH_USA, KL_GER (2)
D4: Exploration of new technologies	0	0	
D5: To break the rules or be different	0	0	

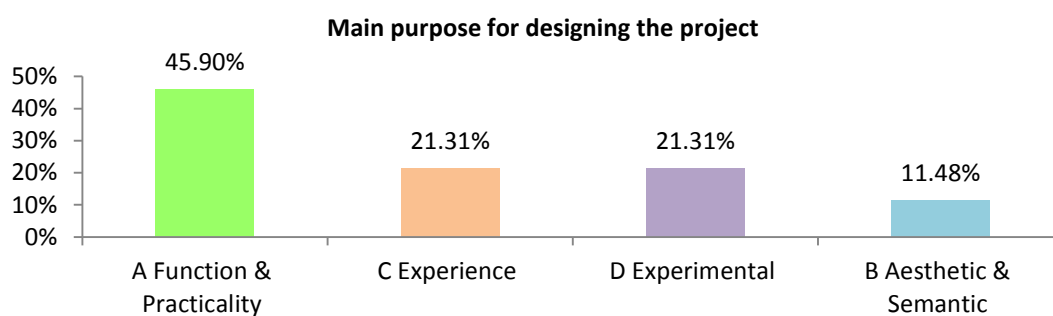
D6: Other reasons – for competition – furniture fair – society program	4	6.56%	AG_MEX, SWR_SWE, TH_JAP (3)
	61	100%	

Table 5.3: Detailed breakdown of responses count and percentage of main purpose for designing the project of from the NVIVO software

As stated in the previous theme, the *main purpose for designing the project* theme was also linked to the Conceptual Model. The highest responses count that was received from the interviews were for child nodes A: *Function and Practicality category* (28 responses). A6: Other reasons, was the highest responses count of grandchild nodes (14 counts from 6 sources) as seen in Table 5.3 above.

As illustrated in Figure 5.7 below, the highest responses were from A: Function and Practicality category (45.90%) followed by the C: Experience category and D: Experimental category equally (21.31%) and lastly is the B: Aesthetic and Semantic category (11.48%). The graph also shows the same the percentage of the Experience and Experimental categories, where 13 responses count for each category received from the sources. Even though the percentages are less than half of the A: Function and Practicality category, these categories also showed significant responses where designers equally stated their designs were intently for the user to experience nature and as a part of a research project (9.84%). These results also suggested that the designers were more focused on the functionality and practicality purposes rather than the aesthetic and semantic reasons while designing these projects.

Figure 5.7: Percentage and frequency bar chart for 4 main categories and 24 subcategories of the Conceptual Model for the main purpose of designing the project theme



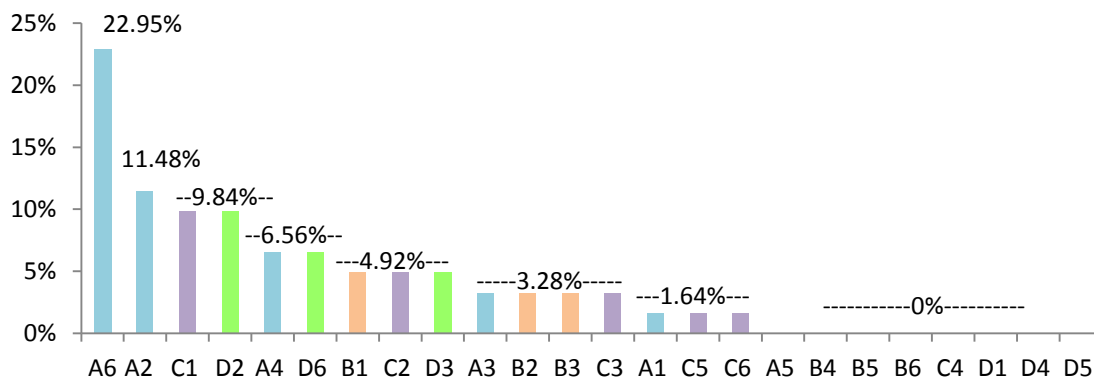


Figure 5.7 above shows that the highest responses are from A6: Other Reasons (22.95%) which is from the A: Function and Practicality category, where the interviewed designers stated their various reasons for designing the FDLOs that included:

- to question the decision between interior and exterior,
- the relation between landscape and architecture,
- architecture as an object,
- to encapsulate landscape,
- small space,
- multipurpose furniture design,
- symbiosis concept for balcony,
- to design a small furnishing concept, to solve seating need,
- to create furniture with purpose and to decompose by fungus,

In 5 of 9 answers (more than half), other reasons were related to the relationship between furniture and space (interior, architecture and landscape). This suggested that most interviewed designers were trying to design FDLOs that is multi-functioned and at the same time serves its purpose by bringing small landscape indoor.

The results were followed by A2: *Farming or food* (11.48%) that is also from the same main category. Next purposes for designing the selected FDLOs were for users or consumers C1: *to experience nature indoor* (9.84%) from the C: Experience category and as D2: *part of a research project* from the D: Experimental category. Figure 5.8 below shows the word frequency for this theme that represents the highest quoted keywords in the interviews. The largest keywords include; *interior, landscape, architecture, space, plants, grow, inside, nature* and *think*. These word frequencies validate the responses as stated above about the relationship between furniture design and space.

Table 5.4: Detailed breakdown of responses count and percentage of reasons for using living organisms from the NVIVO software

Child and Grandchild Nodes (Conceptual Model/Subcategories)	Responses Count	Percentage	Designers
A: Function and Practicality	29	43.28%	
A1: To Learn	2	2.99%	PVH_NOR (1)
A2: Farming or Food	7	10.45%	MH_GER,PVH_NOR, TH_JAP (3)
A3: Purify water or air	1	1.49%	GZ_USA (1)
A4: Generate Energy	1	1.49%	CP_UK (1)
A5: To encourage hobbies	4	5.97%	KL_GER, MH_GER, PVH_NOR (3)
A6: Other reasons <ul style="list-style-type: none"> – Practical reason – living object – sample of material similar to real grass – living organisms provide services to human – multifunction furniture design – space saving design – to design furniture with purpose – decomposing the furniture – to welcome insects rather than fighting them. 	14	20.9%	DB_ICE, DLH_USA, MA_CAN, MH_GER, NF_USA, NR_FRA, PVH_NOR, SWR_SWE (8)
B: Aesthetic and Semantic	5	7.46%	
B1: Aesthetic value or decoration	2	2.99%	MA_CAN (1)
B2: Collection and display	1	1.49%	MH_GER (1)
B3: Communication or convey message	2	2.99%	CP_UK (1)
B4: Artistic reasons	0		
B5: Contemplation	0		
B6: Other reasons	0		
C: Experience	21	31.34%	
C1: To experience nature	7	10.45%	EW_USA, GZ_USA MA_CAN, NR_FRA NU_USA (5)
C2: Environmental consciousness	5	7.46%	AG_MEX, MA_CAN PVH_NOR, SWR_SWE (4)
C3: To heal or calm or lower stress	1	1.49%	JL_USA (1)
C4: Entertainment	1	1.49%	DB_ICE (1)
C5: To stimulate senses	2	2.99%	PVH_NOR (1)
C6: Other reasons <ul style="list-style-type: none"> – growing up with plants – interest – to create an opportunity for them to embed themselves, showed they how to do that. – All then it is something to take care off – to talk about 	5	7.46%	GZ_USA, KHJ_SK, PVH_NOR (3)
D: Experimental	12	17.31%	
D1: Conceptual design	0	0	
D2: Part of a research project	4	5.97%	CP_UK, DLH_USA, KL_GER (3)
D3: Exploration of new materials	4	5.97%	DLH_USA, KL_GER (2)
D4: Exploration of new technologies	2	2.99%	CP_UK, DLH_USA (2)
D5: To break the rules or be different	1	1.49%	KL_GER (1)
D6: Other reasons	1	1.49%	KL_GER (1)
	67	100%	

The highest percentage as shown in Figure 5.9 below was A: Function and Practicality category (43.28%) followed by the C: Experience category (31.34%). These results suggested that the designers were more focused on the functionality, practicality and user experience towards the living organisms (plants or animals) rather than the experimental, aesthetic and semantic reasons when embedding the living organisms into designs.

Figure 5.9: Percentage and frequency bar chart for 4 main categories and 24 subcategories of the Conceptual Model for reasons of using living organisms theme.

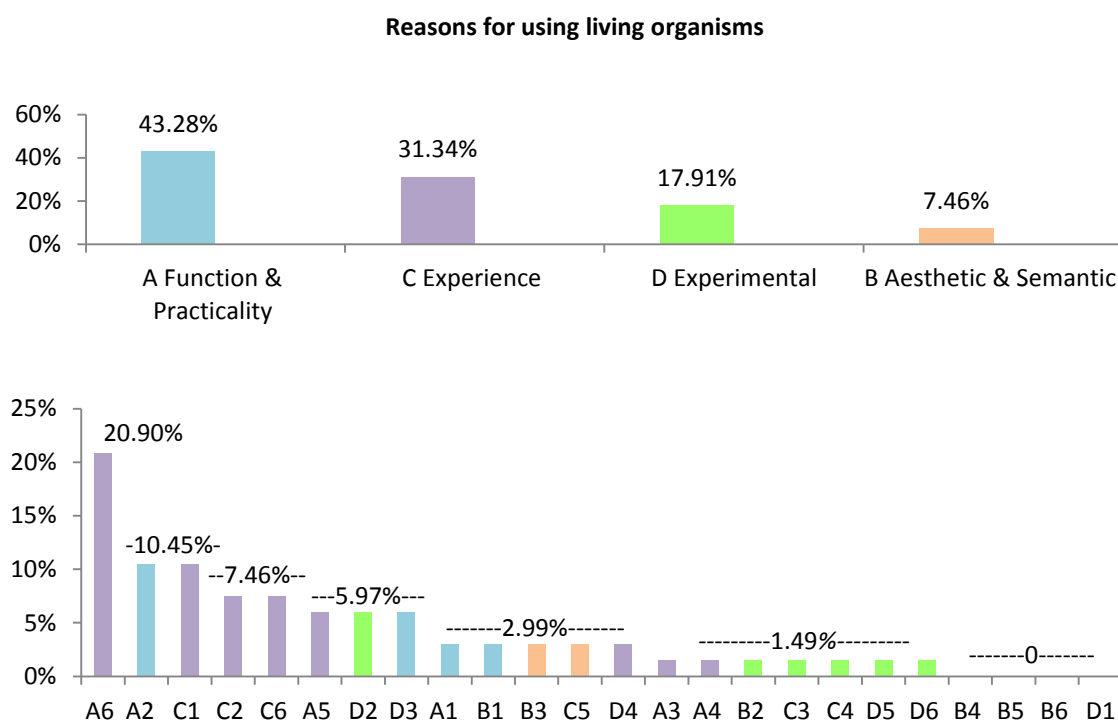


Figure 5.9 shows that the highest responses were from A6; Other Reasons (20.90%) from the A: Function and Practicality category, where the designers stated their various reasons of using living organisms including:

- for practical reasons,
- living objects,
- a sample of material similar to real grass (as stated by the designer, this material is easier to apply and use for the furniture productions, which can be used to substitute the real grass),
- living organisms provide services to human,
- multifunction furniture design,
- space saving design,
- to design furniture with purpose – decomposing the furniture,
- to welcome insects rather than fighting them.

Theme 4: Inspiration of FDLOs

All of the responses from the interviews about what inspired or influenced them to design FDLOs were categorized into 12 child nodes; 1) *Design competition or exhibition*, 2) *Books or reading materials*, 3) *Environmental issues*, 4) *Nature, plants or animals*, 5) *People and lifestyle*, 6) *Urban farming*, 7) *Multipurpose furniture*, 8) *Materials*, 9) *Organic and geometric*, 10) *Arts, drawings, architecture and designs* 11) *Designers, architects or artists*, 12) *To convey a message*. The detailed information on child nodes of the designers' inspirations for designing FDLOs with responses counts, percentage and designers (sources) involved in the interviews are shown in Table 5.5 below. As can be seen in the table, *nature, plants or animals* were the highest inspirations for the designers with 9 responses count quoted from the interviews.

Table 5.5: Detailed breakdown of responses count and percentage of inspiration of FDLOs from the NVIVO software

Child Nodes (Inspiration)	Responses Count	Percentage	Designers
Design competition or exhibition	2	6.45%	AG_MEX, SWR_SWE (2)
Books or reading materials	1	3.23%	SWR_SWE (1)
Environmental issues	1	3.23%	AG_MEX (1)
Nature, plants or animals	9	29.03%	DLH_USA, MA_CAN, MH_GER, NR_FRA, NU_USA (5)
People and lifestyle	6	19.35%	EW_USA, GZ_USA, KHJ_SK, KL_GER, PVH_NOR, TH_JAP (6)
Urban farming	2	6.45%	JL_USA, TH_JAP (2)
Multipurpose furniture	1	3.23%	EW_USA (1)
Materials	1	3.23%	NF_USA (1)
Organic and geometric	1	3.23%	JL_USA (1)
Arts, drawings, architectures and designs	3	9.68%	CP_UK, DB_ICE, PVH_NOR (3)
Designers or architects or artists	3	9.68%	GZ_USA, PVH_NOR (2)
To convey message	1	3.23%	AG_MEX (1)
	31	100%	

Figure 5.11: The Percentage and frequency bar chart for the inspirations of FDLOs theme

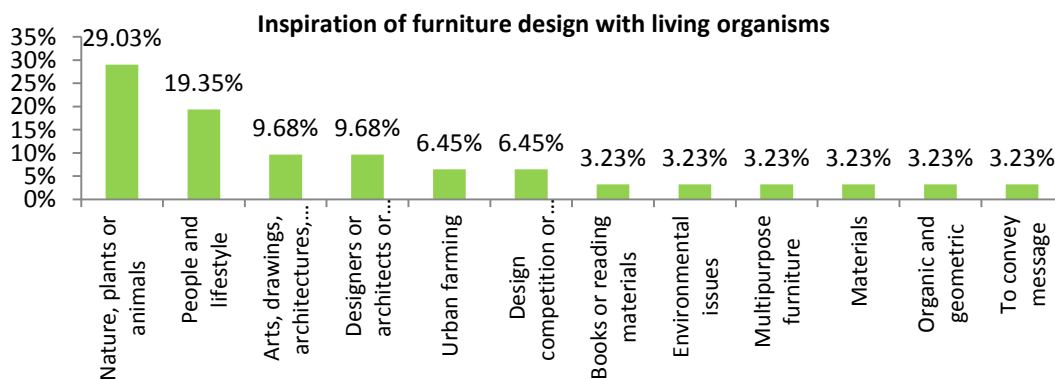
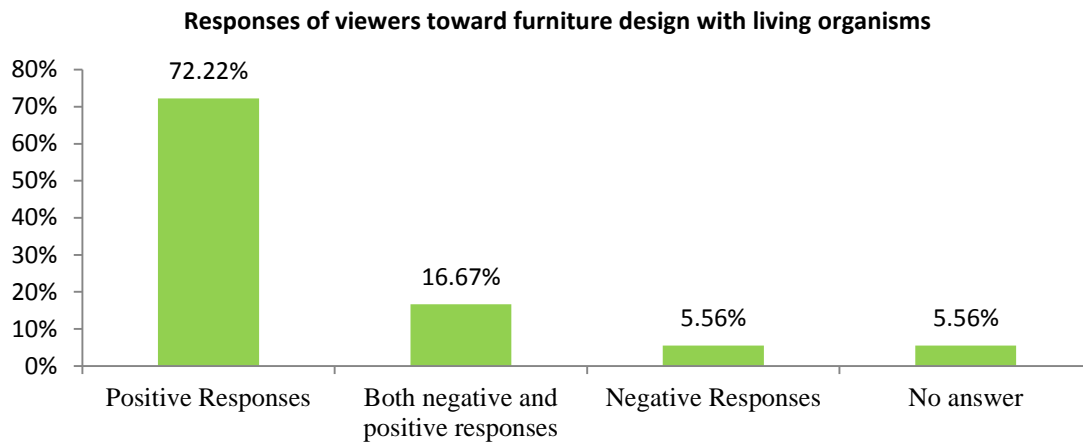


Table 5.6 above shows the detailed breakdown of responses count and percentage of responses received by designers from the viewers towards their FDLOs. Most of the FDLOs received positive responses (13 responses count) and 3 counts for both positive and negative responses. According to Figure 5.13 below, 76.5% of the designers received positive responses.

Figure 5.13: The Percentage and frequency bar chart for viewers' responses towards the FDLOs



Full Results from NVIVO – 17 interviews with FDLOs designers

Interview questions, Themes and Graphs

The full interviews transcribed for this study are not included in this Appendix because of the massive size of the file. The table has been simplified; it contains most of the qualitative data gathered from the interviews using the NVIVO software. The data has been organized according to the interview questions or themes.

Themes	Answers
Reason embedding living organisms	<p>AG, Talita Bench Exterior, Mexico <Internals\\AG-MEX> - § 1 reference coded [2.36% Coverage] Reference 1 - 2.36% Coverage</p> <ul style="list-style-type: none"> Environmental awareness was to make it with the design.
Q1: Why did you choose to embed living organisms in your design project?	<p>CP, The Moss Table, London, UK <Internals\\CP-UK> - § 1 reference coded [8.34% Coverage] Reference 1 - 8.34% Coverage</p> <ul style="list-style-type: none"> I didn't choose to have organic things on my table The scientists were developing a new technology which is called Bio photovoltaic to generate electricity from organisms are something for survival they are extracting the energy from photosynthesis processes in plants <p>DB, The Furnibloom, Iceland <Internals\\DB-ICE> - § 1 reference coded [4.33% Coverage] Reference 1 - 4.33% Coverage</p> <ul style="list-style-type: none"> For fun, and practical reasons <p>DLH, Chair 1: Rococo Chair Retrofitted, USA <Internals\\DLH-USA> - § 1 reference coded [8.44% Coverage] Reference 1 - 8.44% Coverage</p> <ul style="list-style-type: none"> The project is part of the series of project that were exploring interfaces between insects and human communities. We were really interested into domestic insects that commonly trying to invade people living spaces <p>EW, The Planter Table, USA <Internals\\EW-USA> - § 1 reference coded [5.77% Coverage] Reference 1 - 5.77% Coverage</p> <ul style="list-style-type: none"> I wanted to connect people with the natural processes of nature that somehow we have grown very distant from <p>GZ, The Stitch Table, USA <Internals\\GZ-USA> - § 1 reference coded [5.41% Coverage] Reference 1 - 5.41% Coverage</p> <ul style="list-style-type: none"> I guess because I'm growing up with plants in my house and I feel like having no plants inside your house is like missing something. Not getting enough oxygen in your space because the air gets stale without plants. I feel like living things help make you feel like it's the place you want to be in

JL, The Galapagos Coffee Table, USA <Internals\JL-USA> - § 1 reference coded [6.85% Coverage] Reference 1 - 6.85% Coverage

- Symbiotic relationship between organic matter and productivity/well being

KHJ, HappilyEver, South Korea <Internals\KHJ-SK> - § 1 reference coded [5.14% Coverage] Reference 1 - 5.14% Coverage

- I'm interested in it

KL, The Roots, Germany <Internals\KL-GER> - § 1 reference coded [14.71% Coverage] Reference 1 - 14.71% Coverage

- It's for my final year work and I'm doing deformation
- If you are looking into gardening, normally you see the deformation or if you know about a normal status quo when you see something normal and then you see something different you were always go back to the normal
- I want to create something different and deformation is something different than normal and you have to put in your mind when you see the deformation
- my idea was to grow roots directly into a direction and I place a form out of stools and table

MA, The Grass lamp, Canada <Internals\MA-CAN> - § 1 reference coded [17.94% Coverage] Reference 1 - 17.94% Coverage

- I think that the only things that really needed to bring the life into the object. The reason why because it's giving the life to the object
- makes the object liveable

MH, The BalKonzept, Germany <Internals\MH-GER> - § 1 reference coded [6.27% Coverage] Reference 1 - 6.27% Coverage

- plants are always the main thing in my pots collections
- the plants which might be helpful or necessary for small garden piece

NF, Grass Ottoman, USA <Internals\NF-USA> - § 1 reference coded [5.91% Coverage] Reference 1 - 5.91% Coverage

- We use plastic grass

NR, Co-Habitation, France <Internals\NR-FRA> - § 1 reference coded [9.09% Coverage] Reference 1 - 9.09% Coverage

- I tried to find some synergy between nature, plants and bird and other things which can give people a service

NU, Desert Eco Chair, USA <Internals\NU-USA> - § 1 reference coded [10.98% Coverage] Reference 1 - 10.98% Coverage

- It's part of that desert eco-system
- to certain the desert is probably the last place anybody would like to sit

PVH, The Spire, Norway <Internals\PVH-NOR> - § 1 reference coded [8.65% Coverage] Reference 1 - 8.65% Coverage

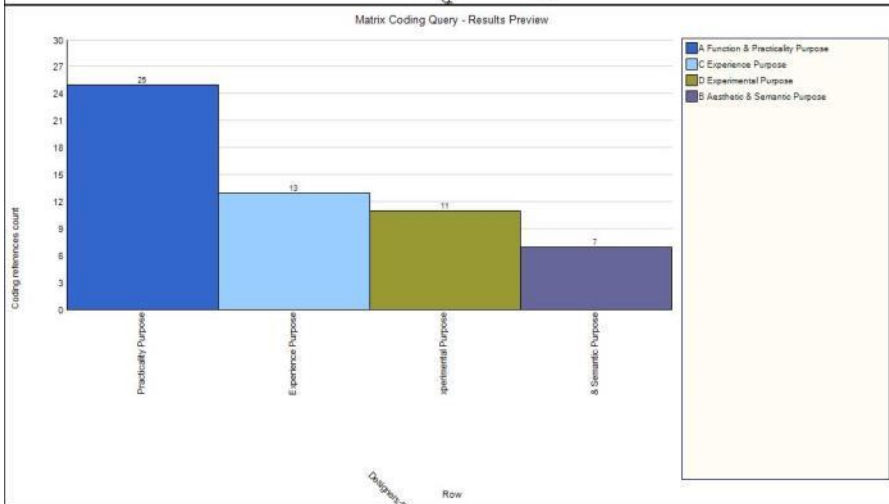
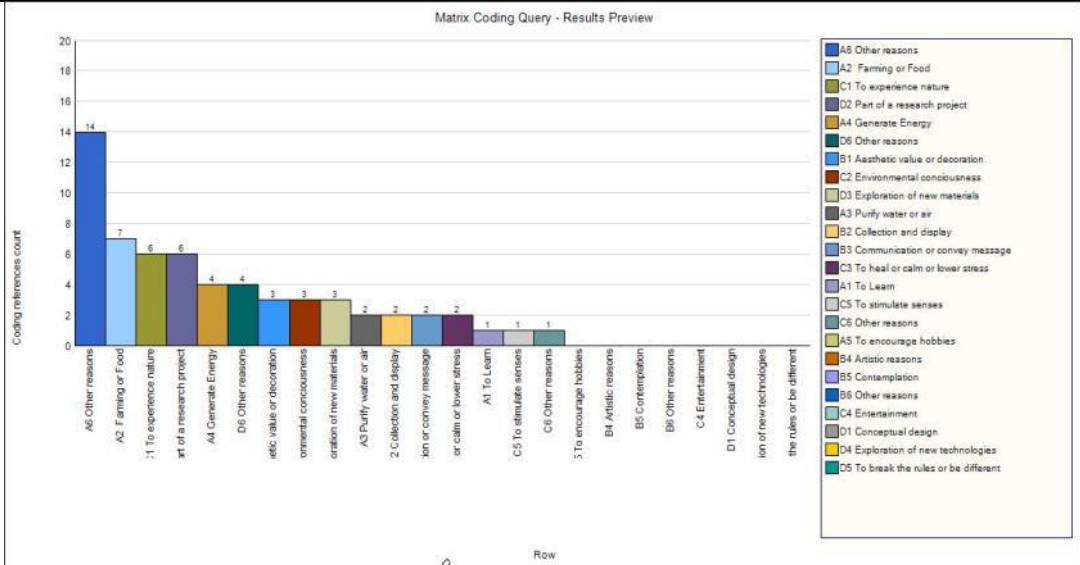
- Sensual, Educational, Edible, Green
- It's basically in the city, they don't have much space or balcony. Not everybody has an all that, a chance to grow things
- to design for seeds centre, where you can sit around the table, swap seeds and learn about seeds and consume a lot of forms of seeds
- it is something to take care off, to talk about and to get stimulated

SWR, Mushroom Ate my Furniture, Sweden/ Taiwan <Internals\SWR-SWE> - § 1 reference coded [10.86% Coverage] Reference 1 - 10.86% Coverage

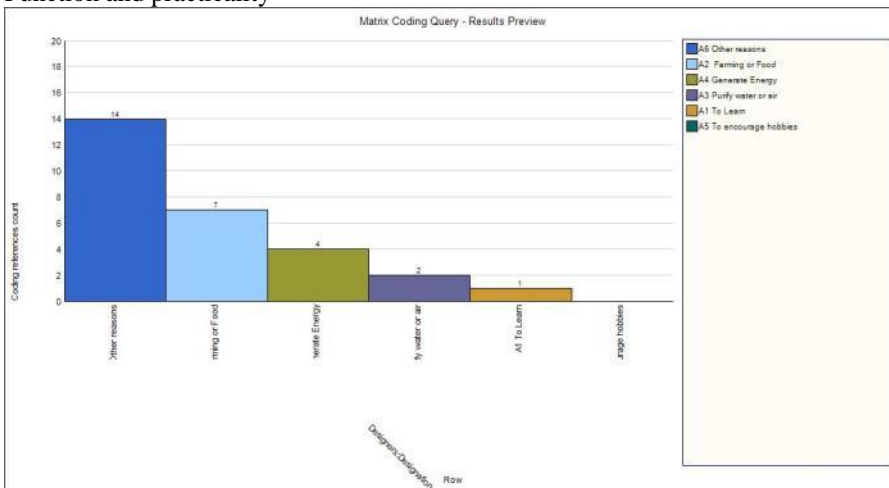
- It's because from the concept, it's called beautiful desk, to think how the lifetime ends for us to create from the environmental perspective
- I saw about how the materials end like naturally or have a good finishing or a good cycle like the book, Cradle to Cradle

<p>Main purpose of FDLO</p> <p>Q2: What was your main purpose when you designed the project?</p>	<p>AG, Talita Bench Exterior, Mexico <Internals\AG-MEX> - § 1 reference coded [5.66% Coverage] Reference 1 - 5.66% Coverage</p> <ul style="list-style-type: none"> It's a project which was designed for a competition <p>CP, The Moss Table, London, UK <Internals\CP-UK> - § 1 reference coded [6.41% Coverage] Reference 1 - 6.41% Coverage</p> <ul style="list-style-type: none"> To communicate the technology We said we could develop some a possible product that could exist in the future, utilizing that technology. But one of the ideas that we have is thinking on how this technology could be used in the home environment I came up with the idea of the moss table which I was thinking of a piece of furniture that actually could cause the organisms become like a living battery, which people harness the energy to the plants. <p>DB, The Furnibloom, Iceland <Internals\DB-ICE> - § 1 reference coded [5.63% Coverage] Reference 1 - 5.63% Coverage</p> <ul style="list-style-type: none"> In the beginning it was designed for an installation on a design exhibition <p>DLH, Chair 1: Rococo Chair Retrofitted, USA <Internals\DLH-USA> - § 1 reference coded [9.20% Coverage] Reference 1 - 9.20% Coverage</p> <ul style="list-style-type: none"> we were interested in working with natural system rather than adapt them to really to question the decision between interior and exterior in architecture and through that we think the relation between architecture and landscape it engaged us to be fact that architecture also can be seen as an object within landscape <p>EW, The Planter Table, USA <Internals\EW-USA> - § 1 reference coded [8.69% Coverage] Reference 1 - 8.69% Coverage</p> <ul style="list-style-type: none"> The bigger connection that I was trying to develop was a connection with farming and food production, which I think carries with it a collective subconscious the memory of which is very important to us as a society <p>GZ, The Stitch Table, USA <Internals\GZ-USA> - § 1 reference coded [11.70% Coverage] Reference 1 - 11.70% Coverage</p> <ul style="list-style-type: none"> My apartment, when I was at school was very small I designed a table which can display plants in your house <p>JL, The Galapagos Coffee Table, USA <Internals\JL-USA> - § 1 reference coded [5.98% Coverage] Reference 1 - 5.98% Coverage</p> <ul style="list-style-type: none"> Cleaner air/ inspirational environment and better interior space <p>KHJ, HappilyEver, South Korea <Internals\KHJ-SK> - § 1 reference coded [4.90% Coverage] Reference 1 - 4.90% Coverage</p> <ul style="list-style-type: none"> To promote the strong relationship <p>KL, The Roots, Germany <Internals\KL-GER> - § 1 reference coded [15.43% Coverage] Reference 1 - 15.43% Coverage</p> <ul style="list-style-type: none"> it's an experiment to see how the roots grow from different directions because I'm hoping to open the mould in 10 years and see how the roots deformed <p>MA, The Grass lamp, Canada <Internals\MA-CAN> - § 1 reference coded [10.78% Coverage] Reference 1 - 10.78% Coverage</p> <ul style="list-style-type: none"> you can use it for your own consumption and also cleaning your air to interact with cohesive things between humans and the nature <p>MH, The BalKonzept, Germany <Internals\MH-GER> - § 1 reference coded [2.56% Coverage] Reference 1 - 2.56% Coverage</p>
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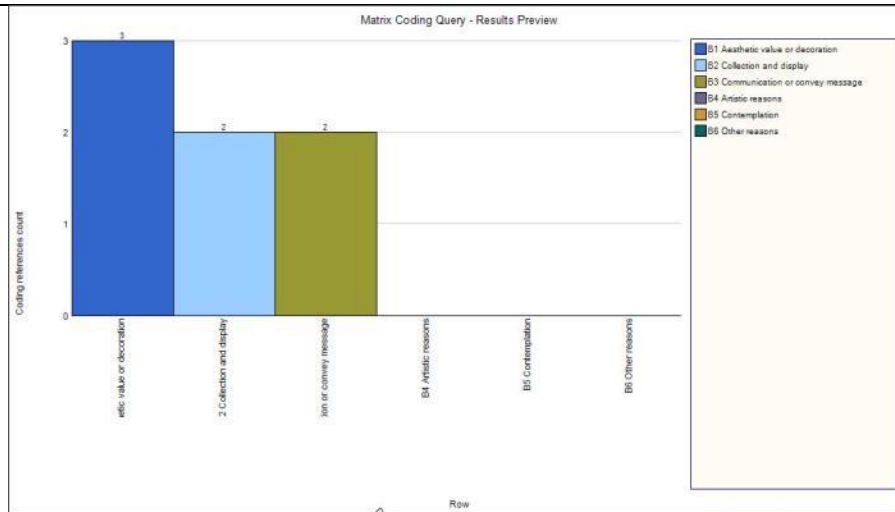
	<ul style="list-style-type: none"> • to make a small furnishing concept for the balcony which integrates the plants which is space saving and it also easily is attached <p>NF, Grass Ottoman, USA <Internals\NF-USA> - § 1 reference coded [6.70% Coverage] Reference 1 - 6.70% Coverage</p> <ul style="list-style-type: none"> • Solve seating need of project <p>NR, Co-Habitation, France <Internals\NR-FRA> - § 1 reference coded [8.45% Coverage] Reference 1 - 8.45% Coverage</p> <ul style="list-style-type: none"> • I basically think that we don't really have to avoid insects, but we have to find a way like my project, to live with insects and not against • It's like live with nature not against it and try to mix our lifestyle with the natural elements, biodiversity lifestyle • We have to find ways to integrate more nature inside our home, our lifestyle. <p>NU, Desert Eco Chair, USA <Internals\NU-USA> - § 1 reference coded [3.30% Coverage] Reference 1 - 3.30% Coverage</p> <ul style="list-style-type: none"> • To recreate the feeling of being in a specific place in nature <p>PVH, The Spire, Norway <Internals\PVH-NOR> - § 1 reference coded [11.39% Coverage] Reference 1 - 11.39% Coverage</p> <ul style="list-style-type: none"> • A furniture for a seed centre in Bergen (Norway) • I wanted to only make it to have a plant or a planter or a plan table, table you able to plant things in • The shape is not going to be a square or a rectangular shape and I knew I was going to work it in a round and a natural form. <p>SWR, Mushroom Ate my Furniture, Sweden/ Taiwan <Internals\SWR-SWE> - § 1 reference coded [7.73% Coverage] Reference 1 - 7.73% Coverage</p> <ul style="list-style-type: none"> • There's a furniture fair in Stockholm, The school asked us to go to this fair so they wanted us to start with this environmental design book, Cradle to Cradle • So eventually, this idea came out was beautiful desk, so it is about, the designers saw the creators think about how is the product ends at the beginning of the designing process <p>TH, The Cultivation Kitchen, Japan <Internals\TH-JAP> - § 1 reference coded [11.00% Coverage] Reference 1 - 11.00% Coverage</p> <ul style="list-style-type: none"> • The program, we have to change the society in the future. So the kitchen was proposed for 2020, a future product • Nowadays, in Japan, children don't know how to grow a plant, how to grow a vegetable, to differentiate the types of plants and the cultivation kitchen is like to experience in house and educate the children to grow the vegetable and planting plants for food • various vegetables in supermarket, but it has chemicals or pesticides which are not safety for vegetables
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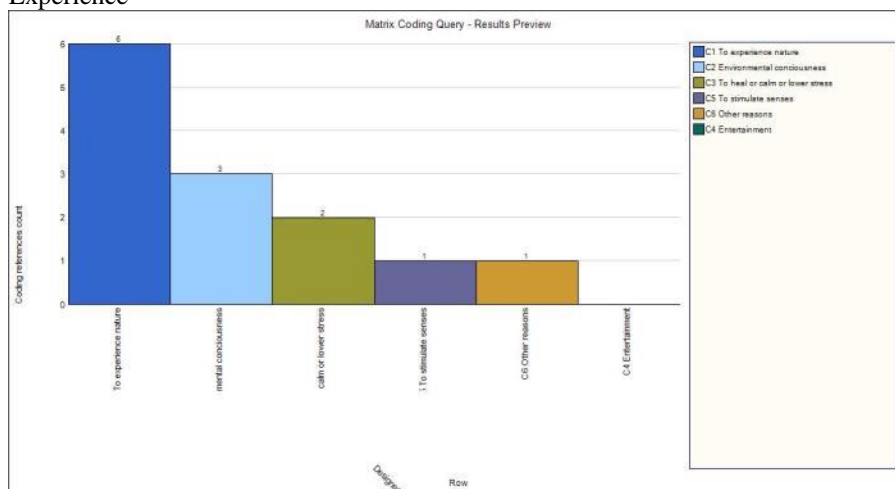
Function and practicality



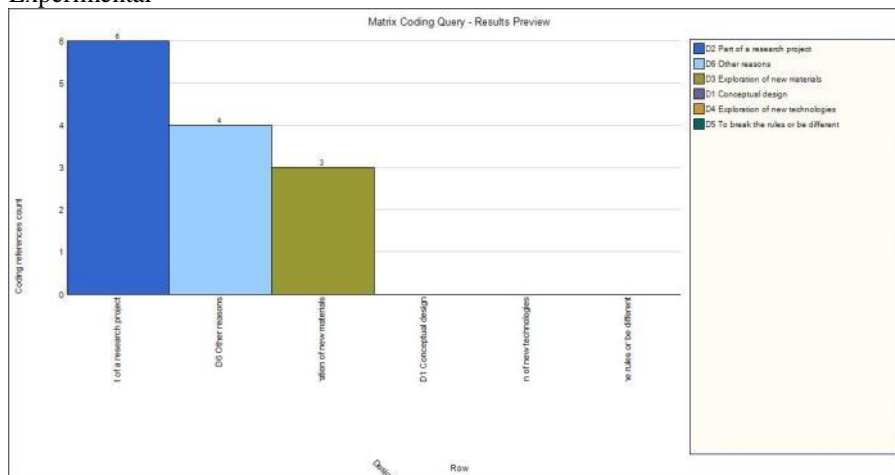
Aesthetic and semantic



Experience



Experimental



Communication/
convey messa

AG, Talita Bench Exterior, Mexico <Internals\AG-MEX> - § 2 references coded [11.59% Coverage] Reference 1 - 8.15% Coverage

- I try to give a message.
- Humans are part of nature, as the tree was used to make the bench was also part of nature.
- It's like there's a relationship between us.

Q3: Did you try to communicate or convey a specific message

CP, The Moss Table, London, UK <Internals\CP-UK> - § 1 reference coded [7.56% Coverage] Reference 1 - 7.56% Coverage

- Yes
- was to create a very simple object that because of its simplicity, it would not astounding the

<p>through your design? If yes, what was it, and why?</p>	<ul style="list-style-type: none"> • way of people looking at the moss • people would focus their attention on the moss which was the most important part of this project • the important of object to communicate, convey a message <p>DB, The Furnibloom, Iceland <Internals\\DB-ICE> - § 1 reference coded [7.30% Coverage] Reference 1 - 7.30% Coverage</p> <ul style="list-style-type: none"> • I like to surprise people and make them think, about the environment <p>DLH, Chair 1: Rococo Chair Retrofitted, USA <Internals\\DLH-USA> - § 1 reference coded [8.39% Coverage] Reference 1 - 8.39% Coverage</p> <ul style="list-style-type: none"> • I think not really • We're thinking of the chair as a message, we want to put the chair out there and understand how people might respond to it and also how insects will respond to it • The chair is an experiment. But certainly with some of the images that we made that represent the chair that we certainly did want to communicate specific messages. • understanding landscape as a relationship negotiated between human and nature <p>EW, The Planter Table, USA <Internals\\EW-USA> - § 1 reference coded [8.47% Coverage] Reference 1 - 8.47% Coverage</p> <p>The bigger connection that I was trying to develop was a connection with farming and food production, which I think carries with it a collective subconscious the memory of which is very important to us as a society</p> <p>GZ, The Stitch Table, USA <Internals\\GZ-USA> - § 1 reference coded [9.60% Coverage] Reference 1 - 9.60% Coverage</p> <ul style="list-style-type: none"> • I want to encourage people to integrate plants into their life and sort of like an alternate partner, something to be interacting with. <p>JL, The Galapagos Coffee Table, USA <Internals\\JL-USA> - § 1 reference coded [12.78% Coverage] Reference 1 - 12.78% Coverage</p> <ul style="list-style-type: none"> • Controlled nature can be stimulating in unexpected ways - I was really looking at ways to create edible environments <p>KHJ, HappilyEver, South Korea <Internals\\KHJ-SK> - § 3 references coded [25.02% Coverage] Reference 1 - 16.12% Coverage</p> <ul style="list-style-type: none"> • Yes • To promote various scenarios for friendship and bonding between dogs and human by sharing of an object in order to counter a problem – increasing of the number of abandoned dogs. <p>KL, The Roots, Germany <Internals\\KL-GER> - § 1 reference coded [7.44% Coverage] Reference 1 - 7.44% Coverage</p> <ul style="list-style-type: none"> • I don't know, the reaction of people are different, in the beginning, • I want to tell the people that nature is very important want people to observe the nature more and we are part of the nature. <p>MA, The Grass lamp, Canada <Internals\\MA-CAN> - § 1 reference coded [7.05% Coverage] Reference 1 - 7.05% Coverage</p> <ul style="list-style-type: none"> • Yes. • Get healthy, get relax, don't get very stressed • this lamp or this object, will actually give you the feeling of calmness when you're sitting and absorb • we're speaking about somebody who cannot afford to go on the weekend to go into the nature or a park, this like bringing the nature and the park back to your home <p>MH, The BalKonzept, Germany <Internals\\MH-GER> - § 1 reference coded [9.98% Coverage] Reference 1 - 9.98% Coverage</p>
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- my products are self-explanatory
- what you see is what you get
- It has no big theory or message. It's a just a thing for plants and for eating.

NF, Grass Ottoman, USA <Internals\NF-USA> - § 1 reference coded [9.93% Coverage]
Reference 1 - 9.93% Coverage

- Fitting visual for space/ comfort and practicality

NR, Co-Habitation, France <Internals\NR-FRA> - § 1 reference coded [17.72% Coverage]
Reference 1 - 17.72% Coverage

- Yes
- I read a book that is about a man who protects birds and the other man asked why are you trying to convince people to protect birds? The man answer it ' it's not about bird that we need to convince but the quality of the relationship between man and nature, it need to be involved'

NU, Desert Eco Chair, USA <Internals\NU-USA> - § 1 reference coded [5.40% Coverage]
Reference 1 - 5.40% Coverage

- Not necessarily a specific message - but the specific experience of being immersed in a particular eco-system.
- it is about anything I can do is about beautifying our world or reminding people about nature

PVH, The Spire, Norway <Internals\PVH-NOR> - § 1 reference coded [0.82% Coverage]
Reference 1 - 0.82% Coverage

- Yes. Grow your home a little wilder.

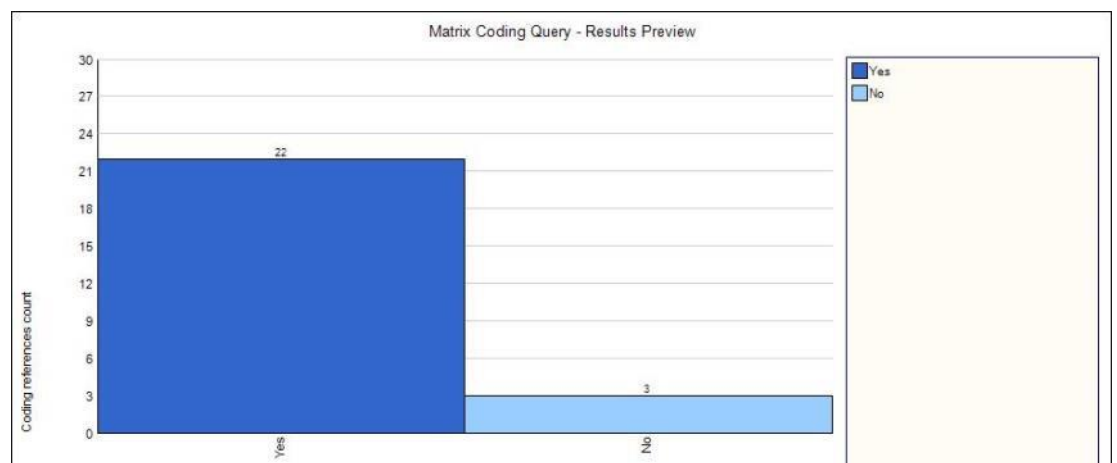
SWR, Mushroom Ate my Furniture, Sweden/ Taiwan <Internals\SWR-SWE> - § 1 reference coded [15.18% Coverage]Reference 1 - 15.18% Coverage

- Yes, like I said it's to show and to remind people
- To show people, including the designers or customers to think about what would happen after the creating an item or buying an item, because since now we're started to have environmental issues and want to have this concern
- we should think about our responsibility and do not just thinking about the starting to create but also think about the end and what's going to happen if this object is not useable anymore or like, people don't want it anymore

TH, The Cultivation Kitchen, Japan <Internals\TH-JAP> - § 1 reference coded [7.24% Coverage]

Reference 1 - 7.24% Coverage

- Yes, the product includes the important message. The message is 'product for the future'- about eating and living
- trying to promote a healthy lifestyle.



Main concept of FDLO

AG, Talita Bench Exterior, Mexico <Internals\AG-MEX> - § 1 reference coded [12.67% Coverage]

Q4: In relation to your project, what was the main concept behind it?

Reference 1 - 12.67% Coverage

- The industry that used the tree or forest but left out all leaves and branches and all were discarded.
- I like the idea that we cut the tree and we use the leaves, branches and integrate it in a smaller scale proportionately to the bench.
- It's like a memorial of a tree in a bench. It was a tree before it turns into a bench but the wood has been processed and not directly comes from the tree itself.

CP, The Moss Table, London, UK <Internals\CP-UK> - § 1 reference coded [7.54% Coverage]

Reference 1 - 7.54% Coverage

- The technology, because we wanted to show the way, it was mention in the presentation what could be done with the technology and we find that the moss was generating energy even though it wasn't enough to power the lamp
- It's mean to be communication object just to show the potential of that technology.

DB, The Furnibloom, Iceland <Internals\DB-ICE> - § 1 reference coded [9.13% Coverage]

Reference 1 - 9.13% Coverage

- The main concept was to make furniture that functioned as a greenhouse
- to have this double function of seating and eating the material from the table

DLH, Chair 1: Rococo Chair Retrofitted, USA <Internals\DLH-USA> - § 1 reference coded [8.65% Coverage] Reference 1 - 8.65% Coverage

- idea of working with natural energies, systems in close rather that against them
- also a question about the relationship with interior and exterior
- So we were interested in how digital factors are automatically pursue as the solution to the problem and digital fabrication, digital where there ultimately everything is analog

EW, The Planter Table, USA <Internals\EW-USA> - § 1 reference coded [11.17% Coverage]

Reference 1 - 11.17% Coverage

- In hopes of removing some of the filters that we have created from our natural environment by subverting the idea of indoor-outdoor and putting living matter in a very common household feature. Not a feature purely for the purpose of holding living matter, but something with a purpose.

GZ, The Stitch Table, USA <Internals\GZ-USA> - § 1 reference coded [22.06% Coverage]

Reference 1 - 22.06% Coverage

- This idea of like a sort of a man made surface and then like a natural contrast growing out of that manmade surface.
- It's like having it growing between the cracks in this table in a control way.
- It's also involved the material usages

JL, The Galapagos Coffee Table, USA <Internals\JL-USA> - § 1 reference coded [6.21% Coverage] Reference 1 - 6.21% Coverage

- Edible/ aesthetic environments, Cleaner air, sensory calming

KHJ, HappilyEver, South Korea <Internals\KHJ-SK> - § 1 reference coded [15.48% Coverage]

Reference 1 - 15.48% Coverage

- We are all born in nature and we live our lives in it

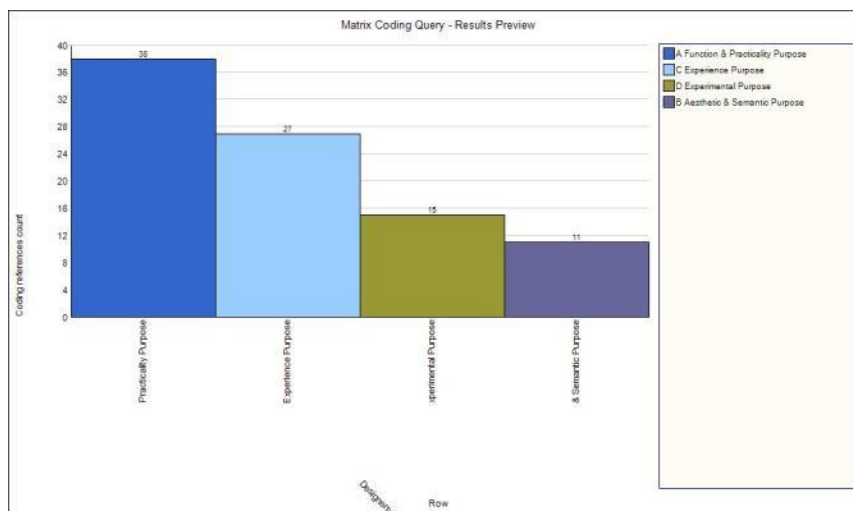
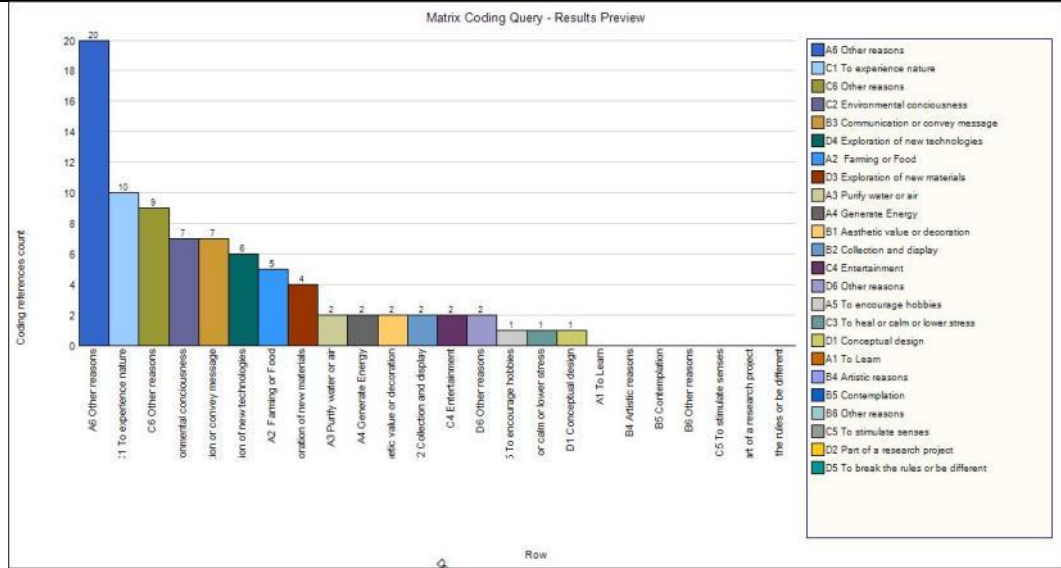
KL, The Roots, Germany <Internals\KL-GER> - § 1 reference coded [12.01% Coverage]

Reference 1 - 12.01% Coverage

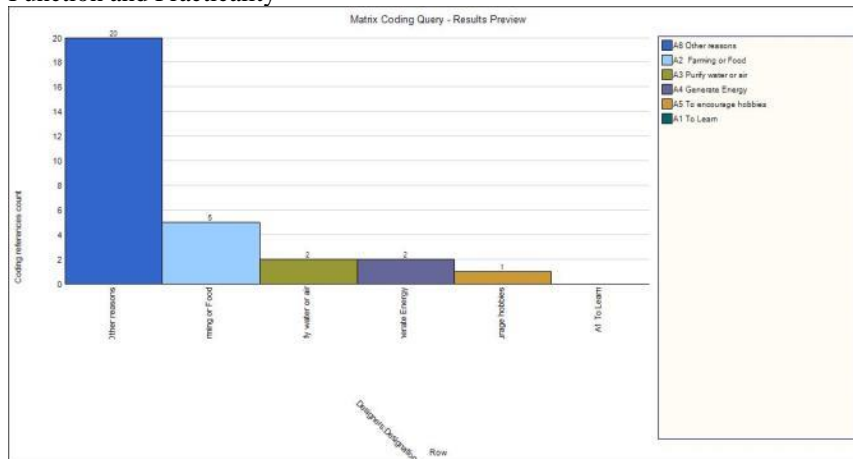
- I started to think about deformation and my idea was just a concept where deformation exists and I just created parameters of deformation and let the deformation to grow by its own.
- to create an objects with the roots
- It's just an experimental design project.

MA, The Grass lamp, Canada <Internals\MA-CAN> - § 1 reference coded [9.62% Coverage]

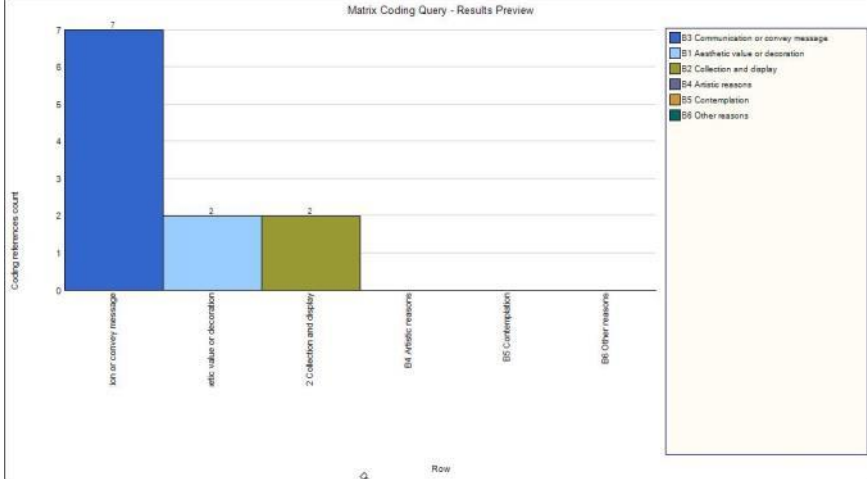
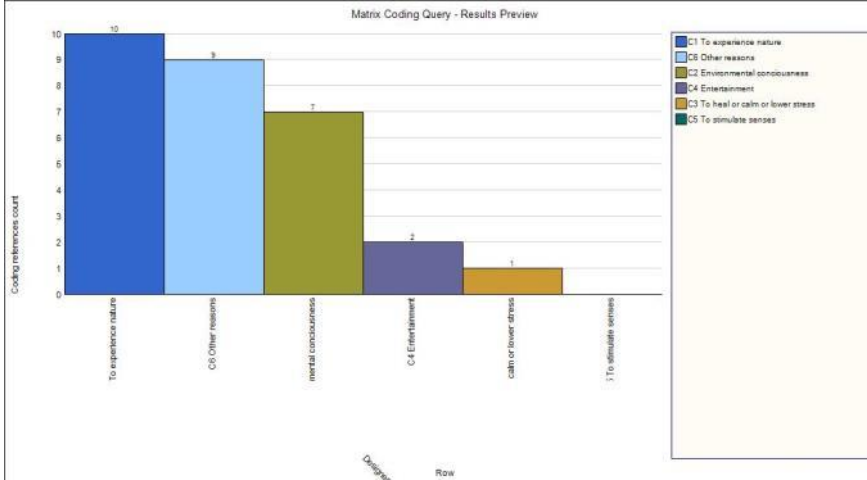
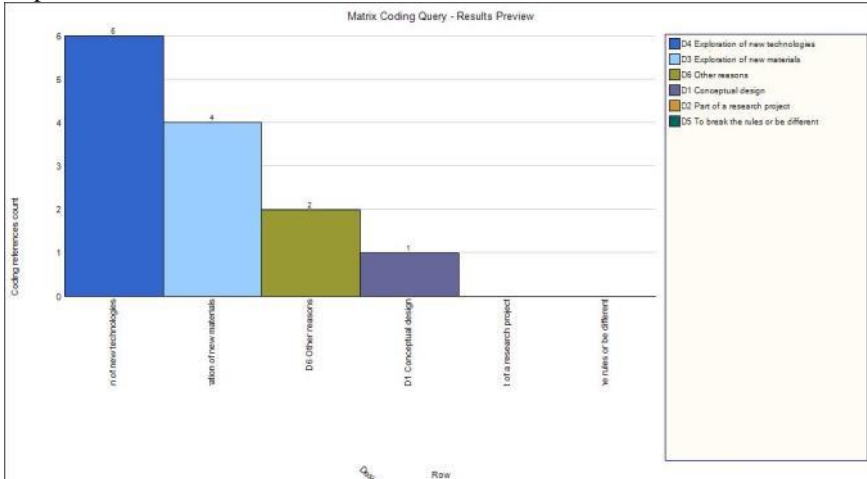
<p>Reference 1 - 9.62% Coverage</p> <ul style="list-style-type: none"> • where we can live into a small space or large space and have the interaction with the nature • looking to this design you actually feel you're outside • you cut the green grass, you can juice it to make it a drinking juice <p>MH, The Balkonzept, Germany <Internals\MH-GER> - § 1 reference coded [16.48% Coverage]</p> <p>Reference 1 - 16.48% Coverage</p> <ul style="list-style-type: none"> • the symbiosis from the balcony concept • Symbiotic or symbiont. • my product can't stand alone, you'll need something to attach to • It's an item with additional function and solution • life solution for people who like greens <p>NF, Grass Ottoman, USA <Internals\NF-USA> - § 1 reference coded [7.62% Coverage]</p> <p>Reference 1 - 7.62% Coverage</p> <ul style="list-style-type: none"> • Usability, comfort, something fresh yet appropriate <p>NR, Co-Habitation, France <Internals\NR-FRA> - § 1 reference coded [4.73% Coverage]</p> <p>Reference 1 - 4.73% Coverage</p> <ul style="list-style-type: none"> • I created this pot with hole for spider to live inside it. • With this design, I can just move my pots, move the spiders too and I don't have to destroy the spider's home <p>NU, Desert Eco Chair, USA <Internals\NU-USA> - § 1 reference coded [2.86% Coverage]</p> <p>Reference 1 - 2.86% Coverage</p> <ul style="list-style-type: none"> • To have a living microcosm representing one of nature's splendid and diverse eco-systems, • to create a mini-environment • to bring maximum joy, • to experience far-away settings in one's own home • to transport oneself to a favourite nostalgic spot <p>PVH, The Spire, Norway <Internals\PVH-NOR> - § 1 reference coded [12.80% Coverage]</p> <p>Reference 1 - 12.80% Coverage</p> <ul style="list-style-type: none"> • To create a plantable • Before I started this furniture design, I studied permaculture design. So I've been already inspired by lots of things that come from Australia • permaculture ideas and in the nature, the ethics of permaculture, earth care, people care and fresh air, it's a very humble and very sustainable approach • it informs the principles of permaculture, very much inform my furniture design • It stands for permanent agriculture <p>SWR, Mushroom Ate my Furniture, Sweden/ Taiwan <Internals\SWR-SWE> - § 1 reference coded [14.74% Coverage]</p> <p>Reference 1 - 14.74% Coverage</p> <ul style="list-style-type: none"> • The main concept behind it is to set up a desk of wooden furniture by planting spores in it then the wood could provide a suitable environment and nutrition to the life of the fungus. And the wood would be eaten by the fungus at the same time to give another life to the nature • it's a little bit transferring life from the furniture piece to the fungus <p>TH, The Cultivation Kitchen, Japan <Internals\TH-JAP> - § 1 reference coded [12.46% Coverage]</p> <p>Reference 1 - 12.46% Coverage</p> <ul style="list-style-type: none"> • The decreasing of population. In Japan the population is decreasing • There's program of food waste, we have lots of food and we waste lots of it
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Function and Practicality



Aesthetic and Semantic

	 <p>Matrix Coding Query - Results Preview</p> <table border="1"> <thead> <tr> <th>Category</th> <th>Coding reference count</th> </tr> </thead> <tbody> <tr> <td>B3 Communication or convey message</td> <td>7</td> </tr> <tr> <td>B1 Aesthetic value or decoration</td> <td>2</td> </tr> <tr> <td>B2 Collection and display</td> <td>2</td> </tr> <tr> <td>B4 Artistic reasons</td> <td>0</td> </tr> <tr> <td>B5 Contemplation</td> <td>0</td> </tr> <tr> <td>B6 Other reasons</td> <td>0</td> </tr> </tbody> </table> <p>Experience</p>  <p>Matrix Coding Query - Results Preview</p> <table border="1"> <thead> <tr> <th>Category</th> <th>Coding reference count</th> </tr> </thead> <tbody> <tr> <td>C1 To experience nature</td> <td>10</td> </tr> <tr> <td>C5 Other reasons</td> <td>9</td> </tr> <tr> <td>C2 Environmental consciousness</td> <td>7</td> </tr> <tr> <td>C4 Entertainment</td> <td>2</td> </tr> <tr> <td>C3 To heal or calm or lower stress</td> <td>1</td> </tr> <tr> <td>C6 To stimulate senses</td> <td>0</td> </tr> </tbody> </table> <p>Experimental</p>  <p>Matrix Coding Query - Results Preview</p> <table border="1"> <thead> <tr> <th>Category</th> <th>Coding reference count</th> </tr> </thead> <tbody> <tr> <td>D4 Exploration of new technologies</td> <td>6</td> </tr> <tr> <td>D3 Exploration of new materials</td> <td>4</td> </tr> <tr> <td>D6 Other reasons</td> <td>2</td> </tr> <tr> <td>D1 Conceptual design</td> <td>1</td> </tr> <tr> <td>D2 Part of a research project</td> <td>0</td> </tr> <tr> <td>D5 To break the rules or be different</td> <td>0</td> </tr> </tbody> </table>	Category	Coding reference count	B3 Communication or convey message	7	B1 Aesthetic value or decoration	2	B2 Collection and display	2	B4 Artistic reasons	0	B5 Contemplation	0	B6 Other reasons	0	Category	Coding reference count	C1 To experience nature	10	C5 Other reasons	9	C2 Environmental consciousness	7	C4 Entertainment	2	C3 To heal or calm or lower stress	1	C6 To stimulate senses	0	Category	Coding reference count	D4 Exploration of new technologies	6	D3 Exploration of new materials	4	D6 Other reasons	2	D1 Conceptual design	1	D2 Part of a research project	0	D5 To break the rules or be different	0	
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<p>Inspiration of FDLO</p>	<p>AG, Talita Bench Exterior, Mexico <Internals\AG-MEX> - § 1 reference coded [9.98% Coverage] Reference 1 - 9.98% Coverage</p> <ul style="list-style-type: none"> Trend of sustainable design: lack of culture of sustainability in Mexico From a competition <p>CP, The Moss Table, London, UK <Internals\CP-UK> - § 1 reference coded [12.13% Coverage] Reference 1 - 12.13% Coverage</p> <ul style="list-style-type: none"> My inspiration is the most basic idea that people might have about what the table is and what the lamp is 																																											

- Braun products of the 60s, it was a really nice combination of simplicity and effectiveness in communication and in term of function

DB, The Furnibloom, Iceland <Internals\DB-ICE> - § 1 reference coded [8.17% Coverage]
Reference 1 - 8.17% Coverage

- Actually the idea was inspired from a piece of art, where there was a plastic flower in the seat of a chair

DLH, Chair 1: Rococo Chair Retrofitted, USA <Internals\DLH-USA> - § 1 reference coded [9.36% Coverage] Reference 1 - 9.36% Coverage

- The chair is a rococo armchair, rococo is a style which was inspired by nature
- I thought... Well, why go all of the works to weave silk to represent leaves when you can really just have leaves like we can do that
- Why have images of an ant climbing out of the branch when you could have ants climbing on branches?
- Why not just why represent nature through a frozen image when you can actually invites natural systems in and they present themselves?
- We're suspicious of images of nature and we wanted to see if we could actually allow nature to be presented itself so that's where the chair by connecting it to the outdoors, that it allows that potentially to have it.

EW, The Planter Table, USA <Internals\EW-USA> - § 1 reference coded [7.79% Coverage]
Reference 1 - 7.79% Coverage

- Watching people separate the uses of their household objects and the thinking about the ways in which we can embed much more into one piece of furniture.

GZ, The Stitch Table, USA <Internals\GZ-USA> - § 1 reference coded [9.64% Coverage]
Reference 1 - 9.64% Coverage

- My mother likes to garden a lot
- George Nakashima, which, have a split sections in the model and anything like that. I was inspired by that

JL, The Galapagos Coffee Table, USA <Internals\JL-USA> - § 1 reference coded [11.95% Coverage] Reference 1 - 11.95% Coverage

- Interested in urban farming - (well micro-farming in this case) and searching for a way to combine modern minimal geometric design aesthetics with organic matter.

KHJ, HappilyEver, South Korea <Internals\KHJ-SK> - § 1 reference coded [7.57% Coverage]
Reference 1 - 7.57% Coverage

- Researching of our people and how people's act with it.

KL, The Roots, Germany <Internals\KL-GER> - § 1 reference coded [9.95% Coverage]
Reference 1 - 9.95% Coverage

- I'm doing a research for deformation and I found and saw about human deformation.
- There's an old Japanese tradition where they wanted to have smaller feet and its involved deformation and I'm very interested to know more about it, but not on human.
- I saw how the tree deformed naturally and unnaturally.

MA, The Grass lamp, Canada <Internals\MA-CAN> - § 1 reference coded [5.50% Coverage]
Reference 1 - 5.50% Coverage

- Looking through my window
- the lamp in a round shape, this is the same as you have the round vision when you're looking through your window, when you're staring on the window for a long time, your vision got narrow

MH, The Balkonzept, Germany <Internals\MH-GER> - § 1 reference coded [8.21% Coverage]
Reference 1 - 8.21% Coverage

- I looked and learned into nature, how plants connect with each other or maybe animal

- connect to
- the fish, which always live together with the shark to clean them, to make something as nobody work or live alone

NF, Grass Ottoman, USA <Internals\NF-USA> - § 1 reference coded [10.18% Coverage]
Reference 1 - 10.18% Coverage

- Found a small sample of plastic wheat grass – added to my ‘LIKE’ file

NR, Co-Habitation, France <Internals\NR-FRA> - § 1 reference coded [6.47% Coverage]
Reference 1 - 6.47% Coverage

- The inspiration is from the spider, just the observation of the spiders

NU, Desert Eco Chair, USA <Internals\NU-USA> - § 1 reference coded [13.99% Coverage]
Reference 1 - 13.99% Coverage

- I went to Peru on vacation for 3 weeks in 1996 and was amazed by the range of its natural beauty
- I was informed that of the 120 or so eco-systems on the planet, 80 could be found in Peru
- motivated to recreate a personal space where one could capture and 're-feel' one's vacation in nature

PVH, The Spire, Norway <Internals\PVH-NOR> - § 1 reference coded [26.36% Coverage]
Reference 1 - 26.36% Coverage

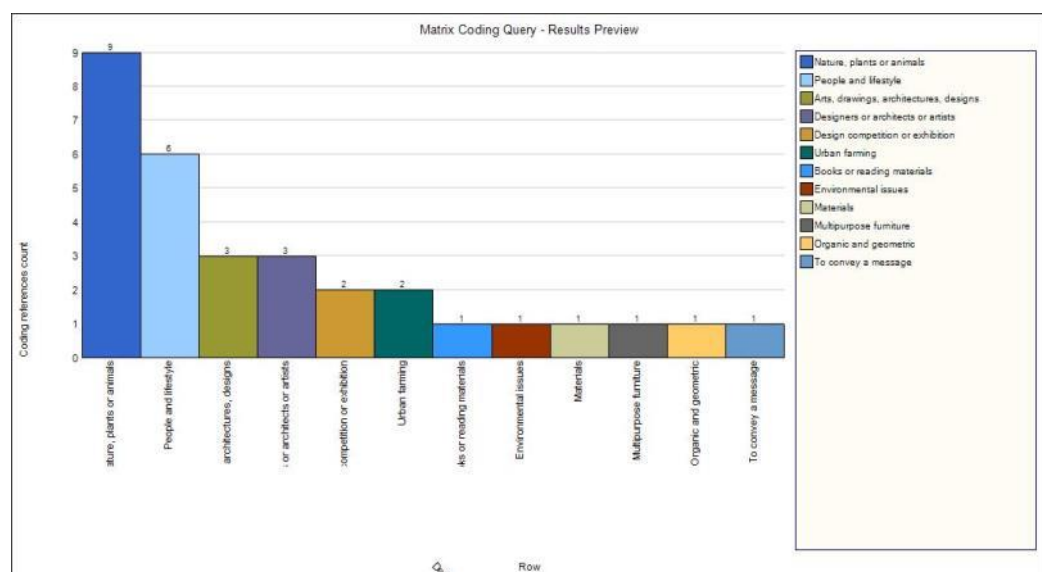
- A drawing by Hundertwasser, which inspired me to design the table, Tree Tennant
- inspired by an architect and artist from Austria, Friedensreich Hundertwasser, he integrated and incorporated, real living trees throughout the architecture sections or parts such as windows of the houses
- Another inspiration for this, land artist from Scotland, his name is Andy Goldsworthy, he's making land art sculpture, built from natural materials.

SWR, Mushroom Ate my Furniture, Sweden/ Taiwan <Internals\SWR-SWE> - § 1 reference coded [1.71% Coverage] Reference 1 - 1.71% Coverage

- it was very inspiring about this exhibition theme and from this book Cradle to Cradle

TH, The Cultivation Kitchen, Japan <Internals\TH-JAP> - § 1 reference coded [8.56% Coverage]
Reference 1 - 8.56% Coverage

- Probably, some vegetables grow in factory like an in industrial plant in some European countries and in Japan
- the green factory, I was inspired by these images
- the feeling that I have while eating inspired me to design the cultivation kitchen



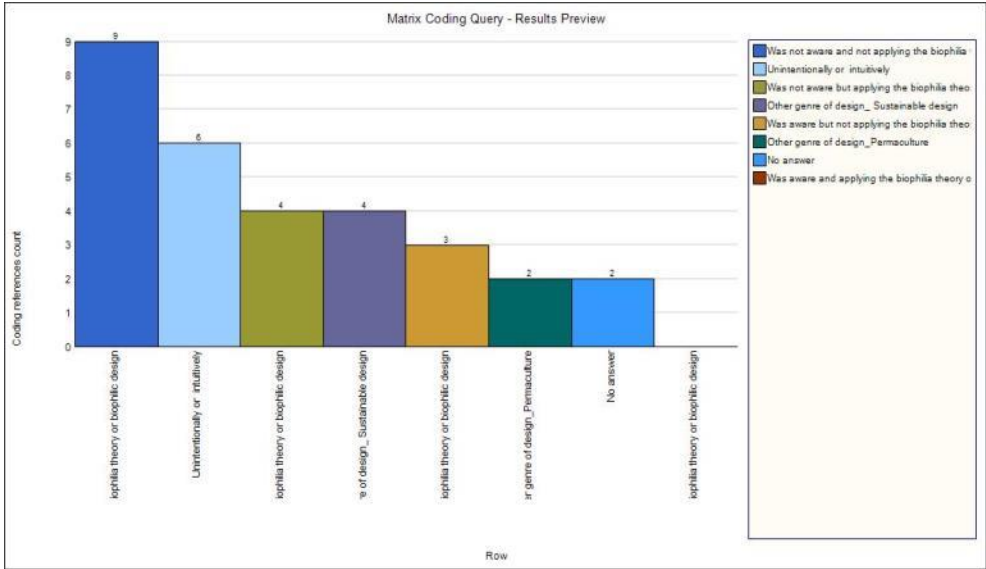
<p>FDLO: concept or commercialized</p> <p>Q6: Is your furniture piece just a concept, or is it commercialised?</p>	<p>AG, Talita Bench Exterior, Mexico <Internals\AG-MEX> - § 1 reference coded [6.27% Coverage] Reference 1 - 6.27% Coverage</p> <ul style="list-style-type: none"> It's a concept right now. <p>CP, The Moss Table, London, UK <Internals\CP-UK> - § 1 reference coded [8.88% Coverage] Reference 1 - 8.88% Coverage</p> <ul style="list-style-type: none"> I don't think the table is going to be commercialized in the near future as an energy production object because as I say they still in the stage of the development of the technology hasn't reached the point which the energy that potentially can be extracted from the moss is happening. <p>DB, The Furnibloom, Iceland <Internals\DB-ICE> - § 1 reference coded [19.33% Coverage] Reference 1 - 19.33% Coverage</p> <ul style="list-style-type: none"> In the beginning, it was just a concept art, but afterwards so many people wanted to buy it. So I produced some, and showcased it on a furniture fair, in Stockholm and Vilnius, and on all kinds of exhibitions in Iceland. I was also chosen to design a Nordic Landscape architects Exhibition in Shanghai related to Expo 2010, where the furniture where the main concept. Unfortunately, they are not in production yet. <p>DLH, Chair 1: Rococo Chair Retrofitted, USA <Internals\DLH-USA> - § 1 reference coded [21.04% Coverage] Reference 1 - 21.04% Coverage</p> <ul style="list-style-type: none"> it's sort of neither because in terms of being just a concept, meaning is it a design image we actually made, we build the chair and we connected it to the outdoors and we watch the insects inside it and all it's really an experiment like a lab experiment, cross with a work of art or a work of design <p>EW, The Planter Table, USA <Internals\EW-USA> - § 1 reference coded [4.31% Coverage] Reference 1 - 4.31% Coverage</p> <ul style="list-style-type: none"> Concept, but made on commission. I have sold three Planter Tables <p>GZ, The Stitch Table, USA <Internals\GZ-USA> - § 1 reference coded [6.53% Coverage] Reference 1 - 6.53% Coverage</p> <ul style="list-style-type: none"> Not particularly - because I don't have the resources or time to trying to that to myself <p>JL, The Galapagos Coffee Table, USA <Internals\JL-USA> - § 1 reference coded [3.72% Coverage] Reference 1 - 3.72% Coverage</p> <ul style="list-style-type: none"> Concept <p>KHJ, HappilyEver, South Korea <Internals\KHJ-SK> - § 1 reference coded [6.92% Coverage] Reference 1 - 6.92% Coverage</p> <ul style="list-style-type: none"> a concept <p>KL, The Roots, Germany <Internals\KL-GER> - § 1 reference coded [3.28% Coverage] Reference 1 - 3.28% Coverage</p> <ul style="list-style-type: none"> The Roots are an experimental and very conceptual. <p>MA, The Grass lamp, Canada <Internals\MA-CAN> - § 1 reference coded [4.11% Coverage] Reference 1 - 4.11% Coverage</p> <ul style="list-style-type: none"> We're right now in a point of commercialize it. It's going to be ready in May and available to be purchased online a floor lamp \$499 and a table lamp \$160 <p>MH, The Balkonzepit, Germany <Internals\MH-GER> - § 1 reference coded [15.46% Coverage] Reference 1 - 15.46% Coverage</p> <ul style="list-style-type: none"> I think my product is quite easy to commercialize because there's no technical stuffs, it's
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	<p>simple</p> <ul style="list-style-type: none"> • produce the item by myself and I sell them in the web shop, distributors, and dealers all over Europe • It's not a mass product, it's a limited edition product and I think it has a niche for such product • 130 euros <p>NF, Grass Ottoman, USA <Internals\\NF-USA> - § 1 reference coded [7.80% Coverage] Reference 1 - 7.80% Coverage</p> <ul style="list-style-type: none"> • We have been producing the 'Grass Ottoman' for 10 years <p>NR, Co-Habitation, France <Internals\\NR-FRA> - § 1 reference coded [3.28% Coverage] Reference 1 - 3.28% Coverage</p> <ul style="list-style-type: none"> • I wish, I hope to commercialize it soon. I have not developed it in 3D yet <p>NU, Desert Eco Chair, USA <Internals\\NU-USA> - § 1 reference coded [34.71% Coverage] Reference 1 - 34.71% Coverage</p> <ul style="list-style-type: none"> • I have the first prototype and the second was sold from the show called "Chair-ity" • I made small models for future chairs: Forest / Waterfall / Mountain / Grand Canyon / Island / Herb Garden, etc <p>PVH, The Spire, Norway <Internals\\PVH-NOR> - § 1 reference coded [10.16% Coverage] Reference 1 - 10.16% Coverage</p> <ul style="list-style-type: none"> • A prototype, one of piece. But definitely, it's not made for the industry <p>SWR, Mushroom Ate my Furniture, Sweden/ Taiwan <Internals\\SWR-SWE> - § 1 reference coded [7.61% Coverage] Reference 1 - 7.61% Coverage</p> <ul style="list-style-type: none"> • Conceptual <p>TH, The Cultivation Kitchen, Japan <Internals\\TH-JAP> - § 1 reference coded [7.04% Coverage] Reference 1 - 7.04% Coverage</p> <ul style="list-style-type: none"> • It's just a concept. Not a selling product, but a kind of commercial and its purpose for 2020, for presentation <div> <p>Matrix Coding Query - Results Preview</p> <table border="1"> <thead> <tr> <th>Category</th> <th>Coding references count</th> </tr> </thead> <tbody> <tr> <td>Conceptual</td> <td>11</td> </tr> <tr> <td>Conceptual but produced few prototypes</td> <td>3</td> </tr> <tr> <td>Commercialized</td> <td>3</td> </tr> </tbody> </table> </div>	Category	Coding references count	Conceptual	11	Conceptual but produced few prototypes	3	Commercialized	3
Category	Coding references count								
Conceptual	11								
Conceptual but produced few prototypes	3								
Commercialized	3								
<p>Knowledge: Biophilia Theory/ Biophilic</p>	<p>AG, Talita Bench Exterior, Mexico <Internals\\AG-MEX> - § 1 reference coded [6.59% Coverage] Reference 1 - 6.59% Coverage</p> <ul style="list-style-type: none"> • I've heard about it recently, maybe in a year. 								

<p>Design</p> <p>Q7: Do you know what biophilia theory and biophilic design are?</p>	<ul style="list-style-type: none"> • It's about the relationship of human being and living organisms. • I don't know much about it <p><i>CP, The Moss Table, London, UK</i> <Internals\CP-UK> - § 1 reference coded [0.55% Coverage] Reference 1 - 0.55% Coverage</p> <ul style="list-style-type: none"> • No, the first time that I have heard about it was your paper. <p><i>DB, The Furnibloom, Iceland</i> <Internals\DB-ICE> - § 1 reference coded [3.13% Coverage] Reference 1 - 3.13% Coverage</p> <ul style="list-style-type: none"> • Not really <p><i>DLH, Chair 1: Rococo Chair Retrofitted, USA</i> <Internals\DLH-USA> - § 1 reference coded [0.88% Coverage] Reference 1 - 0.88% Coverage</p> <ul style="list-style-type: none"> • Yes. In fact, when I was an undergraduate at Harvard, E. O Wilson taught there and I had friends who studied with him <p><i>EW, The Planter Table, USA</i> <Internals\EW-USA> - § 1 reference coded [2.20% Coverage] Reference 1 - 2.20% Coverage</p> <ul style="list-style-type: none"> • No. <p><i>GZ, The Stitch Table, USA</i> <Internals\GZ-USA> - § 1 reference coded [1.13% Coverage] Reference 1 - 1.13% Coverage</p> <ul style="list-style-type: none"> • I don't think so. <p><i>JL, The Galapagos Coffee Table, USA</i> <Internals\JL-USA> - § 1 reference coded [5.66% Coverage] Reference 1 - 5.66% Coverage</p> <ul style="list-style-type: none"> • Not really, unless it relates to biology as inspirations. <p><i>KHJ, HappilyEver, South Korea</i> <Internals\KHJ-SK> - § 1 reference coded [3.51% Coverage] Reference 1 - 3.51% Coverage</p> <ul style="list-style-type: none"> • No. <p><i>KL, The Roots, Germany</i> <Internals\KL-GER> - § 1 reference coded [1.43% Coverage] Reference 1 - 1.43% Coverage</p> <ul style="list-style-type: none"> • Not really. I know a bit about it, but I'm not sure about it. <p><i>MA, The Grass lamp, Canada</i> <Internals\MA-CAN> - § 1 reference coded [0.69% Coverage] Reference 1 - 0.69% Coverage</p> <ul style="list-style-type: none"> • Yes. <p><i>MH, The BalKonzept, Germany</i> <Internals\MH-GER> - § 1 reference coded [1.12% Coverage] Reference 1 - 1.12% Coverage</p> <ul style="list-style-type: none"> • No, I think I haven't heard the theory before <p><i>NF, Grass Ottoman, USA</i> <Internals\NF-USA> - § 1 reference coded [4.69% Coverage] Reference 1 - 4.69% Coverage</p> <ul style="list-style-type: none"> • No answer <p><i>NR, Co-Habitation, France</i> <Internals\NR-FRA> - § 1 reference coded [1.46% Coverage] Reference 1 - 1.46% Coverage</p> <ul style="list-style-type: none"> • Yes, I know about it. <p><i>NU, Desert Eco Chair, USA</i> <Internals\NU-USA> - § 1 reference coded [0.64% Coverage] Reference 1 - 0.64% Coverage</p> <ul style="list-style-type: none"> • Yes. <p><i>PVH, The Spire, Norway</i> <Internals\PVH-NOR> - § 1 reference coded [6.18% Coverage] Reference 1 - 6.18% Coverage</p> <ul style="list-style-type: none"> • Not quite, but I can guess
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	<ul style="list-style-type: none"> I wasn't really familiar with that term and I guess biophilia is life the opposite of biophobia; people don't like life and the real living organisms in design <p>SWR, Mushroom Ate my Furniture, Sweden/ Taiwan <Internals\SWR-SWE> - § 1 reference coded [0.97% Coverage] Reference 1 - 0.97% Coverage</p> <ul style="list-style-type: none"> No, I only know about Biomimicry <p>TH, The Cultivation Kitchen, Japan <Internals\TH-JAP> - § 1 reference coded [3.44% Coverage] Reference 1 - 3.44% Coverage</p> <ul style="list-style-type: none"> I've only heard about biophilia word, but I don't know biophilic design <div> <p>Matrix Coding Query - Results Preview</p> <table border="1"> <caption>Matrix Coding Query - Results Preview</caption> <thead> <tr> <th>Category</th> <th>Coding references count</th> </tr> </thead> <tbody> <tr> <td>No</td> <td>11</td> </tr> <tr> <td>Yes</td> <td>6</td> </tr> <tr> <td>No answer</td> <td>1</td> </tr> </tbody> </table> </div>	Category	Coding references count	No	11	Yes	6	No answer	1
Category	Coding references count								
No	11								
Yes	6								
No answer	1								
<p>Awareness on Biophilia Theory/ Biophilic Design</p> <p>Q8: Were you aware about biophilia theory or biophilic design while you designed your project (of furniture with living organisms)?</p>	<p>AG, Talita Bench Exterior, Mexico <Internals\AG-MEX> - § 1 reference coded [9.96% Coverage] Reference 1 - 9.96% Coverage</p> <ul style="list-style-type: none"> I think now it's more towards biophilia Maybe it was about sustainability, but it was not all precisely <p>CP, The Moss Table, London, UK <Internals\CP-UK> - § 1 reference coded [10.57% Coverage] Reference 1 - 10.57% Coverage</p> <ul style="list-style-type: none"> I never came across with that as a theory, but I've been interested in that sort product, hybrid composition which combining the organic and the inorganic and living things in objects. I'm coming from sustainable discourse. So I have an interest in sustainability area, so my design was about communication, working with scientist to develop whatever they needed, but the table was appropriate and for people, it works in sustainability. <p>DB, The Furnibloom, Iceland <Internals\DB-ICE> - § 1 reference coded [5.48% Coverage] Reference 1 - 5.48% Coverage</p> <ul style="list-style-type: none"> No. <p>DLH, Chair 1: Rococo Chair Retrofitted, USA <Internals\DLH-USA> - § 1 reference coded [8.84% Coverage] Reference 1 - 8.84% Coverage</p> <ul style="list-style-type: none"> We were definitely not thinking of that when we made this chair. No, I said, we were thinking of E. O. Wilson, 'A journey to the ants' We definitely interested in the relation between humans and nature. That's landscape, that's kind of work that negotiates the relationship but of anything our works is probably more like biophobic. it could be biophilic, it could be biophobic We weren't trying to apply E. O. Wilson, biophilic theory at all, but we're definitely thinking 								

	<p>about his research about, ants and other insects.</p> <p>EW, The Planter Table, USA <Internals\EW-USA> - § 1 reference coded [4.28% Coverage] Reference 1 - 4.28% Coverage</p> <ul style="list-style-type: none"> No. <p>GZ, The Stitch Table, USA <Internals\GZ-USA> - § 1 reference coded [4.08% Coverage] Reference 1 - 4.08% Coverage</p> <ul style="list-style-type: none"> No. It's sort of like the subconscious idea behind my table <p>JL, The Galapagos Coffee Table, USA <Internals\JL-USA> - § 1 reference coded [6.34% Coverage] Reference 1 - 6.34% Coverage</p> <ul style="list-style-type: none"> No <p>KHJ, HappilyEver, South Korea <Internals\KHJ-SK> - § 1 reference coded [7.17% Coverage] Reference 1 - 7.17% Coverage</p> <ul style="list-style-type: none"> No answer <p>KL, The Roots, Germany <Internals\KL-GER> - § 1 reference coded [1.54% Coverage] Reference 1 - 1.54% Coverage</p> <ul style="list-style-type: none"> No. <p>MA, The Grass lamp, Canada <Internals\MA-CAN> - § 1 reference coded [6.17% Coverage] Reference 1 - 6.17% Coverage</p> <ul style="list-style-type: none"> I was not basically moved by the concept to apply to this product specifically I was just acting on my own and trying to produce something what I going to feel nice <p>MH, The BalKonzept, Germany <Internals\MH-GER> - § 1 reference coded [9.52% Coverage] Reference 1 - 9.52% Coverage</p> <ul style="list-style-type: none"> I hate theory, I never or I don't care for theories I think I know this theory without knowing it. For me, it's obvious people need some nature in life. <p>NF, Grass Ottoman, USA <Internals\NF-USA> - § 1 reference coded [8.84% Coverage] Reference 1 - 8.84% Coverage</p> <ul style="list-style-type: none"> No answer <p>NR, Co-Habitation, France <Internals\NR-FRA> - § 1 reference coded [12.36% Coverage] Reference 1 - 12.36% Coverage</p> <ul style="list-style-type: none"> The theory came after this project, for two years now. I did read about biophilia in this book about the concept of biophilia <p>NU, Desert Eco Chair, USA <Internals\NU-USA> - § 1 reference coded [2.60% Coverage] Reference 1 - 2.60% Coverage</p> <ul style="list-style-type: none"> I did not audibly use the particular word or phrase in speech - but was certainly responding to its tenants of loving and yearning to be connected with nature <p>PVH, The Spire, Norway <Internals\PVH-NOR> - § 1 reference coded [3.17% Coverage] Reference 1 - 3.17% Coverage</p> <ul style="list-style-type: none"> No. I guess, it intuitively, I worked with an approach of not being aware of this term of biophilia or biophilic design There's a lots of study in Norway going on in terms of biophilia, but I've never heard this term that people using referring to nature as a way to enhance and help to cure and so on <p>SWR, Mushroom Ate my Furniture, Sweden/ Taiwan <Internals\SWR-SWE> - § 1 reference coded [0.68% Coverage] Reference 1 - 0.68% Coverage</p> <ul style="list-style-type: none"> No
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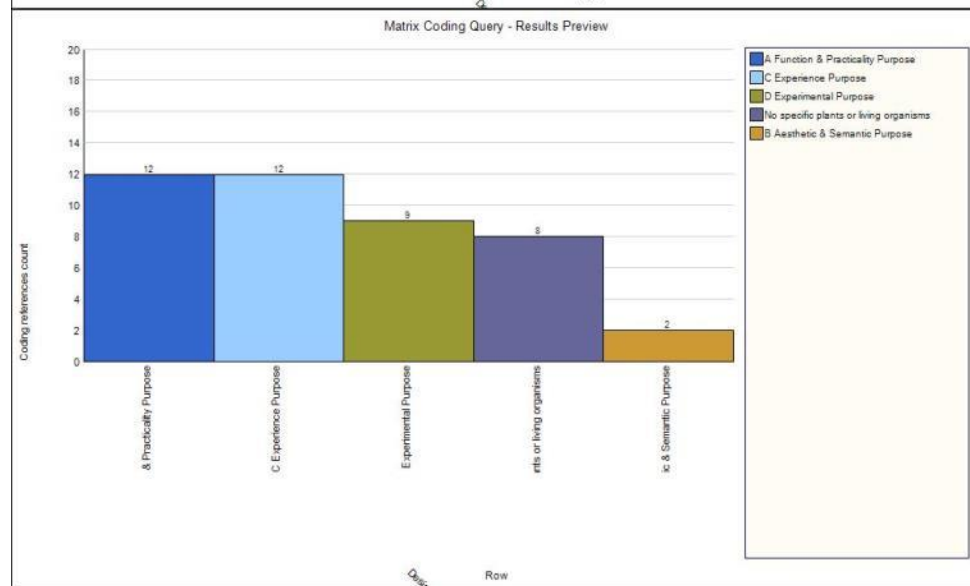
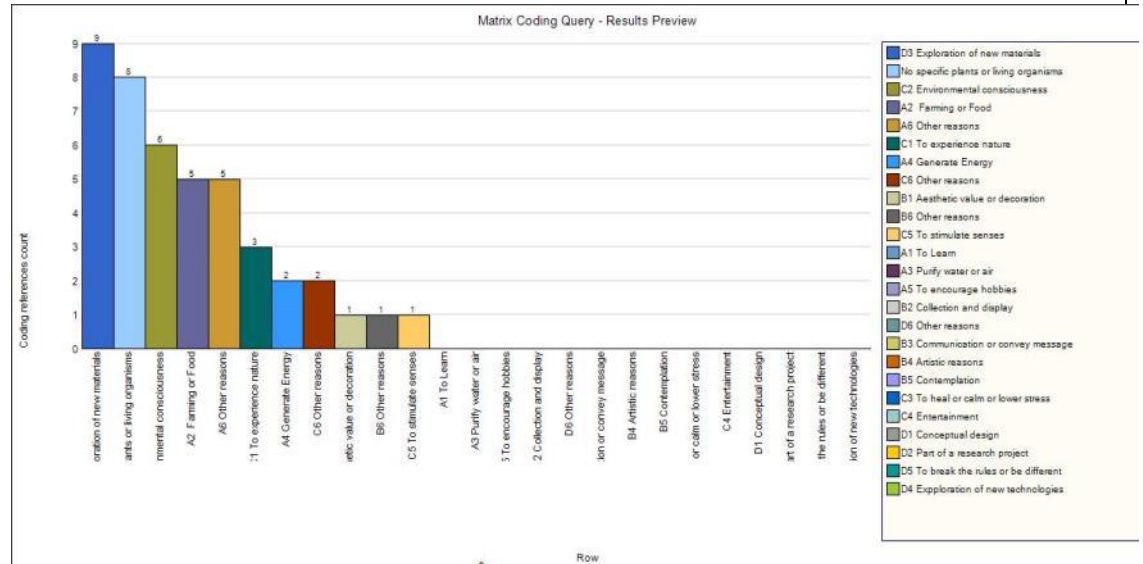
	<p>TH, The Cultivation Kitchen, Japan <Internals\\TH-JAP> - § 1 reference coded [11.92% Coverage] Reference 1 - 11.92% Coverage</p> <ul style="list-style-type: none"> No, our series is quite related to sustainable, it's a very important keyword for us, sustainability 
<p>Specific living organisms</p> <p>Q9: Why did you choose the specific types of plants or animals embedded into your design?</p>	<p>AG, Talita Bench Exterior, Mexico <Internals\\AG-MEX> - § 1 reference coded [6.69% Coverage] Reference 1 - 6.69% Coverage</p> <ul style="list-style-type: none"> To be honest, I don't precisely and decide some specific type of plants to be used and a specific tree. <p>CP, The Moss Table, London, UK <Internals\\CP-UK> - § 1 reference coded [11.48% Coverage] Reference 1 - 11.48% Coverage</p> <ul style="list-style-type: none"> They proposed that moss would be better organisms to use because it was more resilient and got some properties that were better for the table. in theory you can use any plants to generate electricity because the process where the electricity is harness photosynthesis, and all plants do photosynthesis It much better to use moss because first of all, you need to keep it in a good humidity conditions that you don't have to, because they don't have roots, they'll revive and they don't need direct light exposure which is good because the table will be in indoor places <p>DB, The Furnibloom, Iceland <Internals\\DB-ICE> - § 1 reference coded [15.56% Coverage] Reference 1 - 15.56% Coverage</p> <ul style="list-style-type: none"> I'm very much aware of the lacking space for food production in the world, and agriculture in cities, that was my interest. I also saw it as a way to make our environment more beautiful, with colourful plants. I also had in mind, that you would not need much space, for example just on a balcony <p>DLH, Chair 1: Rococo Chair Retrofitted, USA <Internals\\DLH-USA> - § 1 reference coded [1.62% Coverage] Reference 1 - 1.62% Coverage</p> <ul style="list-style-type: none"> It's really because people don't want insects in their domestic spaces and so they try to, put a lot of energy into resisting them to take a different approach in to see how people would respond to that <p>EW, The Planter Table, USA <Internals\\EW-USA> - § 1 reference coded [11.05% Coverage] Reference 1 - 11.05% Coverage</p> <ul style="list-style-type: none"> The wheatgrass I initially chose due to the trend of drinking wheatgrass juice. The original concept was to mow away enough wheatgrass every morning to juice in your home.

	<ul style="list-style-type: none"> • Another driving factor in choosing wheatgrass was the formal characteristics of wheatgrass. <p>GZ, The Stitch Table, USA <Internals\GZ-USA> - § 1 reference coded [6.88% Coverage] Reference 1 - 6.88% Coverage</p> <ul style="list-style-type: none"> • Random plants. <p>JL, The Galapagos Coffee Table, USA <Internals\JL-USA> - § 1 reference coded [4.60% Coverage] Reference 1 - 4.60% Coverage</p> <ul style="list-style-type: none"> • I used Wheat Grass which is used for juicing • Edible. <p>KHJ, HappilyEver, South Korea <Internals\KHJ-SK> - § 1 reference coded [9.45% Coverage] Reference 1 - 9.45% Coverage</p> <ul style="list-style-type: none"> • We are all born in nature and we live our lives in it • Increasing of the number of abandoned dogs. <p>KL, The Roots, Germany <Internals\KL-GER> - § 1 reference coded [7.15% Coverage] Reference 1 - 7.15% Coverage</p> <ul style="list-style-type: none"> • I only used plants which have water roots which in the end turn into wood, the one which has 80% of water in the roots • Most of the plants I choose can grow quickly and I don't have to wait for years to see it grows. • I need to see how the roots grow; to which direction will it grows. <p>MA, The Grass lamp, Canada <Internals\MA-CAN> - § 1 reference coded [16.77% Coverage] Reference 1 - 16.77% Coverage</p> <ul style="list-style-type: none"> • the whole idea is to creating something live, organic, and green, is to bring back to life into the object, and would become lifeless • Our plant is edible, we can have a juice. So you can plant whatever you like. <p>MH, The BalKonzept, Germany <Internals\MH-GER> - § 1 reference coded [3.18% Coverage] Reference 1 - 3.18% Coverage</p> <ul style="list-style-type: none"> • No specific plants • They can decide what they want to put in <p>NF, Grass Ottoman, USA <Internals\NF-USA> - § 1 reference coded [10.05% Coverage] Reference 1 - 10.05% Coverage</p> <ul style="list-style-type: none"> • Found sample I liked, when appropriate use came up, I used it for this project <p>NR, Co-Habitation, France <Internals\NR-FRA> - § 1 reference coded [9.25% Coverage] Reference 1 - 9.25% Coverage</p> <ul style="list-style-type: none"> • To choose a spider was because, in my home, I have some spiders and I tried to find a good balance life between human and spiders • The spider web helps to collect or eat insects in your home and also collected the dust while the spiders build their webs <p>NU, Desert Eco Chair, USA <Internals\NU-USA> - § 1 reference coded [11.50% Coverage] Reference 1 - 11.50% Coverage</p> <ul style="list-style-type: none"> • 35 percent of the earth's surface is covered by desert, arid mountains and dry plateaus - these succulents and cacti are the genus & species found in these places <p>PVH, The Spire, Norway <Internals\PVH-NOR> - § 1 reference coded [0.82% Coverage] Reference 1 - 0.82% Coverage</p> <ul style="list-style-type: none"> • The consumers or the users can plant anything on the table <p>SWR, Mushroom Ate my Furniture, Sweden/ Taiwan <Internals\SWR-SWE> - § 1 reference coded [1.86% Coverage] Reference 1 - 1.86% Coverage</p> <ul style="list-style-type: none"> • To decompose the furniture because the fungus will start to take some nutrition, it is more like this wood is providing nutrition to fungus
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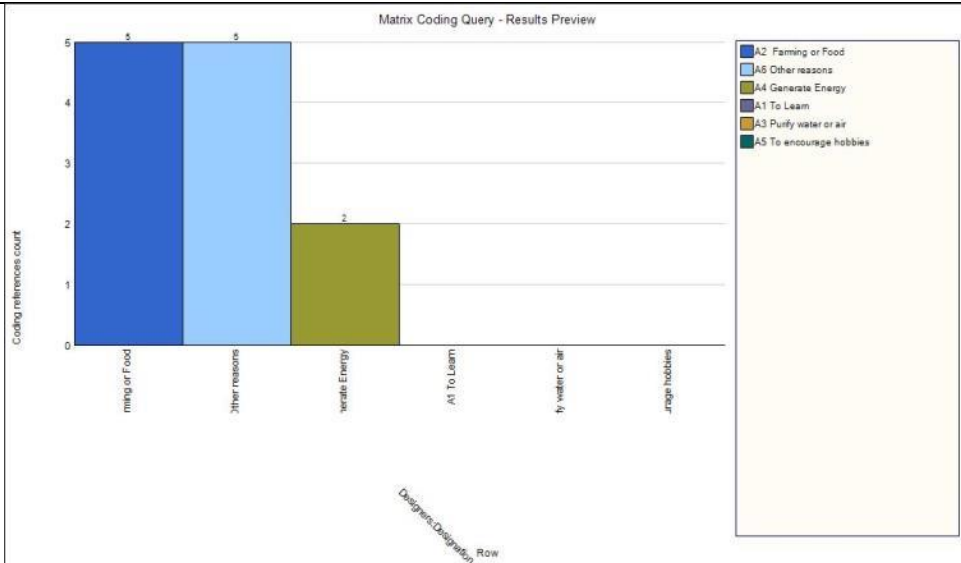
TH, The Cultivation Kitchen, Japan <Internals\\TH-JAP> - § 1 reference coded [4.30% Coverage]

Reference 1 - 4.30% Coverage

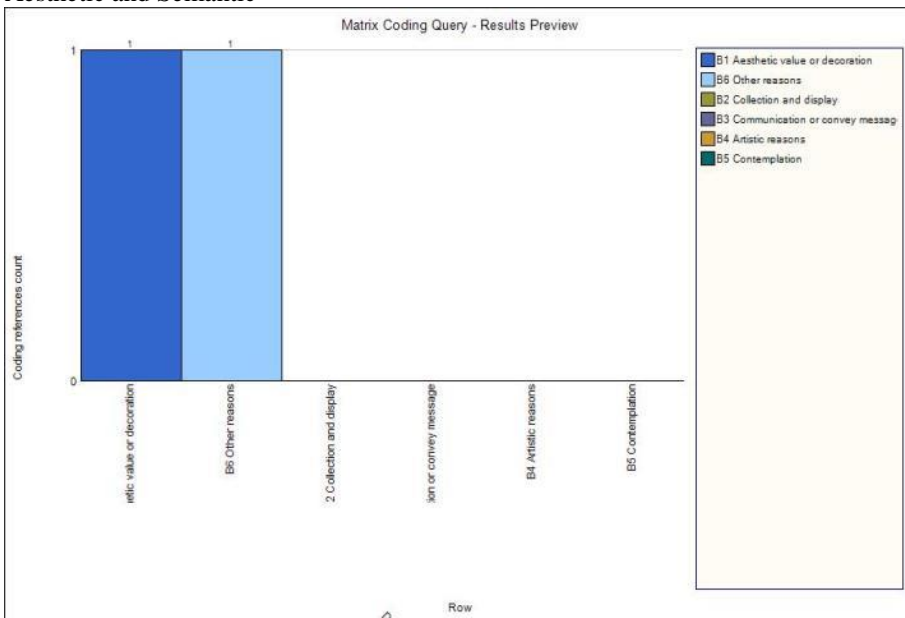
- To produce organic vegetables
- to promote a healthy lifestyle about eating and living



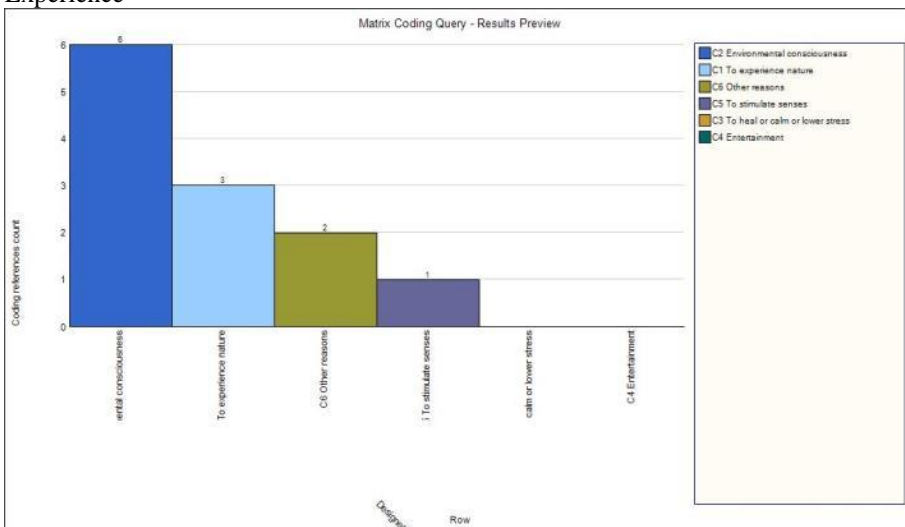
Function and Practicality



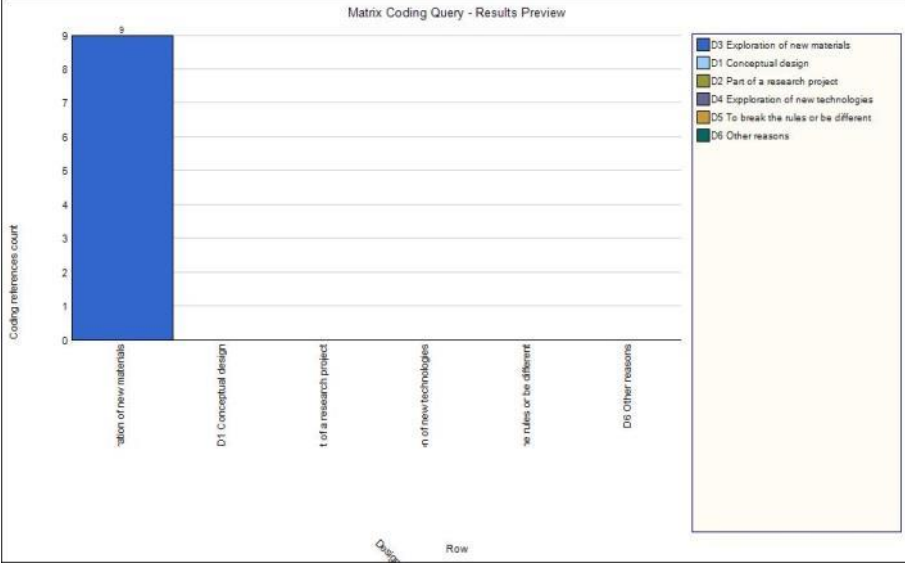
Aesthetic and Semantic



Experience



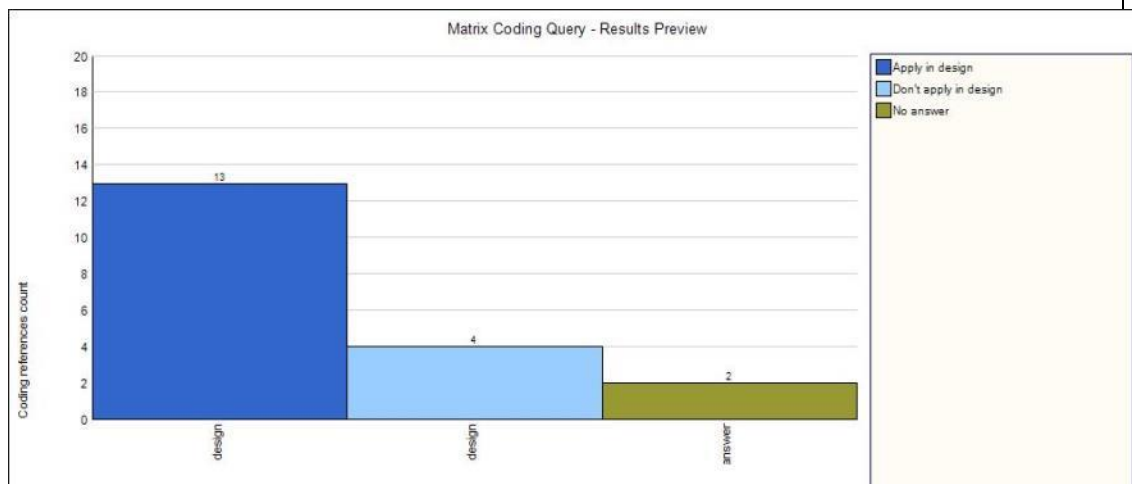
Experimental

	 <p>Matrix Coding Query - Results Preview</p> <p>Coding references count</p> <p>Row</p> <p>Legend:</p> <ul style="list-style-type: none"> D3 Exploration of new materials D1 Conceptual design D2 Part of a research project D4 Exploration of new technologies D5 To break the rules or be different D6 Other reasons <table border="1"> <thead> <tr> <th>Category</th> <th>Coding references count</th> </tr> </thead> <tbody> <tr> <td>Exploration of new materials</td> <td>9</td> </tr> <tr> <td>D1 Conceptual design</td> <td>0</td> </tr> <tr> <td>Part of a research project</td> <td>0</td> </tr> <tr> <td>Exploration of new technologies</td> <td>0</td> </tr> <tr> <td>To break the rules or be different</td> <td>0</td> </tr> <tr> <td>D6 Other reasons</td> <td>0</td> </tr> </tbody> </table>	Category	Coding references count	Exploration of new materials	9	D1 Conceptual design	0	Part of a research project	0	Exploration of new technologies	0	To break the rules or be different	0	D6 Other reasons	0
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Exploration of new materials	9														
D1 Conceptual design	0														
Part of a research project	0														
Exploration of new technologies	0														
To break the rules or be different	0														
D6 Other reasons	0														
<p>Knowledge: Emotional Design</p> <p>Q10: Do you know what emotional design is?</p>	<p>AG, Talita Bench Exterior, Mexico <Internals\AG-MEX> - § 1 reference coded [0.85% Coverage] Reference 1 - 0.85% Coverage</p> <ul style="list-style-type: none"> • Yes. <p>CP, The Moss Table, London, UK <Internals\CP-UK> - § 1 reference coded [0.22% Coverage] Reference 1 - 0.22% Coverage</p> <ul style="list-style-type: none"> • Yes. <p>DB, The Furnibloom, Iceland <Internals\DB-ICE> - § 1 reference coded [2.06% Coverage] Reference 1 - 2.06% Coverage</p> <ul style="list-style-type: none"> • Yes. <p>DLH, Chair 1: Rococo Chair Retrofitted, USA <Internals\DLH-USA> - § 1 reference coded [0.96% Coverage] Reference 1 - 0.96% Coverage</p> <ul style="list-style-type: none"> • We were not thinking in terms of Donald Norman and his thinking about emotional design <p>EW, The Planter Table, USA <Internals\EW-USA> - § 1 reference coded [1.58% Coverage] Reference 1 - 1.58% Coverage</p> <ul style="list-style-type: none"> • No. <p>GZ, The Stitch Table, USA <Internals\GZ-USA> - § 1 reference coded [0.68% Coverage] Reference 1 - 0.68% Coverage</p> <ul style="list-style-type: none"> • Yes. <p>JL, The Galapagos Coffee Table, USA <Internals\JL-USA> - § 1 reference coded [2.34% Coverage] Reference 1 - 2.34% Coverage</p> <ul style="list-style-type: none"> • No. <p>KHJ, HappilyEver, South Korea <Internals\KHJ-SK> - § 1 reference coded [3.07% Coverage] Reference 1 - 3.07% Coverage</p> <ul style="list-style-type: none"> • Yes, I guess so <p>KL, The Roots, Germany <Internals\KL-GER> - § 1 reference coded [1.75% Coverage] Reference 1 - 1.75% Coverage</p> <ul style="list-style-type: none"> • Yes. 														

	<p>MA, The Grass lamp, Canada <Internals\MA-CAN> - § 1 reference coded [0.49% Coverage] Reference 1 - 0.49% Coverage</p> <ul style="list-style-type: none"> No. <p>MH, The BalKonzept, Germany <Internals\MH-GER> - § 1 reference coded [10.05% Coverage] Reference 1 - 10.05% Coverage</p> <ul style="list-style-type: none"> The theories and the design principles, I don't know that <p>NF, Grass Ottoman, USA <Internals\NF-USA> - § 1 reference coded [3.17% Coverage] Reference 1 - 3.17% Coverage</p> <ul style="list-style-type: none"> No answer <p>NR, Co-Habitation, France <Internals\NR-FRA> - § 1 reference coded [2.37% Coverage] Reference 1 - 2.37% Coverage</p> <ul style="list-style-type: none"> I don't really know about emotional design <p>NU, Desert Eco Chair, USA <Internals\NU-USA> - § 1 reference coded [0.70% Coverage] Reference 1 - 0.70% Coverage</p> <ul style="list-style-type: none"> I suppose that I do intuitively <p>PVH, The Spire, Norway <Internals\PVH-NOR> - § 1 reference coded [2.08% Coverage] Reference 1 - 2.08% Coverage</p> <ul style="list-style-type: none"> Yes. <p>SWR, Mushroom Ate my Furniture, Sweden/ Taiwan <Internals\SWR-SWE> - § 1 reference coded [3.81% Coverage] Reference 1 - 3.81% Coverage</p> <ul style="list-style-type: none"> I think so <p>TH, The Cultivation Kitchen, Japan <Internals\TH-JAP> - § 1 reference coded [6.39% Coverage] Reference 1 - 6.39% Coverage</p> <ul style="list-style-type: none"> Yes, if we see the vegetables or some plants in the kitchen in the furniture, we're surprised. That's an emotional experience <div> <p>Matrix Coding Query - Results Preview</p> <table border="1"> <thead> <tr> <th>Category</th> <th>Coding references count</th> </tr> </thead> <tbody> <tr> <td>Yes</td> <td>11</td> </tr> <tr> <td>No</td> <td>5</td> </tr> <tr> <td>no answer</td> <td>1</td> </tr> </tbody> </table> </div>	Category	Coding references count	Yes	11	No	5	no answer	1
Category	Coding references count								
Yes	11								
No	5								
no answer	1								
<p>Emotional design application</p> <p>Q11: Did you</p>	<p>AG, Talita Bench Exterior, Mexico <Internals\AG-MEX> - § 1 reference coded [15.19% Coverage] Reference 1 - 15.19% Coverage</p> <ul style="list-style-type: none"> I don't think about it. But as I think about it now, I think it's a yes. I think it wasn't intently. Personally everything that I did while designing furniture, I tried to integrate something, 								

<p>use principles of emotional design when designing your project?</p>	<p>about emotional design.</p> <ul style="list-style-type: none"> • So, I think I can say that I may have that approach, • I try to, maybe some parts, small part. <p>CP, The Moss Table, London, UK <Internals\CP-UK> - § 1 reference coded [5.29% Coverage] Reference 1 - 5.29% Coverage</p> <ul style="list-style-type: none"> • No, well I think I didn't. When I was designing it, I wasn't thinking emotional design. • The only thing close to emotion was I wanted to focus the attention of people, so I like them to be able to look at the moss, to focus on the plant and puts the object in the second level. • So, yes, I guess that has to do with emotion because plants have something, close to our nature and they are alive <p>DB, The Furnibloom, Iceland <Internals\DB-ICE> - § 1 reference coded [5.44% Coverage] Reference 1 - 5.44% Coverage</p> <ul style="list-style-type: none"> • It was not the main goal, but it came as an extra bonus <p>DLH, Chair 1: Rococo Chair Retrofitted, USA <Internals\DLH-USA> - § 1 reference coded [0.93% Coverage] Reference 1 - 0.93% Coverage</p> <ul style="list-style-type: none"> • We did not apply principle of emotional design when designing the project <p>EW, The Planter Table, USA <Internals\EW-USA> - § 1 reference coded [2.82% Coverage] Reference 1 - 2.82% Coverage</p> <ul style="list-style-type: none"> • No answer <p>GZ, The Stitch Table, USA <Internals\GZ-USA> - § 1 reference coded [13.62% Coverage] Reference 1 - 13.62% Coverage</p> <ul style="list-style-type: none"> • I would say my furniture is very personal just because I have never done anything like commercial purpose. • it sort of nice when other people come for the first time and see the table and delighted by how unique it is with the plants in there and all that stuff • it's really elevating people to something that they can enjoy. • It isn't just to be functional, but to sort of to create delight <p>JL, The Galapagos Coffee Table, USA <Internals\JL-USA> - § 1 reference coded [12.46% Coverage] Reference 1 - 12.46% Coverage</p> <ul style="list-style-type: none"> • I strive to connect design with a visceral emotional experience to create value when interacting with my products and environments. <p>KHJ, HappilyEver, South Korea <Internals\KHJ-SK> - § 1 reference coded [5.84% Coverage] Reference 1 - 5.84% Coverage</p> <ul style="list-style-type: none"> • Give experience and make people feel <p>KL, The Roots, Germany <Internals\KL-GER> - § 1 reference coded [3.95% Coverage] Reference 1 - 3.95% Coverage</p> <ul style="list-style-type: none"> • Yes, I try too. • It involved different levels of emotions. • It's involved the form and the material itself and the stories behind the projects, and the ideas to trigger the emotion. <p>MA, The Grass lamp, Canada <Internals\MA-CAN> - § 1 reference coded [13.71% Coverage] Reference 1 - 13.71% Coverage</p> <ul style="list-style-type: none"> • 100% yes • It's the same but in design and architecture is the same thing, you're looking at an object and a building you're starting to developing emotions • if you look at something emotionally, something bright, you'll associate it sunlight, people generally feel better <p>MH, The Balkonzepit, Germany <Internals\MH-GER> - § 1 reference coded [7.83%</p>
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	<p>Coverage]</p> <p>Reference 1 - 7.83% Coverage</p> <ul style="list-style-type: none"> • Yes, more intuitively • I don't think about the theories to switch on the emotional components, but that's not my main intention to help people with their life <p><i>NF, Grass Ottoman, USA</i> <Internals\NF-USA> - § 1 reference coded [5.48% Coverage]</p> <p>Reference 1 - 5.48% Coverage</p> <ul style="list-style-type: none"> • No answer <p><i>NR, Co-Habitation, France</i> <Internals\NR-FRA> - § 1 reference coded [2.69% Coverage]</p> <p>Reference 1 - 2.69% Coverage</p> <ul style="list-style-type: none"> • Mutually, yes, and probably. Is it like the concept of Japanese of Kawaii? Very cute. <p><i>NU, Desert Eco Chair, USA</i> <Internals\NU-USA> - § 1 reference coded [4.93% Coverage]</p> <p>Reference 1 - 4.93% Coverage</p> <ul style="list-style-type: none"> • As an artist, I am always balancing as many aspects of design, form, function, aesthetic, my tastes, wanting it to appeal to others, originality, etc. so, emotions and reactions do play a role. • It's a gift that we give each other to remind each other, to be human and to be lovely and to be part of nature <p><i>PVH, The Spire, Norway</i> <Internals\PVH-NOR> - § 1 reference coded [7.70% Coverage]</p> <p>Reference 1 - 7.70% Coverage</p> <ul style="list-style-type: none"> • But in terms of Spire, I haven't really thought of if it something that raises the emotional value of this design, so I'm not quite sure if that applies to the table design • I don't aim to trigger certain emotional <p><i>SWR, Mushroom Ate my Furniture, Sweden/ Taiwan</i> <Internals\SWR-SWE> - § 1 reference coded [0.41% Coverage] Reference 1 - 0.41% Coverage</p> <ul style="list-style-type: none"> • No. <p><i>TH, The Cultivation Kitchen, Japan</i> <Internals\TH-JAP> - § 1 reference coded [4.83% Coverage]</p> <p>Reference 1 - 4.83% Coverage</p> <ul style="list-style-type: none"> • Yes, maybe. Japanese uses a different definition, it's very difficult to explain. For me, eating is very emotional.
<p>Natural elements on emotion</p>	<p><i>AG, Talita Bench Exterior, Mexico</i> <Internals\AG-MEX> - § 1 reference coded [7.06% Coverage]</p> <p>Reference 1 - 7.06% Coverage</p> <ul style="list-style-type: none"> • Absolutely. • I think people do feel something towards living organisms.



<p>Q12: Do you think that natural elements can encourage emotional attachment of people with their furniture?</p>	<p>CP, The Moss Table, London, UK <Internals\CP-UK> - § 1 reference coded [12.25% Coverage] Reference 1 - 12.25% Coverage</p> <ul style="list-style-type: none"> • Yes, I think so. • A plant is a living organisms and people's relation with plants are like the relationship of between two beings to existence in being, so you can see people talking to the plants in very kind of affectionate way • All I can say is the nature of the relationship of people with objects will change if the objects are made out of a living organisms • So I guess, in time you will maybe create a relationship, an effective relationship with that object because it's living organisms that is blending in a functional object. <p>DB, The Furnibloom, Iceland <Internals\DB-ICE> - § 1 reference coded [5.04% Coverage] Reference 1 - 5.04% Coverage</p> <ul style="list-style-type: none"> • Yes definitely. <p>DLH, Chair 1: Rococo Chair Retrofitted, USA <Internals\DLH-USA> - § 1 reference coded [13.82% Coverage] Reference 1 - 13.82% Coverage</p> <ul style="list-style-type: none"> • We were very much aware of the idea that natural elements, some people believe it can encourage emotional attachment to furniture and to all sorts and often that's like imagery, like images of natural elements • we were also aware that can happen with so many things, it doesn't limited to the natural elements • we accept that natural elements could encourage emotional attachment of people with their furniture but so can so many other things and we're mostly interested though in just crossing a kind of line and sync whether people thought this is interesting <p>EW, The Planter Table, USA <Internals\EW-USA> - § 1 reference coded [14.77% Coverage] Reference 1 - 14.77% Coverage</p> <ul style="list-style-type: none"> • Yes, absolutely. • I think that people and animals are engineered to want to be around this natural matter. When you have to care for something you also create a stronger attachment and when you sustain some part of yourself off of something, when you need it for food, which is one of the core elements we need to stay alive, you develop a more emotional attachment. <p>GZ, The Stitch Table, USA <Internals\GZ-USA> - § 1 reference coded [6.86% Coverage] Reference 1 - 6.86% Coverage</p> <ul style="list-style-type: none"> • the plant that you're connected to and the table you're connected to sort of double you're emotional connection to the product • It sort of like that will increase its value to people <p>JL, The Galapagos Coffee Table, USA <Internals\JL-USA> - § 1 reference coded [12.78% Coverage] Reference 1 - 12.78% Coverage</p> <ul style="list-style-type: none"> • Yes - on a tactile and psychological level relating to memory and past connection to the natural environment. Memories of gardens, camping, trips to nature, parks etc. <p>KHJ, HappilyEver, South Korea <Internals\KHJ-SK> - § 1 reference coded [9.69% Coverage] Reference 1 - 9.69% Coverage</p> <ul style="list-style-type: none"> • I hope to transfer people into the wild with the touch and feel of natural elements <p>KL, The Roots, Germany <Internals\KL-GER> - § 1 reference coded [12.41% Coverage] Reference 1 - 12.41% Coverage</p> <ul style="list-style-type: none"> • Yes, I think so. • it's the same as you'll get fascinated with the direction of the roots, how it grows and other special details • I have lots of respect for them, the plants and the animals. <p>MA, The Grass lamp, Canada <Internals\MA-CAN> - § 1 reference coded [1.14% Coverage]</p>
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Reference 1 - 1.14% Coverage

- 100% yes

MH, The BalKonzept, Germany <Internals\MH-GER> - § 1 reference coded [4.48% Coverage]

Reference 1 - 4.48% Coverage

- Yes, I think so
- to put in some plants; can also give a product some connotation

NF, Grass Ottoman, USA <Internals\NF-USA> - § 1 reference coded [7.31% Coverage]

Reference 1 - 7.31% Coverage

- No answer

NR, Co-Habitation, France <Internals\NR-FRA> - § 1 reference coded [8.81% Coverage]

Reference 1 - 8.81% Coverage

- Of course, the nature will produce more attachment with the furniture or any design
- if the people is a bit sensitive to nature, I think it will increase the attachment towards any product or furniture design

NU, Desert Eco Chair, USA <Internals\NU-USA> - § 1 reference coded [1.02% Coverage]

Reference 1 - 1.02% Coverage

- Yes.

PVH, The Spire, Norway <Internals\PVH-NOR> - § 1 reference coded [2.72% Coverage]

Reference 1 - 2.72% Coverage

- Yes, indeed there's many ways natural element in this table can trigger emotions. Yes

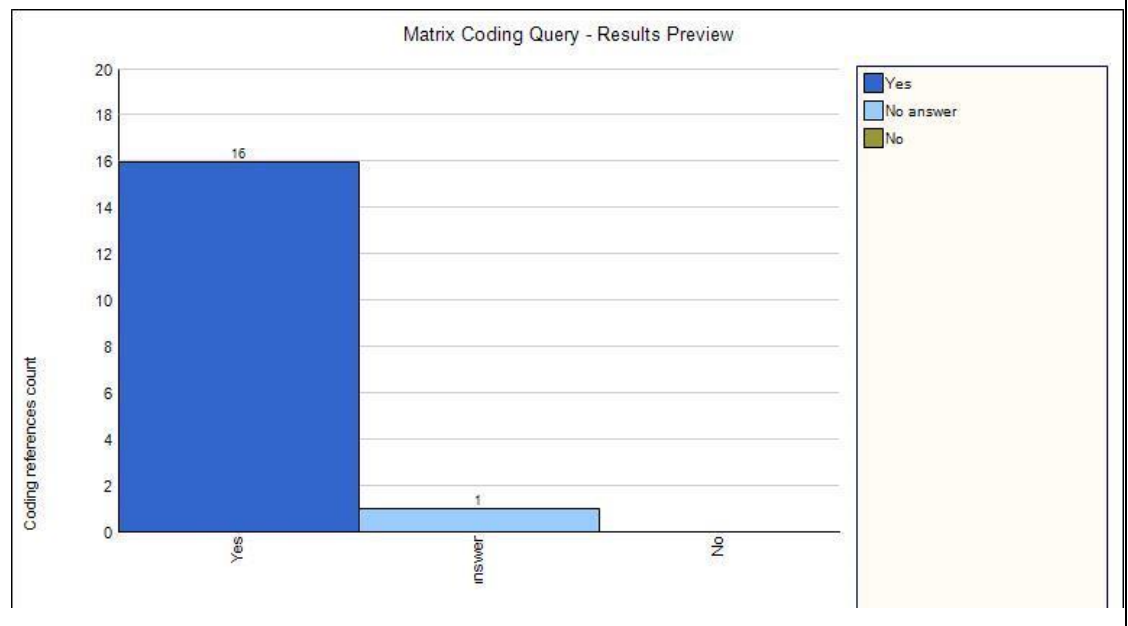
SWR, Mushroom Ate my Furniture, Sweden/ Taiwan <Internals\SWR-SWE> - § 1 reference coded [5.76% Coverage] Reference 1 - 5.76% Coverage

- I would say yes because it's much stronger than usual material and it something that has a life and has different looks all the time and people has different expectation and people doesn't know but it involve curiosity I guess

TH, The Cultivation Kitchen, Japan <Internals\TH-JAP> - § 1 reference coded [5.40% Coverage]

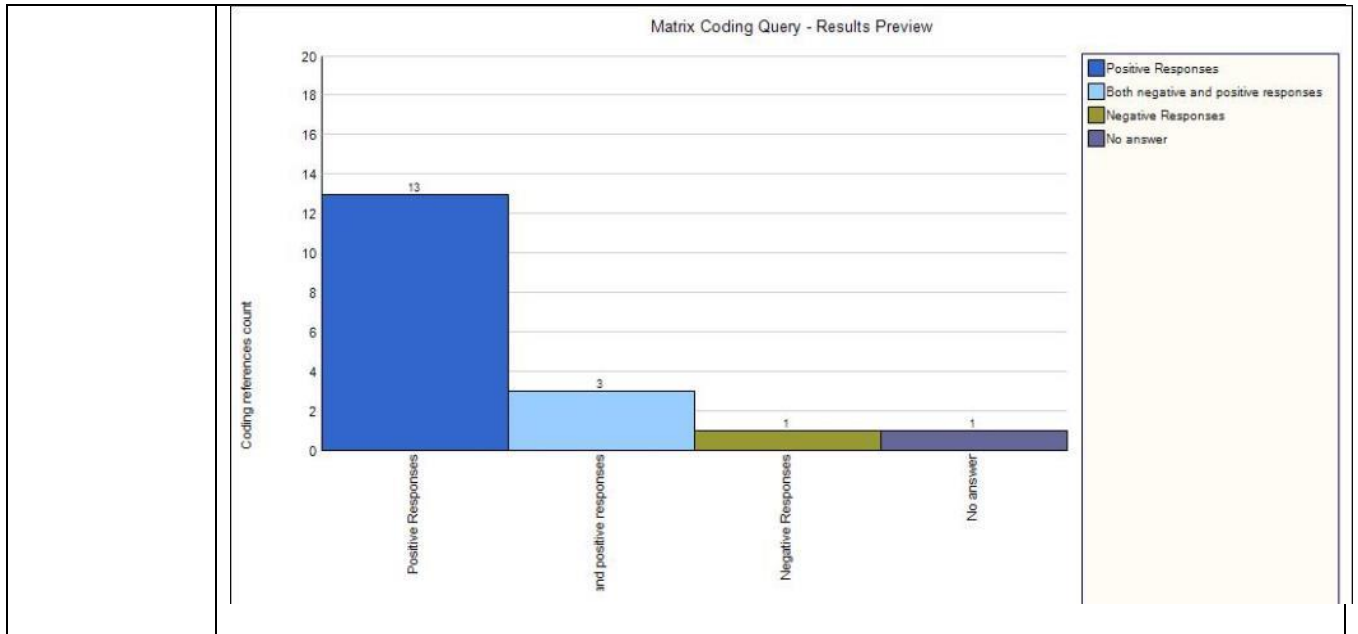
Reference 1 - 5.40% Coverage

- People want to grow some vegetable by themselves. I hope to encourage to other people to new things for family, society, friends make interaction



<p>Viewers respond towards FDLO</p> <p>Q13: How have people responded to your design? (Positive or negative reactions of viewers)</p>	<p>AG, Talita Bench Exterior, Mexico <Internals\AG-MEX> - § 1 reference coded [8.58% Coverage] Reference 1 - 8.58% Coverage</p> <ul style="list-style-type: none"> I think there's a lot of reactions I send it to design blogs and I think there was a good response about it. I don't remember any negative responses. <p>CP, The Moss Table, London, UK <Internals\CP-UK> - § 1 reference coded [8.77% Coverage] Reference 1 - 8.77% Coverage</p> <ul style="list-style-type: none"> I think in general the reaction has been very positive <p>DB, The Furnibloom, Iceland <Internals\DB-ICE> - § 1 reference coded [9.40% Coverage] Reference 1 - 9.40% Coverage</p> <ul style="list-style-type: none"> People love it, it always makes people smile, and comments like “wow, what a good idea” is very common and “I would like to have it on my balcony”. <p>DLH, Chair 1: Rococo Chair Retrofitted, USA <Internals\DLH-USA> - § 1 reference coded [7.87% Coverage] Reference 1 - 7.87% Coverage</p> <ul style="list-style-type: none"> It was interesting to people and for us is really interesting to see how blogs in different countries represent it in an almost ridiculous way We love just seeing the responses, both positive and negative We were just seeking to put it out there and to see how people responded to it <p>EW, The Planter Table, USA <Internals\EW-USA> - § 1 reference coded [17.07% Coverage] Reference 1 - 17.07% Coverage</p> <ul style="list-style-type: none"> People have responded very positively. I don't think that their reactions are purely based on the novelty of the design or that it is unexpected. I think that people have an emotional and conceptual reaction to bringing living organisms into their everyday furniture. I also think that people respond very positively to a cat being in a number of the photos. I think people want there to be an interactive experience with cute animals with their furniture. <p>GZ, The Stitch Table, USA <Internals\GZ-USA> - § 1 reference coded [1.83% Coverage] Reference 1 - 1.83% Coverage</p> <ul style="list-style-type: none"> definitely positive feedback <p>JL, The Galapagos Coffee Table, USA <Internals\JL-USA> - § 1 reference coded [8.32% Coverage] Reference 1 - 8.32% Coverage</p> <ul style="list-style-type: none"> Very well - it was created over 10 years ago and doesn't seem to have dated too much! <p>KHJ, HappilyEver, South Korea <Internals\KHJ-SK> - § 1 reference coded [5.14% Coverage] Reference 1 - 5.14% Coverage</p> <ul style="list-style-type: none"> No answer <p>KL, The Roots, Germany <Internals\KL-GER> - § 1 reference coded [8.95% Coverage] Reference 1 - 8.95% Coverage</p> <ul style="list-style-type: none"> My teacher was not happy about this project and asking me to stop wasting my time experimenting with it and wanted me to produce real designs. But, as the response from other people is quite good, people keep in touch and understand the project. Some were fascinated with the images and the prototypes. <p>MA, The Grass lamp, Canada <Internals\MA-CAN> - § 1 reference coded [6.00% Coverage] Reference 1 - 6.00% Coverage</p> <ul style="list-style-type: none"> Beautiful, 99.9% love the design we get hundreds of response that it's beautiful but hundreds is not enough, we need thousands But we do believe after publishing in the magazine, maybe we get high response to the
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	<p>product. I personally believe it's going to be a big product and people would generally love it.</p> <p>MH, The Balkonzept, Germany <Internals\MH-GER> - § 1 reference coded [4.88% Coverage] Reference 1 - 4.88% Coverage</p> <ul style="list-style-type: none"> • The only negative comments are regarding the price • I think the most comments also very positive. I received lots of positive comments from the urban density area, the United States and also Brazil <p>NF, Grass Ottoman, USA <Internals\NF-USA> - § 1 reference coded [12.07% Coverage] Reference 1 - 12.07% Coverage</p> <ul style="list-style-type: none"> • Always a 'Great Ottoman!', once they sit on it their attention is on the 'It's so comfortable' reaction. <p>NR, Co-Habitation, France <Internals\NR-FRA> - § 1 reference coded [13.31% Coverage] Reference 1 - 13.31% Coverage</p> <ul style="list-style-type: none"> • I have lots of bad reaction, people are mostly scared of spiders and they don't understand why I want to integrate it at home • when I explain the concept and people who are not really scare of spiders, the concept of synergy as the spiders can give us a service <p>NU, Desert Eco Chair, USA <Internals\NU-USA> - § 1 reference coded [7.35% Coverage] Reference 1 - 7.35% Coverage</p> <ul style="list-style-type: none"> • It has always been initially positive - especially since was 'ahead-of-its-time', original and visually unique. • A smaller percentage do comment on whether a sitting person will come in contact with any thorns from cacti, however, I did not place the varieties that could hurt someone in such a way <p>PVH, The Spire, Norway <Internals\PVH-NOR> - § 1 reference coded [7.16% Coverage] Reference 1 - 7.16% Coverage</p> <ul style="list-style-type: none"> • Attracted, both visually and sensually • they want to touch the table, and some people want to smell it, and smell the plants and the wood <p>SWR, Mushroom Ate my Furniture, Sweden/ Taiwan <Internals\SWR-SWE> - § 1 reference coded [28.66% Coverage] Reference 1 - 28.66% Coverage</p> <ul style="list-style-type: none"> • I received lots of positive responses and first a lot of people or most of them said it's very poetic, people thought it's very poetic because it's almost like you put like a poison to somebody before you die • Negative responses is people would think it's a bit creepy or like horror, people don't get used to have a piece of chair that can grow something, they think it's creepy <p>TH, The Cultivation Kitchen, Japan <Internals\TH-JAP> - § 1 reference coded [14.20% Coverage] Reference 1 - 14.20% Coverage</p> <ul style="list-style-type: none"> • I received lots of reaction, but generally, good reaction • We got a lot of opinion, we proposed for the future, but, some of the people 'We want to buy now...' • But, there's some opinion 'this kitchen invites summer insects such as mosquitoes and flies'. It maybe invites and some people don't want to use this kitchen because they hate the mosquitoes, there's water in the tray the cultivation kitchen use soil too.
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Appendix F: Chapter 6 – Triangulations

- Continuous Triangulation Table from Chapter 6
- Illustration of Data
 - From the Interviews
 - Detail cross section for Function and Practicality Category
 - Detail cross section for Aesthetic and Semantic Category
 - Detail cross section for Experience Category
 - Detail cross section for Experimental Category
 - From the Australian and International Designers
 - From the Stratified groups (Art and Design/Creative, Education/Academic and Students)
 - Early development

Appendix F: Chapter 6 – Triangulations

Continuous Triangulation Table from Chapter 6






























Table 6.8 (b) below is the continuous triangulation analyse from the triangulation analysis of quantitative and qualitative results of online survey and interviews in Chapter 6.

Even though there were no interviews done for *Q2: Life within Object*, *Q3: The Threatening Cactus*, *Q5: The Greenwall*, *Q8: The Aqua Table* and *Q9: Local River*, the responses by both respondent groups (Designers and stratified group) showed similarity. For example, most respondents except for the Australian designers responded to *Experience category: C1: To experience nature, C2: Environmental consciousness, C3: To heal/ calm/ lower stress, C4: Entertainment* and *C5: To stimulate senses* for *Q2: Life within Object*. Only 2 groups responded (Education/Academic and Students) to the *Aesthetic and Semantic category* with *B1: Aesthetic value/decoration* and *B4: Artistic reasons*.

<i>Q2: Life within Object</i>									
Experience: C1, C5, C3, C4		Experience: C1, C3, C4, C5, C2		Experience: C1, C2, C5, C3		Experience: C1, C2, C3, C4		No interview	
				Aesthetic and Semantic: B4, B1, B3		Aesthetic and Semantic: B4, B1, B2			
<i>Q3: The Threatening Cactus</i>									
Aesthetic and Semantic: B4, B3, B2, B1		Aesthetic and Semantic: B4, B1, B2, B3		Aesthetic and Semantic: B4, B1, B2		Aesthetic and Semantic: B4, B2, B1		No interview	
Experimental: D5, D1, D2		Experimental: D5, D1, D3		Experimental: D5, D1, D3, D2		Experimental: D5, D1, D3			
		Experience: C5, C4, C1		Experience: C1, C5, C2		Experience: C1, C5, C2			
Quantitative results					Qualitative Results				
Australian Designers (AD)/ International Designers (ID)			Stratified group (Art and Design/ Creative (AC), Education/ Academic (E) and Student (S))			Interviews (FDLO Designers)			
AD		ID	AC	E		S		D	
<i>Q4: The Stitch Table</i>									
Experience: C3, C1, C5, C2		Experience: C1, C5, C3, C2		Experience: C2, C1, C3, C5		Experience: C1, C3, C2, C5		Experience: C1, C6	
Aesthetic and Semantic: B1, B2, B4		Aesthetic and Semantic: B1, B2, B4		Aesthetic and Semantic: B1, B4, B2		Aesthetic and Semantic: B1, B4, B2		Aesthetic and Semantic: B1, B2, B3	

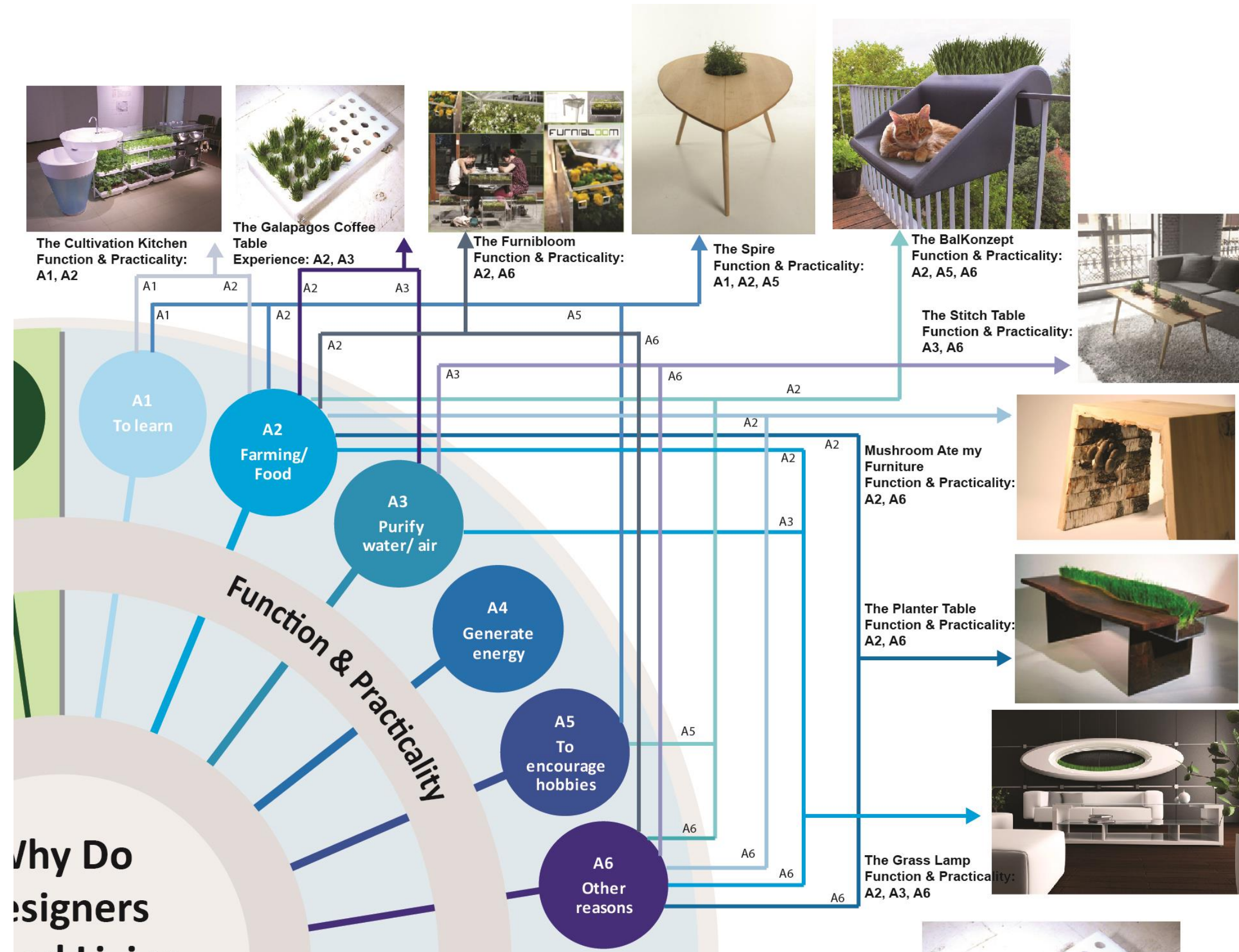
								Function and Practicality: A3, A6	
								Experimental: D1, D2	
<p>For Q4: <i>The Stitch Table</i>, it can be seen that, most all respondents agreed with interviewed designers where they chose C1: <i>To experience nature</i> from the Experience category, B1: <i>Aesthetic value/ decoration</i> and B2: <i>Collection and Display</i> from Aesthetic and Semantic category, but the Function and Practicality and Experimental main categories do not receive a higher response from the respondents.</p>									
Q5: The Greenwall									
Experience: C1, C3, C5, C2	Experience: C1, C3, C5, C2	Experience: C1, C3, C2, C5	Experience: C1, C3, C2	No interview					
Aesthetic and Semantic: B1, B2, B4	Aesthetic and Semantic: B1, B2, B4	Aesthetic and Semantic: B1, B2, B4	Aesthetic and Semantic: B1, B2, B4						
			Function and Practicality: A5, A3, A2						
Q6: Mushrooms Ate my Furniture									
Experimental: D5, D2, D1, D3	Experimental: D1, D3, D5, D2	Experimental: D3, D5, D2, D1, D4	Experimental: D5, D3, D1, D2	Experimental: D1, D2, D3, D6					
Quantitative results								Qualitative Results	
Australian Designers (AD)/ International Designers (ID)		Stratified group (Art and Design/ Creative (AC), Education/ Academic (E) and Student (S))					Interviews (FDLO Designers)		
AD	ID	AC	E	S	D				
Q6: Mushrooms Ate my Furniture									
	Aesthetic and Semantic: B4, B3, B1		Aesthetic and Semantic: B4, B3, B2,						

				Function and Practicality: A2, A6					
Experience: C5, C1, C2		Experience: C5, C1, C2				Experience: C1, C2, C5		Experience: C2, C4	
<p>It can be seen that all respondents agreed with the interviewed designer, that living organisms used in this FDLO in Q6: <i>Mushrooms Ate my Furniture</i>, were for <i>Experimental</i> category, where they similarly answered it for D1: <i>Conceptual design</i>, D2: <i>Part of a research project</i> and D3: <i>Exploration of new materials</i>.</p>									
Q7: The Moss Table									
Experimental: D1, D5, D4, D3		Experimental: D1, D4, D3, D2		Experimental: D1, D5, D3		Experimental: D1, D3, D5		Experimental: D1, D2, D4	
Experience: C3, C1, C5		Experience: C5, C1, C2		Experience: C1, C2, C3, C5		Experience: C1, C2, C5, C3		Experience: C2	
		Aesthetic and Semantic: B1, B2, B4		Aesthetic and Semantic: B1, B2, B4		Aesthetic and Semantic: B1, B2, B4		Aesthetic and Semantic: B3	
<p>The main reasons for the interviewed designer embedded the living organisms into his FDLO for Q7: <i>The Moss Table</i>, are for communication (B), as part of a research project and exploring a new technology. Moreover, all chose D1: <i>conceptual design</i>, which is from the <i>Experimental</i> category. However, only 2 out of 4 respondents agreed with the interviewed designer that this FDLO is for D4: <i>Exploration of new technologies</i>.</p>									
Q8: The Aqua Table									
Experience: C3, C1, C4		Experience: C1, C3, C4, C5		Experience: C3, C1, C4, C5		Experience: C3, C1, C4, C5		No interview	
Aesthetic and Semantic: B1, B2, B4, B5		Aesthetic and Semantic: B1, B2, B4		Aesthetic and Semantic: B1, B2, B4		Aesthetic and Semantic: B1, B2, B4			
Q9: Local River									

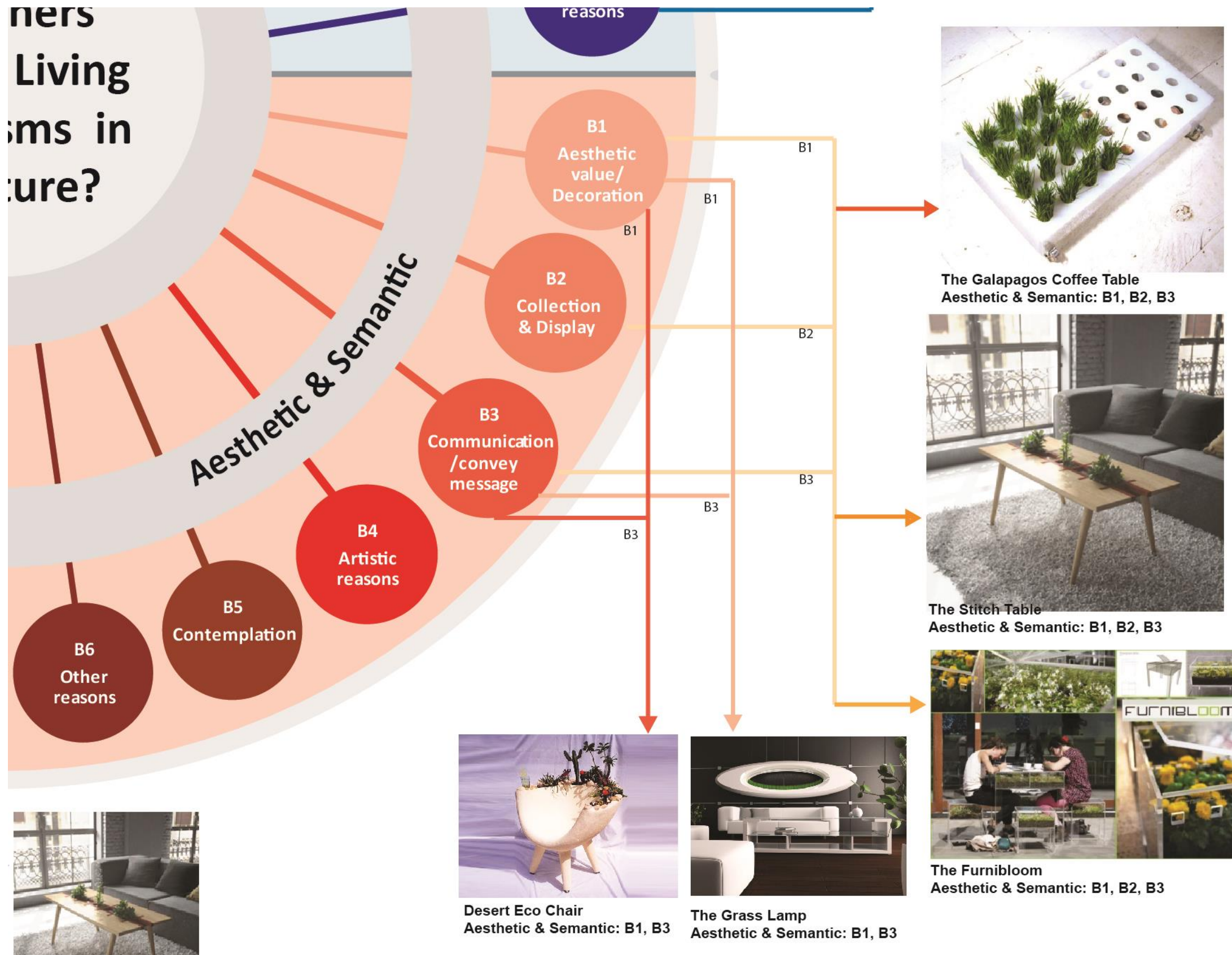
	Experience: C1, C4, C5	Experience: C1, C3, C5	Experience: C1, C4, C3, C5	No interview	
Experimental: D1, D5, D2	Experimental: D1, D5, D2	Experimental: D5, D2, D4			
Aesthetic and Semantic: B2, B1, B4	Aesthetic and Semantic: B2, B4, B1	Aesthetic and Semantic: B2, B1, B4	Aesthetic and Semantic: B1, B2, B4		
Q10: The Cultivation Kitchen					
Function and Practicality: A2, A1, A3, A5	Function and Practicality: A2, A1, A3	Function and Practicality: A2, A3, A5	Function and Practicality: A2, A5, A1, A3	Function and Practicality: A1, A2	
 	 	 	 		
 			 		
	Experimental: D2, D1, D4				
	 				
					
		Experience: C2, C1, C3	Experience: C2, C1, C3, C5	Experience: C1, C2, C3	
		 	 		
			 		
<p>The responses received from the interviewed designers are almost similar to the Australian designers and the stratified group for Q10: The Cultivation Kitchen where the interviewed designers stated that the purpose of using the living organisms are for Function and Practicality category (A1: To learn and A2: Farming/ food and for Experience category (C1: To experience nature, C2: Environmental consciousness and C3: To heal/ calm/ lower stress. Most respondents except the Education/ Academic didn't answer A1 and the respondents also answered A3: Purify water/ air and A5: To encourage hobbies, which is a relevant answer for the FDLO.</p>					

The 3 visual analyses (charts) have been designed based on the results gathered from the interviews and the online surveys and were designed separately. The charts show details categorisation of each FDLO in subcategories that were identified from the results. For figure 6.1, the results were gathered from 17 interviews with FDLOs designers, but only 16 of the FDLOs were included in the figure. The Grass Ottoman was excluded from the chart because it was designed without any real living organisms embedded into it. The images of FDLOs can be seen repetitively in the main categories based on the real reasons based on purposes provided by the designers.

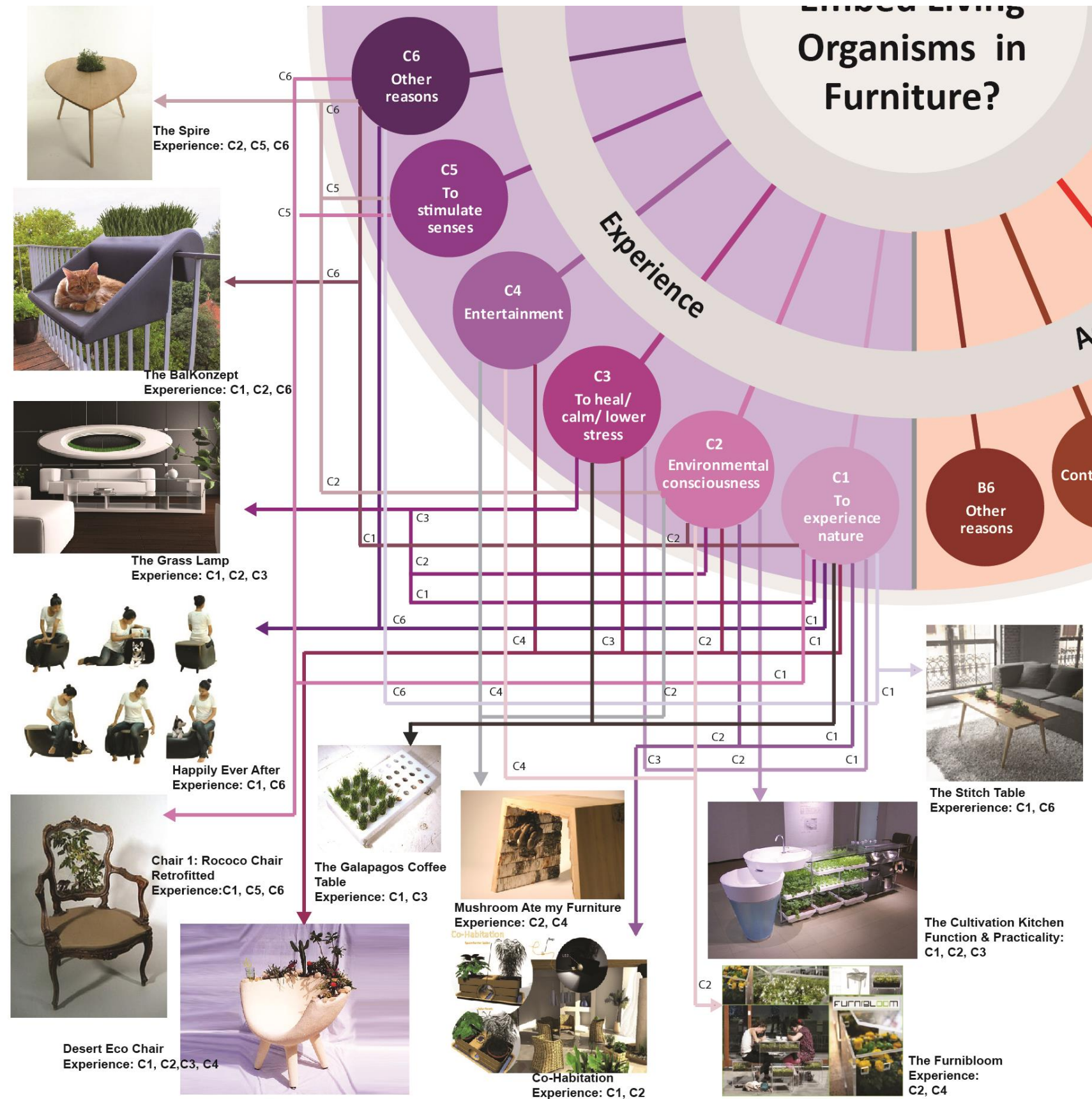
Detail cross section for Function and Practicality Category



Detail cross section for Aesthetic and Semantic Category



Detail cross section for Experience Category



Detail cross section for Experimental Category



Illustration of the Data Which Gathered from the SPSS (the Australian and International Designers)

VISUAL REPRESENTATION OF QUANTITATIVE (SPSS) RESULTS OF INTERNET SURVEY OF AUSTRALIAN DESIGNERS AND INTERNATIONAL DESIGNERS AS COMPARED TO CONCEPTUAL MODEL

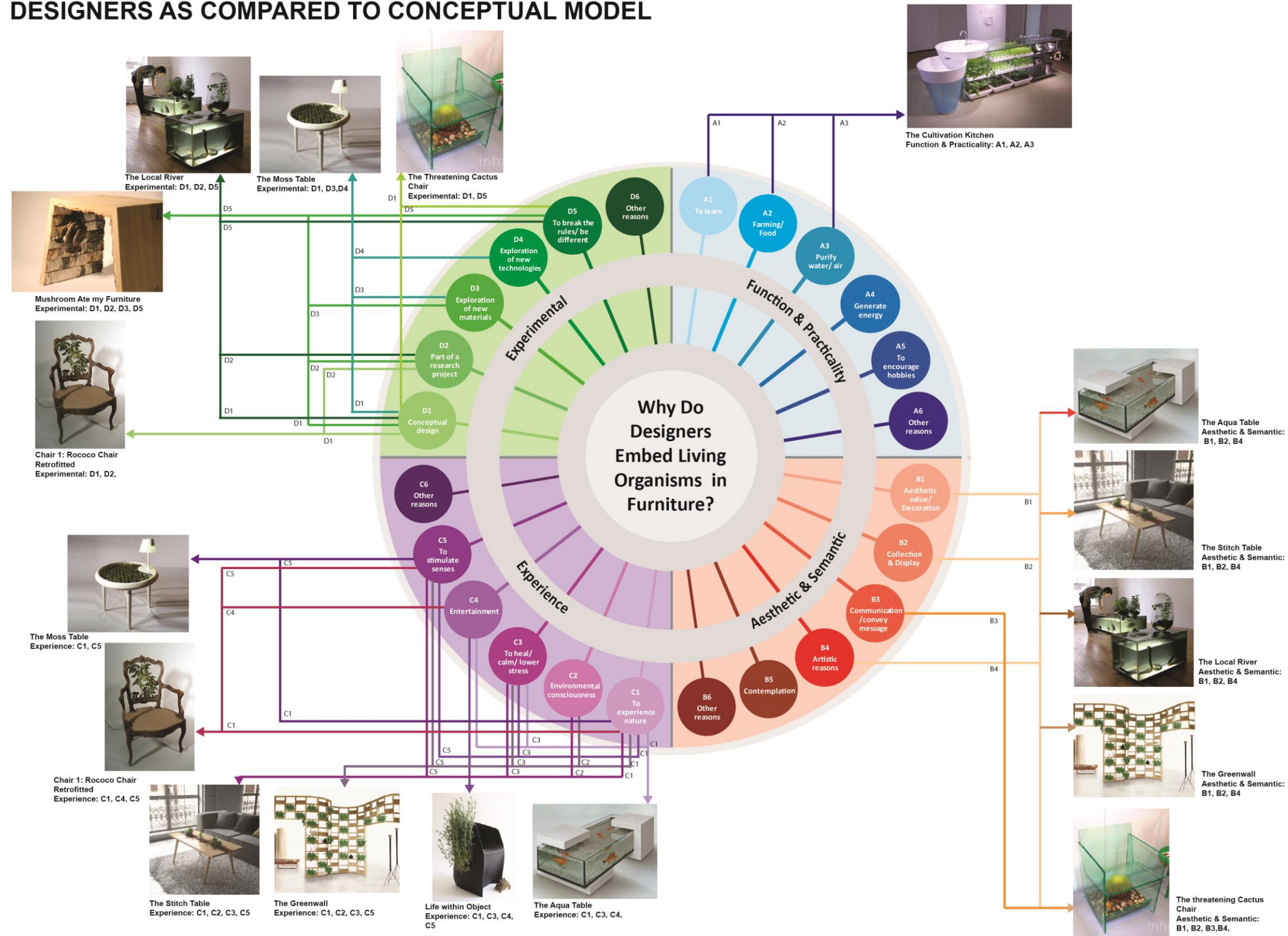


Illustration of the Data Which Gathered from the Stratified groups (Art and Design/Creative, Education/Academic and Students)

VISUAL REPRESENTATION OF QUANTITATIVE (SPSS) RESULTS OF INTERNET SURVEY OF STRATIFIED GROUP (ART & DESIGN/CREATIVE, EDUCATION/ACADEMIC AND STUDENTS AS COMPARED TO CONCEPTUAL MODEL

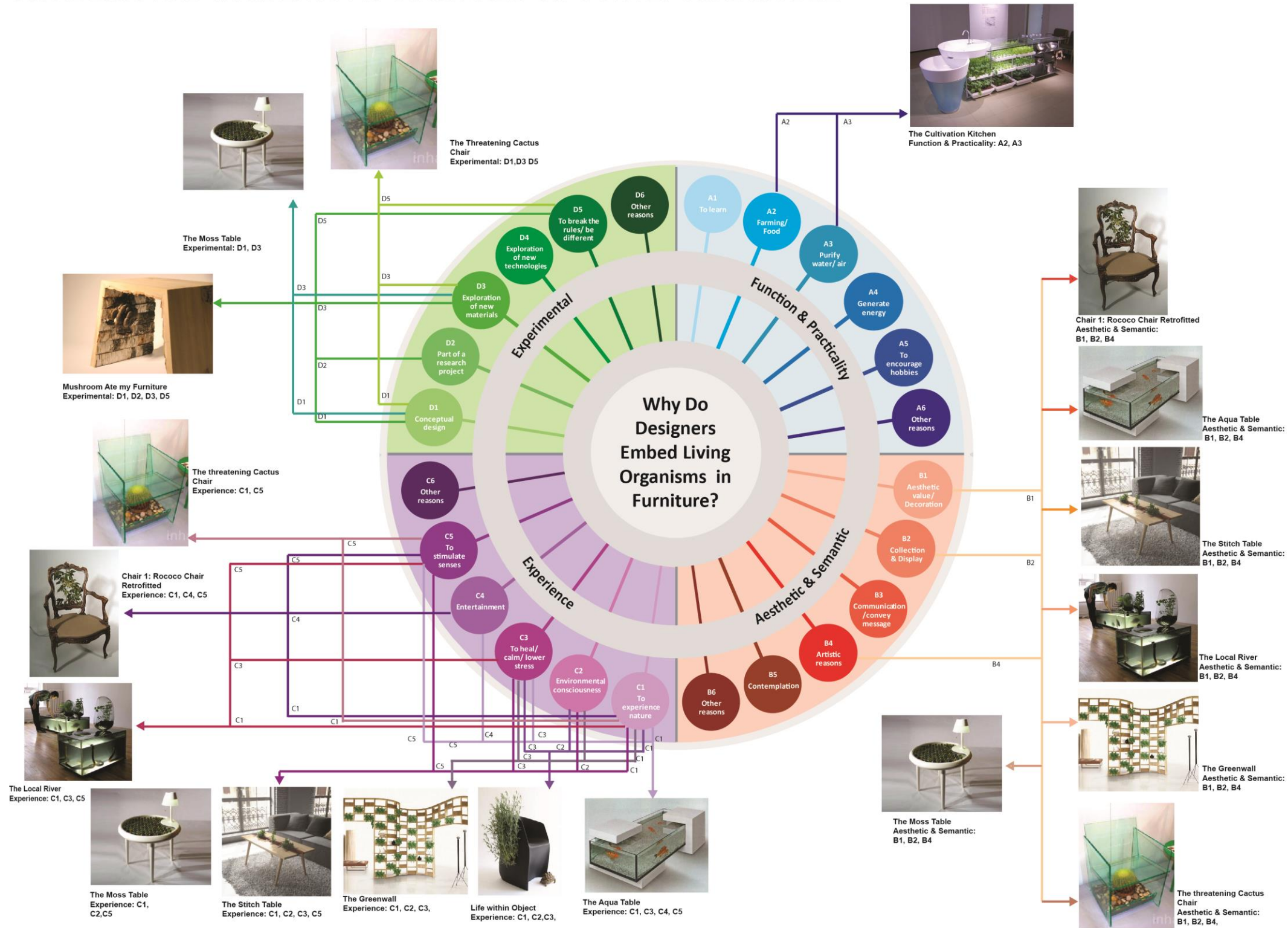
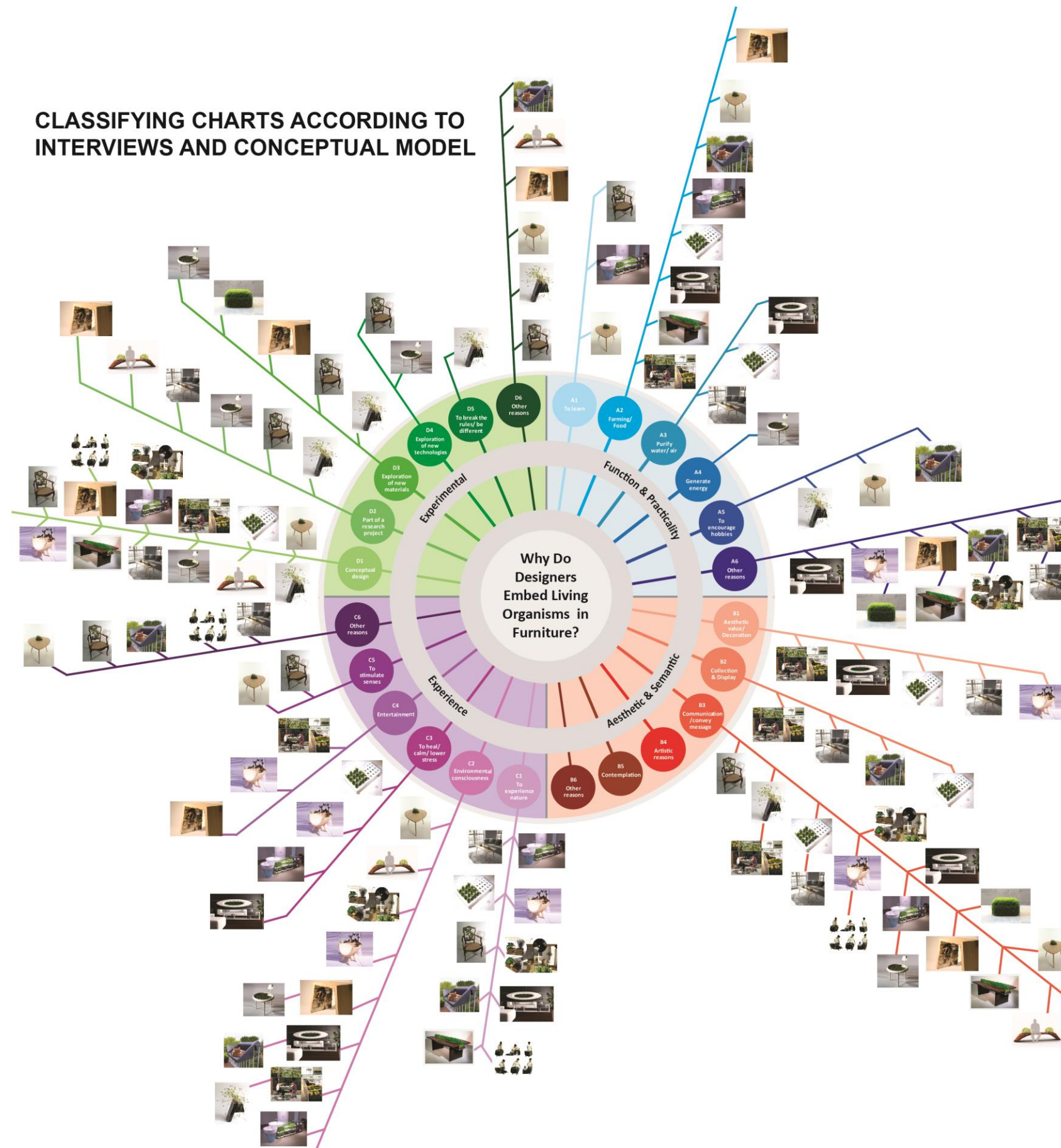


Illustration of the Data Which Gathered from the Interviews with 17 FDLO Designers – Early development



Appendix G: Peer Reviewed Journal Paper – IJAS 2014



A STUDY OF FURNITURE DESIGN INCORPORATING LIVING ORGANISMS WITH PARTICULAR REFERENCE TO BIOPHILIC AND EMOTIONAL DESIGN CRITERIA

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This paper reports on the first (theoretical) stage of a two-part investigation of selected aspects of biophilia theory as applied in the design of furniture, and with particular reference to design criteria that designers may use, including emotional criteria. The second (empirical) part of this investigation will report on the results of surveys based on the findings of the first stage and, while some empirical findings will be previewed in this paper, the main findings will be published in a separate paper. The aims of this paper are twofold: firstly, to investigate the wide-ranging typology of published furniture designs incorporating living organisms (often with few logical explanations apart from anecdotal or implied axiomatic benefits) and, secondly, to identify the criteria designers and users may employ to make design-and-use decisions about such furniture with particular reference to biophilic and emotional design criteria. Biophilia theory proposes that humans have an instinctive and innate need to connect with nature. In general, biophilic design uses biophilic principles in the design process. Interestingly, a review of the literature has found that, although biophilic design has been widely reported in architecture and environmental design circles, few studies address the logical application of these principles in the context of furniture design. Following a critical literature review, this paper proposes a novel typology of furniture designs that incorporate living organisms (such as plants, animals and insects). This typology is based on at least 168 furniture designs classified into 4 main categories and 24 sub-categories. The underlying purpose being to provide a framework from which useful furniture design criteria may be inferred subject to empirical testing. For brevity, a synopsis of this typology is presented in the main body of the paper with the details given in the appendix along with source credits. This is followed by proposing a model of evaluation criteria, a metric which may be used to inform the design of furniture from a user and designer perspective. The paper also presents a brief preview of how these models have been applied in the empirical part of this investigation, along with a summary of findings and conclusions.

Keywords: Biophilia, Biophilic design, Furniture design, Emotional design criteria, Living organisms.

INTRODUCTION

Biophilia, from the Greek *bios*: meaning life, and *philos*: love and bonding, is a theory which proposes that humans have an inherent affinity to affiliate with natural systems and processes (Wilson, 1984; Kellert et al, 2008). Although the ‘artificial’ built environment has often ‘protected’ people from nature,

humans and the natural surroundings are two things that cannot be separated because both are related to and benefit from each other. Moreover, humans tend to experience, reflect and bond with nature physically and mentally, and recent studies have proven the benefits of nature in the built environment for people's health and wellbeing (Kellert et al, 2008; Huelat et al, 2008; Park et al, 2009; Beatley, 2010; Reeve et al, 2012; Tracada, 2012; Reeve et al, 2013; Newman, 2014; Ryan et al, 2014; Terrapin, 2014; Zydervelt, 2014). There is also an emerging and well-known trend, especially in the architectural design of buildings, where biophilic design elements and principles are increasingly used. However, the links between "*furniture design with living organisms*" (referred to as FDLOs in this paper) and biophilic design have seldom been explored on a rational basis especially as to why designers use living organisms in their designs, or how consumers of such furniture react to such furniture designs from pragmatic, semantic or emotional points of view. It is not generally known if FDLOs are influenced by a variety of criteria including those based on emotional responses, although these are clearly important design criteria (Norman, 2004). A rational framework of these criteria needs to be developed so as to better inform and understand the design of such furniture. In addition, the range of FDLOs types, published in the literature, does not appear to have been classified into logical groups. Hence a typology of such designs is urgently needed especially for design research and design process purposes. The following review of the literature will outline much of what has been published in relation to these aspects as well as highlighting the need for additional research.

LITERATURE REVIEW

Definitions: It is important to briefly review the meanings of the terms furniture design, biophilia and biophilic design, and emotional design, as follows below.

Furniture design: can be defined as the design of movable, functional objects that support human activities such as tables, chairs, sofas, beds and storages. Different types of furniture are designed to cater for different types of activities. Furniture designs can be classified based on the materials from which they are made, craftsmanship, function, styles, status, beliefs, cultures, eras, and psychographic and demographic factors (Hinchman, 2009; Pina, 2010). Current or contemporary designs are diverse because of new needs, trends, advances in ergonomics, and the development of new technologies in manufacturing and materials. Furthermore, furniture designs can also be historical artefacts that provide an overview on culture and ways of living. For example, a chair can be designed to be a throne for a king (a luxurious eclectic piece to show status), be used as part of religious ceremonies, or can just be used by all people in public areas such as offices, schools, parks and malls.

Biophilia and Biophilic Design: as defined by the Dictionary of Environment and Ecology Fifth Edition (2004), the prefix bio is '*referring to living organisms*' and the suffix philia is '*attraction towards or liking for something*'. As such, biophilia describes the innate feelings of people that are associated with nature and living organisms (Wilson, 1984). Moreover, biophilia theory proposes certain possible reactions and behaviours of humans towards their environment and how the surrounding environment affects their daily life. Wilson (1984, p 1) developed Biophilia theory and defined it as 'the innate tendency to focus on life and lifelike process.' Biophilia theory was further developed as 'biophilic design' by Kellert et al, (2008)—this is the application of biophilia theory in the design of the environment, where the effects of nature on the human mind, emotions and physical well-being are crucial (Kellert et al, 2008). According to Kellert et al (2008, p3), biophilic design is:

'The deliberate attempt to translate an understanding of the inherent human affinity to affiliate with natural systems and processes – known as biophilia, into the design of built environment'.

Kellert et al (2008, p7 - 15) have also divided biophilic design into six design elements. These elements can be a useful guide for designers and researchers to apply in designs that can bring nature closer to

'The deliberate attempt to translate an understanding of the inherent human affinity to affiliate with natural systems and processes – known as biophilia, into the design of built environment'.

Kellert et al (2008, p7 - 15) have also divided biophilic design into six design elements. These elements can be a useful guide for designers and researchers to apply in designs that can bring nature closer to people. As interpreted by the writer in Figure 1, hereunder, these elements are generally applied to architecture and landscape design, but how they apply to furniture design is not that clear. As depicted in Figure 1 below, these six design elements are 1: *Environmental features*— which involve colour, water, air, sunlight, plants, animals, natural materials, views and vistas, facade greening, geology and landscape, habitats, ecosystems and fire in nature., 2: *Natural shapes and forms*— these are the man-made designs that include natural traits, motifs, forms or structures., 3: *Natural patterns and processes*— these comprise the integration of natural elements and cycles that are compatible with the built environment., 4: *Light and space*— involves the function of lights and spaces in outdoors and indoors of built environment., 5: *Place-based relationships*— these involve the merging of ecology into culture, for example the adaptation of Yin-Yang concepts into design, where the Chinese culture incorporates the natural elements into daily life, and, finally, 6: *Evolved human-nature relationships*— which describe the affiliations between human beings with nature and how nature has influenced them.

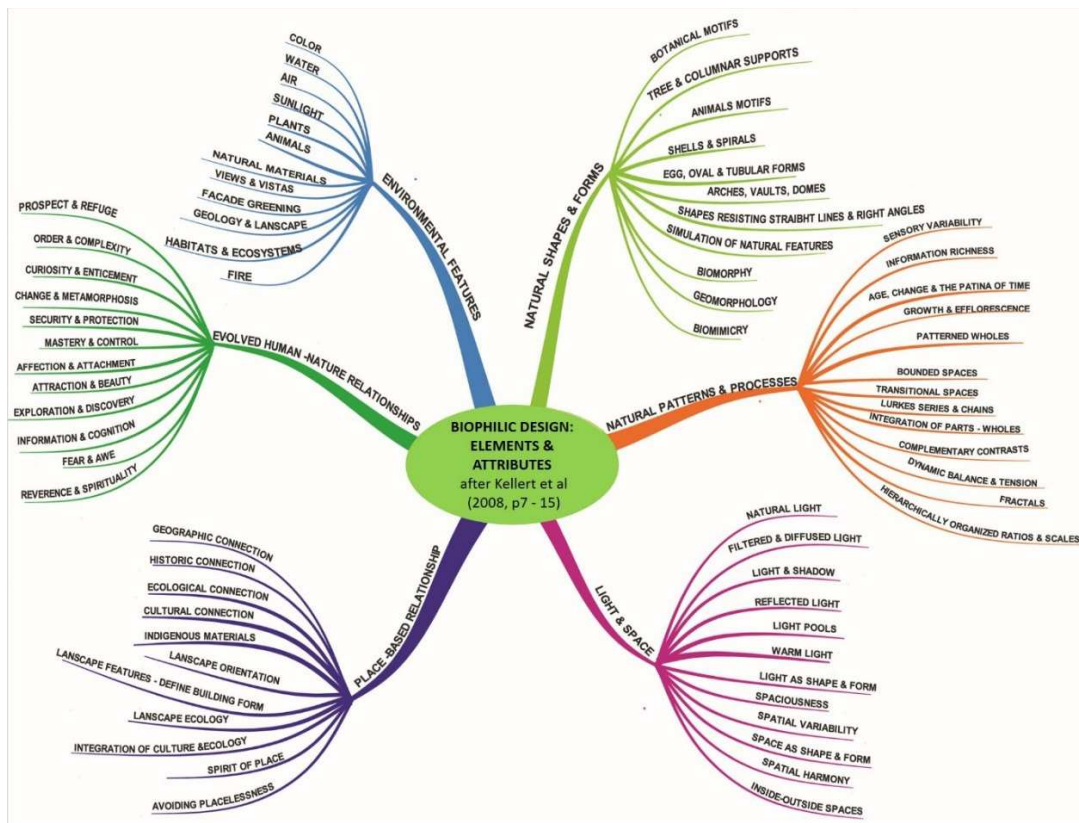


Figure 1: Graphic interpretation and summary of Biophilic design elements—after Kellert et al (2008, p7 - 15)

Although all of these biophilic design elements are useful from a preliminary and general point of view, it is not clear how they may be applied in the development of a related typology and specific design criteria for FDLOs.

from the literature, although emotional responses are well known in terms of their effects on design decisions as well as consumer choices or preferences. Emotions can be defined as subjective biological conscious or non-conscious expressions which involve facial and vocal expressions, physiological symptoms and occur depending on certain events that can be experienced in daily life (Niedenthal et al, 2006). In order to further understand emotion, Plutchik (2001) developed an emotion circumplex model using a colour wheel where he categorized and placed similar emotions close to each other.

Norman (2004) proposed three levels of *'emotional design'*, which are; 1: *visceral level*, 2: *behavioural level* and 3: *reflective level*. Meanwhile, Desmet (2012) has developed a typology of 25 positive emotions that were divided into nine categories. According to Khalid and Helander (2006), user interactions with products are influenced by emotion, and there are five main methods to measure emotions: these are 1: *Semantic Scales* developed by Kuller in 1975, 2: *Positive Affect Negative Affect Schedule (PANAS)* developed by Watson et al in 1988, 3: *Questionnaire for Measuring Pleasure in Products* used by Philips Design and developed by Jordan in 2000, 4: *Product Emotion Measurement Instrument (PrEmo)* developed by Desmet in 2003, and finally 5: *Kansei Engineering* developed by Nagamachi in 2005.

All of this work provides useful, design-relevant information although no specific studies applying to FDLOs have been detected in the literature regarding criteria that designers may use in the design process for FDLOs. In view of the above findings, it follows that a potential framework for evaluating the design of FDLOs in relation to biophilic design elements would need to take into account criteria influenced by human emotions. It is important to note that although many examples of FDLOs (especially with plants) are related to green design, Eco design or sustainable design, this research will focus on biophilic design, rather than design for sustainability.

PREVIOUS RESEARCH & KNOWLEDGE GAP IN THE LITERATURE

After reviewing several studies related to biophilia, biophilic design and emotional design in the literature, it is found that there are few research studies regarding biophilia theory, biophilic design or emotional design conducted in the context of furniture design and more specifically in FDLO's. For example, Ulrich (1981) demonstrated the effects of natural and urban scenes towards psychophysiological (psychology and physiology) aspects. A related study was conducted by Balling and Falk (1982), where they assessed the visual preferences of 548 subjects towards natural landscapes.

Many studies have been conducted to understand the effects of real plants and natural elements towards psychology, health and attention in human-environment relationships (Kaplan, 1995; Tennessen and Cimprich, 1995; Frumkin, 2001; Bringslimark et al, 2009; Grinde and Patil, 2009; Howell et al 2011; Joye and Van den Berg, 2011). In addition, different studies on emotion and experience with nature were also developed by Perkins (2010) and Hinds and Sparks (2011). Kahn Jr. (1997) conducted research on children's affiliation with nature in education and human development. All these studies showed that nature and natural elements have important effects on the mental, physical, behavioural and emotional aspects of human beings.

Interestingly, a study relevant to this investigation was conducted by Windhager et al in 2010, who studied the effects of an aquarium with fish placed in an exhibition in a Mall (a European shopping mall in Austria). This study used a direct behavioural observation method (by using a hidden video camera) to observe respondent reactions, with a view to understanding human behaviour when confronted by living organisms in non-natural surroundings. Although admittedly not necessarily conclusive, they suggested that living organisms influenced passers-by emotionally as well as attracting people's attention. Another relevant study on the perception of greenery in residential buildings was conducted by White and Gatersleben (2011) who surveyed 188 participants who rated digitally modified images of houses with or without vegetation. Similarly, a study in landscape architecture conducted by Roth (2005) explored the

validity of online surveys to evaluate and to visually assess the scenic quality of 17 German landscape sites.

Other studies related to emotional design, user experiences and product design have been published by Chitturi (2009), Blijlevens et al (2009), Lenay (2010), Dazkir and Read (2011), Fokkinga and Desmet (2013), Hassenzahl et al (2013) and Desmet and Pohlmeier (2013). In addition, an interesting study on emotion design was conducted by where they researched furniture forms and their influences on emotional responses in interior environments. Specifically, they used a simulated setting consisting of curvilinear and rectilinear sofas, and the data were collected from 111 participants were analysed by means of Mehrabian and Russell's nine-point semantic differential scale (as cited in Dazkir and Read, 2011).

From the literature above, it is apparent that there is a serious gap in knowledge in this field. It follows that there is an urgent need to develop a new typology or classification for FDLOs mindful of biophilic and emotional design criteria.

A PROPOSED TYPOLOGY FOR FDLOs

Based on compilations of FDLOs published in design books and on the web, the lead author has identified at least 168 designs embedded with living organisms (refer to Appendix I for the source credits for these designs). These design examples are classified by context (outdoor or indoor) as well as by type of furniture (chair, table, other). Through further analysis of the different types of FDLOs found, a typology is proposed as shown in Figure 2 below (shown in partial form). After analysis of the noted 168 designs (some examples are shown in Figure 3), it is found that these designs have different purposes, such as furniture for learning, food consumption and farming, generating energy, purifying water or air, experiencing nature, to heal, to calm and to lower stress (Appendix II contains the details of the proposed FDLOs typology).

























































Examples of Furniture Design with Living Organisms (FDLOs)						
Indoor	Chair/ Bench					
						
						
	Table					
						
						
						
	Others					
						
	Outdoor	Chair/ Bench				
						
						
Table						
						
Others						

Figure 2: A proposed typology for FDLOs (for brevity only a partial typology structure is shown – the full typology is shown in Appendix II) (source: authors)



Figure 3: Selected examples of FDLOs (sources: see appendix I)

The proposed typology was used to provide a theoretical background for the research project and development of a new model of evaluation criteria which describes the characteristics and *purposes* of the various types of FDLOs —as related to the four categories of criteria-purposes as discussed hereunder.

CONCEPTUAL DEVELOPMENT & RESEARCH METHODS

Conceptual Development: From analysis of the above typology, and through several iterations, a model with twenty four different *purposes* organized into four main categories of criteria is proposed as shown in Figure 4, namely:

A: Function and Practicality, B: Aesthetic and Semantic, C: Experience, D: Experimental. The *Function and Practicality* category is divided into six purposes, namely, A1: *to learn*, A2: *farming or food*, A3: *purify air or water*, A4: *generate energy*, A5: *to encourage hobbies*, and A6: *other reasons*. The six purposes under the *Aesthetic and Semantic* category are B1: *aesthetic value or decoration*, B2: *collection and display*, B3: *communication or to convey a message*, B4: *artistic reasons*, B5: *contemplation* and B6: *other reasons*. Under the *Experience* category, six purposes are identified namely, C1: *to experience or interact with nature*, C2: *environmental consciousness*, C3: *to heal, calm or lower stress*, C4: *entertainment*, C5: *to stimulate senses* and C6: *other reasons*. Finally, in the fourth *Experimental* category, the six purposes identified are as follows: D1: *conceptual design*, D2: *part of a research project*, D3: *exploration of new materials*, D4: *exploration of new technologies*, D5: *to break the rules/ be different* and D6: *other reasons*.

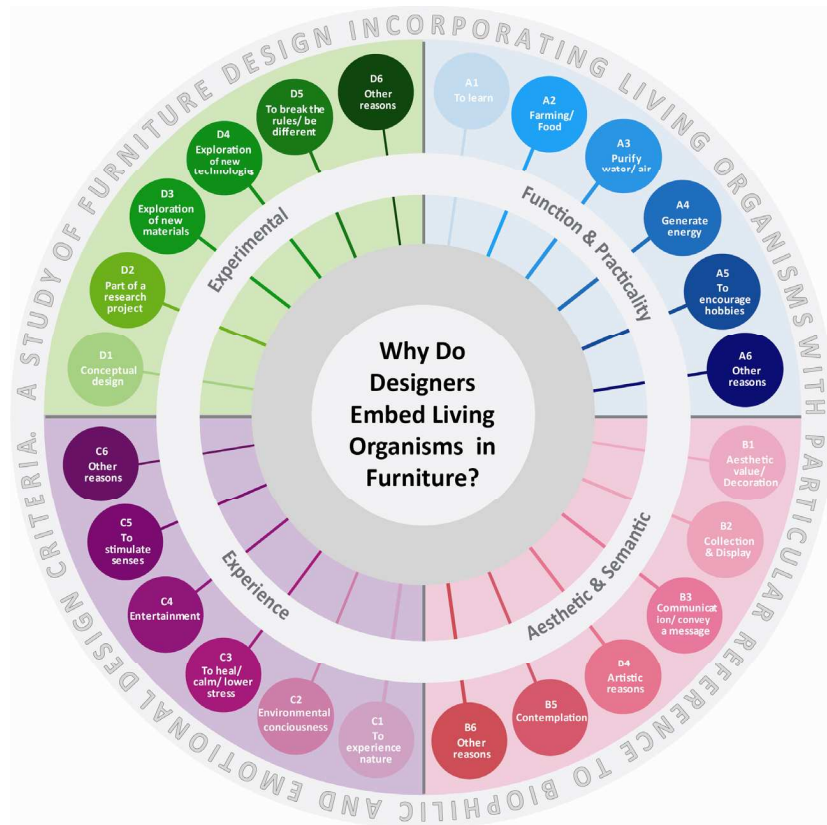


Figure 4: Proposed model of design criteria/purposes underpinning FDLOs (source; authors)

Research Methods: In order to achieve the aims noted in the abstract, this research is being conducted by; 1: *observations* of current FDLOs (as categorised in the above typology), 2: *interviews*, to gather information from current furniture designers, and 3: *questionnaire-based surveys* to obtain quantitative and qualitative data from potential users about how they perceive and interpret the images of FDLOs.

Interviews: To date, twelve one-on-one interviews have been carried out in order to gather information from designers involved in designing FDLOs. These interviews were conducted using Skype, on a semi-structured basis and the response data is being analysed in keeping with recommended survey methods. (Bryman, 2012; www.sociology.org.uk/methfi.pdf, 2013). These interview data are currently being processed (detailed empirical results will be presented in a subsequent paper).

Survey: As informed by the literature review, a valid way of conducting this type of research is by using images (both original as well as digitally altered) embedded in online surveys (White and Gatersleben 2011, Roth 2005). The testing of the noted design criteria/purposes model uses sets of images of FDLOs and digitally altered versions to compare and survey respondents' perceptions and emotional responses towards FDLOs as well as similar furniture designs that do not incorporate living organisms. This model (noted in Figure 4) was adapted for survey design purposes as shown in Figure 5 hereunder. A corresponding online survey employed closed format questions that proposed a combination of radio button, image selection, 7- point semantic scales, and 5-point Likert scales.

After experimentation with diverse online survey tools (e.g., SurveyGizmo, Survey Monkey, ACSPRI/ Lime Survey, Free online surveys), SurveyGizmo was selected because the web host produced a user friendly, vibrant and colourful format adequate for the type of visual research employed in this project. According to Schmidt (1997) Zhang (2000), Sills and Song (2002), Evans and Mathur (2005), Kiernan et al (2005), Roth (2005) and Behrend et al (2011); web-based surveys are a powerful communication tool for research because of the vast use of the internet. Even though there are disadvantages, online surveys still provide strengths such as global reach, flexibility, convenience, low cost, ease of data entry and analysis, among others.

In order to validate the proposed model of design criteria for FDLO's, in the survey respondents were required to select a minimum of four answers from the twenty four purposes, according to what they considered best describes the given images. The answers given by the respondents will be evaluated and compare according to the actual reasons and explanation of the design, provided by the designers.



Figure 5: The proposed design criteria/purposes model, reformatted for the online survey (source: authors)

SELECTED FINDINGS & RESULTS

Respondent Background: Interview data obtained from specific FDLO designers (as noted under item 2 of the research methods above) are currently being processed. Further online surveys with specific groups of participants, including design professionals and design educators, are also currently in train so statistical comparison may be made between different groups of respondents.

Initially, and after several trial tests, a preliminary online survey was launched in August 2014 aimed at a general sample of the population. A total of 252 respondents answered the survey and a general overview of the demographics of participants (professional and geographical backgrounds) is shown in Figures 6.

Respondents came from Asia (59.1%), Australia and Oceania (18.3%), Americas (11.9%), Europe (7.5%) and Africa (3.2%). As shown in Figure 6, bearing in mind the nature and topic of the study, the highest number of respondents come from an educational or academic background (28.5 %), followed by art and design/ creative disciplines with 24.1% and students with 21.3%.

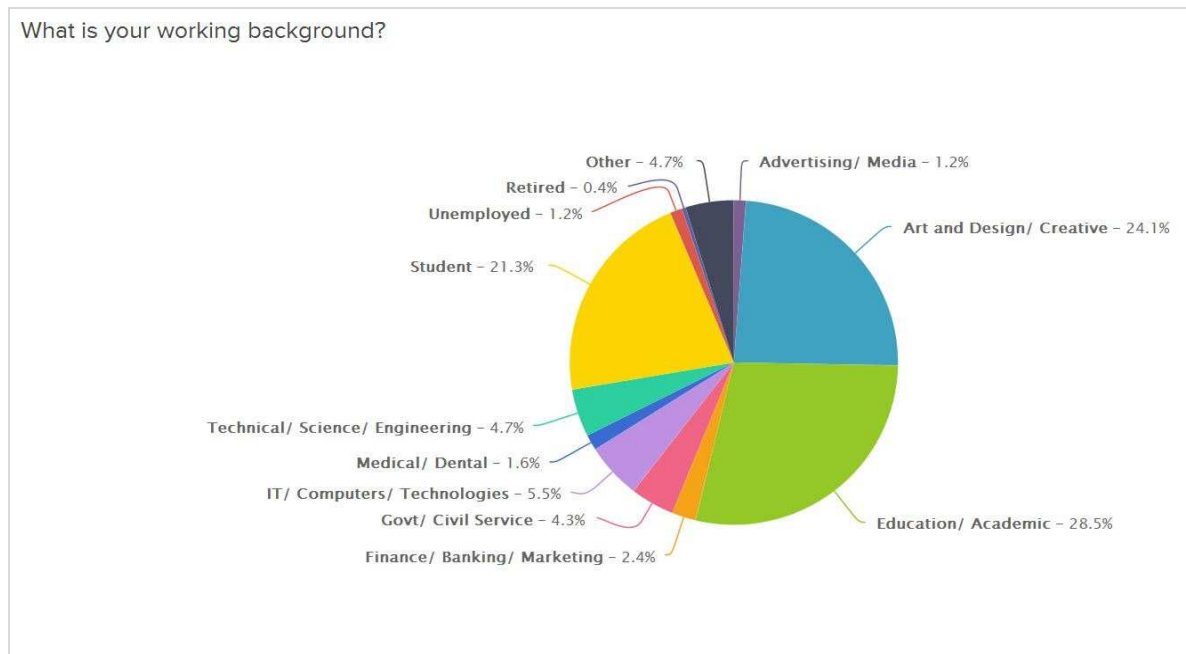


Figure 6: Respondent's professional background (source: authors)

Hence, it is possible to make some preliminary (but cautious) comparisons between the three largest groups (i.e., Education/Academic, Art and Design/creative and Students; by using statistical tests such as the Mann Whitney U Test (for comparing two groups) and the Kruskal Wallis test for comparing three or more groups (assuming that the data are not normally distributed). The remaining groups of respondents' could be grouped together but may not be indicative of the general population interested in FDLOs. However, it is realised that comparisons between specific groups of designers/respondents would be more reliable and this inquiry is currently in progress.

Design perceptions: This section of the preliminary questionnaire was designed to identify the preferences of respondents toward selected FDLO images, using an image selection format that compared two similar furniture designs, one with, and one without living organisms—a relevant extract from the questionnaire is shown in Appendix III. As shown in figure 7, the design with living organisms that was most favoured (to date but subject to further investigation) by the respondents in the noted preliminary survey is the design by Greg Zulkie, *The Stitch Table*, with 78.6% positive answers (labelled B in Figure 7; 198 respondents). The design with living organisms that was least favoured by the respondents (as compared to its similar counterpart) was the design by Deger Cengiz, *Threatening Cactus Terrarium Chair*, with 22.6% negative answers (labelled B in Figure 8, 57 respondents)



Figure 7: Most favoured FDLO, as compared to counterpart without living organisms (source: authors)



Figure 8: Least favoured FDLO, as compared to counterpart without living organisms (source: authors)

Emotional Design: This section of the preliminary questionnaire was designed to identify emotional responses towards FDLO images. The questions in this section used a 7-point emotion scale rating, based on adjectives, as follows: 1: *Disgusted*, 2: *Uneasy*, 3: *Bored*, 4: *Neutral*, 5: *Pleasantly Surprised*, 6: *Admired*, 7: *Fascinated*. This 7-point emotion scale was developed ad hoc for this study, and adapted

from the diverse existing emotional design scales found during the literature review. The design which received the highest positive emotional response was, again, the design by Greg Zulkie, *The Stitch Table* with 78.1% positive responses by 197 respondents.

Not surprisingly (due to the artistic, provocative and controversial nature of the design, as evidenced by the title), the design which received the highest negative emotional response was again the design by Deger Cengiz, *The Threatening Cactus Terrarium Chair* with 55.6% negative responses from 140 respondents. Most respondents stated that they felt *Uneasy* (40.1%) and only 28.3% responded with positive emotions.

Biophilic Design: Based on the other studies about Biophilia theory and Biophilic design as identified in the literature review, respondents were asked questions about potential positive or negative effects that they believed living organisms in the interior environment could cause. Examples of positive effects were “to heal, calm or lower stress”, and examples of negative effects were “causing allergies” (as in the case of pets). These questions used a 5-point Likert scale rating of 1: *Strongly disagree*, 2: *Disagree*, 3: *Neither Agree or Disagree*, 4: *Agree* and 5: *Strongly Agree*.

When asked about the effects of having nature indoors or nearby, nearly half of the respondents *agreed* (125 respondents, 49.6%), and one third of the respondents *strongly agreed* (81 respondents, 32.1%) that having natural elements and living organisms indoors can release stress and calm people, as shown in figure 9, below.

Having natural elements and living organisms indoors can: A. Release stress/ calm you

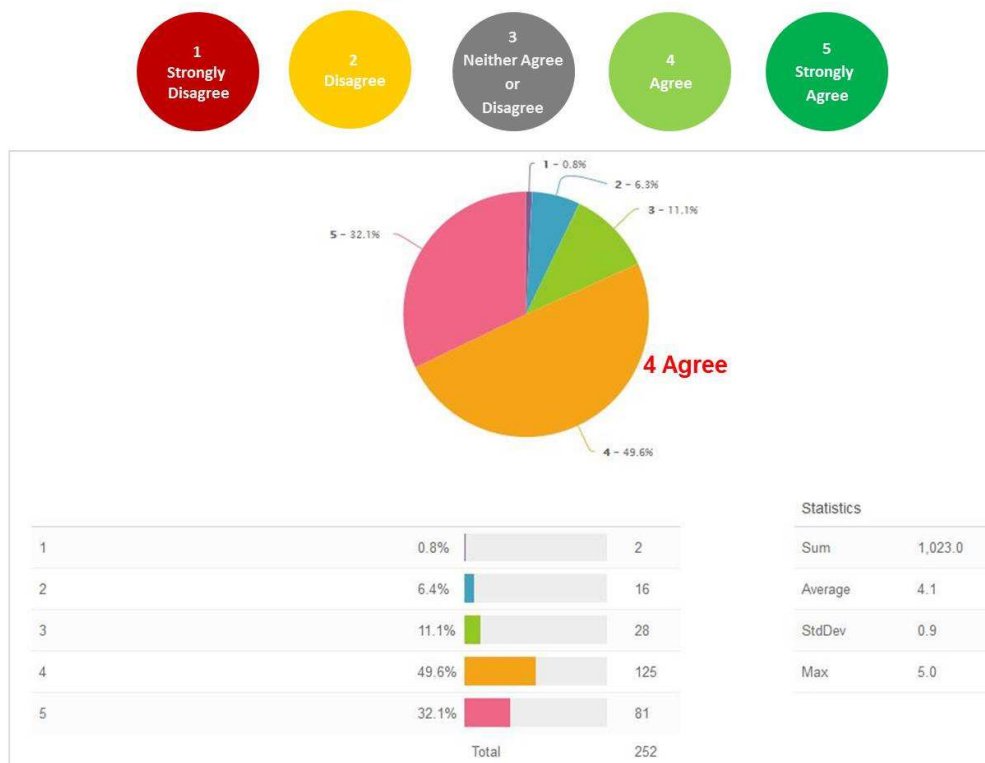


Figure 9: The effect of FDLOs towards respondents (source: authors)

CONCLUSIONS

Current trends in design and architecture are looking for new ways to establish connections with nature, mostly motivated by environmental awareness. Biophilic design is the term used to describe an “innovative approach that emphasizes the necessity of maintaining, enhancing and restoring the beneficial experience of nature in the built environment.” (Kellert, Heerwagen & Maador, 2008). This approach is based on scientific evidence that shows that contact with nature has strong positive effects in human beings. As such, it tries to bring nature and natural elements back into the built environment, enhancing human well-being by connecting him to nature or to elements which remind him of nature. Biophilic design builds upon growing awareness in health, nutrition, medicine and psychology which shows that patients recover more quickly, students learn better and workplace productivity increases in built environments that offer an interaction with nature and natural elements. While Biophilia and Biophilic design have been widely studied in the built environment, especially landscape architecture and architecture, there are limited studies in terms of Interior, or Industrial Design, and more specifically within Furniture design. Being Furniture a very important aspect of interior design and of our current built environment, it was interesting to note the growing number of furniture designs which incorporated living organisms, such as plants and animals. As such, this type of furniture pieces, here described as FDLOs (Furniture Designs with Living Organisms) has been categorized, and a new typology which can help understand these furniture designs has been developed.

Although many current examples of FDLOs are currently motivated by eco-design or sustainable design trends, it is possible that Biophilia theory (our inherent affiliation to nature) plays a role in the designers' motivations, as well as in the users' emotions and experiences with this type of furniture. Studies in applications of the Biophilia theory have demonstrated the benefits that nature in the built environment brings to health and wellbeing of people. A literature review evidenced a gap in knowledge, as no studies were found which address Biophilia or Biophilic design within furniture design. The initial proposal described in this paper establishes a typology of FDLOs (furniture designs with living organisms, such as plants, animals and insects). Based on compilation and classification of at least 168 FDLOs, a typology and then a subsequent conceptual model were developed, in order to provide a theoretical background to be tested in the subsequent empirical research. Four main categories of FDLOs were identified which comprise *A: Function and Practicality*, *B: Aesthetic and Semantic*, *C: Experience*, *D: Experimental*. This model, which was developed from the typology described in this paper, is currently being validated through surveys, but has proven useful to further understand FDLOs

Although, still in progress and without definitive conclusive results yet, this project has proposed a new category of furniture (furniture designs with living organisms, or FDLO's), has proposed a typology to understand and potentially evaluate this type of furniture, and is uncovering the reasons behind these furniture designs, as well as the preferences and perceptions by users. As has been suggested by some of the interim results of the survey, interestingly and not surprisingly, the FDLOs which were most and least preferred by a majority of respondents (as compared with similar pieces without living organisms) have a direct correlation with positive and negative emotional responses. While the examples highlighted in this paper are the extremes, other examples are also being analysed, compared and discussed. Henceforward, the researchers are surveying different groups of respondents to make a comparison between the general respondents and specific target groups for more meaningful research results.

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Appendix I: References for the Images of FDLOs

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






























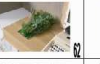















































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




















































































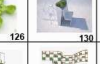






















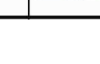

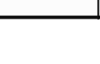












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












































































































































































































































































Appendix II



























































- 1) The typology of 168 FDLOs and The 4 Main Categories with 24 Purposes Typology Tables
- 2) The 4 Main Categories with 24 Purposes Typology Tables
 - Function and Practicality (A)
 - Aesthetic and Semantic (B)
 - Experience (C)
 - Experimental (D)

Indoor												Outdoor																																																																																																																																																											
Chair/ Bench				Table				Others				Chair/ Bench				Table				Others																																																																																																																																																			
																																																																																																																																																																							

Function and Practicality (A)											
A1: to learn	A2: farming or food		A3: purify air or water			A4: generate energy	A5: to encourage hobbies				A6: other reasons
	 41	 42	 18	 23	 24	 30	 4	 23	 37	 41	 61
	 43	 44	 27	 28	 30	 47	 42	 44	 49	 52	 75
	 49	 57	 33	 34	 36	 61	 57	 58	 63	 65	 81
	 65	 75	 37	 39	 45	 65	 78	 78	 91	 92	 102
	 79	 80	 51	 55	 59		 93	 99	 101	 102	 130
	 81	 83	 91	 92	 63		 105	 106	 112	 113	 150
	 89	 99	 64	 66	 67		 118	 126	 129	 135	 159
	 101	 104	 68	 69	 70		 146	 147	 148	 150	 163
	 126	 150	 75	 82	 85		 156	 157	 158	 159	
	 158	 162	 87	 94	 105		 161	 166	 167	 169	
			 106	 117	 108						

Aesthetic and Semantic (B)											
B1: aesthetic value or decoration	B2: collection and display		B3: communication or to convey a message		B4: artistic reasons		B5: contemplation		B6: other reasons.		
 5	 6	 7	 1	 4	 9	 2	 31	 4	 6	 35	 119
 8	 10	 14	 11	 22	 25	 32	 50	 8	 25	 120	 121
 16	 17	 24	 37	 40	 45	 32	 50	 8	 25	 120	 121
 28	 29	 31	 46	 48	 56	 81	 89	 13	 22	 13	 123
 32	 35	 39	 59	 61	 69	 91	 92	 31	 32	 46	 125
 51	 53	 58	 70	 73	 76	 91	 92	 31	 32	 46	 125
 63	 69	 74	 83	 84	 90	 93	 116	 110	 115	 48	 130
 86	 99	 101	 94	 95	 96	 117		 86	 103	 89	 131
 103	 106	 110	 97	 100	 105			 86	 103	 89	 131
 113	 115	 118	 108	 109	 119			 133	 141	 109	 139
 128	 131	 139	 126	 130	 157			 133	 141	 109	 142
 144	 151	 154	 158	 159	 163			 144	 167	 168	 143
 155	 160	 165	 166	 167	 168			 144	 167	 168	 164

Experience (C)																		
C1: to experience or interact with nature										C2: environmental consciousness		C3: to heal, calm or lower stress		C4: entertainment	C5: to stimulate senses		C6: other reasons	
																		
																		
																		
																		
																		
																		
																		
																		
																		
																		
																		
																		
																		
																		
																		
																		
																		
																		
																		
																		

Experimental (D)											
D1: conceptual design		D2: part of a research project		D3: exploration of new materials		D4: exploration of new technologies		D5: to break the rules or be different		D6: other reasons.	
 1	 6	 2	 9	 6	 10	 38	 47	 13	 60	 12	 13
 12	 13	 13	 38	 31	 32	 60	 77	 110	 115	 52	 164
 38	 47	 51	 143	 38	 47	 79	 80	 116	 133		
 80	 75			 50	 77	 81	 85	 141	 155		
 77	 78			 89	 150	 89	 162				
 79	 80										
 81	 85										
 89	 121										
 122	 123										
 126	 164										

Appendix III - Relevant extract from the questionnaires (sample questions of each of the sections)

Section A – Background of Respondent

Page 2: Section A - Respondent Background

What is your gender? *

- Male
- Female

What is your age? *

- 18 - 25
- 25 - 30
- 31 - 40
- 41 - 50
- 51 - 60
- more than 60

What is your working background? *

- Advertising/ Media
- Art and Design/ Creative
- Education/ Academic
- Finance/ Banking/ Marketing

Section B – Design

Question 2

*



A



B

Section C – Emotional Design

Question 1



Chair I: Rococo Armchair Retrofit by David L. Hays, Kevin Stewart & Shuangshuang Wu.(2010). Lucas, D., (2011) Green Design, Germany: Braun Publishing AG., <http://inhabitat.com/a-chair-that-welcomes-plants-and-insects-into-your-home/> [Accessed 15 February 2013/2014]

1
Disgusted

2
Uneasy

3
Bored

4
Neutral

5
Pleasantly Surprised

6
Admired

7
Fascinated

Section D – Conceptual Model



Local River by Mathieu Lehanneur and Anthony van den Bossche (2008).
 Fairs M., (2009). Green Design. Dubai: Carlton Books Limited., <http://www.designboom.com/design/local-river-by-mathieu-lehanneur-with-anthony-van-den-bossche/>, <http://www.treehugger.com/sustainable-product-design/local-river-by-mathieu-lehanneur.html>, <http://drumofglass.blogspot.com.au/2011/04/matthieu-lehanneur.html> [Accessed February & August 2014]

Please look carefully at the furniture design above, then select which sub categories you think are suitable. You may choose minimum FOUR (4) answers.

<p>A1 To learn</p> <p>Function & Practicality (A1)</p>	<p>B1 Aesthetic value/ Decoration</p> <p>Aesthetic & Semantic (B1)</p>	<p>C1 To experience nature</p> <p>Experience (C1)</p>	<p>D1 Conceptual design</p> <p>Experimental (D1)</p>
<p>A2 Farming/ Food</p> <p>Function & Practicality (A2)</p>	<p>B2 Collection & Display</p> <p>Aesthetic & Semantic (B2)</p>	<p>C2 Environmental consciousness</p> <p>Experience (C2)</p>	<p>D2 Part of a research project</p> <p>Experimental (D2)</p>
<p>A3 Purify water/ air</p> <p>Function & Practicality (A3)</p>	<p>B3 Communication / convey a message</p> <p>Aesthetic & Semantic (B3)</p>	<p>C3 To heal/ calm/ lower stress</p> <p>Experience (C3)</p>	<p>D3 Exploration of new materials</p> <p>Experimental (D3)</p>
<p>A4 Generate energy</p> <p>Function & Practicality (A4)</p>	<p>B4 Artistic reasons</p> <p>Aesthetic & Semantic (B4)</p>	<p>C4 Entertainment</p> <p>Experience (C4)</p>	<p>D4 Exploration of new technologies</p> <p>Experimental (D4)</p>
<p>A5 To encourage hobbies</p> <p>Function & Practicality (A5)</p>	<p>B5 Contemplation</p> <p>Aesthetic & Semantic (B5)</p>	<p>C5 To stimulate senses</p> <p>Experience (C5)</p>	<p>D5 To break the rules/ be different</p> <p>Experimental (D5)</p>
<p>A6 Other reasons</p> <p>Function & Practicality (A6)</p>	<p>B6 Other reasons</p> <p>Aesthetic & Semantic (B6)</p>	<p>C6 Other reasons</p> <p>Experience (C6)</p>	<p>D6 Other reasons</p> <p>Experimental (D6)</p>

Section E – Biophilic Design

Having natural elements and living organisms indoors can:

A. Release stress/ calm you *

1 Strongly Disagree	2 Disagree	3 Neither Agree or Disagree	4 Agree	5 Strongly Agree
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B. Create awareness of nature and ecological impact *

1 Strongly Disagree	2 Disagree	3 Neither Agree or Disagree	4 Agree	5 Strongly Agree
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C. Foster a sense of care (as living organisms need to be watered or fed) *

1 Strongly Disagree	2 Disagree	3 Neither Agree or Disagree	4 Agree	5 Strongly Agree
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D. Be educational (especially for children) *

1 Strongly Disagree	2 Disagree	3 Neither Agree or Disagree	4 Agree	5 Strongly Agree
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“Either write something worth reading or do something worth writing.”

Benjamin Franklin*

Thank you for reading this dissertation.

* Retrieved from: http://www.brainyquote.com/quotes/quotes/b/benjaminfr133951.html?src=t_reading.(2016).