Implementing Sensory and Emotional Intelligence into Architectural Design Education in Ireland.

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Implementing Sensory and Emotional Intelligence into Architectural Design Education in Ireland

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Masters of Science in Research Department of Architecture

2017
Implementing Sensory and Emotional Intelligence into Architectural Design Education in Ireland.

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Submitted for: Masters of Science in Research

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CORK INSTITUTE OF TECHNOLOGY
INSTITÚID TEICNEOLAÍOCHTA CHORCAÍ

Submitted to Cork Institute of Technology

October, 2017
$b \approx 1111.59$

$\approx 1424.32$
Title: Implementing Sensory and Emotional Intelligence into Architectural Design Education in Ireland.

Abstract:
The 21st century, as a whole, has seen massive developments in smart technologies, environmental strategies and architectural form. The 3D built environment is advancing on a daily basis, but has become a very two dimensional experience, frontloaded with screened imagery and visual stimuli, which has encouraged a trend of ocular-centric dominance. Unfortunately, as a result of this, the human experience is often lost. The prioritisation of the multi-sensorial human experience is not only at threat from this visual predominance, but also environmental concerns and economy seem to hold a greater place on the hierarchy. Research carried out by the WHO established that the vast majority of people, spend up to 90% of their lives in indoor spaces (WHO, 1999), and yet this does not reflect the positioning of the human experience within the design process. By continuing to rely on one sensory modality, our built environment is increasingly failing to respond to the sensory and emotional needs of the user. Architectural design must remember it has a responsibility to enhance the human experience, not dismiss it.

Developing a level of awareness among the architectural design community is essential in order to prioritise the human experience throughout the design process. Although there is no immediate solution, education can play a key role in addressing this issue. If the education system begins to supply industry with graduates, who hold an awareness and knowledge for the multi-sensorial human experience and its emotional impact, this in turn, will encourage a more human-centred approach in industry which promises huge individual and societal benefits.
The primary aim of the research is to develop third level educational content, disseminated in the form of a *module descriptor* and *educational resource pack*, which addresses the human experience in the built environment, in terms of the *sensory stimuli and emotional intelligence*. The content allows, both the lecturer and student, to establish awareness of how people perceive, experience and develop relationships with any space, place or environment. This knowledge and understanding of the multi-sensory human experience should create awareness of how to better regulate and manage the balance of sensory exposure and emotional impact on the user in their 3D designs. Education is a practical, long-term approach to achieving sensory balance within the built environment.

The research carried out an observational period for one academic semester, to identify if *sensory and emotional intelligence* is being acknowledged within the design studio environment, and the type of *teaching and learning methods* typically used within an architectural educational facility, and *problem based learning* environment. The findings of the observational period, highlighted that no direct acknowledgement to *sensory and emotional intelligence* was made throughout the academic semester, furthermore, a low *rate of inference* was recorded within the design studio environment. These findings, together with literary support, informed the formulation of the *module descriptor* and *educational resource pack*.

In order to identify the strengths and limitations of the educational resource pack, two student cohorts participated in an educational trial, within the department of architecture, CIT. The content was tested over the course of an academic semester, as were the teaching and learning methods utilised to deliver the content. The main
Limitations identified were rooted in information literacy and language barriers, primarily as a result of the interdisciplinary nature of the content. The overall teaching and learning methods utilised showed many successes, when supported by sufficient time allocations. Finally, the educational resource pack in application, recorded a higher rate of inference during the educational trial, than the rate of inference recorded during the observational period.

A series of recommendations have also been identified for the areas of education, industry and further research.

**Keywords:** Ocular-centric dominance; sensory and emotional intelligence; human experience; educational resource pack.
Declaration

I hereby declare that the material and data contained in this thesis is entirely my own work unless otherwise clearly indicated in writing within the body of the report itself, whereby full and proper references and acknowledgements are incorporated where applicable.

This is submitted in partial fulfilment of the requirements for the award of Master of Science in Research in Cork Institute of Technology and no other Institution.

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Acknowledgements

I would like to express my gratitude to my supervisors, Dr Garrett O'Sullivan, Martin Boylan and Dr Jim Harrison of Cork Institute of Technology. Their outstanding guidance, mentoring and continued support have played a key role in this research.

I would also like to gratefully acknowledge the support of Katherine Keane, Head of the Department of Architecture, for her continued support throughout the course of study. Extended thanks are also given to Kevin Busby and Anne Rogers for the cooperation and support throughout the interactive stage of the research. The entire Department of Architecture have made the research journey so enjoyable.

I would also like to thank my family for their unrelenting support and patience throughout my entire educational journey. They have always encouraged me to follow my instinct and do what I felt was right. I will be forever grateful for every opportunity you have given me. My amazing friends, your patience and understanding throughout are more appreciated than you know. In particular, I have to acknowledge the presence of Rachel, Kevina, Lucy, Emma and Sergi, who have offered their reassurance on a daily basis. You have made me laugh, made me breathe and made me sure. You are all amazing!

Finally, and most important, I would like to thank my sister Yvonne. She has constantly supported and encouraged every journey I have undertaken in life. She pushes me to challenge myself on a daily basis, and without her support and reassurance I would not have perused this educational journey. Her confidence in me, has given me confidence in myself to embrace the strong, independent women that we are. This thesis is dedicated to her.
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“All fine architectural values are human values, else not valuable.”

- Frank Lloyd Wright
Introduction

1.1 Introduction to the Research

The 20\textsuperscript{th} and the 21\textsuperscript{st} century have seen the built environment evolve, expand and technically advance. Together architects and engineers are pushing the boundaries of environmental strategies, smart schemes, embedded systems, all of which contribute to improving the standard of living within the built environment. Another area which is consistently 'evolving' is architectural form. Gravity defying structures are a thing of the norm in today's society, after all "there are 360 degrees so why stick to one?" (Hadid, 2003). This approach has infiltrated the built environment at such a rate that some are suggesting that architecture may be crossing into the discipline of art. Quirke (2011), for example, suggests that architecture has become "majorly focused on expressing itself as a unique entity, becoming more of an art than architecture". She further highlights the difference between art and architecture, which may be overlooked in today's society, in that "art is a form of self-expression with absolutely no responsibility to anyone or anything", and while "architecture can be a piece of art" it must firstly hold responsibility for both people and context. This oversight is not surprising considering one of the century's most renowned architects defends "the validity of self-expression" as "a basic value", and furthermore does not understand "why people hire architects and tell them what to do" (Gehry, 2000). This type of ego driven 'starchitecture' is influencing the industry globally. The Bilbao Effect, for example, screams success due to its innovative form and economic gain, yet does it function for the type of use it was originally designed for? Does its function for the user? Finally, has it actually been validated outside of visual presence and economic success?
1.2 **Validation through the Visual Aesthetic**

Today's society appears to be suffering from ocular-centric dominance, which has resulted in an acceptance for validation primarily through the visual aesthetic (Pallasmaa, 2012). Some of the more acclaimed buildings in society have been widely accepted as great architectural design, only to later present major short comings in terms of the structural integrity and function. Frank Gehry's 'Stata Centre' in MIT, known for its unconventional, robotic like structure, resulted in massive issues with drainage, leaks and cracks, forcing MIT to sue Gehry. Later, more problems emerged with the innovative structure, which highlighted a lack of consideration for the Massachusetts climate. The angular window boxes and other protruding roofs areas, gathered snow and ice to excessive levels, whereby the emergency exits became blocked from the offloads. The offloads also damaged other elements of the building's facade, and made the access routes unsafe for the passer-by. Another similar climatic case emerged with the Walt Disney Concert Hall in Los Angeles. The concaved surfaces of the building had to be sandblasted at a later date, costing $275,000 to reduce glare from the building, which reportedly increased the temperature of the pavement to 140 degrees. The structure also impacted on the internal temperature of the residential apartments within close proximity of the landmark building. These are just two international examples of what can happen when visual statement or ocular-centric dominance, are to the forefront of the design development process and are awarded accordingly.

This research focuses on establishing the affects of ocular-centric dominance within the built environment, how this is creating sensory imbalance, and ultimately, how this
Introduction

impacts on the human experience? The World Health Organisation (WHO) has confirmed that people spend up to 90% of their lives within interior spaces (WHO, 1999). This highlights the importance of human acknowledgement within the design development process, due to the unavoidable levels of exposure people are subject to, within the built environment. This percentage was established in 1999, yet problematic buildings and spaces are consistently emerging. This research, among other things, questions why is this happening in such an intelligent society?

1.3 Gap in Knowledge in Industry

The literature surrounding the hegemony of the eye confirms that ocular-centric dominance is increasingly becoming a more dominantly accepted factor in society (Blumenberg et. al., 1993). This prioritisation of the eye places vision at the top of the sensory hierarchy, and so the remaining senses are increasingly forgotten. Some suggest this prioritisation of vision in Western Civilisation began with the emergence of the printing press and printed language (Hibbitts, 1992; Moran, 1978), whereas others suggest it began with the ancient Greeks (Pallasmaa, 2012). Howes (2005) suggests that sight became separated from the other senses during the Age of Enlightenment “when the association of vision with reason became entrenched, and the progressive rationalization of society became identified with the increasing visualization of society and space”. Regardless of the varying theories, it is evident that the hegemony of the eye has been prevalent in society for quite some time, Plato himself claimed sight was humanity’s greatest gift (Jay, 1994).

The literature review further pinpoints the current gap in knowledge in terms of multi-sensory acknowledgement within the architectural discipline. It is clear that vision has
been prioritised, but what is not clear is why this is still happening? Why is one sensory modality being prioritised over the other, despite the apparent adverse effects this is having on the human experience. Is it purely due to ego and ocular-centric dominance? Or is it rooted in awareness and knowledge within the discipline?

1.4 **Gap in Knowledge in Education**

Architectural education is traditionally housed within the realm of the *History of Art* within Bachelor of Arts (BA) umbrella, but quite often, especially in the Institute of Technology (IoT) scenario, architectural education is housed under the broader engineering Bachelor of Science (BSc) umbrella. While a case can be argued for the benefits of both umbrellas in relation to the architectural discipline, the holistic nature of the discipline may be better afforded within its traditional roots.

In order to further explore this theory, the research has identified a *typical case* sample to participate in an observational period, which observes and analyses the current state of multi-sensory acknowledgement within a *typical case* architectural educational facility. The chosen Department of Architecture is housed under the School of Engineering umbrella (BS).

It is important to identify the current levels of sensory acknowledgement within the third level studio environment and identify the potential domineering topics within the curricula. Establishing whether industry demands for topics such as, environmental education and Information Computing Technology (ICT) competency etc., are affecting the content being delivered in architectural courses across the country is important in understanding how to create a more balanced approach. Are these exogenous factors
having such an impact on architectural education, that architectural design is now posing a disservice to the user? Are designers being educated to understand people in space?

A top down approach in higher education has seen the structure and content within educational facilities adapt and evolve over the years, as a response to industry requirement and market demand. This is particularly the case within the IoT scenario. The Higher Education Authority (HEA) have drafted *The National Strategy Framework for Higher Education 2030* which is aiming to redevelop third level education in Ireland, to improve the overall educational experience, availability of education to various socio-economic backgrounds and produce larger amounts of highly skilled graduates, which in turn will feed back into society and local economy. The 2030 campaign contains many potential positives to the current education system, but also raises a cause for concern. This campaign initiated in 2009, by the then Minister for Education and Skills, Batt O’ Keefe, in conjunction with the HEA, further promotes industry or economic focus within the IoT's across Ireland. In order to improve and maintain the current standard of living into the future, the governmental response is to create highly skilled graduates which promote world class innovation and research, to compete on the global market.

This governmental or economic pressure is largely affecting the areas that are being developed in 3rd level education, and as a result, STEM (science, technology, engineering and maths) fields are at the fore front for HEA and privatised funding. Areas such as architectural education are being internally directed into the STEM research fields, as opposed to the psychological or humanistic research fields due to
Introduction

funding availability. In the Irish Report of the Research Prioritisation Steering Group 14 key areas have been identified for development and prioritisation of funding.

- Future Networks & Communications
- Data Analytics, Management, Security & Privacy
- Digital Platforms, Content & Applications
- Connected Health and Independent Living
- Medical Devices
- Diagnostics
- Therapeutics: Synthesis, Formulation, Processing and Drug Delivery
- Food for Health
- Sustainable Food Production and Processing
- Marine Renewable Energy
- Smart Grids & Smart Cities
- Manufacturing Competitiveness
- Processing Technologies and Novel Materials
- Innovation in Services and Business Processes

These 14 core areas might touch on architectural design in varying ways, but essentially, the architectural areas being addressed are rooted in STEM. There appears to be a ‘price tag’ on research and so, certain types of education may be suffering. Students are becoming super skilled but can they appreciate the bigger humanistic picture? The education system must remember that in “five years from now the skills required in the workforce will have changed significantly” (Ohlmeyer, 2016). Therefore, in agreement with The World Economic Forum (WEF) estimations, which state, that work success in areas such as artificial intelligence and machine learning will derive from skills based in “creativity, problem-solving and critical thinking” not solely
technical competencies (WEF, 2016). Technical competencies are evolving rapidly, but are holistic critical competencies and creativity keeping pace?

The research aims to narrow the gap in knowledge, between current governmental focus within higher education, and the resulting type of graduate being produced within the architectural design discipline. Is the higher education system currently educating architectural designers to cater for the human multi-sensory experience within the built environment? If not, can this gap in knowledge be bridged through educational means?

1.5 **Guide to the Thesis**

After a rationale for the research has been offered in chapter one, the following chapters focus on a series of key areas within the research. Chapter two highlights the key literary areas which draw down on the current gap in knowledge forming the basis for the research. Some of the key areas explored include, the segregation of the senses, the current trend of ocular-centric dominance, higher education influence, and teaching and learning within the problem based learning environment.

Chapter three offers the methodological approach identified to carry out the qualitative research. Varying areas are explored to identify the most suitable approach for the pre-interactive and interactive stages of the research. The pre-interactive stage deals with the secondary sources applicable to the research, whereas the interactive stage deals with both secondary sources and primary sources.

Chapter four documents the observational period carried out within the educational facility, which spans over one full academic semester. This is the first part of the
Introduction

interactive stage of the research. Firstly, it familiarises the researcher with a *typical case* PBL environment, within an architectural design based course. Secondly, it highlights the level of multi-sensory acknowledgement within the indicative content and classroom environment. Finally, the observational period provides the research with an appreciation for the successes and limitations of varying teaching and learning methods within the PBL environment.

On the basis of what is identified from the observational period, along with literary support, chapter five, sees the creation of a module descriptor, supported by an educational resource pack. The indicative content is sourced using an inter-disciplinary approach, drawing on areas such as environmental psychology and neuroscience. Within this chapter the main learning outcomes and threshold concepts for the educational resource pack are identified, which address both the cognitive and affective domain. Established discipline specific models and independent models formulated by the research are both contextualised into the indicative content of the module.

Chapter six, documents the second part of the interactive stage of the research, the educational trial. The educational resource pack developed is tested on two cohorts within the facility over an academic semester. The successes and limitations of the content are analysed, based on the findings from the observation of the two participating cohorts. These findings are then utilised, to inform the finalised educational content and teaching and learning methods, specified in the resource pack.
Introduction

The final chapter offers the overall conclusions and recommendations for the research. The over-arching aim of the research is to draw down on the gap in knowledge apparent within the architectural design discipline, which impacts on the ability of the architectural designer, to cater for the human experience within the built environment. Furthermore, the research aims to establish that the best long term method to challenge this disconnect, and improve holistic human experience within the built environment, is balanced education.

This chapter further identifies the strengths and limitations of the educational tool and further grounds the need for a resource of this capacity through primary support. Recommendations are also offered for the areas of education, industry and further research.

1.6 Conclusion

The core aim of the research is to create awareness, through a fundamental level of knowledge, of the importance of the holistic human experience within the built environment. This awareness must then be applied to the design development process to encourage change, and a paradigm shift within the discipline itself. The philosophical, professional and ethical foundations of the architectural design discipline only stand to gain from this awareness. For this reason, the educational route offers a logical long-term approach to achieve this paradigm shift, which can then inform other areas within the discipline. In a world, where intelligent advancements are a daily occurrence and new discoveries are informing industry of climate change and black holes in space, it is important to remain grounded. Every advanced product, every sustainable strategy implemented and every smart building
erected is essentially to be used by people. Everything designed, is to be used by people.

"Good design is a renaissance attitude that combines technology, cognitive science, human need and beauty to produce something that the world didn't know it was missing."

(Paola Antonelli)
“Books are the carriers of civilization. Without books, history is silent, literature dumb, science crippled, thought and speculation at a standstill”

- Barbara Tuchman
2.1 **Introduction**

In order to carry out this research certain thematic areas are taken into consideration. The senses are considered in terms of their historic origins and contribution to human perception within society. The emotional aspect of the senses is also considered to identify the impact on the human experience. Collectively the sensory and emotional aspect of human perception is grounded in architectural literary context, where available, to establish reasoning for the current sensory state of the built environment.

The concluding gap in knowledge established within the literature, surrounding the area of sensory and emotional intelligence within the architectural design discipline, is further considered in an educational manner. Educational parameters are explored to establish a means of delivery, for inter-disciplinary knowledge into the problem based learning environment. Assessment strategies are also explored to analyse the successes and limitations of the educational intervention.

- **Literature Review Part 1**

2.2 **The Senses in Early Society**

The human senses have been an integral part of society throughout the ages. It is believed that Aristotle, a renowned Greek philosopher, coined four of what are considered to be the traditional five senses; sight, sound, smell and touch. Aristotle in 'De Sensu et Sensibilibus', demonstrates his belief that the senses were directly associated with the elements, in that, sight was linked to water due to the water content of the eye, sound was associated with air, smell was linked to fire and touch to the earth (Aristotle, C. 320 BC). Taste was not considered by Aristotle as an
sense but as an extension of touch, but it later received its place on the hierarchy. Aulus Gellius, a Roman author, is recognised for defining the five senses as a whole, stating that "nature has given five senses to living beings, sight, hearing, taste, touch, and smell" (Anderson, 2003).

Earl R. Anderson's 1943 publication 'Folk-taxonomies in Early English', delves into the senses in chapter eight. The overview provided by Anderson, considers opinion and debate from the leading theorist surrounding the earliest sensory conversation. John Locke's 'An Essay Concerning Human Understanding' explores the potential limitations of human apprehension, while Abraham Tucker's work 'The light of Nature Pursued' (1768) is suggesting "we may possibly be capable of twenty senses, but being provided with inlet for only five". This publication further highlights the conflicting opinion of Democritus and Aristotle. Democritus is suggesting that 'touch' is really the only sense, but Aristotle refutes this opinion in 'De Sensu et Sensibilibus'. Plato is also considered in Anderson's debate, a quote taken from 'Theaetetus' is highlighted to emphasise how Plato considered the senses beyond the traditional five.

"The senses are variously named hearing, seeing, smelling; there is the sense of heat, cold, pleasure, pain, desire, fear, and many more which have names, as well as innumerable others which are without them; each has its kindred object each variety of colour has a corresponding variety of sight, and so with sound and hearing, and with the rest of the senses and the objects akin to them" (Plato, C.369 BC).
He identifies the idea of a sense for heat and pain, in which today contemporary thinkers call 'thermoception' and 'nociception'. He also highlights the potential subjectivity of the senses, stating a "variety of colour has a corresponding variety of sight". Additionally, Isaac Newton's prediction "that light itself has no colour" and that "light evokes colour in suitable eyes and brains" further supports this subjective argument, essentially, "is your sensation of green like my green" (Gregory, 1998).

These varying opinions offered in the above publications, identify the complex nature of the senses and sensory perception. Regardless of whether there are five senses, or 20 senses, these publications confirm that people perceive their environments through a sensory medium. Sensory perception is achieved through the engagement of sensory modalities which send sensory messages to the brain, linking the physiological with the psychological. Furthermore, these publications offer an important foundation, in understanding the human senses and their prominence in society throughout the ages.

2.3 **An Anthropological Approach**

While the human experience may never really be generalised or quantified, understanding human diversity and subjectivity can be obtained through cultural studies. A leader in his field, and sensory enthusiast, David Howes an Anthropology Professor at Concordia University, Montreal, is one of the leading authors surrounding the themes of aesthetics and the senses in cross-cultural perspective. He is also the co-editor of *The Senses & Society* journal, which is one of the only journals to purely focus on the senses and embodiment in anthropology.
One of his earlier, most renowned publications ‘Empire of the Senses; The Sensual Cultural Reader’ (2005), questions how human ontological dimension e.g. vision, olfactory, tactile, basic sensory mediations, may carry culture and furthermore, become shaped by culture (Hinton, 2008). Essentially how the senses affect culture and culture affects the senses. The book, edited by Howes, comprises of a series of literary pieces written by a selection of authors, which offer cultural perspective on the senses in society throughout the ages. The five sections of the book include; The Prescience of the Senses, The Shifting Sensorium, Sensescapes, The Aestheticization of Everyday Life and The Derangement of the Senses.

There are a selection of key thematic areas within the book, in which Howes identifies in the opening chapter; “episteme [how the senses maintain a certain social and cultural order, and, in turn, how the senses are highly shaped by the social and cultural order]; emplacement [how the senses are connected to certain localities and play a key role in creating a sense of place]; intersensoriality [how any event entails a simultaneous experiencing, or sequential experiencing, of the senses, all of which must be explicated to understand the sensorial event]; historicization of the senses [how sense epistememes shift through time]; the colonization of the senses [how sensory valuations from other cultures may invade and transform local sensorial systems, resulting in hybrid entities]; sense ratios [how the relative importance of the senses varies by culture]; senses as aesthetic systems [how a sensorial modality may part play a key part in an aesthetic system]; and senses as a source of dis-ease [how a sensorial modality may be the source of distress]” (Hinton, 2008).
This publication offers a very broad overview of the senses in history across many cultures, which emphasises the complexity of how varying cultures experience their environments. It also delves into the sensory debate surrounding the Western classification of the traditional five senses, and demonstrates the importance of multisensory acknowledgement when describing or analysing a cultural experience. Each author offers a sensory scenario, cultural study or a synopsis of a historic event, which presents the senses in a different light.

Alain Corbin offers a worthy opinion in ‘Charting the Cultural History of the Senses’, stressing how the historian has a responsibility "to identify what it is that conditions the frontier between the spoken and the unspoken" (Howes, 2005). In other words, written accounts of sensory experiences may be rooted in bias, subjectivity and metaphor which may deceive the "careless analyst". He also suggests "omnipresence" and continuous exposure to a certain type of stimuli e.g. noise from traffic, may be omitted from descriptions of cities for example, purely because people "no longer take heed" or because of its "extreme banality". Lastly, he concludes that the hierarchy of the senses "both ordered and reflected the hierarchy that functioned within society". How individuals engaged or used their senses placed them in one of two groupings. The first group "were in constant contact with the inertia of matter, were accustomed to exhausting toil, and were spontaneously capable of feeling with their flesh an animal pleasure, produced by contact" the second group "thanks to their freedom from manual labour, were able to enjoy the beauty of an object, demonstrate delicacy, subdue the instinct of the affective senses, and allow the brain to establish a temporal gap between desire and its gratification" (Howes, 2005). Therefore, not only does
cultural diversity impact sensory perception, but also the social classes within varying cultures can impact perception.

In the chapter ‘Sensescapes’ various cultural habits and traditions are analysed in terms of their societal sensory hierarchy. Steven Feld studies the Kaluli people of Papua New Guinea, and their perception of the power of sound in “interpersonal dynamics” and the “aesthetic of musical performance”. Constance Classen further suggests that the Ongee people of South-East Asia prioritise the sense of smell, as it plays a key role in “healing, aesthetics and physiology” (Hinton, 2008).

In the chapter on ‘Aestheticization of Everyday Life’, the senses are portrayed for their multi-sensorial characteristics. Thoreau’s literary pieces depicting the beauty of multi-sensory nature are referenced and highlighted for their ability to address and recognise the multi-sensorial aspect of nature, and how people can learn from this. William Ian Miller’s essay, ‘Darwin’s Disgust’, looks into how the emotion “disgust” can be triggered by the senses, focusing most of his attention on touch. David Howes brings the multi-sensorial debate into consumerism and capitalism in his article on ‘Hyperesthesia’, a topic which holds huge relevance in the 20th and 21st century. He looks at how modern day marketing utilises over-stimulation of the senses, or hyperesthesia, to manipulate the consumer. At this stage, the book starts to portray the potential negative effects of sensory stimulation, and delves into topics such as ‘deranged sensations’ and ‘dystoposthesia’.
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The 'Empire of the Senses' provides an animated, inter-disciplinary overview of the senses throughout the ages. Each piece, in a unique way, highlights how diverse sensory perception can be among different cultures, subcultures and subgroups. Furthermore, the anthropological approach to understanding the senses in society, grounds the importance of understanding people; can spaces be designed for people if people are not understood? It must be considered that one size may not fit all, and appropriate measures should be taken to identify and understand sensory perception within society.

2.4 An Architectural Approach

In his article 'The Senses in Architecture', Howes (2005) begins to contextualise his knowledge within the architectural realm, as a response to an upsurge of interest in the senses, both in society and the built environment. The article incorporates four sections; Geography of the Senses; History of the Senses, Street Sense: Sensory Ethnography and the City and lastly, Architecture of the Senses, in which he introduces a series of notable authors who have published works touching on this field.

The section entitled 'Geography of the Senses' offers a very apt observation made by J. Douglas Porteous; “Notwithstanding the holistic nature of environmental experience, few researchers have attempted to interpret it in a holistic [or multisensory] manner” (Porteous, 1990). Porteous highlights how multisensory notions quite often end up rooted in visual aesthetic debate, which only cater for one sensory modality; vision. He goes on to stress that the interplay of each sensory modality is key in establishing “sense of space” and “the character of the place” (Howes, 2005). This observation
offered by Porteous, may sum up what is happening in today's built environment, in that; architectural designers are attempting to cater for the multi-sensory experience through the visual aesthetic.

The second section, *History of the Senses*, reiterates the historic linkages between the senses and the elements, but also begins to recognise the sensory transition which came about during the 'Age of Enlightenment'. Howes highlights how this "elemental understanding of the architecture of the senses came undone during the enlightenment, when the association of vision with reason became entrenched, and the progressive rationalization of society became identified with the increasing visualization of society and space". He goes on to reference the social theorist James Scott and political activist Jane Jacobs, while discussing the era of modernity, zoned spaces and the effects the "new standards of urban design" would have on people's interaction within these "zoned spaces". This piece highlights the potential behavioural effects designed spaces can have on people.

Jacobs in her renowned book *The Death and Life of Great American Cities* (1961) further explores the effects, and in turn, the responsibilities that town and city planners have in promoting reasonable behaviour with society and the built environment. She advocates against the "tunnel vision" of the modernist movement, suggesting that "dull, inert cities [...] do contain the seeds of their own destruction and little else. But lively, diverse, intense cities contain the seeds of their own regeneration, with energy enough to carry over for problems and needs outside themselves" (Jacobs, 1961). Although not an environmental psychologist or architect,
Jacobs was very in touch with people and human behaviour within the built environment. She recognised the important role, in which the planner or designer, held in catering for human well-being and safety, and that each city had the capacity to promote reasonable social order. Her theory on behaviour and social order is supported by Rachel Kaplan and Stephen Kaplan, who further suggest the importance of people’s environment in promoting “reasonable people” (Kaplan and Kaplan, 2009; Kaplan and Kaplan 2003). Together, they focus on the importance of meeting people’s informational needs within the built environment through the “Reasonable Person Model (RPM)”. The RPM focuses on three major domains (a) building mental models [understanding and perceiving reality through experience and learned behaviour], (b) becoming effective [directed attention versus fascination on behavioural impact] and (c) meaningful action [environment must “bring out the best in people”] (De Young, 2013).

The third section of, ‘Street Sense: Sensory Ethnography and the City’ offers a similar cultural approach to that of ‘Empire of the Senses’. Once again, Howes references the work of Lisa Law, and also Christoph Neidhart’s studies based on the socialist Russia, among others. The last section, ‘Architecture of the Senses’, reveals the most relevant content, in terms of the research topic. Up until now the literary pieces identified, have provided an historic overview and level of understanding in relation to the senses in society, but have done so in isolation. Philosophers, Anthropologists, Geographers and even Activists have formulated the basis of the research, primarily because they offer a very humane and knowledgeable approach to understanding the senses, not just scientifically but socially. However, Howes now begins to acknowledge the relevance
Literature Review

of this knowledge in the discipline of architecture. This opening question offered by Howes; “How might the architecture of the senses i.e. the study of the cultural construction of the sensorium in different times and places, help inspire an architecture for the senses?” is suggesting that there is a lack of awareness of sensory architecture in the architectural discipline. He acknowledges that although sensory conversation and relevance have existed for some time, it has only been considered with intent in recent years. He references works by E.T Hall on proxemics and also Marshall McLuhan’s sense ratios. Lastly, Howes introduces a series of seminal authors within the architectural sensory field and acknowledges their contributions.

2.5 Ocular-centrism

Juhani Pallasmaa is recognised for ‘The Eyes of the Skin’, originally published in 1996. Throughout this book, and together with a series of other publications by Pallasmaa e.g. ‘Space, place and atmosphere. Emotion and peripherical perception in architectural experience’, ‘Light, Silence, and Spirituality’ (2014) and ‘Hapticity and Time’ (2000) etc. a strong case is offered for the current trend of “ocularcentrisim” and the “hegemony of the eye” within Western culture. Pallasmaa’s work highlights the disconnect between architecture and people, which is primarily rooted in its inability to cater for the multi-sensory human experience. Firstly, Pallasmaa references the role of architecture and the built environment, in terms of the human experience stating “that ‘life-enhancing’ architecture has to address all of the senses simultaneously, and help to fuse our image of self with the experience of the world. The essential mental task of buildings is accommodation and integration” (Pallasmaa, 2012). The occupant must be
housed but also identify with the space in a multi-sensory manner. He goes on the stress that architecture “articulates the experience of our being-in-the-world and strengthens our sense of reality and self”.

Secondly, he offers a critique of the senses throughout the ages, but hones in on “ocular-centrism”, suggesting that it has become the norm within the built environment. He argues that the prioritisation of the “narcissistic or nihilistic eye” has resulted in cultural detachment and bodily isolation from the other senses. The narcissistic eye “views architecture solely as a means of self-expression” which may be likened to that of the contemporary term ‘starchitecture’. The nihilistic eye, on the other hand, “deliberately advances sensory and mental detachment and alienation” (Pallasmaa, 2012). In more basic terms Pallasmaa is suggesting that architecture is being dictated by ego and visual dominance which fails to cater for the human holistic experience.

Thirdly, he stresses the importance of recognising the prehistoric person, “the body knows and remembers. Architectural meaning derives from archaic responses and reactions remembered by the body and the senses”. He acknowledges the importance of “haptic memory” among traditional cultures, which allowed them to “develop dimensioning and proportioning systems” and survival skills. The key point Pallasmaa is suggesting, is that primordial genetics are still engrained in the 21st century person; “our sensations of comfort, protection and home are rooted in the primordial experiences of countless generations”, therefore primal need still remains and visually orientated architecture is not catering for this human dimension.
He further highlights another effect of "ocular-centrism" within the architectural realm, and that is the idea of architecture being considered as an art form. While architecture may indeed be considered a work of art, it requires another dimension. Quirke (2013) in her article on 'How to make Architecture, not Art' differentiates between architecture and art, suggesting "art is a form of self-expression with absolutely no responsibility to anyone or anything" and that "architecture can be a piece of art, but it must be responsible to people and its context".

Lastly, Pallasmaa signs off with his interpretation of what he believes architecture essentially is; stating that "architecture is the art of reconciliation between ourselves and the world, and this mediation takes place through the senses". He then refers to a Frank Lloyd Wright passage, in which he states is "more urgent today than at the time of its writing".

"What is needed most in architecture today is the very thing that is most needed in life- Integrity. Just as it is in a human being, so integrity is the deepest quality in a building...if we succeed, we will have done a great service to our moral nature- the psyche- of our democratic society...Stand up for integrity in your building and you stand for integrity not only in the life of those who did the building but socially a reciprocal relationship is inevitable (Wright, 1954)"
2.6 **Sensory and Emotional Perception**

Joy Monice Malnar and Frank Vodvarka (2004) are also recognised for their publication ‘Sensory Design’. This book differs from the literary pieces presented to date, in that it is architecturally involved; while the book does delve into the historic nature of the senses, similar to that of the previous publications, it does so in an architectural manner. Each practitioner, example of work or literary piece utilised within the publication is grounded with architectural relevance, in that, the reader does not have to consider the potential sensory relevance to the architectural space, place or environment or architectural discipline. Secondly, the book offers a collection of key literary pieces which present an abundance of interdisciplinary perspective on understanding the senses. Various theories and models e.g. Gestalt principles, Cartesian model, Empiricism etc. are highlighted and analysed for the contribution to the understanding of sensory perception. While the entire publication holds a great degree of relevance for the research, three chapters are of major relevance.

Chapter three, ‘Sensory Response’, highlights the importance of understanding how people react to the engagement of various sensory modalities. One of the key realisations within this chapter is the importance of understanding Marshall McLuhan’s ‘sense ratios’ and ‘cultural perspective’. David Howes theory on the possibility of independent intelligences for each modality is explored; “different forms of reasoning, memory and attention for each of the modalities of faculties of consciousness [seeing, smelling, speaking, hearing etc.] instead of reasoning, memory and attention being general mental powers?” (Malnar and Vodvarka, 2004). In other words, the sense ratio (sensory hierarchy) of a particular culture, may lead to the development of specific
intelligences for the prioritised modality, hence promoting a unique way of thinking or unique sensory perception, for that particular culture. The debate surrounding general perception and cultural perception is long standing and remains to be concluded, but what can be rationalised is the need for understanding sensory ratios of varying cultures.

Howes and Classen (1991) offer “five valuable considerations” typically aimed at the anthropologist, but could also assist the architectural designer in understanding the potential user of a space, place or environment.

1. Other cultures do not necessarily divide the sensorium as we do.
2. The first step is to discover what sorts of relations between the senses a culture considers proper.
3. Senses that are important for practical purposes may not be important culturally or symbolically.
4. Sensory orders are not static but develop and change over time, just as cultures do.
5. There are many different sensory orders for different groups within a society.

Furthermore, this chapter also delves into the theory of ‘form follows function’, but highlights that “form is simply not function made visible” but “translates an object’s function into the language of perceptual expression” (Malnar and Vodvarka, 2004; Arnheim, 1977). In order to achieve “true order” Arnheim suggests that there must be “inner order” and “outer order”, and that the visual representation of the inner and outer orders should be in concert to represent a unified message.
Chapter six 'The Meaning of Meaning' sees the book acknowledge the age old debate of cognition versus emotional response in the brain. Do we register the cognitive or emotional experience first and how does this effect behaviour?

For instance, the 'James-Lange Theory' is suggesting that "emotional experiences are sensory facts" and that emotional reactions such as "pleasure and displeasure" or "interest and excitement" may happen in "mental operations without any obvious bodily expressions", hence why it is hard to visually appreciate which response comes first, the physical or psychological (Malnar and Vodvarka, 2004). He further goes on to suggest that the common sense approach adopted by many, which accepts that "we react first emotionally and then physically", is not correct. He believes that the more rational approach would suggest that "we react physically to an event, which in turn induces the emotion". To explain his theory he uses this analogy; common sense says "I tremble because I am frightened", James says "I am frightened because I tremble". He believes the bodily change is as a result of the emotion (Wilson, 2003).

Regardless of the varying debates on this topic, the important factor in terms of this research is that people register an emotional response to an event. Furthermore, regardless of whether the cognitive or emotional percept comes first, human behaviour is still influenced, either in a positive or negative manner (Malnar and Vodvarka 2004; Wilson, 2003).
An extensive literary review carried out by Schreuder et al. (2016), further acknowledges the uncharted territory of emotional response to stimuli. The main concluding factors established suggest that in order to enhance emotional, cognitive and behavioural response to multi-sensory stimuli, the stimuli must be congruent in nature. On the other hand, incongruent multi-sensory stimuli are more likely to affect higher order responses, but may promote memory. They also acknowledge that a single negative sensory cue or unisensory cue has the same capabilities as a negative multi-sensory cue in effecting emotional response (Schreuder et al., 2016).

What is important to note is how to potentially identify emotional implication within the built environment as a result of sensory stimuli. Firstly there must be an awareness of the human emotions, which are presented well by Robert Plutchik. Plutchik's 'Wheel of Emotions' (1980), presents the eight primary emotions and their emotional opposites. The wheel also adds an organisational structure to what may be considered a largely unorganised field and introduces the reader to a series of standard emotional states (names), the blended emotions and finally, the potential levels of intensity of each emotional state. While this model may not house every emotional state, it does act as a good foundation for an introduction to the emotions, and how to verbalise emotional states of varying intensity.

Daniel Goleman is a long standing advocate for the recognition of Emotional Intelligence. His publication 'Emotional Intelligence' (1995) establishes the importance of recognising 'emotional quotient' (EQ) as an equal form of intelligence measurement to that of the traditional method of 'intelligent quotient' (IQ) measurement. While
both measure different forms of human intelligence they each play an important role in catering for the human experience. It is important to note that cognition or IQ can only carry the human experience so far; "emotions enrich; a model of mind that leaves them out is impoverished" (Goleman, 2006; Goleman 1995). The ‘five stages of emotional intelligence’ offered by Goleman provide a logical way to understand the emotional processing. The model is based on the self, but it can be argued that one must first understand their emotional selves before understanding others; "Anyone can become angry. That is easy. But to be angry with the right person, to the right degree, at the right time, for the right purpose and in the right way, this is not easy" (Aristotle, 384BC – 322BC). The emotions must be first rationalised to a communicable manner, then understood in context of the self, to later understand others and society.

Chapter seven, ‘Sensory Cues’, boasts one of the most informative chapters within the publication. Malnar and Vodvarka consider how ‘space’ and ‘place’ vary through the work of Yi-Fu Tuan, who states that "what begins as undifferentiated space becomes place as we get to know it better and endow it with value", which can only be achieved through the senses. The authors go on to highlight literary pieces which showcase the experience of “place” through “odor” and “sound”, non-ocular-centric modalities essentially. The chapter, or book, as a whole, does not just reference the multi-sensory experience; it captures the human response to the multi-sensory and unisensory stimuli in varying scenarios. For example, a scenario is offered to the reader depicting the affect sound may have on the blind in two situations. In a Michael Southworth study; the blind “preferred low to middle frequency and intensity sounds” and their “delight increased when sounds were novel, informative, responsive to personal action
and culturally approved”. Whereas, sounds which were received in a “rush and roar” manner were considered annoying, particularly when the “masking effects were high”. What can be taken from this chapter is the importance of context, and realising the potential effects of sensory stimuli on the occupant within different context or environments.

The chapter further highlights the importance of the sense of smell on the hierarchy, and the power it potentially has on human behaviour. First of all, the authors note that although the human brain may not “rationalise” or “verbalise” what is initially smells, the human body does have an immediate reaction to olfactory messages, triggering instinctive behaviour. Secondly smell is recognised for its capability to register in the long-term memory of the brain, which can largely contribute to “place awareness”, “place identity” or as Pallasmaa (1994) suggests the “space of scent”, when he proposes “the strongest memory of space is often odor….A particular smell may make us secretly re-enter a space that has been completely erased from the retinal memory; the nostrils project a forgotten image and we are enticed to enter a vivid daydream.”

Sound is also given its place on the sensory hierarchy in terms of spatial perception and characterisation of place. The typical city soundscapes are given particular acknowledgement for their sensory output in order to rationalise how this may affect the perception of a space, place or environment. The city dweller is recognised for their constant bombardment of “attention demanding sounds, smells and microclimates” (Malnar and Vodvarka, 2004), or exposure to sensory overload. The authors further acknowledge the limitations of designing in sensory isolation; “visible
form conceived as an isolate can never be experienced as intended by the designer when the sonic form, or even other nonvisual factors such as microclimate or olfactory environments are not designed in correlation”.

Richard Neutra’s ‘Survival Through Design’ (1954), also recognised the poor affects the “metropolitan type” built environment has on the human nervous system. The inability of man to identify with the ubiquitous process of “machine” or “metropolitan” environments, limits the human ability to cope with the stimuli output. Neutra proposes that the adjustment to “man-made environment is a much more complex process than biological adjustment to a natural habitat” as a result of continuous exposure to “new frictions and nervous arrhythmias”. He concludes that “every new technological invention results in urgent new demands on the human nervous equipment”. In light of the 21st century developments in smart technology, drones and robotics, to name but a few, exposure to sensory stimuli is higher than ever, therefore, man’s ability to identify with today’s embedded systems, must be equally as difficult as Neutra suggested of the 1950’s metropolitan man-made environment. Finally, Neutra offers a summary of what he believes to be the task of the designer in society;

“He must attempt to strike a happy medium between those physiological imperatives that are the constant of life, on the one hand, and on the other hand, the acquired responses, which by his professional judgement he finds possible to include in a wholesome scheme. He must pledge himself to serve wholesomeness honestly. If physicians take such a humane oath, designers must too” (Neutra, 1954).
Nueta is highlighting a gap in knowledge in relation to the designer’s ability to manage sensory output or exposure within the metropolitan environment.

Chapter seven of ‘Sensory Design’ also highlights the change in the design development process, in relation to acoustical awareness. Notable references are made to the “Greek Theater at Epidaurus” and the “Shah Abbas Mosque” for their acoustical excellence, and regard for musical principles. The architect in the era of Vitruvius and Gabrieli placed huge importance on not only visual presence and statement, but the acoustical capabilities of the spaces they were creating, primarily because it was a key functional element of the intended use. Why have acoustics taken such a back seat within the design development process, just because cities or the built environment in general is not intended for musical appreciation, does not excuse a lack of consideration for acoustic comfort. Malnar and Vodvarka reference Douglas Pocock (1989), a geographer, who reminds that “sound not only surrounds but can penetrate to the very core of the sentient. This primitive power, which bypasses the cerebral and directly addresses the heart, elicits an emotional response” and this may not always evoke positive reactions. The World Health Organisation (WHO), have suggested that up to eight million insomniacs now occupy European cities purely as a result of traffic noise pollution. Furthermore, up to 1.6 million DALY’s are lost per year as a result of traffic noise pollution, once again. The acoustic or sonic properties of the built environmental are increasing morality rates across developed countries.
2.7 Conclusion to the Senses

The above publications and literary references, establish that a gap in knowledge exists. Architectural designers are not currently catering for the total human multi-sensory experience, as a result of what appears to be a lack of knowledge. The publications referenced, while very insightful are not applied within the realms of education or industry. Dissemination from inter-disciplinary fields such as Anthropology, Neuroscience, Philosophy and Environmental Psychology are not currently at a level whereby architectural designers can benefit from this knowledge in an applied sense. Language barriers and cumbersome text laden publications all add to the existing access limitations, in which the architectural design disciplines face.

In order to breach the gap in knowledge the appropriate educational measure must be analysed to disseminate inter-disciplinary knowledge into the architectural design discipline.
2.8 Introduction to an Educational Approach

In order to create an educational tool which can be applied to the typical architectural problem based learning environment, the literature surrounding third level education and its application is reviewed. The literature hones in on legislative frameworks, learning outcomes, constructive alignment, threshold concepts and assessment methods.

2.8.1 Frameworks and Learning Outcomes

In order to design educational content for third level education the National Framework of Qualifications (NFQ) level of the potential learner profile must be identified e.g. fundamental (Level 6/7), intermediate (Level 8) or advanced (Level 9/10) etc. The module content and learning outcomes can then cater for the level of learning intended.
Kennedy’s ‘Writing and Using Learning Outcomes [A Practical Guide]’ (2007), is considered for its simplified and applied nature. Firstly the guide addresses the educational legislative frameworks at National and European levels. The outcome based approach to education is also rationalised in terms of its contribution to the Bologna process; in that, by use of a generalised weighting system the channels of communication would be opened up across Europe. The level of education achieved by the student can be recognised through the use of a credit system, which encourages mobility, transferability, comparability and co-operation.

This guide allows the educationalist, turn the aims and objectives of a potential module into learning outcomes. The short guidebook heavily references the work of Benjamin Bloom or ‘Blooms Taxonomy’, which address the three domains of learning; the cognitive domain, affective domain and psycho-motor domain. For the purpose of this research the cognitive and affective domains
are of particular interest, as the psychomotor domain deals with developing manual skills (Randall, 1994). Therefore, the publications 'Taxonomy of educational objectives: The classification of educational goals. Book 1: Cognitive Domain' (1956) and 'Taxonomy of Educational Objectives. Book 2: Affective Domain' (1999) act as a more detailed support for these two particular areas. The 'action verbs' addressed within both domains play a crucial role in the outcome based learning approach. Each domain has six categories which suggest the level of learning the student should be undertaking; within these categories the 'action verbs' are listed.

Moon also offers an extensive overview of the outcome based approach in the leading publication, 'The Module and Programme Development Handbook' (2002) of the outcome based learning approach in which has infiltrated higher education structures. This book goes beyond the outcomes itself and delves into the "linking of levels, learning outcomes and assessment criteria", and also touches on areas such as 'group' and 'peer' methods for teaching and learning. This book, in essence, indirectly offers guidelines which promote and complement the problem based learning environment.

2.8.2 Constructive Alignment

The theory of 'constructive alignment' is also considered for the module development. Biggs and Tang's book 'Teaching for Quality Learning at University' (1999; 2007), again, highlights the shift within higher education surrounding an outcome based approach to learning. They also acknowledge
the importance of 'active engagement' within the learning environment and stress the importance of what the student does as opposed to what the teacher does. The book offers guidelines to allow for implementation of constructive alignment with the higher education environment. Donnelly and Fitzmaurice 'Designing modules for learning' (2005), also support the 'Constructive Alignment' theory and offer a 'three stage process', building on the Biggs and Tang approach to encouraging deeper learning. They also offer what they call 'action triggers' to guide the lecturer in; understanding the demographic of learner, the resources available and ultimately, deciding the best teaching strategy to achieve the learning outcomes (Donnelly and Fitzmaurice, 2005).

2.8.3 Catering for the Learner and Educational Environment

The leading publication, edited by Heather Fry, Steven Ketteridgeis and Stephanie Marshall, 'A Handbook for Teaching and Learning in Higher Education' (2008), offers an inclusive overview of the current demands on the education system. They acknowledge the rapid advancements in technology and its use within the teaching and learning environment, the growing levels of student diversity within classrooms and the various styles of teaching methods currently being utilised and promoted. The book is divided into three sections.

Part one, 'Teaching, supervising and learning in higher education', deals with actual teaching and supervision within the higher education environment and has a specific area which looks into student motivation, and curriculum design. Of particular interest in this sub chapter, is the reference to "intrinsic and
extrinsic motivation" in students and how to address this within the classroom environment.

Part two, 'Teaching in the disciplines', deals with discipline specific areas within education, which makes this publication different to previous publications listed to date. The editors have differentiated between disciplines, in that, the teaching and learning methods for one discipline may not suit another. They have collated a series of sub chapters, written by experienced educationalists within their fields. Of particular interest are 'Key aspects of teaching and learning in engineering' and 'Key aspects of teaching and learning in arts, humanities and social sciences', which address the problem based learning environment, but the other topics also provide insight to various teaching and learning methods.

Part three, 'Enhancing personal practice', focuses on enhancing the teaching and learning experience, to support best standard practice, which is particularly aimed at those starting out in their educational careers or those wishing to improve or adapt.

2.8.4 Threshold Concepts

Another key theme within the book is the concept of 'deep learning' and 'affective engagement' as opposed to 'surface learning' and sole 'cognitive engagement'. The idea of 'threshold concepts' are also introduced, as a potential method to promote understanding and develop student learning, in an applied sense. This theory originally coined by Meyer and Land, in their book 'Overcoming barriers to student understanding: Threshold concepts and
troublesome knowledge' (2006), highlights the problematic issues with arise in higher education with regard to understanding and 'deep learning'. They address these issues as "stuck places" or "troublesome knowledge" and advocate for structuring the curriculum or module around these problematic areas. This method offers a very applied or realistic means toward education, and allows the student to understand 'why' they need to know what they are learning as they transition through the content. Given the applied nature of the teaching and learning method and the reliance on industry expertise, this method complements the problem based learning environment.

2.8.5 Inter-Professional Education (IPE)

Inter-professional education (IPE), a relatively new term, is starting to gain weight in the medical and social sciences educational fields. A series of publications offer context and insight to IPE within these parameters. The World Health Organisation (WHO) published a 'Framework for Action on Interprofessional Education & Collaborative Practice' (2010). This document recognises the role IPE can play in society or specifically healthcare in this instance; stating that they "partners recognize interprofessional collaboration in education and practice as an innovative strategy that will play an important role in mitigating the global health workforce crisis" (WHO, 2010). This report or framework has emerged as a direct response to a global shortage in healthcare professionals. A number of publications support the WHO's "call to action", to establish policy which promotes IPE e.g. Oandasan and Reeves (2005) publication entitled, 'Key elements for interprofessional education. Part
PRE-EDUCATIONAL TRIAL

METHODOLOGY

3.0

"Not everything that counts can be counted, and not everything that can be counted counts"

- Albert Einstein
Methodology

3.1 **Introduction**

This chapter explores the methodological framework undertaken to carry out the research and the rationale behind it. The framework is categorised under two headings to represent the two main stages of the research, the *Pre-Educational Trial* and the *Educational Trial*. The *Pre-Educational Trial* comprises of two stages, the *Observational Period* and the design of the *Educational Resource Pack*, whereas the *Educational Trial* solely focused on the implementation of the actual module.

3.2 **Choosing a Framework**

When considering qualitative or quantitative research methods it is vital to understand the research question at hand e.g. “If the question is a qualitative one, then the most appropriate and rigorous way of answering it is to use qualitative methods”, a commonsensical approach (Quinn and Cochran, 2002). Despite this, quite often research is strong armed into quantifiable measures to gain validity but Einstein himself made a very valid argument stating “Not everything that counts can be counted, and not everything that can be counted counts”. Boston’s North-Eastern University reassures in their guide to *Qualitative Research Methods* that “qualitative research is a type of scientific research” (Berg et al., 2004). In this instance the research question being offered *‘Integrating Sensory & Emotional Intelligence into Architectural Design Education in Ireland’* must be answered by primarily qualitative means but can and is supported by relevant quantitative elements. The methods used to obtain and validate data must reflect the core essence of the research, after all, the physical world is a place “of colours and sounds, of pleasures, of grief’s, of passionate
loves, of ambitions, of strivings,” and this human experience cannot be quantified (Wiereinski, 2015).

In order to proceed with the research, clear aims and objectives are identified to guide the research and recognise the appropriate methodology to implement. In the Sage Publication ‘Designing and Planning your Research Project’ Thomas and Hodges (2008) reiterate the importance of understanding the research question and objectives associated, in order to make informed decisions “about which populations or demographic groups to include in the study and what data collection methods to use” (Thomas and Hodges, 2010, Palys, 2008).

3.3 Aims & Objectives

Aims

1. Establish a Human Awareness

Identify the current level of human awareness among architectural designers in relation to the sensory and emotional implications of the built environment in a typical third level architectural educational facility.

2. Implementing Sensory and Emotional Intelligent Course Content

Establish course content to aid the introduction of sensory and emotional intelligence into a typical third level architectural design academic programme. The progressive module aims to educate designers on understanding and implementing sensory and emotional intelligence in architectural design.
Methodology

3. Developing a Resource Park to Aid Module Delivery

Develop a user friendly resource pack to facilitate the tutor, in any given architectural design course, to successfully deliver sensory and emotional intelligence or elements of, at various levels of academic education.

Objectives

1. Pre-Educational Trial

A full academic semester of structured observation is carried out to highlight what is being taught and learned in relation to sensory and emotional intelligence within the studio environment. This observational period also showcases the varying teaching methods being used and their effectiveness in the teaching and learning process. The observational data obtained is further supported by unstructured interviews with test group participants and faculty.

2. Educational Trial

A preliminary module draft, based on observational findings, literary review and precedent analysis, is designed to include sensory and emotional intelligent course content into the studio environment.

3. Data Analysis

Findings from the educational trial along with literary review and precedent study inform the following contents of the resource pack:

- Finalised resource pack content
- Teaching and learning methods
- Teaching and learning aids (resource materials, theory and independent learning guides)
Methodology

- Directional Guides for varying academic ability / differentiated learning

The following introduces the various sub methodologies undertaken to fulfil the research aims and objectives.

3.4 Pre - Educational Trial – Observational Period

3.4.1 Non - Probability Sampling

In order to identify the most appropriate sample selection for the case study, non-probability sampling methods are being used. Non probability sampling "represents a group of sampling techniques that help researchers to select units from a population that they are interested in studying" (Laerd Dissertation, 2012). Purposive sampling is a core element of non-probability sampling, in that the researcher makes informed decisions to identify a sample rather than random selection methods typically adopted in probability sampling. Subjective judgement supports the researcher’s decision to identify a particular sample to ensure the best possible platform for the research.

3.4.2 Purposive Sampling

Within purposive sampling there are many varying techniques that can be adopted, for the purpose of this research subjective judgement and typical case sampling methods are utilised. One of the main reasons for this selection is rooted in the need for a normal or typical sample. The case study, which includes an observational period and an educational trial, must be implemented within a typical case architectural design educational facility.
Methodology

'Sage Encyclopaedia of Qualitative Research Methods' references a study carried out by Howard Becker, who in a bid to highlight how medical students were socialized into the profession, carried out his study in the University of Kansas Medical School purely because there was nothing unusual about it. As a result of the normality of this school it could then be associated with a typical medical school experience (Palys, 2008). This case study represents similar criteria applicable to the current research.

In order to identify a sample for the research, to best represent a typical case sample, a filtration process is implemented. This process involved setting out criteria based on subjective judgement to provide an adequate platform for the research.

1. Located within an Irish Context for Accessibility Purposes

The test base should ideally be located in Ireland for accessibility and familiarity purposes. The research is suggesting that architectural design can better service the occupant when the designers are familiar with the cultural demographic of the demographic of people they are catering for. Bearing this in mind, the researcher concluded that an Irish location would better support the research as opposed to a foreign location for familiarity and language purposes.
Methodology

2. An Institute Offering a Qualification in Architectural Design Education

Firstly, a graduate leaving a design course at degree level is by industry and legislative standards ready to enter the work force at an entry or junior level. To critique the level of sensory and emotional awareness going out into industry the researcher felt this standard of education an appropriate level to begin with, and so, in turn the educational facility had to offer a fundamental or intermediated level course.

Secondly, Institutes of Technology (IoTs) have been selected by the researcher as a target host facility as opposed to the University model based on two factors;

- Firstly, the academic level of a student entering an IoT scenario, entering in on a level 7 or Level 8 basis, has a higher non-progression rate to that of a student entering University scenario (Frawley et al., 2017). The research is suggesting if the educational trial proves successful within an architectural design course in an IoT setting, with students potentially entering on a lower academic level, by default it can be assumed that it will be successful within a University setting where the entry requirements are more competitive and non-progression levels are lower (Mooney et al., 2010). Also, interior specific courses are not currently available at University level in Ireland.

- Secondly, traditionally speaking, architectural education is housed within the realm of History of Art (Bachelor of Arts). In the IoT scenario, quite often, architectural education is housed
under the *Engineering* umbrella (Bachelor of Science). In order to witness if the STEM orientation is affecting what is being taught within an architectural course, the IoT test base can further benefit the research.

Finally, given the project is heavily rooted in architectural design with a strong interest in interiors; largely emerging from the World Health Organisation statistics which inform that “we spend 90% of our lives indoors” (WHO, 1999), the chosen facility had to have a strong interiors department with architectural reference to complement and promote the unavoidable relationship between architecture and interior design. These requirements filtered the sample scope to identify the following possible host facilities, given that they offer an interior based degree course, with an architectural reference in Ireland:

<table>
<thead>
<tr>
<th>Institute of Technology</th>
<th>Course Title</th>
<th>Level</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. DIT – Dublin Institute of Technology</td>
<td>Design (Interior &amp; Furniture)</td>
<td>8</td>
</tr>
<tr>
<td>2. CIT – Cork Institute of Technology</td>
<td>Interior Architecture</td>
<td>8</td>
</tr>
<tr>
<td>3. ITS – Institute of Technology Sligo</td>
<td>Interior Architecture</td>
<td>8</td>
</tr>
</tbody>
</table>

Table 3.1 Applicable third level honours courses in Ireland (Author, 2016).

After the necessary analysis of the above IOT's, departments and specific course content, this research identified Cork Institute of Technology (CIT) as the test base for the following reasons.
Methodology

- CIT, as per ECIA (European Commissioners of Interior Architecture) recommendation, has actively taken a step back from information and communications technology (ICT) reliance. Integration of ICT packages has been introduced in stages to allow progressive integration of computing skills. This phased approach encourages development of hand skills and allows the student to obtain a greater understanding of first principle design and design fundamentals at a fundamental stage of education. One of the great advocates of humanistic and hepatic design, Juhani Pallasmaa (2009), states in his book 'The Thinking Hand', "the line traced by the hand is a spatial one: placed in a distinct perceptual or imagined space with expressive richness and emotive life ... in contrast to the computer's emotionless factuality of mathematical space". He further concedes in the following chapter that one skill should not replace another; balance is key, "in addition to operative and instrumental knowledge the designer and artist need existential knowledge moulded by their experience of life" (Pallasmaa, 2009).

- As a result of this ICT awareness in CIT, the research stands to benefit from the raw observation of this transition and will complement the evolution period within the department. Together, the researcher and departmental body can strive to argue that a shift toward a less ICT literate graduate with the affordance for more emotive awareness and critical ability would further enhance the learning experience for the student, student intuition, and long-
Methodology

term societal benefit afforded by the graduate, for "in our vital need, science has nothing to say to us" (Husserl, 1970).

- The Department of Architecture within Cork Institute of Technology has agreed to support and facilitate the varying stages of the research. The department granted permission to run and document the longitudinal observation within the studio environment and also supports the educational trial stage during the academic semester.

The architecture department holds a strong internal interest in the topic, and in the overall creation of a module to offer the subject matter, with the possibility of future inclusion in the programmatic review.

Finally, the researcher has built rapport with the facility and overall Department of Architecture within CIT during her undergraduate tenure, in which she completed the BSc. Interior Architecture (2008-2012). This rapport gave both the researcher and department the confidence to carry out the research to a high standard.

3.5 Pre-Educational Trial

3.5.1 Longitudinal Observation

To carry out the observational period the next stage involves choosing a cohort of students to observe within the Interior Architecture course. The actual observation falls into the second semester slot due to the restraints of the research timeframe itself. After discussion with the faculty within the
Methodology

department the first year group is chosen due to the unanimous opinion that if a module, containing sensory intelligence (SI) and emotional intelligence (EI), were to be run in time, it would start concurrently with first year design studio and progress through the four academic years. Also the domestic nature of the first year design studio projects provides a good platform for observation of SI and EI acknowledgement given that there is a strong existing familiarity among the students with the environments they are currently designing.

3.5.2 Observational Structure

The observation takes place within the design studio environment at structured intervals. Over a twelve week period the observer is present for 108 hours observation. This represents three hour segments, three times per week. In entirety the observer is present for 75% of the design studio allotted contact time. In order to document and analyse the observational period a test group of three students is established to allow the observer document detailed observation. These students are selected on an average cohort basis, to represent as closely as possible a typical case sample. The averages are based on design studio scores from semester one. The course coordinator for first year provided the researcher with three student names based on closest to the average result.

Although no ethical issues have been flagged by the Head of Department, waiver forms are drafted to inform the test group of the research and its aims, and also to receive necessary consent from participants to carry out observation.
Methodology

The waiver form also seeks permission to:

- Observe & Document current knowledge of SI & EI.

- Observe & Document test group Teaching & Learning experience.

- Observe & Document test group response to Teaching Methods, (Engagement Levels and Application).

- Observe & Document test group Design Studio Submissions for levels of user acknowledgement.

- Document findings to support primary field research having regard for the Data Protection Act 2003.

The waiver form can be seen in Appendix A, and is drafted holding reference to the Michigan Technological University's Consent to Participate in Research form (Michigan Technology University, 2016).

3.5.3 Non-Participant Observation

The researcher adopts the role of the observer in a non-participant observation manner. Non-participant observation can be classed as a research technique whereby the observer watches his or her own study but plays no active part in the situation under scrutiny. Marshall, in his non-participant observation publication in the 'Dictionary of Sociology', states this approach comes under criticism based on the fact that the presence of the observer "may lead people to behave differently, thus invalidating the data obtained" (Marshall, 2016).

Given that the researcher is observing what is being taught and learned primarily, as opposed to sheer behavioural observation, the presence of an
Methodology

observer should not impede the communication and understanding from lecturer to student over a longitudinal period. Also due to the open-plan layout of the educational environment, the student body are accustomed to continuous environmental noise and distraction.

3.5.4 Observational Measurement Methods

To help document this observational period, the researcher is logging the daily experience in an electronic diary format. The logging process follows a semi structured format and key areas are addressed in each observational session.

- Attendance of the test group and lecturing body.
- The overall class content offered in each session.
- The varying teaching methods used during each session and how they are received?
- The engagement levels of both the student and the lecturer(s) throughout each three hour studio session.
- If there is an interactive or physical element to the studio session e.g. handouts, audio visual, site visits and demonstrations.
- What resources are used in the studio session and how they are received?

Alongside the daily logging, studio submissions are assessed through the use of structured bespoke pro-forma. The various pro-forma are drafted holding reference to the East Riding of Yorkshire lesson observation pro-forma which was accessed through BGfL (Birmingham Grid for Learning) to ensure an international standard layout (Appendix A). The contents of this existing template have been edited to address to core observational aims of the
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research, while maintaining reference to the layout and flow of the East Riding template. The pro-forma content is tailored to incorporate the creative process in its structure and reference is also made to the 'design studio 2' module descriptor.

Pro-forma Breakdown - Student

1. The first category in the student observational pro-forma is categorised under Concept. The concept category is observing how the student is dealing with the initial information on the brief. Are they distinguishing between the client and the potential user? Are they flagging any sensory or emotional design questions, consciously or not?

2. The second category Synthesis, builds on Concept. The observer is highlighting how the test group are researching the project and what precedent they are noting while simultaneously noting user acknowledgement. The initial student concept designs are noted and examined for user awareness and user profiling at this stage.

3. The third category Development, looks into the actual design development stage of the project. Areas such as form and function are noted in the scheme, along with any specification that may have been made. These areas are flagged to see if the user is considered throughout the functional design, the visual aesthetic design and the specification stages and if so, to what level.
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4. The fourth category looks into the overall Dissemination. The presentation techniques of the student are noted to see human acknowledgement at presentation stage. If materials have been proposed at presentation stage, have they been considered from a user sensory and emotional perspective?

5. The following categories Summary, Strengths, Design Development Folder and Progression allow for the observer to make additional observations they deem to be important research.

6. Lastly the Overall Participation of the student is noted to determine general interest, and response to teaching methods.

By default, this allows the observer to document the acknowledgement levels of the user throughout the development of the design studio project. For example, if the student acknowledges the user at the concept stage, at what level does this occur and do they carry this acknowledgement through to the dissemination stage. This strategy covers the documentation of the student approach to human acknowledgement throughout the design development process.

To fully appreciate the teaching and learning experience, the observer must consider the role of the lecturer within the teaching and learning environment. Module content is essentially dictated by the lecturer or at least department level. If the human experience is not prioritised by the lecturer there is a strong possibility that the student will follow suit, therefore the observation must consider the role of the lecturer throughout the observation period. The pro-
Methodology

forma used to carry out lecturer observation holds a similar structure to that of the student pro-forma, but also incorporates key areas from the CIT module descriptor. Learning outcomes are a major factor to be considered as they guide the indicative content implemented and overall direction the lecturer takes throughout the academic semester.

Lesson Plan Pro-forma Breakdown - Lecturer

1. The first category Learning Outcomes lists the six learning outcomes listed in the module descriptor and allows for observational comments. These are flagged to highlight the direction the module content should take and also what level the human experience is acknowledged from the top down essentially. The observer is looking to document how the lecturer interprets these outcomes and how they position the user within their interpretation.

2. The second category Indicative Content, delves into the overall topics that should be covered within the academic semester. Once again the observer is noting how these areas are related to the user experience within the studio environment.

3. The third category Projects, acknowledges the overall weight each project has within the design studio module.

4. The fourth category sees the introduction of the creative process categories, starting with Concept. This area focuses on how the current brief is conceived and delivered to the student cohort. The observation is highlighting the acknowledgement of the user from the lecturer
Methodology

perspective at this stage and also what design theory is being taught to induct the student into a new area of design.

5. The fifth category covers the Synthesis stage, focusing in on the concept research and inspirations. The observation is interested in how the lecturer promotes the research stage and how the human experience is acknowledged.

6. The sixth category, Development, hones in on the direction the lecturer gives during design development in relation to function, visual dominance, specifications and materials. This is a key support stage in the design process to ensure the students are considering their designs from the user perspective.

7. The seventh category, Dissemination, centres in on the final sign off of the project. The presentation of the individual project is critiqued from the lecturer’s stance on user acknowledgement during the presentation. The observer is noting commentary on possible visual dominance effects of the overall design.

8. The eighth category, Project Assessment, highlights how the lecturer is weighting the varying aspects of the submission. This gives insight to the hierarchy of the various elements.

9. The ninth category, Independent Learning, is suggested in the module descriptor. This area is being observed to identify how it is approached and guided throughout each project and if it reflects user experience.

10. The tenth category, Summary, allows for further comment on the overall observation of the lecturer’s role within the studio environment.
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In conjunction with the *pro-forma* documentation and *diary logging*, *in-depth semi structured interviews* are held with members of the test group, the Interior Architecture course coordinator and first year coordinator.

3.5.5 **Aims of Interviews**

The main aim of the lecturer interview is to establish how the course coordinator and the year coordinator approach the academic semester. Relevance is given to the module descriptor which in theory guides the direction and content of the semester. The creative process is also introduced to establish how the lecturers approach the studio project from concept to dissemination. The lecturers are also quizzed on their approach to human experience and how they introduce this into the design studio environment. Lastly, a section of general questions centred on the rational of the research, are put to the lecturers to establish there thought on human experience in architectural design education.

The student interviews look into the student awareness of the human experience in relation to sensory and emotional awareness and their existing level of knowledge. The interview also acknowledges learning to date from the student perspective and the overall teaching and learning experience.
### Table 3.2 Interview schedule for the Pre-Educational stage (Author, 2016).

<table>
<thead>
<tr>
<th>Date</th>
<th>Location:</th>
<th>Lecturer:</th>
<th>Topic:</th>
<th>Date</th>
<th>Location:</th>
<th>Test Group:</th>
<th>Description:</th>
</tr>
</thead>
<tbody>
<tr>
<td>17-2-2016</td>
<td>Architecture Factory @ 12.44pm</td>
<td>Kevin Busy</td>
<td>Reasoning behind; Content, Structure &amp; Assessment for academic semester.</td>
<td>25-2-2016</td>
<td>Louis Kahn Seminar Room Architecture Factory</td>
<td>Student A</td>
<td>Teaching and Learning Experience to date in Design Studio.</td>
</tr>
<tr>
<td>24-2-2016</td>
<td>Architecture Factory @ 3.24pm</td>
<td>Anne Rogers</td>
<td>Reasoning behind; Content, Structure &amp; Assessment for academic semester.</td>
<td>25-2-2016</td>
<td>Louis Kahn Seminar Room Architecture Factory</td>
<td>Student B</td>
<td>Teaching and Learning Experience to date in Design Studio.</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>25-2-2016</td>
<td>Louis Kahn Seminar Room Architecture Factory</td>
<td>Student C</td>
<td>Teaching and Learning Experience to date in Design Studio.</td>
</tr>
</tbody>
</table>

These *semi-structured interviews* act in a supporting role to the observation and allow the student and lecturer a platform to voice opinion, on the varying categories being observed that may not be realised through observation alone. This, in essence, allows for a diagnosis of both student and lecturer opinion, in relation to the teaching and
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learning experience, the teaching and learning environment and the current awareness and weight of sensory and emotional intelligence in architectural education (based on a typical case sample).

3.6 Data Analysis

The observational period provides raw data in the form of observational notes, assessment pro-forma and interview transcripts. Qualitative data analysis can be quiet cumbersome, and requires a systematic approach to begin analysis. Given that there are pre-set aims and objectives for this piece of research the observational analysis stage is structured to highlight key areas.

The types of data collated essentially end up in the form of transcripts and notes. This raw data provides “a descriptive record of the research, but they cannot provide explanations. The researcher has to make sense of the data by sifting and interpreting them” (Pope et al., 2000). In order to deconstruct the data and identify possible themes the following process must be undertaken.

The data is firstly reviewed individually. Each piece of data gathered is referred to as a “data item”. In this instance each observational note, pro-forma and interview transcript are coded individually. The coding process aims to identify themes through “careful reading and re-reading of the data” (Braun and Clarke, 2006). This coded data is then extracted; a “data extract refers to an individual coded chunk of data, which has been identified within, and extracted from, a data item. There will be many of these, taken from throughout the entire data set, and only a selection of these extracts will feature in the final analysis”. In order to identify reoccurring themes within the data “a process called constant comparison” is used. This process ensures “each item is
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checked or compared with the rest of the data to establish analytical categories” (Braun and Clarke, 2006).

Identifying themes and patterns within the data can be considered in two ways, Inductive or Deductive. A top down deductive approach is being used to structure the observational findings in order to test the over-arching hypothesis. Braun and Clark (2006) further suggest when carrying out deductive analysis “it is important that the theoretical position of a thematic analysis is made clear”. Prior to the observation period key areas of interest were identified in order to design the pro-forma used to document the observation. These pro-forma, as previously stated, hone in on key areas such as design studio content, engagement levels, teaching methods, the teaching and learning experience etc., and therefore the analysis stage must consider these categories to identify themes or patterns within each category, in order to inform the proposed new SI and EI content. It is common for any theoretical framework to carry “with it a number of assumptions about the nature of the data, what they represent in terms of the world, reality” and so forth. A good thematic analysis will make this transparent” (Braun and Clarke, 2006).

The below framework, identified in Pope’s article ‘Analysing Qualitative Data’, is considered and referred to in the overall analysis process.

"Five stages of data analysis in the framework approach

1. Familiarisation—immersion in the raw data (or typically a pragmatic selection from the data) by listening to tapes, reading transcripts, studying notes and so on, in order to list key ideas and recurrent themes
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II. Identifying a thematic framework—identifying all the key issues, concepts, and themes by which the data can be examined and referenced. This is carried out by drawing on a prior issues and questions derived from the aims and objectives of the study as well as issues raised by the respondents themselves and views or experiences that recur in the data. The end product of this stage is a detailed index of the data, which labels the data into manageable chunks for subsequent retrieval and exploration.

III. Indexing—applying the thematic framework or index systematically to all the data in textual form by annotating the transcripts with numerical codes from the index, usually supported by short text descriptors to elaborate the index heading. Single passages of text can often encompass a large number of different themes, each of which has to be recorded, usually in the margin of the transcript.

IV. Charting—rearranging the data according to the appropriate part of the thematic framework to which they relate, and forming charts. For example, there is likely to be a chart for each key subject area or theme with entries for several respondents. Unlike simple cut and paste methods that group verbatim text, the charts contain distilled summaries of views and experiences. Thus the charting process involves a considerable amount of abstraction and synthesis.

V. Mapping and interpretation—using the charts to define concepts, map the range and nature of phenomena, create typologies and find associations between themes with a view to providing explanations for the findings. The process of mapping and interpretation is influenced by the original research.
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"objectives as well as by the themes that have emerged from the data themselves" (Pope et al., 2000).

Once the data has been coded it can then be organised using excel to formulate visual communications of the findings e.g. tables, graphics etc.

3.7 Pre - Educational Trial - Designing Module/Resource Pack

3.7.1 Introduction

The pre-educational trial is a key stage in the research, whereby the content for the educational resource pack is formulated. Alongside sourcing indicative content, a number of factors must be considered when designing an educational module of any sort. Below delves into the various elements which contribute to module design within an Irish context. These contributors must be acknowledged when structuring the module indicative content which will further inform the educational resource pack.

3.7.2 Governing Bodies

Bodies such as the Higher Education Authority (HEA) and Quality and Qualification Ireland (QQI) have a top down effect on module design within any educational facility to ensure quality control. QQI are responsible for ensuring quality assurance and high standard of education in Ireland. National Framework of Qualification (NFQ) “is a framework through which all learning achievements may be measured and related to each other in a coherent way”. The many varying qualifications included in the NFQ, “are organised based on their level of knowledge, skill and competence”. This framework was established in 2003 and ensures quality assurance and international recognition of the level of award received by the particular student (QQI, 2016).
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- **Institute Specific**

When designing a module or content for a particular programme in any education facility, quite often there will be an internal structured system to that process. Given that the educational trial is being held within CIT, consideration is given to the pre-existing module descriptor. This descriptor ensures definite guidelines and acts as a good starting point to address key areas.

<table>
<thead>
<tr>
<th>Module Descriptor Areas</th>
<th>7</th>
<th>Pre-Requisite Learning</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Module Title</td>
<td>8</td>
</tr>
<tr>
<td>2</td>
<td>Credits</td>
<td>9</td>
</tr>
<tr>
<td>3</td>
<td>NFQ Level</td>
<td>10</td>
</tr>
<tr>
<td>4</td>
<td>Field of Study</td>
<td>11</td>
</tr>
<tr>
<td>5</td>
<td>Module Description</td>
<td>12</td>
</tr>
<tr>
<td>6</td>
<td>Learning Outcomes</td>
<td>13</td>
</tr>
</tbody>
</table>

The above headings highlight the initial questions that need to be addressed such as, NFQ Level, Credits and Learning Outcomes. These variables have a certain impact factor on the overall resource pack structure, to ensure usability and relatability within a typical educational facility.

The *National Framework of Qualifications (NFQ) level* and the *Learning Outcome* aims are two key factors which inform the academic level of content within the module. The NFQ level dictates the academic level of learning that can be expected from the student and the learning outcomes associated with the course (QQI, 2016). Given that the test group for the observational period is
at a fundamental stage of learning, the module content and learning outcomes should reflect the current level of learning. Learning outcomes are “statements that specify what learners will know or be able to do as a result of a learning activity. Outcomes are usually expressed as knowledge, skills or attitudes” (American Association of Law Libraries, 2016). Learning outcomes can sometimes be confused with aims and objectives. It is important to note that aims are from the teacher’s perspectives on the topic or content they want to cover and the objectives inform the learning outcomes.

*Blooms Taxonomy* is the staple literary reference for identifying the language to adopt to suggest or direct a certain level of learning within the domain in which learning occurs. To clarify, Bloom and a group of educators, identified three levels of learning, the cognitive domain, the affective domain and the psycho-motor domain. The cognitive domain was completed in the 1950’s and is widely known as *Bloom’s Taxonomy of the Cognitive Domain* (Benjamin Bloom et al., 1956). This domain involves “knowledge and the development of intellectual skills. This includes the recall or recognition of specific facts, procedural patterns, and concepts that serve in the development of intellectual abilities and skills” (Randall, 1994). The affective domain was further researched by blooms’ colleagues but is not as extensively researched as the cognitive domain. The affective domain “includes the manner in which we deal with things emotionally, such as feelings, values, appreciation, enthusiasms, motivations, and attitudes” (Randall, 1994).
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These two domains are considered for the drafting of the learning outcomes associated with the educational resource pack. In context, the cognitive domain addresses how to achieve sensory and emotional intelligence and the affective domain addresses why this is important. If these two domains are addressed student learning should equip them with the necessary knowledge and skills, but they should also feel empowerment and value their knowledge and skill.

Before the learning outcomes can be designed the preliminary aims and objectives of the module must be highlighted. These aims and objectives are part emerging from the findings of the observational period, the overall research scope, and literary support.

Aims

- Recognition of Prior Learning is very important. The findings will highlight the necessary level of SI and El content needed to achieve a fundamental level of awareness and understanding among the students. This is an important factor to ensure no overlapping occurs in the event that there is SI and El representation within the course at present.

- "Aims should be brief, succinct and give students a reasonable idea of what to expect from the course" (Williamson, 2014).

- The overall aims of the module must not be too ambitious and remain in line with the current fundamental level of learning of the cohort. The aims must further address these two questions; "what is the purpose of this programme or module?" and, "what is the programme or module trying to achieve?" (Williamson, 2014).
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Objectives

- The objectives must reflect a thematic approach and consider the resource pack in realistic terms and in a third level educational context.

- Objectives should represent the “specific steps which will be taken as part of the curriculum to move towards meeting the module or programme aims” (Williamson, 2014).

3.7.3 Associate Learning Outcomes to the Collective Aims and Objectives

After the aims and objectives have been established the learning outcomes (LO) can be addressed. It should be noted that some of the objectives may build to achieve a certain LO, and each objective does not specifically have to be assigned an individual learning outcome. There is much debate surrounding the amount of LO that should be associated to an individual module. Kennedy (2007) suggests that “a small number of important learning outcomes” are more agreeable “than a large number of superficial ones”. He goes on to reference extensive literary opinion, to conclude that “a module with about six well-written learning outcomes is ideal but if you find yourself having written more than nine learning outcomes, you have gone too far!”(Kennedy, 2007).

3.7.4 Structuring a Learning Outcome

The LO must address the level of learning expected by referencing an ‘action verb’ at the beginning (Kennedy, 2007). Examples of various action verbs are listed, within the various domains, under the various levels of learning. An example can be seen below, which shows the cognitive domain and the ‘action
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verbs' associated with this domain. At this stage the objectives are developed into learning outcomes using the already addressed protocols.

Figure 3.1 Blooms Taxonomy; Cognitive Domain (https://www.gpisd.org/cms/lib/TX01001872/Centricity/Domain/901/blooms_taxonomy.jpg)

3.7.5 **Module Content**

It is vital that the content reflects the learning outcomes to ensure the overall aims are achieved at the end of the academic semester. The content is designed holding reference to a number of key literary areas such as;

- The Aristotelian Senses
- Emotional Registration
- Primitive Need
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- Human Connection with Space, Place and Environment
- Identifying and Managing Sensory Stimuli
- Profiling the User
- The Power of Language

These areas are expanded in chapter five, *Module Design*.

3.7.6 **Teaching Methods**

As the content is being designed, the potential teaching methods and overall delivery methods must be considered. The learning outcomes (developed objectives) play a key part in deciding the various teaching methods. Bonner (1999), in her article *Choosing Teaching Methods Based on Learning Objectives*, highlights two key areas for consideration. She firstly mentions that "a single teaching method typically cannot create all the conditions necessary for a given learning objective." She further acknowledges that the complexity of the topic may dictate the levels of engagement needed to ensure learning; "learning objectives involving complex skills require teaching methods that promote active learning on the part of students, while learning objectives involving simpler skills can be achieved with more passive teaching methods" (Bonner, 1999).

Given that this resource pack is directed at a design student, the teaching and learning methods implemented must promote active learning to encourage students to "engage in activities, such as reading, writing, discussion, or problem solving that promote analysis, synthesis, and evaluation of class
content” (www.crlt.umich.edu/tstrategies/tsal). The content should be linked to the design studio project, where possible, to emphasise that the skills obtained in this module must be associated with and represented in the design studio module.

The observation period further highlights the actual student response to the current teaching and learning methods. These findings along with literary review will inform the type of teaching and learning methods adopted for the educational trial, keeping in mind that a varied method approach stands to benefit the student in two key areas. As previously stated, complex topics are better communicated and understood using active learning strategies, but the teacher must also remember that each student may have a preferred way of learning and may perform better with certain methods.

The *educational environment* is another factor which may affect the teaching and learning experience. While not a primary area of concern during the observational period, the observer considers the affect the educational environment may have on the individual student and the learning experience, and also the lecturer and the teaching method adopted. The educational environment, teaching methods, lecturer and student are all inextricably linked. When considering the teaching and learning experience as a whole, all four elements have to be considered to some varying degree.

Some teaching methods and specific course content may require various *resources*, while again not a primary focus of the observation period; daily observations are noted to establish what is being utilised and what may be
Methodology

needed to enhance the overall teaching and learning experience. These findings identify the interaction levels of the 21st century student with the current resources provided and if there are any limitations existing. Resources must also be considered when integrating new module theory, especially in this particular instance. New theoretical areas such as design psychology, neuroscience, and environmental psychology, which have a significant presence within the new content may be unfamiliar to the majority of the student cohort, therefore any resources that can be adopted to aid this integration should be afforded. Resources can take many shapes and forms and can be inexpensive but just require preparation and integration into class content. DIT's short guide 'Using Pre-Lecture Resources in your Teaching' encourages the use of "pre-lecture" resources, referring to them as "a way of scaffolding students' learning of the new material in a module by providing in advance of each lecture some information to ease the cognitive load associated with new material presented in a lecture" (Seery, 2011). This guide highlights three various cognitive loads, "intrinsic load - the processing of unfamiliar new material and terminology, extrinsic load - the sifting out of pertinent information from information provided and germane load - acquisition and integration of new knowledge and storage into long term memory." The core aim of pre-lecture resources is to "reduce intrinsic load by introducing some terminology or concepts prior to a lecture" which enables students to "become familiar with these and allow for working memory in the lecture to concentrate on integrating these terms/concepts into long term memory (germane load)."
Methodology

In essence, how resources are integrated into a lecture is a key component and determines the success of the learning (Seery, 2011).

3.8 Educational Trial

3.8.1 Introduction

The Educational Trial is a vital stage in the research which provides a live test bed for the resource pack pilot. At this stage, the observational findings have informed the indicative content design in a bid to achieve certain learning outcomes and counteract any obstacles identified in the findings. The trial allows the content to be assessed for impact factor (effectiveness). Based on the assessment, the content alignment as a whole is re-evaluated to ensure an informed and validated teaching and learning resource pack is designed prior to physical and electronic dissemination.

3.8.2 Implementation of Module

- Test Group & Timetable Confirmation

Prior to entering the classroom proper, discussions are held with the course coordinator to establish when the class can be timetabled. The educational trial, which will run concurrently with design studio, is allotted a 30 minute time slot during the existing, three hour design studio session. The class will run every Wednesday from 12.30pm to 1.00pm. The first class is scheduled to start in week 2 on Wednesday 21st September (week 1 is occupied by a departmental group project).

The test group identified for the educational trial is the second year Interior Architecture group. Three members of this group were participants of the
Methodology

original test group during the observational period, held in the previous academic semester. The overall class form this test group for the educational trial.

- Two Roles of the Researcher

The researcher in this particular instance is taking on two roles for the educational trial. During this stage, the researcher changes roles to adopt a participant observer role as opposed to the non-participant observer role held in the pre-educational trial. This change of role is essential to allow the researcher take an active role in the classroom. Firstly, participant observation is a type of observation “in which the observer actually becomes a participant in the situation to be observed” (Fraenkel, 2014). It is important to note that when undertaking participant observation within an educational environment it must be “intense” and “long-term” within the “educational setting” (Erickson, 1985). Therefore, the researcher takes an active role within the classroom, acting as the sole lecturer of the module for the educational trial, while maintaining the role of the observer concurrently.

Based on the findings obtained during the pre-educational observation period, the researcher is now entering the participant observation role with a certain top down approach with regard to areas of interest or a thematic approach. Deductive means were used during the previous observational period to extract themes and patterns which identified key findings and informed the module descriptor design and educational resource pack. These findings inform the areas of interest for the trial observational period in order to assess impact
Methodology

factor of the overall resource pack. Therefore a deductive approach is applied but not solely relied on. The observer is open too, and welcomes inductive themes and patterns. During the observation period both deductive and inductive themes and patterns are considered.

A three pronged approach is adopted to document the daily observations; daily logging of the observational period, assessment teaching and learning pro-forma and student interaction schedules.

3.8.3 Analysis & Validation of Module

- Assessment Methods

On the basis of what emerged during the observation period, along with literary review key areas are flagged. These findings have informed the resource pack content and teaching and learning methods adopted for the educational trial and therefore must be assessed to establish impact factor. It is important to note that there are two types of assessment that need to be applied, the observational assessment of student learning and the overall group. The educational trial period as a whole, is observed from a participant observer stance and provides insight into the success of content, the teaching methods and the resource materials.

The main areas for assessment are:

- **Resource Indicative Pack Content** — Overall topics and how they are received by the student.
Methodology

- **Resource Interaction** – Response to interactive elements of content, both physical and oral.

- **Student Engagement Levels** – General interest in topics and application during the class session.

- **Response to Teaching and Learning Methods** – What impact factor has been achieved?

- **Task and Assessment** – Are the students responding to the type of tasks or exercises utilised? Are these methods providing the lecturer with a body of work to assess?

- **Application and Representation of Knowledge** – Has the student realised the relevance of the content and applied it to the task?

- **Learning Outcomes** – Upon completion have the learning outcomes been achieved by the majority?

- **Educational Environment** – Has the educational environment effected the learning experience or student behaviour?

These assessment areas have been identified as a response to the observational findings in the *pre-educational trail*. An existing assessment model which incorporates all of the above could not be located given the broad scope of the analysis. These categories were sourced from existing educational research publications, and adapted to meet the needs of this research.
Methodology

3.9 Conclusion

The overall Pre-Educational Trial and the Educational trial aim to highlight the key areas which need to be addressed, how they can be addressed and the success of the enhancements made. The qualitative methods adopted allow for an in depth analysis of the teaching and learning experience as a whole within a typical architectural design course in Ireland, having regard to the acknowledgement of the holistic human experience within the built environment.
PRE-EDUCATIONAL TRIAL

OBSERVATIONAL PERIOD

4.0

“To acquire knowledge, one must study; but to acquire wisdom, one must observe.”

- Marilyn Vos Savant
4.1 Introduction

In order to develop and integrate 'sensory and emotional intelligence' into the Interior Architecture course in CIT, the existing level of knowledge and acknowledgement within the design studio environment must be identified. The researcher adopted the role of a non-participant observer for one full academic semester to get an authentic view of the indicative content within the 'design studio' module. Establishing the current level of user awareness and sensory acknowledgement is a core element of the observation period but not the sole purpose. The teaching and learning experience is a vital element and must be critiqued to identify responsive and effecting teaching methods for a typical design student cohort. One must remember that the primary aim of teaching is to enable students to learn and therefore "every teaching action, and every operation to evaluate or improve teaching, should be judged against the simple criterion of whether it can be expected to lead to the kind of student learning" desired (Ramsden, 2003). The teaching and learning experience must be continuously evaluated to ensure maximum learning is facilitated and the desired competences and skills are developed.

Throughout this chapter, the various findings in relation to sensory and emotional acknowledgement and the teaching and learning experience are highlighted and investigated. It is important to remember that the observation is not only concerned with sensory and emotional intelligence (in terms of the user experience) but also with the overall coherence of the content and the teaching and learning environment.

This chapter highlights the current module descriptor analysis, the measurement tools used, the overall observational period, student response to the educational environment and the main observational conclusions.
4.2 **Module Descriptor Analysis**

The module descriptor plays a key role in directing the content delivered within a particular module and therefore holds a significant responsibility in identifying what is prioritised within any given programme. This section deconstructs the existing module descriptor to identify what guidelines and direction are offered to a potential lecturer, and what competences are expected of a learner having completed this module. Are the learning outcomes achieved and do they reflect the desired outcome for the student? Are the teaching methods enforced, promoting deep learning and cognitive engagement?

4.2.1 **Course Title**

The first section of the descriptor provides an introduction to the module, offering the module weight in terms of credits, the NFQ level and the initial description of the module. This particular design studio module carries a 10 credit weighting, 1/3 of the overall 30 credit semester. The NFQ level would state that the students will engage in a fundamental level of learning.
This section also offers other areas such as the Field of Study and Module Author/Coordinator and a brief Module Description.

4.2.2 Learning Outcomes

The next section of the descriptor identifies the learning outcomes that can be associated with a learner on successful completion of the module. The first learning outcome (LO1), addresses the user’s needs in terms of spatial awareness. The observation is interested in how this is addressed within the classroom environment and to what level it is taken to. Is it a physical acknowledgement rooted in technical guidance documents and standards, or does it consider the human experience in various spatial situations. The learning outcome number LO2 and LO3 are not applicable in terms of user
Observational Period

acknowledgement or human sensory experience and therefore will not influence the observation.

<table>
<thead>
<tr>
<th>Learning Outcomes</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>LO1</strong></td>
<td>Describe design intentions and undertake formal and spatial organisation as a response to the needs of users.</td>
</tr>
<tr>
<td><strong>LO2</strong></td>
<td>Illustrate the development of a design process through stages of research and analysis (including context and precedents) to outline design, and from outline design to detailed design.</td>
</tr>
<tr>
<td><strong>LO3</strong></td>
<td>Integrate constructional and environmental strategies within an outline design and in the detailed design of selected elements.</td>
</tr>
<tr>
<td><strong>LO4</strong></td>
<td>Apply human dimensions and human interaction criteria to realise interior spatial design.</td>
</tr>
<tr>
<td><strong>LO5</strong></td>
<td>Select appropriate materials employed in interior space from their aesthetic and tactile properties.</td>
</tr>
<tr>
<td><strong>LO6</strong></td>
<td>Apply colour theory principles in interior design schemes.</td>
</tr>
</tbody>
</table>

Figure 4.2 Module Descriptor: Learning Outcomes (CIT, 2016).

The next learning outcome to address the user experience is the fourth learning outcome (LO4). This outcome suggests human dimension and human interaction, which again flags the observer's attention. How and to what level these topics are explored, is a key element in differentiating between the application of standards and the human experience.

The fifth outcome (LO5) touches on materials and further implies tactile consideration. This is the first outcome to suggest haptic awareness and a non-visual approach toward design which immediately flags attention in terms of sensory acknowledgement. The key area of interest is to identify how materials are approached. Is materiality explored in a visual aesthetic manner, economical or environmental manner or in a haptic manner? Are the properties of the material reflected back to the human experience?
Observational Period

The final learning outcome (LO6), advises the exploration of colour theory principles. The outcome suggests a visual sensory experience which can have strong implications on the human experience in any given space. Therefore, the observation is interested to see how colour theory is addressed in an educational context and is the possible human response acknowledged?

At this stage, the observation notes that there are six learning outcomes in total. There is large debate surrounding the ideal amount of learning outcomes that should be associated with a module. For instance, Moon (2002) suggests between four and eight learning outcomes whereas, McLean and Looker (2006) take a more subjective stance stating “learning outcomes should be few enough and significant enough to be memorable and meaningful – most courses might aim for five to ten outcomes”. Bearing this in mind, the observation would conclude that, the overall relevance and effectiveness of the learning outcomes outweighs the quantity.

4.2.3 Pre-requisite Learning

Pre-requisite learning follows the learning outcome section, which highlights any elements which are necessary in order to enrol in ‘Design Studio 2’. There are no specific requirements listed in this instance but it is highly recommended that ‘Design Studio 1’ is completed successfully prior to entering the ‘Design Studio 2’.
4.2.4 **Module Content & Assessment**

Module Content & Assessment houses four areas including *Indicative Content*, *Assessment Breakdown*, *Course Work* and *Reassessment Requirement*.

The *Indicative Content* section highlights sensory areas, such as texture, colour, lighting, circulation etc. which are key elements of user centred design. How these areas are addressed and integrated into the design studio projects, and to what level the user experience is prioritised or acknowledged surrounding these areas, is a key element part of the observation. The course coordinator for first year Interior Architecture noted that *Colour Theory* and *Materials* were standalone modules prior to semesterisation, and must now be integrated into the design studio to ensure inclusion in the course. This implies that there is now an extra component to be considered and factored into the 'Design Studio' module, and so, how this element is integrated and aligned with the design
Observational Period

studio content is a vital component to ensure it is successfully delivered and learning occurs.

<table>
<thead>
<tr>
<th>Module Content &amp; Assessment</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Indicative Content</strong></td>
</tr>
<tr>
<td>Interior Architecture</td>
</tr>
<tr>
<td>Interior design and Interior Architecture, Space planning, Circulation, Focal points, Material selection, Lighting: natural and artificial, Furniture, fixtures and fittings.</td>
</tr>
<tr>
<td>Design Theory</td>
</tr>
<tr>
<td>Anthropometrics and ergonomics, Material selection, form, texture, colour and reflection, Colour theory.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Assessment Breakdown</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Course Work</td>
<td>100.00%</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Assessment Type</th>
<th>Assessment Description</th>
<th>Outcome addressed</th>
<th>% of total</th>
<th>Assessment Date</th>
</tr>
</thead>
<tbody>
<tr>
<td>Project</td>
<td>Anthropometrics and interaction</td>
<td>3.4</td>
<td>10.0</td>
<td>Week 2</td>
</tr>
<tr>
<td>Project</td>
<td>Single-unit dwelling space</td>
<td>4</td>
<td>35.0</td>
<td>Week 5</td>
</tr>
<tr>
<td>Project</td>
<td>Precedent studies</td>
<td>1.2</td>
<td>5.0</td>
<td>Week 6</td>
</tr>
<tr>
<td>Project</td>
<td>Apartment design</td>
<td>4.5,6</td>
<td>50.0</td>
<td>Sem End</td>
</tr>
</tbody>
</table>

No End of Module Formal Examination

<table>
<thead>
<tr>
<th>Reassessment Requirement</th>
</tr>
</thead>
<tbody>
<tr>
<td>Repeat the module</td>
</tr>
<tr>
<td>The assessment of this module is inextricably linked to the delivery. The student must reattend the module in its entirety in order to be reassessed.</td>
</tr>
</tbody>
</table>

The institute reserves the right to alter the nature and timings of assessment.

Figure 4.4 Module Descriptor: Module Content and Assessment (CIT, 2016).

Design Theory again suggests key sensory areas such as bodily awareness (anthropometrics and ergonomics), materials, texture and reflection etc. Once again, the observer is concerned with how these areas are integrated into the studio environment in a coherent manner.

The overarching concern from the point of view of the observation, is to establish the prioritisation of the user throughout the educational journey. Are these highlighted areas within the module descriptor addressed in a working sense or do they adopt a tutorial framework.
Observational Period

The *Assessment Break Down* and the *Course Work* sections tie the learning outcomes to the course work and the assessment breakdown which acts as a basis for the observer to plan the observational strategy for the academic semester as it highlights the weeks in which certain areas are to be addressed.

In the event of an unsuccessful semester, the reassessment requirement states one must repeat the module in its entirety.

4.2.5 *Module Workload*

The *Module Workload* section presents the full-time and part-time option. For the purposes of this research, the full-time workload is of concern. The workload is broken down into contact and non-contact time. The contact time represents two hours per week in the form of one hour lecture, one half hour group tutorial and one half hour individual tutorial. The non-contact workload holds a further 12 hours per week are dedicated to independent and directed learning. Therefore the total weekly learner workload is 14 hours per week. The observation would note the importance of time management when designing a module descriptor and is interested to understand how this is applied to varying class sizes, to ensure the expected contact time is achieved.
## Module Workload

### Workload: Full Time

<table>
<thead>
<tr>
<th>Workload Type</th>
<th>Workload Description</th>
<th>Hours</th>
<th>Frequency</th>
<th>Average Weekly Learner Workload</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lecture</td>
<td>No Description</td>
<td>1.0</td>
<td>Every Week</td>
<td>1.00</td>
</tr>
<tr>
<td>Tutorial</td>
<td>Group tutorial</td>
<td>0.5</td>
<td>Every Week</td>
<td>0.50</td>
</tr>
<tr>
<td>Tutorial</td>
<td>Individual tutorial</td>
<td>0.5</td>
<td>Every Week</td>
<td>0.50</td>
</tr>
<tr>
<td>Independent &amp; Directed Learning</td>
<td>Research and development of studio project</td>
<td>12.0</td>
<td>Every Week</td>
<td>12.00</td>
</tr>
<tr>
<td></td>
<td>Total Hours</td>
<td>14.00</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Total Weekly Learner Workload</td>
<td>14.00</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Total Weekly Contact Hours</td>
<td>2.00</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### Workload: Part Time

<table>
<thead>
<tr>
<th>Workload Type</th>
<th>Workload Description</th>
<th>Hours</th>
<th>Frequency</th>
<th>Average Weekly Learner Workload</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lecture</td>
<td>No Description</td>
<td>1.0</td>
<td>Every Week</td>
<td>1.00</td>
</tr>
<tr>
<td>Tutorial</td>
<td>Group tutorial</td>
<td>0.5</td>
<td>Every Week</td>
<td>0.50</td>
</tr>
<tr>
<td>Tutorial</td>
<td>Individual tutorial</td>
<td>0.5</td>
<td>Every Week</td>
<td>0.50</td>
</tr>
<tr>
<td>Independent &amp; Directed Learning</td>
<td>Research and development of studio project</td>
<td>12.0</td>
<td>Every Week</td>
<td>12.00</td>
</tr>
<tr>
<td></td>
<td>Total Hours</td>
<td>14.00</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Total Weekly Learner Workload</td>
<td>14.00</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Total Weekly Contact Hours</td>
<td>2.00</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Figure 4.5 Module Descriptor: Module Workload (CIT, 2016).

The different type of class contact time is also an area of interest which again, must be affected by numbers. How the lecturer manages the different stages and types of contact time with the students, and also what resources and teaching methods they use to achieve this, is another key element.

*Independent learning* is suggested for 12 hours per week per student, which initially seems to be quite a large proportion of time in relation to the individual contact time. Given that the module is at fundamental NFQ level, and the
student cohort is largely familiar with didactic and rote learning environments typically adopted in secondary education, the observation keen to identify how this is managed, directed and resourced to ensure active learning occurs. Independent learning “places increased educational responsibility on the student” (The Higher Education Academy, 2014) and therefore the student must be equipped with the skills to engage successfully with this type of learning.

4.2.6 Module Resources

The module resource section highlights the recommended reading material the student should undertake suggesting various staple books and supplementary elements such as magazines. How these resources are communicated to the student is essential. They do not appear to be interactive as the currently stand on the module descriptor website.

<table>
<thead>
<tr>
<th>Module Resources</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Recommended Book Resources</strong></td>
</tr>
<tr>
<td><strong>Supplementary Article/Paper Resources</strong></td>
</tr>
<tr>
<td>• interiors, Wallpaper magazine</td>
</tr>
<tr>
<td>• interiors, World of Interiors magazine</td>
</tr>
<tr>
<td><strong>This module does not have any other resources</strong></td>
</tr>
</tbody>
</table>

Figure 4. 6 Module Descriptor: Module Resources (CIT, 2016).
Observational Period

How these resources are integrated into the learning environment is fundamental to its success and holds an importance for the observer. The educational environment is increasingly seeing a shift toward a more 21st century interactive learner who may not identify with a traditional method of learning i.e. text book based learning, physical library resources etc. (Beetham and Sharpe, 2013).

4.2.7 Programme Delivered In

The final section simply states the programmes in which the module must be delivered in. In this instance the Interior Architecture course offers an ordinary and honours degree option; differentiated learning. Both courses are amalgamated and run concurrently for the first three years. The honours degree course then progresses on into the fourth and final year. Design Studio is a core module throughout either course and runs in each semester.

<table>
<thead>
<tr>
<th>Programme Code</th>
<th>Programme</th>
<th>Semester</th>
<th>Delivery</th>
</tr>
</thead>
<tbody>
<tr>
<td>CR_DINAR_8</td>
<td>Bachelor of Science (Honours) in Interior Architecture</td>
<td>2</td>
<td>Mandatory</td>
</tr>
<tr>
<td>CR_DIARC_7</td>
<td>BSc in Interior Architecture (CR053, Level 7)</td>
<td>2</td>
<td>Mandatory</td>
</tr>
</tbody>
</table>

Figure 4.7 Module Descriptor: Module Delivered in (CIT, 2016).
4.3 Observational Period Analysis

4.3.1 Measurement Tools

In order to structure and document the observational period, measurement tools are identified and tailored to support the non-participant observer. The measurement tools utilised aim to identify the actual of the teaching and learning experience as a whole, highlighting strengths and weaknesses of content, teaching methods, resources and environment. The following table depicts the various measurement tools used for the observation period.

<table>
<thead>
<tr>
<th>Deductive Criteria for Measurement Tools</th>
<th>Measurement Tool Utilised</th>
<th>Usage</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 Attendance of the Test Group and Lecturing body</td>
<td>Attendance Sheet</td>
<td>Each Session</td>
</tr>
<tr>
<td>2 The overall class content offered in each session.</td>
<td>Daily Diary / Continuous Assessment Pro-forma</td>
<td>Each Session</td>
</tr>
<tr>
<td>3 The varying teaching methods used during each session and how they are received.</td>
<td>Methods Checklist</td>
<td>Each Session</td>
</tr>
<tr>
<td>4 One to One learning – Student Lecturer Ratio Per Class</td>
<td>Daily Diary</td>
<td>Each Session</td>
</tr>
<tr>
<td>5 The engagement levels of both the student and the lecturer(s) throughout each three hour studio session.</td>
<td>Inference Schedule</td>
<td>Weekly</td>
</tr>
<tr>
<td>6 If there is an interactive or physical element to the studio session e.g. handouts, audio visual, site visit, demonstrations.</td>
<td>Daily Diary</td>
<td>Each Session</td>
</tr>
<tr>
<td>7 What resources are used in the studio session and how they are received?</td>
<td>Daily Diary</td>
<td>Each Session</td>
</tr>
<tr>
<td>8 Semi Structured Interviews (Student / Lecturer)</td>
<td>Audio</td>
<td>-</td>
</tr>
</tbody>
</table>

Table 4.1 Measurement Tools (Author, 2016).
Observational Period

The measurement tools are tailored towards identifying themes and patterns throughout the observational period, of which are explored in the following section. This section delves into each relevant design studio project in a thematic manner, incorporating the themes and patterns identified, followed then, by the overall conclusions of the pre-educational trial observation. Before these themes and patterns are identified it is important to introduce the test group members and their respective profiles.

4.3.2 Demographic Profile of Test Group

The three test group members which have been selected on an average cohort basis to represent a typical case sample, all transitioned directly from secondary education to tertiary education. There has been no 'stop gap' in their respective educational journey. Student A, B and C are all aged nineteen and selected Interior Architecture as a first choice in the CAO process. Student A entered the course through the Level 8 Honours Bsc. Interior Architecture, whereas, Student B and C entered the course through the Level 7 Ordinary Bsc. Interior Architecture. The CAO points for the Level 7 on the year of entry were 280 points and for the Level 8 were 350. The various socio economic backgrounds for the three test group members based on two parents are listed below. These backgrounds are based on the HEA report, 'A Study of Progression in Higher Education' (Mooney et al., 2010).
Observational Period

<table>
<thead>
<tr>
<th>Test Member</th>
<th>Group</th>
<th>NFQ Level</th>
<th>Socio-Economic Background</th>
</tr>
</thead>
<tbody>
<tr>
<td>Student A</td>
<td>BSc. Honours</td>
<td>Interior Architecture (L8)</td>
<td>Higher Professional and Lower Professional.</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Student B</td>
<td>BSc. Ordinary</td>
<td>Interior Architecture (L7)</td>
<td>Manual Skilled and Own Account.</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Student C</td>
<td>BSc. Ordinary</td>
<td>Interior Architecture (L7)</td>
<td>Manual Skilled.</td>
</tr>
</tbody>
</table>

Table 4.2 Test Group Socio Economic Backgrounds (Author, 2016).

These vital statistics have been highlighted to identify the general profile of an average cohort student within a typical case sample and also to allow for cross comparison with pre-established educational statistics and profiles.

4.3.3 Attendance Levels

Over the 12 week semester attendance levels varied among the test group members, yet the average figure represented a very similar figure to that of the class average. This table shows the test group member individual and collective attendance percentages, along with the 1st year class attendance percentage and the lecturer attendance percentage for the design studio module, during the observation period. The approximate attendance record of the part lecturing body is there to highlight the different structures within second level and third level educational facilities.
### Observational Period

#### Student Attendance Semester 2 (observation period only)

<table>
<thead>
<tr>
<th>Student</th>
<th>Attendance %</th>
<th>Absence %</th>
</tr>
</thead>
<tbody>
<tr>
<td>Student A</td>
<td>91%</td>
<td>9%</td>
</tr>
<tr>
<td>Student B</td>
<td>100%</td>
<td>0%</td>
</tr>
<tr>
<td>Student C</td>
<td>60%</td>
<td>40%</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Test Group Average</th>
<th>Attendance %</th>
<th>Absence %</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>83.80%</td>
<td>16.20%</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>1st year Class Average</th>
<th>Attendance %</th>
<th>Absence %</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>84.5%</td>
<td>15.5%</td>
</tr>
</tbody>
</table>

#### Lecturer Attendance Semester 2 (observation period only)

<table>
<thead>
<tr>
<th>Lecturer #</th>
<th>Approx. Attendance %</th>
<th>Absence %</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Lecturer #</td>
<td>89%</td>
<td>11%</td>
</tr>
<tr>
<td>Lecturer #</td>
<td>94.5%</td>
<td>5.5%</td>
</tr>
<tr>
<td>Lecturer #</td>
<td>91.6%</td>
<td>8.4%</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Lecturing Body Average</th>
<th>Attendance %</th>
<th>Absence %</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>91.7%</td>
<td>8.3%</td>
</tr>
</tbody>
</table>

Table 4.3 Attendance Statistics (Author, 2016).

The observation noted that although huge emphasis is placed on the importance of student attendance; and attendance logs are used on a daily basis. The students are transiting from a secondary educational facility, whereby attendance is mandatory and each individual is accountable for a missed day, to a scenario whereby the onus is on the student to attend. The observation would question the maturity of the student to realise that they are of age and must attend and have an individual responsibility to contribute toward their personal development and education.
The lecturing body represented an approximate absence rate of 8.3% throughout the semester for various reasons e.g. conference attendance, student field trips etc. While the rate is not significant in entirety, this did affect the contact time per student during certain weeks. For example, in week two, the absence of a member of the lecturing body due to a student field trip, saw the lecturer to student ratio reduced from 11.25 minutes per student to 5.6 minutes per student for a three hour studio session. Figure 4 represents the current lecturer to student ratio within the 'design studio 2' module.
Currently CIT's internal policy does not provide a contingency plan for the lecturer in his/her absence as there is no panel in-situ within the college. However, there is an option whereby the lecturer can request, through the Head of Department, a replacement for future identified absence. In the event of no cover being provided, it would suggest that the responsibility remains with the student to progress with their course work until the return of the lecturer or until the next scheduled class. The observation noted that some students displayed unease when this occurred and were unsure whether to stay or go, or how to proceed. Some students stayed in the studio environment and some left. It might be a consideration for IOT's and Universities nationwide to consider the implementation of supervision or replacement policy for the initial first year of third level education, given that the majority of drop out percentages come from the first year demographic.

4.4 Observational Analysis of the Design Studio Environment

This section focuses on each Design Studio project undertaken for the academic semester. The observation mainly concentrates on the indicative content, design theory, teaching and learning methods, educational resources utilised and finally, how the test group members respond to overall content and approach.

4.4.1 Project 1 - Anthropometrics & Ergonomics

Learning Outcomes identified on brief:

Learning Outcomes: On successful completion of this module the learner will be able to...
1. Demonstrate an understanding of human dimensions and human interaction
Introducing the project:

*Anthropometrics and Ergonomics* is the first design studio project of semester two, which is a group project. This project is designed to create an awareness of human scale and dimension. The students to date have not had exposure to technical guidance documents or regulations and so, this project aims to introduce them to human scale in space. It is a group project which prompts the students to recreate the 18 bodily positions, allowing them to self-discover the average ergonomic space people need prior to introducing them to the pre-established regulations.

The students are introduced to the brief by means of informal discussion within the studio environment and their respective groups are identified. The lecturer identifies some of the bodily positions that should be explored and measured throughout the project by drawing on the white board and demonstrating. A previous project from a former year is shown to the class to identify approximately what is expected. The brief is the main physical resource used to communicate the project requirement.

The primary lecturer for first year design studio advocates the *John Dewey* mantra of 'learning by doing' and therefore believes that the student should discover and self-realise human scale in order to fully understand it as opposed to memorising technical guidance documents. The Dewey approach to education is a staple in the field, massively concerned with intellectual growth, morale's and the societal benefits rooted in good education and that education and life cannot be separated. The observer would also advocate for this type of
Observational Period

educational approach in a design studio environment but it must be noted that in order to achieve this level of learning and will for personal development, the student must be aware of why they are undertaking any given task to ensure morale and interest are maintained. They must be aware of the purpose of the exercise to allow them to arrive at that eureka moment and feel a sense of personal development to promote intrinsic motivation (Fry et al., 2008). The interactive element of this group project assisted in engagement levels.

_Student Response to the project:_

- **Student A** responds relatively well to the group activity. S/he does not adopt the leader role within the group but is an active participator. Student A displays good interpersonal skills and displays confidence within the group working environment and there is no apparent hesitant behaviour toward team work. The interactive nature of the project appears to complement this student in terms of engagement and motivation. A key observation throughout the group exercise noted that, the students are integrating their smart phones to document and record the group effort to demonstrate the 18 bodily positions. The use of smart phones adds a fun element to the project, and whether aware or not, active learning is occurring through the use of smart phone technology. Student A in particular is realising human scale and proportion by comparing images taking on a smart phone, of the different group participants. The striking thing here, is that the realisation did not occur prior to this exercise,
Observational Period

or in real-time. This is the first instance whereby the observation has noted active learning through the use of smart phone technology, which is suggesting an expected shift toward a 21st century learner.

- **Student B** responds well to the project at the early stages. The interactive group element of the project does not seem to cause unease or discomfort with the learning method. This student adopts a leader role in the physical measurement element of the project and appears content with this position. Toward the end of the project motivation wanes for Student B would appear to be rooted in morale and the unfamiliar territory of independent learning. The student and their group appeared to need further direction to progress past the 18 bodily positions but did not seek guidance. This particular student appears to need direction and guidance but hesitates to ask formal questions and tends to sit back and cease productivity instead of asking the question. This immediately strikes the observer as a main concern which can affect the learning experience of a student if not intervened. This behaviour did not shift throughout the project and left the observer with the opinion that maximum learning may not have occurred for this student and the respective group.

- **Student C** responds quite differently to the former two test group members. The group dynamic appears to create a discomfort and unease and a potential learning barrier. During the interactive
Observational Period

measurement element of the project Student C tends to hold back and does not engage in the project. S/he does not offer input unless engaged by the group leader. Morale levels appear to be low and attendance is poor also. At this early stage Student C is displaying introverted-like tendencies within a group working environment. The discomfort within the group scenario is very much apparent from the start. As a result of the group dynamic Student C did not reach a level of cognitive engagement whereby s/he “put in an effort to truly understand a topic” (Rotgans and Schmidt, 2011) and as a result the observer would note that the learning experience for Student C is vastly different from that of their respective group, Student A and B, and would flag this as an important initial observation for the duration of the semester.

The students were advised to carry out research on Anthropometrics and Ergonomics as a part of their projects, which would appear on their presentation boards. The students appeared to struggle with the concept of independent research, and continually sought to almost identify a list of what was required.

Stepping away from “didactic teaching” is a key part of giving the student a voice and opportunity to independently learn and critically think, but it must be controlled and reduced overtime while providing the necessary skills to allow the student successfully transition, and ultimately to allow for learning to occur (Fry et al., 2008).
Observational Period

This project was primarily aimed at understanding the scale of the human body in space, and what dimension is needed to allow people to navigate and interact with buildings, rooms and their contents comfortably. The observation noted that the students may not have fully grasped the potential adverse effects that poor anthropometric and ergonomic design can have on people. This could be further assisted by providing examples of 'what not to do' and further grounding this with reference to how it may affect or impact the human experience, gives the students an opportunity to critically think and consider the morale ground of what they are learning. Referring back to the user consistently and personalising the project, might inspire the students to give greater consideration for the user’s well-being, overall experience and may create a desire to learn.

Teaching Methods

Throughout this project there is a prominent teaching and learning experience apparent. The lecturing body are collectively promoting inquiry-based learning, where by the teaching method focuses on student investigation and a hands-on approach. In order for this style of teaching to prove effective, the lecturer must act as a facilitator and provide ongoing guidance and support for the student throughout the learning process, which was evidenced. In this instance, while the lecturing body opted for the same teaching method there appeared to be a slight dis-connect in relation to the level resource used to assist the learning. The students are just beginning to embrace critical ability which will develop over their educational journey, and the type of resource utilised should be given discussed to avoid confusion.
Observational Period

4.4.2 Project 2 - Student Housing

Learning Outcomes identified on brief:

Learning Outcomes: On successful completion of this module the learner will be able to...
1. Describe design intentions and undertake formal and spatial organization as response to the needs of users.
2. Demonstrate the development of a design process through stages of research and analysis through outline design to detailed design.

Introducing the project:

The students are introduced to the project via informal discussion and group conversation. This is the first domesticated project of first year and aims to introduce the student to formal and spatial organisation as a response to the needs of the user. Initially, the observer felt that this would be a project in which the students identify with and relate to in a more in depth manner, primarily as a result of exposure to this type of environment and because the client essentially holds the same demographic vitals. This project provides a good platform to test the student’s prioritisation of the user throughout the design
Observational Period

process. The students should be able to relate to this particular human experience and achieve a deeper understanding of designing for the particular user demographic.

The physical brief, while very thorough, does not provide the students with a context map or section view of the 'pod like' structures. The students struggle to understand what modular or pod developments are initially, which may be rooted in lack of awareness for this type of structure.

The students are advised to remember and carry the realisations obtained from the anthropometrics and ergonomics project forward, and implement them into this project. It is difficult to tell the level of learning achieved by each student as it was a group task and submission. The observation would note that while the group element is a good interactive way to address the topic, an individual end submission may be an easier way to monitor learning and ensure individual participation. It is an important learning curve for the students, and students at fundamental levels of learning are largely motivated by feedback.

It must be noted that the purpose of feedback is “to reduce discrepancies between current understandings/performance and a desired goal”. Reflection is a key part of experiential learning as it “turns experience into learning” prior to starting the next studio project (Boud et al., 1985). At this fundamental stage of learning, feedback is essential to keep the student motivated to understand and develop, over time, metacognition and higher order skills (Higgins et al., 2002)
Observational Period

*Student Response to the project:*

- Student A has a natural ability for space planning and manages to identify their scheme with greater ease than others in the class. The observation has begun to identify a pattern with regard to student A. This student does not seek help regularly from the lecturing body, and will tend to consult with a peer before engaging with the lecturer, but yet arrives at reasonably well thought out schemes for a fundamental stage of design. This may be rooted in the student’s socio economic background, which may have provided previous exposure to the discipline or extra help at home from parents. (Engineer and Draughtswoman). The observation to date would flag concern for the morale of this student, given that s/he has a strong natural ability but does not appear to be stimulated or motivated within the studio environment. S/he spends large proportions of studio time displaying counter-productive tendencies (primarily engaged with smart phone) and has an inference of 0 to 1 questions per three hour studio session unless engaged. If a question is offered toward the lecturer, they tend to be ‘directional’ or ‘means to an end’ questions e.g. “What thickness does the wall have to be for the model?” or “Do I have to put in a kitchen?” (Student A, 2016) Firstly, the majority of the questions are asking for direction, “What must I do?” as opposed to “Can I try this approach?” or “Is there another way to manage this?” The questions
Observational Period

offered rarely challenge what they already know or are familiar with (Author, 2016).

- **Student B** has impeccable attendance in the design studio module. Since the beginning of the observation period this student has not missed a design studio class but their relationship with the lecturing body has not developed or their engagement level increased within the studio environment. This student spends large amounts of additional time within the studio environment but this does not reflect in their design development process. The observation would note that this student may not be progressing at a consistent rate due to lack of engagement with the lecturing body. This student does not have the same natural ability as Student A or C and needs guidance and feedback to develop competencies. This student needs to be more engaged with the lecturing body in order to increase familiarity and encourage a higher inference level. At present the student is likely to ask between 0-1 questions per three hour studio session unless engaged. This student is more likely to challenge what s/he already knows and varying lecturer opinion but lacks competencies to communicate their designs. This student’s design development is not as thought out as it could be because they are not engaging in the studio environment (Author, 2016).
Observational Period

- Student C has begun to develop a pattern for lack of attendance or application. To reiterate, this student harbours a natural ability for design but does not appear to be progressing or developing further competencies for design development. This may be largely associated to the lack of attendance and lack of engagement within the studio environment. The observation is highlighting two possible scenarios, one is questioning the suitability of the learning environment for this particular student, and two, is questioning the suitability of the course for the student. The student displays discomfort and lack of motivation or inspiration within the learning environment. The rate of engagement and inference is staggeringly low in comparison to the other test group members, demonstrating an inference of 0 questions in a three hour studio session unless engaged. The observation further noted that even after engagement with a lecturer the student is still largely unproductive (Author, 2016).

Teaching Method

This project which again promoted inquiry-based learning and largely a facilitator lecturing role also saw the introduction of more resources and a mixed method approach to learning.

During the first week the students are struggling to come to terms with the initial size of the space. Lecturer C takes on a demonstrative role and together with the students, maps out floor area of the ‘pod’ in actual scale. The boulevard area within the architecture factory is large enough to carry out these types of
exercises and allowed the students to really grasp the physicality of the space. The students then took this a step further by moving actual furniture into the space, and mapping the larger elements out in plan format. Each student got involved to some varying degree and seemed to enjoy the interactive element of the task.

![Interactive floor plan](image)

In week 2 of this project, the students appeared to be struggling to come up with inspiration or concepts. As a response to this, Lecturer A shows them a series of audio visual snippets revolving around micro-living and design solutions to small spaces. Three main clips were shown:

- *George Clark Bordeaux Garage*
- *George Clark Barcelona Apartment*
- *Gadget Man Tiny House: Jimmy Car*

The students reacted well to this exposure and type of audio visual resource. The micro housing clips are very informative and provide good reference for the
students to build on and research from. Student B is heavily influenced by the hydraulic aspect of what they have witnessed and carries it into their design scheme. Student C is not present for this and misses out on the learning experience. This resource provided by Lecturer A is further supported by photographic hand-outs of micro housing and development names to reference by Lecturer C.

Despite the success of the audio visual and physical hand-outs, there still appears to be confusion among the students. Learning how to appreciate forms of inspiration and take influence from examples of good design as opposed to copying directly is an important part of the learning process. The observation would note the importance of making the students aware of the difference between both. They must realise that 'good' design is only good when it responds to the specific user needs, and that essentially, one size does not fit all.

4.4.3 Project 4 – Apartment

Learning Outcomes identified on brief:

- On successful completion of this module the learner will be able to...
  1. describe design intentions and undertake formal and spatial organization as response to the needs of users
  2. demonstrate the development of a design process through stages of research and analysis (including context and precedents) to outline design and from outline to detailed design.
  3. demonstrate the integration of constructional and environmental strategies within an outline design and in the detailed design of selected elements.
Observational Period

*Introducing the project*

The final design project of the year is introduced through means of informal discussion and group conversation within the studio environment.

Stage 1: The first stage of the project is to include a group study of 20th century living through analysing a series of renowned designed living spaces e.g. Rietveld’s Schroder house. This project acts as a good primer to second stage; Apartment Design with accessible requirement.

Stage 2: The students are given a brief and a context map in which they can choose plan A, B or C. The plans all contain the same shape, structure and size but have varying orientations. This is the first project whereby the students have to consider orientation and how it will affect their space, and so is the first major sensory experience throughout the semester.

At this stage of the observation, *materials* and *colour theory* have been acknowledged in a working sense, and occasionally, as a direct response to a student choice (specification). Prior to semesterisation, this topic had its own five credit module, which allowed for more in depth acknowledgement. It might be considered as a standalone in the future.

Figure 4.11 Discussing Orientation – Site Plan (Author, 2016).
Observational Period

Student Response to the project:

- Student A once again arrives at a relatively well thought out space plan early earlier than her peers but appears to be unmotivated during the studio sessions. Productivity levels within the studio environment have not increased or changed over the period of the semester. This student appears to carry out the majority of design work outside of the studio environment which once again flags their socio-economic background. The student may be seeking guidance from their parents. The student displays no desire to challenge their designs or further develop aspects of a scheme. This student is displaying a 'means to an end' approach toward the 'design studio' module and does not appear to have an interest in 'personal development' in terms of their design education. The rate of inference is still very low in any studio session, asking between 0-1 questions per three hour studio session. Toward the end of the semester the observation noted a slight shift in engagement, in that, the student began to engage the lecturing body and also observer as a result of developed familiarity with the lecturing body and regular engagement initiated by the observer. The observer posed regular questions to the student to establish an understanding of their thought process throughout the design development process. Only open questions were used to obtain unbiased reactions e.g. "What stage are you at with your design development?" or "What inspired
this design choice?" The student began to seek reassurance, clarity and direct questions toward the observer as opposed to the lecturing body.

- **Student B** has maintained excellent attendance to date and appears to be content within the course, but is still displaying poor levels of active engagement. The student does not engage the lecturer unless engaged. The students design work to date appears to have a very personal stamp, in that they appears to be dis-connect with what the client or user needs are, and their personal preference. The student needs help separating personal preference and user needs, and also the importance of functionality and practicality in their designs. Similarly to Student A, Student B has begun to direct questions at the lecturing body and occasionally, the observer as a result of regular engagement initiated by the observer. The observer regularly asks questions such as “How are you finding this project?” or “Why have you made that design decision?” in a bid to identify the thought process behind the student design choices and also to establish an understanding for their behaviour. This has by default developed a familiarity between the student and observer and has allowed the student build confidence to communicate their daily thoughts.
Observational Period

- Student C's level of attendance has not improved over the semester. The observation would note that the student has not integrated well into the design studio environment and appears to be largely disinterested in course work. This student is displaying a 'means to an end' approach toward the 'design studio' module and does not appear to have an interest in 'personal development' in terms of their design education. The student’s natural ability seems to be allowing them to progress through the semester as they are receiving minimal lecturer input in comparison to their peers. The observer has had far less opportunity to engage with Student C due to the absence, and as a result has not developed them same level of understanding into the thought process behind their design development process as Student A and B.

At this point, it is important to note, the students within the test ground and the larger class know that the observer is there as an observer and not as a tutor. Even though they are aware of this, as a result of the engagement initiated by the observer, the students appear to see the observer as a mentor of sorts. This may be due to familiarity as a result of initiated engagement by the observer.
Teaching Method

This project which again promoted inquiry-based learning and largely a facilitator lecturing role, saw the introduction of more resources including the TGD's (technical guidance documents), as the brief required the space to be wheelchair accessible to accommodate a wheelchair bound visitor. The TGD's prove to be somewhat confusing for the students and are unable to decipher which measurement to take at times. The class repeatedly ask questions such as “How much space do I have to leave at the side of the bed?” or “How wide does the corridor have to be?” The observation would note that because the students are aware of the TGD's they are less likely to entertain the self-discovery mantra and are persistent in getting specific direction. Physical hand-outs are provided, which provide information on kitchen design and dimensioning. The students are introduced to the working triangle and the standardised layout of a typical kitchen is discussed. The students respond well to the readily available information.

It is also important to note that the students at this fundamental stage are heavily influenced by readily available information and can sometimes begin to replicate what they see, instead of developing their own ideas.

Figure 4.12 Demonstrative role; Working triangle explanation (Author, 2016).
Observational Period

In the previous student housing project, a *demonstrator* role was adopted by Lecturer C, which was received very well by the students. This could have been beneficial for the apartment project also. The architecture factory allows for these types of physical learning activities due to its size, and could be considered as a resource of sorts.

All of the lecturing body promote inquiry-based learning and problem-based learning but on occasion, seem to support varying types of teaching aids and resources, which should be provided to the student to promote understanding and active learning. The observation would note that there is validity and good reasoning in the varying approaches and points of view, but may provide a level of overload or confusion to a fundamental learner.
4.5 **Response Educational Environment**

4.5.1 **Test Group Neurological Profiles**

The student’s will spend a large proportion of their four year educational stint within this type of classroom setting and it is important to note their response to this type of learning environment.

![Open plan studio environment, Architecture Factory (CIT, 2013).](image)

Currently this type of environment is new to the three test group members who are familiar with a more traditional enclosed classroom setup. The test group members, expectedly, reported that they “like the new environment” and are “comfortable within it”. They all suggested that this open plan environment has not had any implication on their ability to concentrate or learn. The observational period on the other hand suggested otherwise.
The varying neurological thresholds according to Dunn’s Model for Sensory Processing are:

<table>
<thead>
<tr>
<th>Sensation Seeking</th>
<th>High Threshold + Active Self-Regulation Strategy</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sensation Avoiding</td>
<td>Low Threshold + Active Self-Regulation Strategy</td>
</tr>
<tr>
<td>Sensory Sensitivity</td>
<td>Low Threshold + Passive Self-Regulation Strategy</td>
</tr>
<tr>
<td>Low Registration</td>
<td>High Threshold + Passive Self-Regulation Strategy</td>
</tr>
</tbody>
</table>

Figure 4.14 Dunn’s Neurological Thresholds (Dunn, 2001; Dunn, 1997).

The three test group members all from an average academic cohort have displayed varying neurological thresholds within the studio environment. These thresholds have been based on the individual student’s behavioural traits within the design studio environment. As previously mentioned, during the observational period the students are being primarily observed for user awareness and acknowledgement in their work but also for their engagement levels, academic ability and coping skills within the studio environment.

The main learning environment for the design studio module is located within the architecture factory which promotes open plan studios, which are separated by offices housed in shipping containers.

- The observation has noted that Student A, who is located at the rear of the studio environment, leaves the studio environment at regular intervals during any given session. This student also displayed low levels of...
productivity throughout the semester. Given that the student consistently arrived at reasonably well thought out designs, it would suggest that the student is completing the majority of their studio work outside of the studio environment. This may imply that there is a certain discomfort with the environment in terms of personal application and productivity. The consistent low levels of productivity suggests that the student struggles to apply themselves in the environment, although s/he claims the “open plan environment is not a distraction” and “noise is not an issue”. Student A is more likely to engage with their smart phone or clean their desk area, than apply themselves to design studio work. The observation would note that this student may be distracted by excess external stimuli e.g. traffic on the boulevard, neighbouring classes, conversation etc. as they have regular reactions to certain sensory cues. The regular intervals of absence in each studio session may suggest an active attempt to self-regulate their environment. This student generally moved toward a quieter space in the architecture factory when they left the studio e.g. bathroom, seminar room, vending machine area or outside. The behaviours suggest mild levels of sensation avoiding patterns, which means they display a low threshold for sensory input within the open plan studio environment, and will actively attempt to self-regulate their environment.

The student is located at the rear of the studio, parallel to the open plan boulevard. This would position Student A, at the furthest position from the white board and the general position of the lecturer when addressing the group. As a result of the chosen location in the studio environment, the
Observational Period

student is susceptible to high levels of external sensory stimuli including, acoustical interference and visual distraction from the boulevard and may be experiencing low levels of speech intelligibility (Treasure, 2012).

- **Student B** also shows a *sensation avoiding pattern* within the studio environment, which means they have a *low threshold* for sensory stimuli. This student at first appeared to adopt a *passive* coping strategy, which would have placed them into the *Low Registration pattern* (High Threshold + Passive Self-Regulation Strategy). This student sits in the middle position of the studio environment and is affected daily, by noise levels but will remain seated regardless (passive), but throughout the observation it emerged that they actually use a noise isolation technique to actively regulate their environment. This is a different strategy to that of Student A, but is still an active approach to regulation. Noise isolation, in this instance, came in the form of headphones to self-regulate.

The student holds an impeccable attendance record but maintains low participation and engagement within the studio environment. The student appears to find it hard to apply themselves within the open plan environment, but mainly as a response to the noise. In a bid to regulate their environment they heavily rely on headphones to apply themselves. This strikes immediate concern for the altered learning experience this student is receiving due to the lack of exposure to peer learning and impromptu lecturer commentary. Student B does not have the same natural ability as
Observational Period

Student A or C and would benefit from peer learning and more lecturer input. This student is also affected by the colour of the shipping containers incorporated in architecture factory, which act as the studio dividers, and wears tinted glasses to drown out the green colour. This student is experiencing high levels of sensory overload acoustically and visually.

- Student C also shows a sensation avoiding pattern, which means they have a low threshold for sensory stimuli within the environment and will actively attempt to self regulate their environment. This student appears to be the most affected by the environment displaying the poorest attendance, lowest engagement level and lowest rate of inference. Student A also displayed unease with the dynamic of the group project at the beginning of the semester which suggested possible introverted tendencies. Open plan environments rarely aid introverted personalities in terms of productivity and reportedly can reduce productivity in any person by 66% (Fry et. al., 2008). Student C, still completed class tasks and presented project work, which implied that the vast majority of work or productivity was achieved outside of the studio environment. Student C, was located directly across from Student A at the rear of the studio, and faced into the container wall. Again, the observation would note that this student may be distracted by excess external stimuli e.g. traffic on the boulevard, neighbouring classes, conversation etc. This Student did not attempt to regulate their space to help with the external stimuli or attempt to move further into the classroom, instead, remained unproductive or left the environment.
Observational Period

These profiles have been identified to highlight that although the students have displayed a very similar academic performance, and represent the average cohort, they can still vary vastly in terms of coping skills within any particular educational environment, which may in turn alter the learning experience of any given student. The *Myres-Briggs* organisation carried out a study in 1998, which suggested that 50.7% of the American population are now categorized as introverts, and on a more global scale up to a third of the population would class themselves as introverted (Cain, 2012). If this figure were to be reflected into the built environment would it show environments which cater for this introvert/extrovert demographic breakdown? This figure is especially relevant in an educational environment where productivity, application, engagement and intelligibility are essential to ensure learning occurs.

4.6 **Observational Conclusions**

4.6.1 **Indicative Content & Design Theory**

The *Indicative Content* and *Design Theory*, which are suggested in the module descriptor, are primarily interpreted in a working sense throughout the semester. There is largely no specific week or day which focuses in on a specific topic apart from ‘anthropometrics and ergonomics’, which sees a full week of dedicated attention, in the form of inquiry based learning.

The observer noted that topics such as *Materials, Colour Theory and Reflection*, while may be acknowledged in a working sense, are not given their own theory
based sessions which draw down on principles, this is done in a working sense. The observation noted that acknowledgement and conversation primarily came about as a response to student design choices, or specifications made by the students with triggered debate. These topics may also have been dealt with in other modules outside of the observation period.

*Lighting* is addressed in a working sense, but the importance of lighting could have been further detailed in terms of the user experience e.g. circadian rhythms. While this may be an advanced topic, the realisation that lighting affects people's bodily function and cognitive ability, hones in on the importance of light acknowledgement. However, orientation is addressed at the beginning of the apartment project, whereby the students must choose an apartment plan based on orientation. During this project the students begin to discuss the concept of orientation and the positioning of rooms are as response to this.

The students need to understand why they are learning a particular topic to allow it resonate with them, and to realise the need for the understanding. The ‘Teaching and Learning Handbook’ refers to this as ‘*making of meaning*’ and suggest that better learning occurs when student can understand the reality of what they are learning (Fry et al., 2008). Highlighting the potential adverse effects of poorly lit spaces may initiate the importance and assist student understanding.
4.6.2 **Teaching and Learning Methods**

The lecturing body as a whole largely supported a student-centred / inquiry-based approach toward learning, which in its nature complements design based education. There are varying terms linked with student-centred learning, namely flexible learning, experiential learning, self-directed learning and so 'student-centred learning' can mean different things to different lecturers" (Taylor 2000; Burnard 1999). The lecturing body would appear to have varying approaches toward teaching and learning and how the module learning outcomes are achieved.

- **Lecturer A** largely supports the *John Dewey* approach to education and promotes a *'learning by doing'* mantra within the studio environment. This lecturer wants to see his/her students “self-discover human scale and ergonomic needs” for instance, even though the TGD’s are readily available. Lecturer A believes that if you supply the student with the resource of the TGD before they have self-discovered, the same level of learning is not achieved. The method may take longer to achieve but it arguably does promote *reflection* (Boud *et al.*, 1985) and *lifelong learning*.

- **Lecturer B** appears to support the *'learning by doing'* mantra also, but takes on a more demonstrator role toward the refinement of student designs. This lecturer tends to seek out the students during each design studio class, usually in groups of six or so, and go through their individual designs together. This method promotes peer learning and tries to eliminate design
fail before they happen. Lecturer A, on the other hand, tends to allow the student to realise whether their idea can work or not themselves before intervening (within reason) and encourages physical demonstrations, extreme creativity and pushing boundaries.

Both lecturers’ provide a very credible and valid approaches to teaching and learning and have good reasoning behind their thought process, but the students seem to have difficulty appreciating both methods on occasion. The observation would note that the student cohort may not be mature or intrinsically motivated enough as of yet to make these choices on their own; but every effort should be made to embrace both styles, the creative freedom and individuality but respect refinement and practicality also.

No teaching and learning method is right or wrong, but should be considered for its effectiveness with the particular cohort. The cohort size, maturity and time allocation are some of the factors which may affect a teaching and learning experience, for both the lecturer and student. Communication is essential to assess the effectiveness of the overall learning, and reviewed (if possible) at regular intervals.

Biggs (1999; 2007) suggests that the “a good teaching system aligns teaching method and assessment to the learning activities stated in the objectives so that all aspects of this system are in accord in supporting appropriate student learning.”
The existing module does boast a coherent curriculum, in that the educational aims are apparent and progressive learning is suggested, but "even the best designed module" or curriculum, "can fail if the teaching strategies employed are inappropriate to encourage and support the learners towards meeting the desired learning outcomes" (Donnelly and Fitzmaurice, 2005). Therefore the question formulates, "what is a good strategy?" Toohey (1999) suggests;

"A teaching strategy is ... a plan for someone else's learning, and it encompasses the presentations which the teacher might make, the exercises and activities designed for students, materials which will be supplied or suggested for students to work with, and ways in which evidence of their growing understanding and capability will be collected."

(Toohey, 1999)

The strategy in which the individual lecturer is planning to utilise must be communicated prior to entering the educational environment to realise any conflicts of interest and to ensure the best strategy is adopted to achieve the desired level of student engagement to obtain the learning outcome or class goal.

Donnelly and Fitzmaurice offer a series of 'Action Triggers' to help identify the appropriate strategies for a module.

- "Who are your learners? E.g. undergraduate, postgraduate, adult, international students
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- **What kinds of learning are you trying to achieve?** E.g. knowledge, skills, attitudes.

- **How are you going to deliver the content?** E.g. lectures, tutorials, seminars, practicals.

- **What learning activities can be organized to meet the learning outcomes?** e.g. case studies, problem-solving, role play, group discussions.

- **What resources are available to you?** E.g. handouts, worksheets, OHPs, visuals

- **Does your teaching strategy support the learner to meet the desired learning outcomes?** (Donnelly and Fitzmaurice, 2005).

These action triggers are a good way, for any lecturing body, to breakdown the how the content will be supported throughout the academic semester or to review effectiveness.

4.6.3 **Student Engagement with Methods**

The test group members do not tent to engage the lecturers as regularly as the student cohort at the higher end of the average spectrum and the above average, who are seeking guidance and direction at regular intervals. These attempts to seek clarity in any given project are largely centred on identifying what is expected of them or what they are expected to produce. This ‘means to an end’ attitude appears to be acting as the key motivator for the average student cohort in general. The students by in large, are displaying *extrinsically motivated* traits,
suggesting that they are motivated by grades, external reward and the opportunity to gain approval rather than intrinsically motivated student who is more concerned with the challenge and the mastery of the subject (Fry et al., 2008).

Taking extrinsic motivation into consideration, it is essential that the student is provided with aligned content and aligned methods across the academic semester, especially at a fundamental stage of learning. They need to know exactly what is required of them. Facilitator and demonstrator teaching methods in conjunction with aligned content will provide a structured and manageable environment for student learning. At this point the student has an onus to apply themselves also, and participate in active engagement learning.

To further promote engagement, both cognitively and affectively, the type of resource used to communicate with a 21st century design student must be given consideration. Resource materials should be analysed for impact factor and effectiveness at regular intervals. Audio visual resources appeared effective with this particular cohort and registered a greater initial impact factor than text laden hand-outs. For example, the audio visuals utilised in the apartment project influenced student B’s design immediately, but the same student struggled to comprehend the TGD’s without assistance. While this may vary from student to student, the 21st century student is arguably less likely to identify with book culture or text laden forms of resources.

Lastly, timely feedback is essential. Extrinsically motivated students are hugely influenced by feedback and results based learning. Feedback influences student
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behaviour, especially in a continuous assessment or formative environment. If the student is kept up to date on their performance, they are more likely to adopt a proactive role, rather than a reactive role toward their own education (Nicol and Macfarlane-Dick, 2006).

4.6.4 Educational Environment

The educational environment highlighted two main elements which affected the teaching and learning impact factor.

- Student Behaviour

The students were largely exposed to high levels of sensory stimuli on a daily basis within the open plan studio environment. Stimuli comes in varying forms such as, noise, visual distraction, human traffic, temperature, connectivity of the spaces etc. The test group members all displayed low thresholds for coping with the distractions that came with the space and as a result the desired learning experience is not achieved for these students.

The students adopted individual active strategies to regulate their environment which saw them, vacate the classroom, cognitively disengage or introduce noise isolation devices. Regardless of the strategy introduced, the student regularly disengaged with the learning environment and isolated themselves from sensory overload.

The observation would question if the environment is catering for teaching and learning to the best of its ability. Effort needs to be made to
ensure the students are provided with teaching and learning environments that allow them every opportunity to apply themselves and engage in the class. Similarly the lecturing body must also be provided with environments which support good student behaviour and allow for maximum application and productivity in each class.

- **Sense of Place**

The linear and open format of the studio environment encourages connectivity and social links across the factory floor but a sense of place and territory is potentially lost in the openness. The students are quite exposed and the needs of the student have not fully been addressed. The studios do not offer a sense of territory, privacy, security and does not give the option for the student to personalise their space e.g. personal notice board, desk storage, pin up space, actual designated space. By including these elements to a certain degree, the student, especially those of an introverted or extrinsically motivated nature, will be given the opportunity to create a *sense of place* within the educational environment. This can then further develop levels of *familiarity* and *place identity*. 
“School systems should base their curriculum not on the idea of separate subjects, but on the much more fertile idea of disciplines... which makes possible a fluid and dynamic curriculum that is interdisciplinary.”

- Ken Robinson
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5.1 Introduction

Educating architectural designers to have a better understanding of how people are affected by the built environment, requires a multi-disciplinary and emotional approach because architectural meaning is derived “from archaic responses and reactions remembered by the body and the senses” (Pallasmaa, 2012). People form the one major link between the disciplines of Architecture, Anthropology, Neuroscience and Environmental Psychology, and so it stands to reason that they should consider each other. Developing a module descriptor and resource pack for architectural education, which considers these multi-disciplinary areas is a first step in initiating multi-disciplinary education or inter-professional education, which provides the student with a better understanding of people in the built environment. This resource pack identifies the indicative content needed, to take the student through a series of topics, learning outcomes and threshold concepts, to ultimately develop an awareness of the sensory and emotional effects of their designs on people within the built environment.

The first step in designing the content for the resource pack, is to identify the level of acknowledgement of Sensory Intelligence (SI) and Emotional Intelligence (EI) within the design studio environment. In this instance, the initial observational period highlighted low levels of sensory and emotional acknowledgement within the design studio environment, in terms of the user (human) experience. The positioning of the human experience, in terms of SI and EI, is similar to the current industry hierarchy and therefore, fundamental integration of sensory and emotional intelligence course
content is needed to create a fundamental awareness, a more humanistic design process and ultimately, a more sensitised designer.

5.2 **Aims and Objectives of the Resource Pack**

The overarching aim of the resource pack is to prioritise the human experience on the hierarchy throughout the design process, by implementing *Sensory and Emotional Intelligence* course content. In applied terms, three separate aims are presented.

**Aims:**

1. Create an awareness of SI and EI in architectural design education.
2. Educate architectural designers to realise the importance of humanistic (user centred) design in society.
3. Provide the student with a skill set to profile the potential space and profile the potential user for sensory and emotional need within the space, place or environment.

**Objectives:**

1. Deliver course content to allow the student to realise the social responsibility of the architectural designer in society.
2. Discuss and inform the student on the how the human sensory processing system allows people experience the physical world, and the unavoidable emotional registration process associated with that sensory experience.
3. Highlight the emergence of architectural design through human need for survival, in order to identify primitive design fundamentals and necessities as a starting point.
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4. Explore elements of *anthropology* and *environmental psychology*, such as, familiarity, *place attachment* and *place dependence*, to further understand human connection with the built environment.

5. Identify the effects of *sensory stimuli* in architectural design.

6. Develop aids to assist the student in
   - Understanding the *human sensory system* and *emotional association*.
   - *Profiling the space and the user*. This element should give control to the student to create a profile and in turn design for that specific profile, with user experience holding equal priority to function and form, throughout the design process.

7. Explore the *power of language* in design. This area should explore descriptive and reflective language both oral and written.

5.3 Legislative Factors

When designing learning outcomes, the level of learning must be considered. Two key factors inform the academic level of content within the module descriptor and resource pack, the *National Framework of Qualifications (NFQ) level* and the *Learning Outcome* aims. The NFQ level dictates the level of learning that can be expected from the student and the learning outcomes associated with the course (QQI, 2016). In this instance a fundamental level (Level 7) is established, in keeping with the existing observational cohort and the educational cohort level of learning. It would be deemed imbalanced to implement an educational trial at an intermediate level (Level 8), within a student cohort which are currently at a fundamental (Level 7) stage of learning. Once the NFQ Level has been clarified the learning outcomes for a particular semester
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should be addressed. A learning outcome by definition is a "statement of what a learner is expected to know, understand and be able to do at the end of a period of learning and of how that learning is to be demonstrated" (Kennedy, 2007; Moon, 2002). Learning outcomes can sometimes be confused with aims and objectives. It is important to note that aims and objectives are from the teacher's perspectives of the topic or content they intend to cover.

Furthermore, to ensure versatility and widespread usability of the educational resource pack, varying NFQ levels and associated action verbs are provided. This allows the lecturer to take control of, and responsibility for, the level of learning implemented within any course. This is a necessary element to facilitate differentiated learning within mixed cohorts. Blooms Taxonomy is the staple literary reference for identifying the language to adopt, to suggest or direct a certain level of learning within the domain in which learning occurs. Lastly, the course content must reflect the learning outcomes, and so, the content must be aligned to so do.

5.4  **Associating Learning Outcomes to the collective aims and objectives**

At this stage the aims and objectives have been established and presented in a thematic manner. Once again, it should be noted that some objectives build upon each other, to achieve a certain learning outcomes, and each objective does not specifically have an individual learning outcome. The research has established that in or around five learning outcomes is the ideal amount considering the timeframe allowed in a typical academic semester.
5.5 Resource Pack Indicative Content and Continuous Assessment Strategy

5.5.1 Constructive alignment of course content

Coherent curriculum or content, is essential to ensure a successful educational resource pack is achieved. Biggs (1999) offers a theory on constructive alignment which roots the necessary elements in higher education course content.

"Constructive alignment is a design for teaching, calculated to encourage deep engagement. In constructing aligned teaching, it is first necessary to specify the desired level or levels of understanding of the content in question. Stipulating the appropriate verbs of understanding helps to do this. These verbs then become the target activities that students need to perform, and therefore for teaching methods to encourage, and for the assessment tasks to address, in order to judge if or to what extent the students have been successful in meeting the objectives. This combination of constructivist theory and aligned instruction is the model of constructive alignment." (Donnelly and Fitzmaurice, 2005, Biggs and Tang, 1999)

The preceding quote informs a three stage process constructed by Donnelly and Fitzmaurice (2005):

- Defining the learning outcomes;
- Choosing the learning and teaching methods that can lead to attainment of outcomes;
- Assessing student learning outcomes.
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This strategy is aimed at achieving a deeper level of learning for the student. In order to apply this strategy to the resource pack, the stages have been adapted and expanded to cater for, extraction of new content and inclusion of threshold concepts. The content is considered in an inclusive manner as it is extracted, while referring back to the following five stages continuously.

5 stage process to establishing aligned content for resource pack

![Diagram showing the five stages process]

Figure 5.1 - Five stage process for aligned content (Author, 2016).

How does the indicative content help achieve the desired learning outcomes?
How does the teaching and learning method support the content and learning outcome? How does the assessment strategy promote attainment and deep learning? And have the desired threshold concepts have been achieved?

5.5.2 Key Topics which form Indicative Content

The specific content for the resource pack is categorised under a number of key topics. Each of these areas is evaluated under the five stage process to ensure thorough aligned content which promotes student "cognitive engagement" and "affective engagement" and overall learning (Linnenbrink, 2006; Trowler, 2010).
The Aristotelian Senses

• Identifying Content

In order to introduce the student to the human sensory processing system, they must first be introduced to the senses in their most basic form. By starting with 'The Aristotelian Senses' and expand them into the contemporary format (Lloyd and Owen, 1978; Howes, 2005), this provides the student with a familiar and relatable body of information to build upon, at a fundamental level. The aim of the initial sensory content is to create awareness of the traditional five senses in an architectural context (Pallasmaa, 2012, Franck and Lepori, 2007).

There is huge debate around the senses in general, how many are there? And how they work? But for the purpose of this research, the main aim is awareness of the senses and how they are relevant in architectural design. The senses should be explained in their basic form and then placed in any architectural context. The following graphic allows the student to visually see the link between the two disciplines. Furthermore, the senses must be considered from a humanistic point of view throughout, to register the link between people, sensory processing and the built environment.
Also, it is vital that the students recognise how the senses allow people to perceive, understand and relate to the built environment (Kabat-Zinn, 2005). Without the senses, how would people survive in the world? Architects such as Pallasmaa, and anthropologists such as Howes, among others, are creating awareness of the over reliance on the visual sense in architectural design, and claim that the built environment is suffering from ocular-centric dominance (Bowring, 2007; Pallasmaa, 2012; Howes 2005). The students must realise that good design does not give priority to one sensory modality.

- **Learning Outcome per NFQ Level**

Given that the students are at a fundamental stage of learning within their respective courses, this level is carried forward when considering the appropriate learning outcomes per the existing NFQ level. The “action verb”
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associated with the learning outcome must respect this level also, to ensure fair expectations of learning are implemented (Kennedy, 2007). As it is not possible to have a learning outcome for each class, it is important to set class goals to monitor student progression toward the overall learning outcomes. Class goals give the student a sense of self achievement as they progress through the module content, and an awareness of what they have learned at the end of each class (Ames and Archer, 1988, Linnenbrink, 2005). This formative approach allows the student understand their own progression as they transition (Boud and Falchikov, 2006).

The overall learning outcome for this particular topic is linked with the next topic 'Emotional Registration' (Dolan, 2002). These two topics are inextricably linked and therefore the learning outcome for these topics is identified in the next section.

- Teaching and Learning Method

The teaching and learning methods utilised to deliver sensory knowledge and understanding rely on ‘cognitive engagement’ and ‘affective engagement’ in terms of utilising ‘familiarity’. The students are in a position to identify with, and already hold a degree of familiarity with the sensory content, and so the teaching method should use existing student familiarity (Krause, 2005). The lecturer should maintain a “facilitator role” throughout the early stages of sensory and emotional education, and should provide structure within the classroom to ensure time management. The lesson structure should also, allow for unstructured group or peer discussion to encourage and develop the
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student voice. Furthermore, the resources used to achieve ‘cognitive engagement’ and ‘affective engagement’ must reflect a 21st century design student (Beetham and Sharpe, 2013; Trowler 2010).

• **Assessment Strategy**

Utilising ‘familiarity’ in education is a very effective way of engaging the student (Dienes et al., 2011; Krause, 2005). Sensory content, which may be considered ‘out of discipline’ at first, must be contextualised and broken down to allow the student understand relevance. When addressing the senses, or sensory processing, familiarity allows the student to personally relate to the topic, and the lecturer to achieve a level of student understanding instantly.

Involving daily scenarios within familiar environments promotes engagement, involvement and interest, which further encourages a ‘student voice’ within the classroom (Robinson and Taylor, 2007, Fielding, 2001). In order to support this, resource materials are designed to assist learning.

*Firstly*, the resources used are targeting design students and should communicate in an appropriate graphical manner and not purely through text. The ‘millennial’ (Elam et al., 2007; Monaco and Martin, 2007) type student filtering through today’s education system does not primarily identify with book culture, and therefore educational content should not overly utilise text laden resources.

*Secondly*, the initial resource material should establish ‘what the student already knows?’ (Weinstein, 1988). By providing the student with a primarily graphically read hand-out, which allows brainstorming and documentation as
they progress through the topic at hand, which promotes ‘engagement’, ‘applied thought’ and a ‘sense of voice’ which can be obtained by the student prior to lecturer input.

Thirdly, the intended theory, which in this instance is ‘The Aristotelian Senses’ can be introduced, building on what the student has already discovered or identified.

It is widely agreed that a ‘deeper’ level of learning is achieved when the student engages both the hand (Emig, 1977, Pallasmaa, 2017) and brain (Corno and Mandinach, 1983). Therefore the graphical resource material provides the design student with initial visual stimulation through graphics, followed by cognitive engagement through the required task, and lastly, registration and reflection through logging their thought process (Procee, 2006, Williams, 2001)

- **Threshold Concept Achieved**

The student or potential learner should be able to identify the importance of the senses in daily life. Although not a learning outcome, this threshold concept can be categorised within the ‘affective domain’, and given the content, it is important to allow the student realise the affective reasoning behind what they are learning.

**A.D- Awareness that people perceive the world through multi-sensory processing should be obtained and so, an appreciation for each of the senses is achieved while identifying and exploring them in architectural design context.**
Emotional Registration

- Identifying Content and Learning Outcome

Introducing the registration of 'human emotion' (Izard, 2013; Malnar and Vodvarka, 2004; Wilson, 2003) should follow naturally after exposure to 'The Aristotelian Senses'. To understand emotional processing, the student must first understand that people have an initial physical appreciation of their environment through a sensory experience, and then, through sensory processing, an emotional response is registered. This process highlights that the senses or emotions cannot be considered individually or separately, as one ultimately affects the other (Kringelbach, 2005).

To introduce the students to emotional context, Robert Plutchik's 'Wheel of Emotions' is utilised (Plutchik, 1984). This 3D graphical adaption of basic emotional states provides students with emotional vocabulary exposure, and also provides varying intensities of emotional states. This is a very important part of emotional introduction as it cannot be taken for granted that the student holds an appreciation for emotional expression based on their own personal emotional registration. People experience emotional registration on a daily basis but it can be largely subconscious and therefore not overly considered (Neutra, 1956).

Figure 5.3 - Robert Plutchik's 'wheel of emotions' (Plutchik, 1984).
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To support student introduction to the 'Wheel of Emotions' and new emotional vocabulary, 'Emotional Intelligence' is introduced. Firstly, understanding emotional intelligence is important for the students, as it will later help them identify and manage possible emotional implication in their design schemes. Mayer (1990) is a leader in analysing EI in the design world and offers a good contextual explanation for EI:

"Emotional intelligence involves the accurate appraisal and expression of emotions in oneself and others and the regulation of emotion in a way that enhances living. One aspect of emotional intelligence is the ability to recognize the consensually agreed upon emotional qualities of objects in the environment" (Mayer et al., 1990).

This contextualised theory on EI should be the goal for every designer. The key message proposes a "regulation of emotion in a way that enhances living". Architectural designers should aspire to understand human emotion, to a level, whereby they can identify and help manage potential emotional implication, as a result of their designs. Designers should also be able to recognise "the emotional qualities of objects in the environment". Pallasmaa continuously advocates for the allowance of objects in design, and stresses the important relationship people form with objects within space (Pallasmaa, 2012).
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- **Learning Outcome per NFQ Level**

As previously mentioned the NFQ level remains at a fundamental stage to coincide with the existing level of learning. The action verb used reflects a fundamental expectation of learning within the 'affective domain'. It is important to trigger the affective domain at the early stages of learning, to ensure the student is aware of why they have a responsibility as a designer within society.

*LO1 – A.D - Recognise the importance of sensory and emotional acknowledgement in the built environment.*

- **Teaching and Learning Method**

At the early stages of sensory and emotional intelligence education, the aim is to aid the student in identifying 'familiarity' in the content and to develop their 'student voice'. Therefore the initial teaching and learning methods are very similar in the earlier topics and so, 'emotional registration' is rooted in 'cognitive engagement' which should trigger 'affective engagement'. In simpler terms, the student must engage in the content to develop understanding (cognitive), and once they understand how emotional registration occurs, they can then begin to appreciate why it is important (affective). Arguably, by establishing what they already know to be familiar may trigger the affective element primarily, which may aid the cognitive understanding. Ultimately, it is very important for the student to understand why they are learning a specific topic. The lecturer should maintain a 'facilitator role' where possible; this will...

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allow the student voice to grow as the week's progress, and only use instructor roles to deliver necessary information and direction.

- **Assessment Strategy**

To visualise and apply sensory and emotional processing, and to develop student appreciation for the importance sensory and emotional acknowledgement carries within architectural design, resource materials are designed. The structure reaffirms sensory processing in its layout, and familiarity is re-instated by introducing the home as part of the task.

![Table](image)

Figure 5.4 - Interactive hand-out for sensory and emotional analysis of ‘the home’ (Author, 2016).

The students will consider their own personal experiences within their daily routines and document the sense which triggered the emotional registration. Analysing their personal homes unifies architectural context with sensory and emotional processing. The student has a greater chance of future application because the process has been placed in context.
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- **Threshold Concept**

  C.D. - The key threshold concept to establish is a realisation that people perceive the built environment through sensory experience (cognitively) which leads to emotional registration (affectively).

- **Primitive Need**

- **Identifying Content**

  Establishing why architecture exists is essential when understanding primitive need in architectural design. Therefore, getting back to basics is one way of combating ocular-centric dominance in the built environment. Weighing up what people actually need versus what they are currently exposed to in their built environments, encourages the student to question 'Does visually aesthetic architectural design meet human primitive need?'

  Leading publications on 'primitive need' in architecture are referenced to establish what this actually consists of (Neutra, 1956; Fitch and Branch, 1960; Anderson, 1962; Heimsath, 1977). This information is broken down into legible and simplified buzzwords, to facilitate a fundamental level of learning. These buzzwords are used while extracting recognised prior learning, 'what the student already knows?' by using a brainstorming resource. The lecturer is equipped with completed resource materials containing the buzzwords, to assist the peer or classroom discussion.
Every human being has primal needs. These needs have allowed us to survive and evolve as a race over the many years. In order to help us understand how to design for these human needs we must first re-realise them.

During your group discussion use this page to fill out the primitive needs you have discovered.

Figure 5.5 - Brainstorming resource for introduction to 'Primitive Need' (Author, 2016).

- **Learning Outcome per NFQ Level**

  The action verb 'identify' reflects a fundamental expectation of learning within the 'cognitive domain'. This learning outcome for the most part comes from the cognitive domain but in essence has a moral aspect also and so, 'value' is included to highlight the affective aspect of learning.

  *LO2 – C.D / A.D* - **Identify the necessary primitive needs in architectural design to ensure value is placed on the user experience in the built environment.**

- **Teaching and Learning Method**

  The 'facilitator role' is maintained throughout 'primitive need' but supported by an 'instructor role' to deliver necessary information and direction. The lecturer should facilitate peer or group discussion, as this is a good method to use when exploring this topic. Different economic backgrounds, cultural differences and standards of living all effect what people understand as a human need (sense
ratios; sense episteme) (Howes, 2005). Primitive need may historically stem from the same survival essentials but psychological primitive need may have changed through evolution, global and cultural diversity (Rudofsky, 1964, Fitch and Branch, 1960, Anderson, 1962). Bearing this in mind, peer discussion promotes peer learning and perspective is offered to both the group and lecturer. This topic builds directly on emotional registration and therefore poses a good time to realise and explore the psychological and emotional effects of primitive need, especially in terms of cultural diversity. Understanding cultural diversity is a complex topic, which delves into the realm of anthropology, but establishing an appreciation, that this will affect human need is important and necessary. Howes and Classen (1991) offer 'five valuable considerations' which can assist this process.

- **Assessment Strategy**

Identifying what the student identifies or understands as a primitive need is ideal when establishing a starting point for educational input. Resource materials allow the student, through peer discussion, to list what they consider to be a primitive need. Identifying primitive need, by the current generation of learners may not be as easy as assumed. This generation are often branded as the 'entitled millennial' (Monaco and Martin, 2007), who may struggled to classify real primitive need, as they have never been without shelter, hygiene or heat etc. By addressing primitive need from this angle, the lecturer can reaffirm why architectural design is actually needed and what it should provide in its most basic form. After the buzzwords have been identified the student can
then be asked to categorise them into 'physiological' and 'psychological' need (Deci and Ryan, 2000). This may evoke a conflict of opinion among the group. For instance, territory may be classed as a physiological need, but the reasons why people need it are rooted in psychological comfort also, and therefore can fall into both categories.

At this stage, it is important for the lecturer to monitor how the student cohort is adjusting to the emotional or psychological conversation. This is a topic that may not come naturally to some people, and may cause unease within the classroom. To assist this, the last topic 'The Power of Language' houses excerpts from publications, which describe various spaces in quiet an emotional manner. These excerpts can be brought in to any class at an earlier stage to promote confidence building. Reading a piece of emotional text, aloud among peers, which is not written by the student, offers an opportunity for them to build confidence using emotional vocabulary without feeling unease of judgement. This is a good resource to have at hand, if a student or cohort is finding difficulty relating or engaging.
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- **Threshold Concept**

This is a pivotal point in the student realisation of primitive need. They must get to a stage where they appreciated that the physiological aspect of primitive need, affects the psychological aspect of primitive need. And so, the physiological aspect of architectural design affects the psychological aspect of architectural design.

_A.D - Appreciate that what architectural designers physically design has psychological impact on the user experience._

**Human Connection with Space, Place and Environment (SPE)**

- **Identifying Content**

At this point the student has had a strong introduction to _'The Aristotelian Senses', 'Emotional Registration' and 'Primitive Need'._ The next stage introduces the student to human connection with space, place and environment (SPE). Human connection is heavily rooted in environmental psychology (EP), and architectural design stands to learn a lot from the theories and models drawn down in EP. The student must understand why connections are formed with space, place and environment (SPE), and exposure to some of the predefined models and theories in anthropology and environmental psychology, will allow for better understanding of human behaviour.

Sense ratios, place attachment theory, informational needs, defensible space, and familiarity etc. have huge relevance and impact in architectural design, and
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thus, deserve consideration when designing for people. Opening up the channels of communication between the anthropology and environment psychology disciplines and the architectural discipline is necessary to ensure user sensitive environments are understood and encouraged, within both education and industry fields.

- Learning Outcome per NFQ Level

The action verb 'appreciate' reflects a fundamental expectation of learning standard within the 'Cognitive Domain'.

L.O 3 – Develop an appreciation for anthropology and environmental psychology factors and there relevance in architectural design development.

- Teaching and Learning Method

Peer or group discussion are useful ways to encourage student engagement and develop student voice on the topic, similar to the teaching methods established earlier. However, at this stage the theory element of the content is slightly more advanced and needs more lecturer input to provide context. The lecturer should take a “demonstrator role” initially within the class, to ensure direction is given, in order to aid understanding and clarity. New terminology needs to be presented, and placed in context prior to peer or group discussion.

- Assessment Strategy

The initial introduction to new anthropology and environmental psychology terminology and models is supported by graphical aids provided by the
lecturer. The peer or group discussion, is further supported by an interactive hand-out to allow the student brainstorm, discuss and log their thoughts.

Utilising an existing space to deconstruct in terms of 'human connection' allows the student to breakdown factors which may cause a person to develop a relationship with a space e.g. biographical, spiritual, ideological, narrative, commodified and dependent etc. It is important that the space, initially, is very familiar to the student. This will make the task easier for the student to engage with and allow for deeper understanding of the inter-disciplinary factors in context. Human connection or human relationships with SPE can be further categorised utilising the pre-established theories, to form questions to aid the exercise:

- Why do people (or you) feel 'place attachment'?
- Why do people (or you) feel a sense of a place?
- What causes people (or you) to return to a space, place or environment?
- Why do people (or you) feel a certain emotion in a space, place or environment?

More complex theories such as, sense epistemes, informational needs, dependent factors and dimensions of creating space etc. should be introduced to further explore human connection with SPE (Hashemnezhad, 2012; Howes, 2005). Once this stage has been completed, the limited objective task may begin.
Module Design

The student must deconstruct an existing space or completed design studio project in terms of what they have learned to date. Their findings should highlight the informed changes they would make to their existing design to create a more user centred scheme. The chosen space should be familiar to the student in order to carry out a critical analysis based on either, their experience within the space as an occupant, or as the designer who design created a space for potential users. If time allows the lecturer to carry out the limited objective task utilising both scenarios, this would potentially give the student greater perspective. This would also allow the student identify with the potential user of their space with greater ease. For example, if a familiar café is analysed first, and then their individual café designs are deconstructed. Essentially, a familiar space in which they frequent is analysed first, then followed by an analysis of a similar space they have designed.

- **Threshold Concept**

If the student can understand why people create connections with space, place or environment, they can then apply these learnings to their own designs. This would result with a more considered scheme in terms of the user and the user’s potential relationship with the space.

*A.D. - Appreciate the importance of identifying human connection with SPE.*
Profiling the User

- Identifying Content

This topic is not rooted in theory based learning; it is about creating awareness of the potential user profiles that will occupy the SPE. To help the student identify with the Space and the Users, interactive resources are designed to help the process.

Firstly, the student must identify what the design brief requires of the scheme. This is assisted using SpaceFile, which allows the student to create a client profile and generate and overall understanding of the space requirements in terms of user needs. SpaceFile, is designed to encourage a softer more humanistic approach to understanding the spatial or physical requirement of the brief.

Secondly, the student must realise that there are varying types of user profiles within any scheme. This is assisted using the interactive User Profile resource, which enables the student to separate and categorise the varying user profiles of the SPE e.g. customer and employee. Given the scale and type of project, the amount of user profiles can vary dramatically, but it is a very important part of the design process. Acknowledging each user profile will potentially result in a considered scheme in terms of overall use of the SPE and user comfort within the SPE. It is important to note that roles can be reversed, and the user profiles can be established first and followed by the space requirement.
Module Design

- **Learning Outcome per NFQ Level**

  This learning outcome is linked with the following topic *Identifying and Managing Sensory Stimuli*. The action verb used here reflects a fundamental expectation of learning standard within the ‘Cognitive Domain’.

  \[L.O\, 4 - \, C.D - \textbf{Differentiate} \text{ between the potential user profiles and the sensory and emotional intelligence that should be considered for each user profile}.\]

- **Teaching and Learning Method**

  The graphical hand-outs play a key role in introducing the student to ‘profiling’ in a non-intimidating manner. Two types have been designed to accommodate a two stage process. The first type, Space File, acknowledges the existing or to be designed space and the client. It is important for the student to realise that the client may not always be the user or part of the user profiles, and therefore the needs and requirement from both may be very different. As illustrated, the graphic follows a nine stage process. The hand-out is designed to allow the student create a fictional client or analyse an existing client in a non-intimidating manner, while still answering key elements. The word *space* is used to allow flexible application to a wide variety of briefs or projects. It also introduces a very emotional aspect to the analysis, allowing the student to create a specific emotional scenario to implement or resolve in their design.
This exercise assists the student in identifying the sensory and emotional aspects of a potential project by answering and applying the nine stage process, and provides a good foundation to proceed with user profiling. Drawing down on what has been established in Space File, the student should be in a position to acknowledge how many user profiles may occupy the space, and therefore how many user profiles they need to accommodate and cater for.

The specific User Profile focuses in on the varying types of user identified within the scheme. Each type identified should have a specific user profile e.g. employee or customer, elderly or infant. It is important to realise that there may be varying depths to a user profile e.g. an employee profile in a restaurant could be further categorised in waitress, chef, manager, barman etc. This type of analysis applies to more commercial schemes but is important to note even at a fundamental stage of learning.
The layout of the user profile hand-out is structured so as to guide the student, yet loose enough to allow opinion and voice. By introducing guides like the above, the student then can begin to introduce these elements into the design development process in a structured and manageable way. The purpose of this exercise is to equip the student with a manageable method or process which allows them to identify with the potential occupants, and ultimately design a scheme which acknowledges and has consideration for each user profile.

Figure 5.7 - User Profile hand-out to aid students create occupant profiles
(Author, 2016).

- **Assessment Strategy**

In order to practice identifying user profiles and space requirement the student is given a space to work with. It is advisable that the space chosen, offers a limited amount of profiles to begin with. For example, a café or restaurant scenario, whereby the student identifies the space requirement (use), employee user profile and the customer profile. The space chosen should allow
Module Design

for the next topic ‘Identifying and Managing Sensory Stimuli’, as the SpaceFile and the User Profile will carry forward.

For the initial assessment, group work is adopted to allow the students to brainstorm and peer discuss the Space File and User Profile attributes, as they create fictional profile using the interactive hand-outs. It is advisable, if possible, that the current design studio project is utilised to create relevance and encourage actual application of the process. The students are expected to identify realistic spatial and user profiles within their groups, and present them to the class at the end of the session. The presentations should be loose and informal to ensure a non-intimidating environment and allow student questions and commentary.

- Threshold Concept

Cognitive Domain - Understanding that the potential occupants may be more than one type of user profile is essential. For any given scheme, there may be several types of user profiles, each with varying needs. This is essential to ensure that the main user profiles are acknowledged and catered for, where possible, within any designed space.

**C.D – Understand that the potential occupants of a space, place or environment may have varying user profiles.**
Identifying & Managing Sensory Stimuli

- Identifying Content

Identifying sensory stimuli may seem very technical to a design student and must be introduced in a non-intimidating manner. For this topic the students should be advised to bring the initial sensory resources received at the earlier stages of learning e.g. the senses is architectural context graphic etc. This will provide them with material to reference throughout this process.

Controlling sensory stimuli exposure (sensory cues) in space, place and environment is a very important factor which hugely affects the human experience. Establishing the possible sensory cues which may have impact on a space, place or environment can be a daunting task given the expansiveness of the area. "Environmental characteristics such as luminosity of light sources, the nature and level of ambient noise and acoustics, the presence of specific odors, color hues and shades, and materials and atmospheric factors such as temperature and humidity, all generate sensory input, and combined contribute to specific reactions in the observer" (Schreuder et al., 2016). In a bid to simplify this process, a three stage process for identifying potential sensory input in any given space, place or environment has been formulated (Author, 2017).

- **Location** of the space, place or environment.

- **Intended Use (Space File)** of the space, place or environment.

- **User Profiles** of the space, place or environment.
These three elements should be considered when analysing sensory stimuli. They operate on the basis of firstly locating external factors, and work toward the interior of the SPE. It is important to acknowledge external factors, even if they cannot be changed, to gain a full appreciation of locational sensory exposure e.g. geographical noise pollution etc. This can provide good insight for the potential sensory exposure, both to the specific SPE and User Profiles which will occupy the SPE. The intended use should then be considered, as this will also heavily influence the potential sensory exposure or sensory cues e.g. the sensory output from a library should be far less intrusive than a school or factory. Lastly the actual occupants must be considered for sensory output and sensory needs. The varying user profiles identified may produce different levels of sensory output or need different levels of sensory exposure to carry out their job e.g. a receptionist versus a baker versus a painter.

- **Learning Outcome per NFQ Level**

The action verb ‘differentiate’ reflects a fundamental expectation of learning standard within the ‘Cognitive Domain’.

**L.O 4 – Cognitive Domain - Differentiate between the potential user profiles and the sensory and emotional intelligence that should be considered for each user profile.**
Module Design

- **Teaching and Learning Method**

This topic is rooted in analysis (fundamental as it may be), and so, the lecturer should take on an instructor or demonstrator role to ensure the students relate and engage with the content. This content is more advanced in its nature and the students must be actively engaged to ensure learning and fundamental understanding occurs. Recaps are essential at the end of each lesson to ensure a level of understanding occurs, and if not, it must be identified and revisited.

- **Assessment Strategy**

The project is carried forward from the last section, whereby the students have identified the *SpaceFile* and the potential *User Profiles*. They must now consider the potential sensory stimuli (output and need) for the actual SPE, the use within the SPE and, the user profiles of the occupants.

The students should continue to operate in their groups to encourage peer learning and a deeper level of learning. They must list their identified sensory issues or concerns under each category e.g. User profile – Employee (Shop Assistant) – Vision- Sightlines hindered by signage, external noise affecting communication with customers etc.

This is then presented to the class to assess learning and to encourage further peer learning and self-assessment. To balance the sensory analysis, the groups can be given a specific sense to analyse. This would ensure a more widespread analysis, which the student body will benefit from at the final presentation stage.
**Threshold Concept**

"A.D - The most important element of sensory analysis is to appreciate that sensory stimulus may affect different user profiles in different ways, and so effect how the space functions in terms of the occupant.

What may benefit one user profile may hinder another, and so, the User Profiles must be considered when ‘Identifying and Managing Sensory Stimuli’ within a design scheme.

**Power of Language**

**Identifying Content**

Throughout the module the students will encounter a considerable amount of new vocabulary, terminology and design diction. It is vital to build their confidence in this area, in order to confidently disseminate this knowledge into their future work environment and with their future clients.

Describing design schemes, or spaces is a key part of being an architectural designer. Introducing the student to literary excerpts, which convey an emotional appreciation for a particular space, and the experience within the space, provides a good reference point prior to finding their own voice. In this instance, work is taken from Peter Zumthor, David Howes, Juhani Palasmaa among others, whom portray sensitivity toward the user experience in their literary descriptions. The students will read short paragraphs aloud among their peers, and discuss the body of language used.
Module Design

- **Learning Outcome per NFQ Level**

  **A.D – Awareness of the importance of both the written and verbal communication, of sensory and emotional intelligent design concepts or schemes.**

- **Teaching and Learning Method**

  The lecturer should maintain a facilitator role and demonstrate where necessary for this topic. It is important that the student does not feel like they are in a tutorial or lecture, and that their voice is essential in this class. Reading aloud may seem intimidating at first and confidence may hinder engagement. The lecturer should monitor engagement levels and ensure there is a balanced student input.

- **Assessment Strategy**

  *Firstly,* the students will log descriptive adaptations of a familiar space. Writing a short piece on a particular space in which they frequent regularly allows them great freedom and range to begin writing with descriptive language. The student will log their passages in ‘the power of language’ journal provided. During the group discussions the students receive lecturer and peer review on their passages. These passages should become design studio specific over time, once a certain sensitivity is achieved for the user experience.

- **Threshold Concept**

  Realising that language plays an important role in design communication is a key factor. Building student confidence with emotive and sensory descriptive
Module Design

language is important in challenging ocular-centric dominance within the built environment. Confident verbal and written communication, which promotes the importance of the lived human experience, is pivotal and a very important part of the sensory and emotional intelligence educational journey.

5.6 Conclusion

The above seven key topics which form the indicative contact, have been designed to cater for a third level student and at a fundamental level of learning (level 7). These topics, along with the identified teaching and learning methods, assessment strategies will be tested during the educational trial for both the successes and limitations. Extensive literary support is provided in the actual resource pack to guide the tutor and allow the student carry out independent learning.
"...if we teach today as we taught yesterday, we rob our children of tomorrow."

- John Dewey
Educational Trial

The Academic Pilot

6.1 **Introduction**

The main aim of the research is to develop an educational resource pack, which facilitates the introduction of *sensory and emotional intelligence* into architectural design education in Ireland. Before the resource pack can be disseminated to the broader architectural community it must first be tested and validated for its successes and limitations. The test base has previously been established as *Cork Institute of Technology*, where the *pre-educational observational* analysis has been carried out on a *typical case cohort* within the BSc. Interior Architecture programme. Based on the findings from the observational period, content has been designed to cater for the introduction of *sensory and emotional intelligence* into an architectural design programme, and so, the next stage is the educational trial.

The educational trial runs for the eleven weeks of the academic semester (21st September 2016 – 7th December 2016). The sample for the educational trial includes two student cohorts, second and third year BSc. Interior Architecture.

This chapter highlights the seven core elements of the resource pack and identifies the successes and limitations of the original resource pack, holding reference to; Indicative content, learning outcomes, teaching and learning methods, assessment strategy and threshold concept. The educational environment is also considered throughout the educational trial, but is not a primary factor.
Scheduling of the Academic Pilot

The preceding table highlights the class contact time for both cohort A (Interior Architecture Year 2) and Cohort B (Interior Architecture Year 3) over the academic semester. It can be seen that the classes for each cohort vary in duration. Cohort A represent the same cohort of students in which the pre-educational observational trial was executed on. Initially, the educational trail was only intended to be carried out with one class (Cohort A), but after week one certain limitations were identified and had to be addressed.

<table>
<thead>
<tr>
<th>Academic Week No:</th>
<th>Class Date: (week of)</th>
<th>Cohort A</th>
<th>Cohort B</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>12/09/16 17/09/16</td>
<td>1st-3rd Year Vertical Project</td>
<td>1 week in duration</td>
</tr>
<tr>
<td>2</td>
<td>21/09/16</td>
<td>Class 1 30 minutes</td>
<td>-</td>
</tr>
<tr>
<td>3</td>
<td>28/09/16</td>
<td>Class 2 30 minutes</td>
<td>Class 1 60 minutes</td>
</tr>
<tr>
<td>4</td>
<td>05/10/16</td>
<td>Class 3 30 minutes</td>
<td>Class 2 60 minutes</td>
</tr>
<tr>
<td>5</td>
<td>12/10/16</td>
<td>Class 4 30 minutes</td>
<td>Class 3 60 minutes</td>
</tr>
<tr>
<td>6</td>
<td>19/10/16</td>
<td>Class 5 30 minutes</td>
<td>Class 4 60 minutes</td>
</tr>
<tr>
<td>7</td>
<td>26/10/16</td>
<td>Class 6 30 minutes</td>
<td>Class 5 60 minutes</td>
</tr>
<tr>
<td>8</td>
<td>02/11/16</td>
<td>-</td>
<td>Class 6 60 minutes</td>
</tr>
<tr>
<td>9</td>
<td>07/11/16</td>
<td>-</td>
<td>Class 7 &amp; 8 60 minutes</td>
</tr>
<tr>
<td>10</td>
<td>14/11/16</td>
<td>-</td>
<td>Class 9 60 minutes</td>
</tr>
<tr>
<td>11</td>
<td>21/11/16</td>
<td>-</td>
<td>Class 10 60 minutes</td>
</tr>
<tr>
<td>12</td>
<td>28/11/16</td>
<td>-</td>
<td>Class 11 60 minutes</td>
</tr>
<tr>
<td>13</td>
<td>05/12/16</td>
<td>-</td>
<td>Class 12 60 minutes</td>
</tr>
</tbody>
</table>

Table 6.1 - Class schedule for Cohort A and Cohort B (Author, 2017).
The Academic Pilot

The timeframe allotted, for the education trial with Cohort A, was a 30 minute timeframe which positioned itself within an existing three hour design studio module. This particular cohort has 27 students and the 30 minute timeframe proved difficult to reach and engage the students. After the first class, permission was requested from the department to undertake an additional cohort with a larger timeframe. The request was granted, and Cohort B (Interior Architecture Year 3) also became part of the educational trial. Cohort B has 13 students with a 60 minute timeframe. The criteria surrounding Cohort B represents a more likely scenario if the resource pack was to be implemented as a standalone module in any given facility, and therefore provides a more relatable student sample.

![Background to Student Cohorts](image)

Figure 6.1 - Breakdown of cohort contact time (Author 2017).
6.3 **Implementation of the Resource Pack**

This section describes the educational trial in a running sense. The class topics (as evidenced in the resource pack sections) are used to categorise and structure this section. Also, by adopting this structure the resource pack can be referred to with ease.

As highlighted in the module design chapter, each topic does not have a specific learning outcome, but each topic, class goal and threshold concept build toward the five established learning outcomes. Therefore the learning outcomes are addressed in the conclusions section, in a collective sense, where they are analysed for the successes and limitations with regard to each cohort.

<table>
<thead>
<tr>
<th>LO1</th>
<th>Recognise the importance of sensory and emotional intelligence acknowledgement within the built environment.</th>
</tr>
</thead>
<tbody>
<tr>
<td>LO2</td>
<td>Identify the necessary primitive needs in architectural design to ensure value is placed on the user experience in the built environment.</td>
</tr>
<tr>
<td>LO3</td>
<td>Develop an appreciation for environmental psychology factors and there relevance in architectural design development.</td>
</tr>
<tr>
<td>LO4</td>
<td>Differentiate between the potential user profiles and the sensory and emotional intelligence that should be considered for each profile.</td>
</tr>
<tr>
<td>LO5</td>
<td>Awareness of the importance of both the written and verbal communication of sensory and emotional intelligent design concepts of schemes.</td>
</tr>
</tbody>
</table>

Table 6.2 - Initial learning outcomes for resource pack (Author, 2016).
Introduction

<table>
<thead>
<tr>
<th>Class 1</th>
<th>Location</th>
<th>Class Time</th>
<th>Duration</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cohort A</td>
<td>Louis Kahn Seminar Room</td>
<td>11.15am</td>
<td>30 minutes</td>
</tr>
<tr>
<td>Cohort B</td>
<td>Louis Kahn Seminar Room</td>
<td>11.45am</td>
<td>60 minutes</td>
</tr>
</tbody>
</table>

This introductory class, which is delivered to both cohorts, is centred on introducing the student to the module content itself, and presents them with an overview of what to expect over the eleven week educational trial. Additional to this, there are two core aims of the class:

a. Identifying the social responsibility of an architectural designer in society.

b. The realisation that people spend up to 90% of their lives in indoor spaces.

A PowerPoint presentation is used to deliver the introductory lecture to both cohorts. The lecturer has to adopt an instructor role at the beginning to give a certain amount of information to the students, but also encourages student engagement by adopting a facilitator role to introduce directed questions and also interactive hand-outs.

The students are asked at the beginning of the lecture; if they “think Interior Architects or Architectural Designers in general have a social responsibility to society?” The vast majority seemed bemused by the term ‘social responsibility’, and struggled to answer but when the lecturer asks “Does a doctor have a social responsibility to society?” and the students unanimously said “yes”. This suggests a lack of awareness among the students across both cohorts, about
how their job as an architectural designer also affects people's lives and society in general.

The lecture progresses on to introduce the interactive element of the session. The resource utilised is the IF Tracker (Internal Footprint Tracker). This is an interactive resource, based on the same principles of a typical carbon footprint tracker. This is used to allow the students document where they physically spend their time on a typical day, calculate the overall hours inside, and eventually arrive at a personal percentage. As opposed to telling the students the WHO (world health organisation) figure, the IF Tracker allows them to self-realise that they too spend around 90% of their lives inside (WHO, 1999).

Finally, when prompted again, after the realisation of the percentage of time spent in indoor spaces, the students were in full agreement that Architectural Designers of all varying degrees have a social responsibility within society. They were all unaware of the WHO statistic and unaware of their own personal percentages, and so, a threshold concept has been achieved. The students now hold a different opinion of the architectural role in society and also, the importance of the internal environment in terms of the user.

The resource proved successful in achieving this realisation, but the majority of the students struggled with the mathematical element of the resource, and had to be assisted to arrive at a percentage. Cohort A displayed greater difficulties with the hand-out in general; this may be rooted in the age and current fundamental level of learning. Cohort B did present similar difficulties but once given direction were largely able to arrive at a percentage. All in all, this
The Academic Pilot

interactive hand-out needs to be modified for the finalised resource pack, in order to achieve widespread, unassisted usability.

Figure 6.2 - Mathematical element of hand-out (Author, 2016).

The rate of inference:

Throughout the class, the lecturer keeps note of the *rate of inference* or engagement levels of the student, with both the topic and resource. For the introductory lecture the *rate of inference* with the topic was substantially lower than the *rate of inference* with the resource.

<table>
<thead>
<tr>
<th>Cohort B</th>
<th>Rate of Inference</th>
<th>Rate of Inference</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Topic</td>
<td>Resource</td>
</tr>
<tr>
<td></td>
<td>0.8 questions p/student</td>
<td>2.0 questions p/student</td>
</tr>
<tr>
<td>Cohort A</td>
<td>Rate of Inference</td>
<td>Rate of Inference</td>
</tr>
<tr>
<td></td>
<td>Topic</td>
<td>Resource</td>
</tr>
<tr>
<td></td>
<td>0.6 questions p/student</td>
<td>1.8 questions p/student</td>
</tr>
</tbody>
</table>
The Academic Pilot

The higher volume of engagement for both cohorts was rooted in the task element of the class. These figures suggest the student is more likely to cognitively engage with a task as opposed to the oral theory, a means to an end approach, while at the introductory stage of the module. The students may have not obtained enough information to promote intrinsic engagement (Fry et. al., 2008).

- **Topic 1**  
  The Aristotelian Senses

<table>
<thead>
<tr>
<th>Class 2</th>
<th>Location</th>
<th>Class Time</th>
<th>Duration</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cohort A</td>
<td>Louis Kahn Seminar Room</td>
<td>11.15am</td>
<td>30 minutes</td>
</tr>
<tr>
<td>Cohort B</td>
<td>Louis Kahn Seminar Room</td>
<td>11.45am</td>
<td>60 minutes</td>
</tr>
</tbody>
</table>

This class introduces both cohorts to 'The Aristotelian Senses' the five standard senses and them expanded into their contemporary format. The main aim of this class is to get the students to:

a. **Realise that people interpret the world through all of their senses collectively.**

b. **Realise that visual sense should not always be considered the predominant sense.**

At the beginning of the class, the students are prompted with questions to recognise prior learning or existing knowledge on the topic e.g. "What are the Aristotelian Senses?" While the majority were eventually able to list the five senses, very few were familiar with ‘Aristotle’ and were thrown by the title. A slight language barrier prevented the students replying to questions, which they did actually know the answer too. The lecturer had to prompt a response...
by directing further questions e.g. "How do you understand the physical world?" "What five human characteristics allow you understand what is in front of you, what is in your hand?"

When asked the question "do you see, hear or touch your mobile phone first?" The vast majority responded with 'hear or see'. When the lecturer suggested the phone may be in your pocket, the students then began to suggest that you may 'hear or touch it first'. And finally, when the lecturer suggested the phone may be on silent, the students all stated you would 'touch' it first. This shows the students immediate prioritisation of vision, and a lack of immediate critical thought on the extended senses. Pallasmaa (2012) reminds that "All the senses, including vision, are extensions of the tactile sense". Does this represent what is happening throughout the design process, in which students are responding to an initial visual response that fails to consider the entire sensory experience?

The students in both cohorts are beginning to display hesitancy when introduced to a new topics or language. The more confident members of the two cohorts needed less encouragement to voice an opinion, whereas, the less confident members needed to be engaged by the lecturer or further prompted with more information. A topic of this nature may seem out of discipline or irrelevant to design students and so, to ensure engagement of all members of the cohorts, an extra resource would be advised. An interactive hand-out would promote engagement by default, regardless of the initial levels of intrinsic motivation. The vast majority of students at fundamental levels of learning are intrinsically motivated, and so respond to task orientated teaching
and learning. The instructor role of the lecturer could be further supported by an interactive resource (hand-out) to promote student cognitive engagement.

As the topic expanded into the contemporary senses the student engagement levels depleted. The formal, discipline specific language, created a language barrier and immediately the students struggled to remain focused. The 'sense of balance', for instance, is formally known as 'equilibrioception'. The observation would note that this language should be presented in a secondary position e.g. 'sense of balance' as opposed to 'equilibrioception'. This supports a more diluted language, familiar to the student and the architectural discipline.

Rate of Inference:

The rate of inference for this class is quiet low, with Cohort B again displaying higher inference levels that cohort A. The low rate of inference is likely due to the sensory language barriers which became apparent throughout the class, and essentially affected both the teaching and learning experience.

<table>
<thead>
<tr>
<th>Cohort B</th>
<th>Rate of Inference</th>
<th>Rate of Inference</th>
</tr>
</thead>
<tbody>
<tr>
<td>Topic</td>
<td></td>
<td>Resource</td>
</tr>
<tr>
<td></td>
<td>0.5 questions p/student</td>
<td>n/a</td>
</tr>
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</table>

<table>
<thead>
<tr>
<th>Cohort A</th>
<th>Rate of Inference</th>
<th>Rate of Inference</th>
</tr>
</thead>
<tbody>
<tr>
<td>Topic</td>
<td></td>
<td>Resource</td>
</tr>
<tr>
<td></td>
<td>0.3 questions p/student</td>
<td>n/a</td>
</tr>
</tbody>
</table>
A more diluted, familiar language contextualised into the architectural design discipline, may have increased the *rate of inference* for both cohorts and encouraged understanding and *active engagement*. The students are still developing a level of knowledge which may also affect their ability to engage with the topic. There was no interactive resource used for this class and so not *rate of inference* to report.

**- Topic 2 ** Emotional Registration

<table>
<thead>
<tr>
<th>Class 3</th>
<th>Location</th>
<th>Class Time</th>
<th>Duration</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cohort A</td>
<td>Louis Kahn Seminar Room</td>
<td>11.15am</td>
<td>30 minutes</td>
</tr>
<tr>
<td>Cohort B</td>
<td>Louis Kahn Seminar Room</td>
<td>12.00am</td>
<td>60 minutes</td>
</tr>
</tbody>
</table>

The topic 'Emotional Registration' builds on the previous session 'The Aristotelian Senses'. The core aims of this class are to:

*a. Introduce the students to the basic human emotions and basic emotional vocabulary.*

*b. Realise that people firstly sense their physical environment and then, through sensory processing, register and emotional response in the brain.*

Firstly, the students are introduced to Robert Plutchik’s ‘*wheel of emotions*’. Speaking about emotional content in any discipline can be a daunting topic; therefore, it cannot be assumed that there is an existing vocabulary among the students. Using the ‘*wheel of emotions*’ allows the students to grasp the idea of emotional vocabulary in a non-intimidating manner. The visual aid also
identifies a series of vocabulary to stress varying emotional intensities and colour codes them to assist understanding. After Plutchik's wheel is introduced to the students, they are prompted to add to or suggest other emotional vocabulary they personally identify with. The resource itself provides 'the wheel of emotions' and a space to document their own additions. Upon reflection, more space could have been provided for the students' input as it is quite a small area, which does not stress the importance of their personal engagement. A bigger designated area specific to student interaction may suggest greater importance and prioritise written engagement (task orientation).

The next stage of the class introduces the students to 'Emotional Intelligence'. Equipping the students with a basic emotional vocabulary is only the beginning; they must also develop awareness for emotional intelligence. The first stage of Daniel Goleman’s model of the 'five stages of emotional intelligence' is referenced and contextualised. The remaining four stages go beyond a fundamental stage of learning and could be referred back to after the seven stages of the resource pack have been addressed. The main aim is to get the students to understand and appreciate their own emotions in any given space, place or environment.
Developing the skill of 'self-awareness' among the students is an important element in establishing and building their emotional confidence. In order to understand the emotional implication of architectural design, they must firstly be able to realise their own personal emotions within a space, place or environment. The significance of the emotional brain must be realised, after all, "The emotional brain responds to an event more quickly than the thinking brain" (Goleman, 1995). An interactive hand-out is utilised to extract their personal experiences. This exercise revolves around 'the home', a familiar space which assists the students to identify the emotions they associate with their home. This task builds on the previous classes and prior learning to date. The students are asked to fill in a template (interactive hand-out) by identifying a space within the home, the predominant sense they associate with that space and the emotion they register with the experience.
Cohort A worked in group format for this exercise, primarily to try and achieve the class goal within the 30 minute timeframe. Cohort B worked individually for the exercise as the 60 minute timeframe accommodated this. This also allowed for a cross-comparison between group work and individual work.

The student responses varied in content between cohorts and individuals, but 'Comfort', for example, was the main emotion associated with the home overall. When prompted to question why they felt "comfortable", further commentary and discussion resulted in a deep realisation of the sensory and emotional experience. Students felt comfortable as a result of temperature, sense of safety, various auditory cues which trigger sense of place and nostalgia, and olfactory cues such as cooking which again trigger sense of place and memory. All these elements can be classed as "comfortable", but it is important for the student to question the bigger picture to really understand where an emotional state is rooted.

Overall, this resource proved successful in registering the sensory experience with an emotional response. Cohort B worked individually and arrived at a deeper level of understanding in comparison to Cohort A. This may be rooted in the age difference, fundamental stage of learning and class timeframe. Cohort A worked in group format made up of two and threes. The group element worked well for this particular task, as it is a limited objective task which documents their personal experience, therefore cognitive engagement came with greater ease.
Cohort B, for the most part arrived at relatively well thought out examples but would have also benefited from the grouped format and may have further engaged with peer discussion. Cohort A interacted well with the task but did not reach the same level of understanding as Cohort B primarily due to time restraints, as the lecturer did not have the time to further elaborate on their examples and re-cap and further contextualise. This would question the level of learning obtained by Cohort A in comparison to Cohort B. Regardless of overall learning and competencies achieved, both cohorts are in agreement that a sensory experience will have an emotional implication and so, a concept threshold has been achieved.

Utilising the home environment allowed them to self-realise that what people sense can have quiet an instant emotional impact, as the majority of their responses were rooted in quiet nostalgic and personal associations, which were mainly rooted in positive experiences. When asked if they realised that the majority of their responses “were very emotional and nostalgic?”, the majority said “no”, which reaffirms that people may not always be aware of how their emotional reactions to space, place and environment may influence their perception. A lack of awareness of the intensity or immediateness of their emotional reactions became apparent. Goleman (2006) suggests that the emotional brain has immediate registering capabilities, stating that “the amygdala in the emotional center sees and hears everything that occurs to us instantaneously and is the trigger point for the fight or flight response”. Simply put, if we don’t feel safe, we leave.
The observation would note that group work could assist *deeper learning* and *cognitive engagement*, for this particular limited objective exercise, and should be suggested in the resource pack guidelines. Boud (2014) suggests that “students learn a great deal by explaining their ideas to others and by participating in activities in which they can learn from their peers” and is “becoming an increasingly important part of many courses”. Furthermore, the interactive hand-out itself needs to be modified; some of the sensory terminology used has created a *language barrier* and used up valuable class time. It must be remembered that when students are entering into inter-professional fields, that language barriers are likely to exist. Suleman (2013) suggests that “the use of profession-specific jargon can interfere with sharing information among professionals from differing fields”. If this is the case in the professional world, students are not exempt, and so, must be assisted to understand “vocabulary that is specialized and potentially inaccessible to those outside of the discipline”. A more diluted language, which is contextualised, should be used, and more space provided to allow the student document their thoughts and opinions, peer thoughts and overall commentary.

**Rate of Inference:**

The *rate of inference* with the topic was quiet similar for both cohorts in this instance, but Cohort B did record a higher rate than Cohort A. Cohort B on closer analysis has a large proportion of mature students within the cohort which may account for the higher *rate of inference* with the emotional content.
Cohort B

<table>
<thead>
<tr>
<th>Rate of Inference</th>
<th>Rate of Inference</th>
</tr>
</thead>
<tbody>
<tr>
<td>Topic</td>
<td>Resource</td>
</tr>
<tr>
<td>0.6 questions p/student</td>
<td>1.8 questions p/student</td>
</tr>
</tbody>
</table>

Cohort A

<table>
<thead>
<tr>
<th>Rate of Inference</th>
<th>Rate of Inference</th>
</tr>
</thead>
<tbody>
<tr>
<td>Topic</td>
<td>Resource</td>
</tr>
<tr>
<td>0.2 questions p/student</td>
<td>2.0 questions p/student</td>
</tr>
</tbody>
</table>

Cohort A recorded a higher rate of inference with the resource. On the surface this may suggest that Cohort A were more engaged with the resource than Cohort B but this was not the case. Cohort A did engage with the resource but the rate of inference was mainly rooted in establishing how to correctly use the resource as opposed to questioning what they resource was trying to establish. Cohort B recorded a lower rate of inference, but in this case, it was due to their ability to engage with the resource with greater ease.

- **Topic 3 Primitive Need**

<table>
<thead>
<tr>
<th>Class 4</th>
<th>Location</th>
<th>Class Time</th>
<th>Duration</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cohort A</td>
<td>Louis Kahn Seminar Room</td>
<td>11.15am</td>
<td>30 minutes</td>
</tr>
<tr>
<td>Cohort B</td>
<td>Louis Kahn Seminar Room</td>
<td>12.00am</td>
<td>60 minutes</td>
</tr>
</tbody>
</table>

This class focuses on understanding why architectural design exists and why do people need it. This is a key part in understanding what people really need from a designed space and separates need from novelty. Cohort A and Cohort B
both represent a 21st century student demographic, and so it cannot be assumed that they hold an appreciation for the term primitive need. The main aim of this class is to assist the student to:

a. Understand what primitive need is and why it is important in architectural design (first principles design).

b. Realise that human need can be both physiological and psychological.

To begin the session, the lecturer prompts the question “what is primitive need?” to initiate a brainstorming session. It is important to recognise prior learning or existing knowledge within the cohorts. The students engage in a brainstorming session, and are given an interactive hand-out, to allow them document as they go. The lecturer adopts an instructor and facilitator role at the same time, an instructor role is used to give examples to initiate the session, and a facilitator role allows the lecturer to used directed questions to build upon what the students have suggested as a primitive need.

Initially both cohorts seemed hesitant with the term ‘primitive’, and did not engage until the lecturer further prompted “what do people absolutely need to survive?” Again, this is another example of language barriers affecting cognitive engagement and active learning. When prompted with “air”, the students began to offer words such as “food and water”, “a place to live”, and “health”. A number of Cohort A students suggested that “electricity” was a primitive need, and was “absolutely necessary for survival”. This is a prime example of a 21st century interpretation of primitive need. The students in both cohorts have
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to be further prompted to realise needs such as safety and territory. The last need to be identified by both cohorts is ironically people. There was a ‘eureka’ moment when the lecturer posed the question “Do people not need people to survive?” to which the one student responded “I never thought about it like that”. Several students were in agreement with this statement, which again shows the prioritisation of people on the hierarchy. The observation would note a higher level of student interest after the brainstorming session and a shift in mentality is emerging. A study carried out by Garside (2009), suggests that students who engaged in group discussion as a means of learning, dealt better with “higher level thinking”. The study concluded that “face-to-face instructional methods make a significant difference in student learning” as opposed to traditional instructional methods.

Once the students have been introduced, they are asked to differentiate between a ‘physiological primitive need’ and a ‘psychological primitive need’. This is the first session where the students begin to associate physiological and psychological categories to human need. The lecturer initially had to further elaborate on the categories, stating “physiological, means what we as people physically need to survive” and “psychologically, what we as people mentally need to survive” for both cohorts. This is the first session where the student voice is really established in Cohort B. The students offer an opinion on what they consider to be physiological need and psychological need, and even enter into debate about which category they should appear in. Territory, as expected, caused debate as some students felt it should be categorised as a physiological
need and others a psychological need. Once the student voice emerges the lecturer encourages this and directs further questions to keep the debate going, and uses the opportunity to try and engage the quieter, less engaged students. The question “what about shelter, is this physiological or psychological?” is directed, 8 of 13 students suggest it is physiological. The lecturer quickly suggests “but how would you feel if you didn’t have shelter?” and again a shift in mentality begins. The students are arriving at the concept threshold, and are beginning to question their initial response, and those that are engaged are very much displaying critical ability.

The main learning here is that the students realise that human need can be, both physiological and psychological (conjoint), and that they are inextricably linked. A physical experience will have a psychological impact and vice versa. This awareness has been achieved to varying degrees with both cohorts, but by the end of the session Cohort B display greater confidence categorising and identifying physiological and psychological need than Cohort A.

Cohort A, on the other hand, need much more assistance with the psychological aspect and struggle to identify psychological need in general. Again, time is against the lecturer and the same level of understanding is not achieved with cohort A as B. The lecturer would question if Cohort A are as ready as Cohort B to progress onto the next class Human Connection with SPE?

To date, Cohort A have not had the same class contact time and are struggling to reach absorb the content. The lecturer to student ratio is much lower for the more fundamental level learners, than the more advance level.
On review, it should be noted that at least one hour needs to be allocated to the ‘primitive need’ session. It is very important that a level of understanding is achieved prior to entering the next session, and that the concept threshold has been achieved. The resource pack guidelines should stress that if learning has not been achieved to the desired level at the end of this class, that the next class should be dedicated to a recap session. The session should offer an overview of ‘The Aristotelian Senses’, ‘Emotional Registration’ and ‘Primitive Need’ collectively, highlighting the main learnings. It is important that the students reach that “transformative” stage in the learning, which “allows further learning to proceed” (Meyer and Land, 2010).

Furthermore, an interactive resource other than the brainstorming template should be provided to assist categorising physiological and psychological need. The students appeared to be confused by the task at first, and the lecturer had to show them how to make a list, which slowed down the process. Cohort A became more focused with constructing a template as opposed to actual task at hand.
The rate of inference:

The rate of inference for the topic varies dramatically between both cohorts. Cohort A struggled to engage with the psychological aspect of primitive need, which may be primarily due to the timeframe and level of learning to date. The lecturer did not have time to engage the students with directed questions, or establish the level of understanding achieved. Cohort B displayed a much higher rate of inference with the topic and engaged in a critical manner. Again, this may be associated with the additional timeframe and the level of learning to date.

<table>
<thead>
<tr>
<th>Cohort B</th>
<th>Rate of Inference</th>
<th>Rate of Inference</th>
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</thead>
<tbody>
<tr>
<td></td>
<td>Topic</td>
<td>Resource</td>
</tr>
<tr>
<td></td>
<td>1.7 questions p/student</td>
<td>0.3 questions p/student</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Cohort A</th>
<th>Rate of Inference</th>
<th>Rate of Inference</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Topic</td>
<td>Resource</td>
</tr>
<tr>
<td></td>
<td>0.8 questions p/student</td>
<td>0.5 questions p/student</td>
</tr>
</tbody>
</table>

The rate of inference with the brainstorming resource proved more successful with Cohort A. A pattern is starting to emerge with Cohort A, who appear to be more comfortable with task orientated methods of learning as opposed to theoretical discussion methods of learning, a “means to an end” approach (extrinsic motivation) (Fry et. al., 2008). Cohort B displayed a lower rate of inference with the brainstorming resource, which can be largely associated with the emergence of the student voice.
Cohort B did not feel the need to engage with the resource, they were comfortable engaging with the lecturer through oral discussion and debate.

- **Topic 4**  
**Human Connection with Space, Place and Environment (SPE)**

<table>
<thead>
<tr>
<th>Class 5</th>
<th>Location</th>
<th>Class Time</th>
<th>Duration</th>
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</thead>
<tbody>
<tr>
<td>Class 6</td>
<td></td>
<td></td>
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</tr>
<tr>
<td>Cohort A</td>
<td>Louis Kahn Seminar Room</td>
<td>11.15am</td>
<td>30 minutes</td>
</tr>
<tr>
<td>Cohort B</td>
<td>Louis Kahn Seminar Room</td>
<td>12.00am</td>
<td>60 minutes</td>
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</table>

This topic is spanned over two classes. At this point, the specific class content covered with each cohort changes. This is as result of the level of learning currently achieved with both Cohorts. Cohort A stay centred on the home environment, to maintain a familiar environment, and apply this awareness to their design studio project 'The Café'. Cohort B continue with the existing lesson plan.

The main aims associated with both classes are to:

a. **Introduce the students to factors which influence human connection with space, place and environment.**

b. **Allow the students to develop an understanding as to why people may develop a connection with a space, place or environment.**
Cohort A

Given the time restraints, and current level of knowledge, the lecturer has tailored the original lesson plan. Excerpts of the indicative content are extracted to dilute the content and expected learning for these two classes. The observation would note that the majority of Cohort A have not obtained the desired level of learning to date, and so, the initial class briefly re-caps on the previous three classes to give the students an overview of the main learnings to date, before progressing onto the Human Connection with SPE. In an ideal situation where more time could have been allocated, this re-cap would have had its own class.

To try and create a better understanding the lecturer utilised the existing design studio project to further contextualise the indicative content. The students are currently designing a ‘Student Café’ to be based in the student centre in CIT. The lecturer approaches Human Connection by asking the students to visualise their favourite café. They are then asked to list reasons why they like it, and what makes them return to that particular space. The lecturer consciously uses diluted familiar language for this session, to encourage student engagement levels and increase understanding. The students respond better to the diluted language and seem more eager to offer their personal opinion on their experiences. The main reasons offered for revisiting their chosen cafes were; “felt comfortable in the space”, “on route”, “location”, “good food and coffee”, “cool space”, “young environment”, “good music”, “cosy”, “service”, “views”, “easy access” and “temperature”.
While on the surface, their responses seem basic they are rooted in a deeper meaning. The lecturer loosely categorises their responses into existing theories to contextualise their findings.

<table>
<thead>
<tr>
<th>Place Identity</th>
<th>Sense of Place</th>
<th>Design Comforts</th>
<th>Informational needs</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cool space</td>
<td>Comfortable</td>
<td>Temperature</td>
<td>Service</td>
</tr>
<tr>
<td>Young environment</td>
<td>Cosy</td>
<td>Seating</td>
<td>On route</td>
</tr>
<tr>
<td>Good music</td>
<td>Views</td>
<td>Warm</td>
<td>Easy access</td>
</tr>
<tr>
<td></td>
<td>Friendly place</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Friendly people</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Table 6.3 – Student responses to their connection to a chosen café (Author, 2017).

By placing the student responses into loose categories, this created awareness of the inter-disciplinary approach, but also created confusion. The students struggled to grasp the language and spent more time trying to understand the link between the languages than understanding the reason for the human connection and so, they did not successfully relate the newfound awareness back to their chosen designed space.
At the end of the two sessions, the students have reached a basic level of awareness for human connection to SPE. They have established a very fundamental level of awareness in which they can express in their own language but a language barrier still exists. A resource is needed to clarify the link between the languages, which further relates back to the design development process or a designed space.

**Cohort B**

Now that Cohort B have identified what primitive need is and how this relates to designing for people, it is important to build on this and realise why people develop connections with various SPE. This class hones in on environmental psychology factors which study human behaviour within the built environment. To begin this session the lecturer poses the questions “Why do people (we) identify with any space, place or environment?” Again, as in the previous topics this is to establish existing student knowledge, and also to engage the student by starting with what they already know. The lecturer had to elaborate on the term ‘identify with’, and further explain what the question is trying to establish. “Why do people (you) connect with a SPE, or develop a relationship with a SPE?” and “Why do people (you) keep going back to a particular SPE?”

The students are provided with an interactive hand-out to allow them to discuss, brainstorm and document their thoughts and those of their peers to begin with. Once a level of knowledge is established the lecturer took on a facilitator role to add to what the students had self-discovered and began to
introduce discipline specific language. For example, one of the main reasons offered by Cohort B was "because they feel comfortable" within their chosen SPE. ‘Comfortable’ is then categorised into ‘sense of place’, which later links to ‘place attachment’. Approaching new theories and models with this approach allows the student to identify what they already know and contextualise their existing knowledge and experience prior to introducing the new language.

After the group discussion and integration of fundamental terminology and models, e.g. dependant factors, informational needs etc. the students are given the limited objective project. Cohort B must deconstruct a space in terms of the user experience. They must examine their previous design studio project ‘The Boulevard’, a break out space located in the Architecture Factory open plan educational facility. This design studio project required the students to design a breakout space for students which would occupy the existing boulevard. This project was chosen to examine, because it is a critique of their designs and the project was based in a familiar space.
The lecturer asked the students to examine their space using their 3D Models, and walk through it as if they were a potential user. They then had to identify potential reasons that would encourage or discourage human connection with the space. The lecturer offered questions to aid the analysis.

- Are the informational needs of the user met?
- Does the space offer dependent factors?
- Does the space address proxemics and personal space?
- What aspects of the design identify with student need?
- How are the users sense affected within the space?

This exercise proved successful in identifying oversights in their designs. *Navigation* and *user orientation* were two key areas identified. The more extravagant designs did not consider the potential effects this may have on the
user experience. By not providing *directional sightlines* or *guides* the informational needs of the user may not be met, and this may cause disorientation. One student recognised “what we think is crazy and innovative, might make the user crazy”. This is a key learning, pushing boundaries and innovation has many benefits but must acknowledge the user experience.

The students also recognised that they may not have considered the potential noise issues that may be caused by their designs. Minimalistic designs do not offer much acoustic property and given the space is located in an open plan educational facility, reverberation; echo and general interference may affect the neighbouring classroom environments.

Largely speaking the students recognised that their design may be overly visual and need to consider the human experience in a multi-sensory manner. By equipping the students with existing theories and models, it provided a checklist to refer back to e.g. informational needs, dependant factors, place attachment, defensible space e.g. “Does my design have a dependant factor that will connect with the user profile?” “Has my design met the information needs of the user?” They are encouraged to embrace *Eileen Gray* mentality, which suggests “to create, one must first question everything” (Adam, 2014).

**The rate of inference:**

The *rate of inference* varied for both cohorts once again. Cohort B displayed a higher *rate of inference* with the topic than Cohort A. The overall content delivered to the cohorts differed but the intended learning remained the same.
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The lecturer simply contextualised the indicative content in a different manner to cater for the two cohorts, as they had reached different levels of learning to date. Both Cohorts displayed an increased rate of inference with the topic during the second class; which may be rooted in the level of understanding achieved in the first class.

<table>
<thead>
<tr>
<th>Cohort B – Class 5 &amp; 6</th>
<th>Rate of Inference</th>
<th>Rate of Inference</th>
</tr>
</thead>
<tbody>
<tr>
<td>Topic</td>
<td></td>
<td>Resource</td>
</tr>
<tr>
<td>1.0 questions p/student</td>
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</tr>
<tr>
<td>2.1 questions p/student</td>
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<td>1.0 questions p/student</td>
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</table>

<table>
<thead>
<tr>
<th>Cohort A – Class 5 &amp; 6</th>
<th>Rate of Inference</th>
<th>Rate of Inference</th>
</tr>
</thead>
<tbody>
<tr>
<td>Topic</td>
<td></td>
<td>Resource</td>
</tr>
<tr>
<td>0.3 questions p/student</td>
<td></td>
<td>0.2 questions p/student</td>
</tr>
<tr>
<td>0.7 questions p/student</td>
<td></td>
<td>0.4 questions p/student</td>
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</tbody>
</table>

Cohort B were more engaged with their 3D models than the brainstorming hand-out during the first class, but again, the rate of inference increased during the second class, once a certain level of knowledge had been achieved. Again, Cohort B are displaying a newfound comfort with oral discussion and are not as reliant on a resource as Cohort A, who again spent more time trying to understand the link between the languages than really understanding the reason for human connection. Cognitive Load Theory which traditionally focuses on "instructional methods to decrease extraneous cognitive load so
that available cognitive resources can be fully devoted to learning” would encourage the inclusion of real-life tasks to act as “the driving force for complex learning” (Van Merrienboer and Sweller, 2005). In this case, Cohort A appear to be suffering from ‘overload’ and cannot focus or engage with the actual content, as a result of not having enough structure or direction. It might be advised to create a resource which assists the students to categories their familiar language into pre-established theories and models. This would assist with linking the discipline specific languages and allow for more time to engage in further link these theories and models to the design development process or a critique of an existing space.

**Continuation of the Trail with Cohort A:**

As a result of the level of learning achieved to date with Cohort A, it has been decided to end the educational trial with the Cohort A. The students have not reached a level whereby they can continue onto the next stage, and in order to get them to the desired level a more extensive timeframe is needed, which unfortunately cannot be allocated by the department at this moment. The 30 minute timeframe is not allowing adequate time to successfully deliver the indicative content to the students. Although only 50% of the educational trial has been completed with Cohort A, many findings have been obtained which will inform the resource pack content and guidelines.
While this site visit is primarily centred on the current design studio project — *The Opticians*, it provided a good opportunity for the lecturer to visit an existing space with Cohort B, and carry out a live analysis of the space in terms of sensory output and user needs.

In order to facilitate this site visit a resource is utilised to allow the students documents their observations. The booklet guides the students, and provides cues as to what they should be looking for. Some of the topics covered in the booklet are:

- Site Analysis
- Identify External/Internal Sensory Stimuli and state potential effect on user.
- Document entrance, sightlines and adjacencies
- Assess internal spaces for user comfort
- Identify user profiles within the space

Topics such as *User Profile* and Identifying *Sensory Stimuli*, are covered in the next three classes, and so this site analysis provides the lecturer with a good appreciation for what the students already know.
Rate of Inference:

The rate of inference with the topic is quite high in this instance, the students are engaged in the site visit as it is rooted in their design studio project, but also show a good rate of inference with the sensory content, and those engaged actively direct questions at the lecturer. The rate of inference with the resource (booklet) is quite high mainly due to instructional questions.

<table>
<thead>
<tr>
<th>Cohort B – Class 7</th>
<th>Rate of Inference</th>
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<tbody>
<tr>
<td>Topic</td>
<td>Resource</td>
<td></td>
</tr>
<tr>
<td>1.8 questions p/student</td>
<td>2.3 questions p/student</td>
<td></td>
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</tbody>
</table>

The students are introduced to their first overall sensory assessment and spatial assessment in terms of user experience, and are unsure what the booklet is asking them to do. The lecturer demonstrates on site, and facilitates the students throughout the visit. The students are asked to make note of problematic areas and overall thoughts on the sensory and spatial assessment, which will be discussed in the following classes.
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- **Topic 5**  
  **User Profile**

<table>
<thead>
<tr>
<th>Class 8</th>
<th>Location</th>
<th>Class Time</th>
<th>Duration</th>
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<tbody>
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<td>Louis Kahn Seminar Room</td>
<td>11.15am</td>
<td>30 minutes</td>
</tr>
<tr>
<td>Cohort B</td>
<td>Louis Kahn Seminar Room</td>
<td>12.00am</td>
<td>60 minutes</td>
</tr>
</tbody>
</table>

Being aware of the potential occupant(s) of the SPE is essential to cater for the user experience. Although it may be impossible to fully cater for each individual potential user, it is important that core user profiles are identified. The main aim of this topic is to get the students realise that;

a. **The client and the user may be two different people and that there may be several types of user profiles within any given space, place or environment.**

b. **The varying types of user profiles may have different requirements of the space, place or environment.**

This topic is not rooted in theory or new models therefore the lecturer obtains a facilitator / demonstrator role for the class. The students are put into three groups and given a limited objective task based on the Barbican Centre in London. The students are given a limited amount of information.

![Figure 6.5 - Project context based on Barbican Centre (Author, 2016).](image-url)
and must decipher the potential types of user which may occupy the SPE.

During the site visit the student were able to establish the various user profiles within the Opticians, (current design studio project) and this assists their confidence in proceeding with this task. By simply having awareness of the phrase “user profiles”, the students appear at ease with the initial task at hand.

_Bonfire_ restaurant, located on the ground floor of the Barbican is utilised as the space for the user profile analysis. The site was chosen by the researcher for the following reasons; It is located in a high density area with significant footfall, it is a well-designed space located within a high profile building with large amounts of readily available information, lastly, hospitality is one of the major sectors in architectural design industry. Limited amounts of information are utilised to avoid overload, and to allow the students hone in on the major sensory areas.

The students are split into three groups and given an interactive hand-out to assist the process. The hand-out simply provides sections to list the potential user profiles. As this is their first time attempting user profiling, the lecturer suggests they should identify four user profiles to begin with. Some students are actively engaged in the exercise but others appear to be unmotivated. The student responsible for documenting the group's responses was the most engaged in the exercise. This is an interesting observation and highlights the
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how the students are primarily intrinsically motivated and may need individual
tasks to motivate themselves to engage.

The main four user profiles identified are customers, manager, waitress/waiter,
and kitchen staff. As the students identify each profile, the lecturer asks
“where does the owner fit into the equation?” The students respond with
questions e.g. “how do we know who the owner is?” and “does the owner work
there?” The students have just self-realised that the owner or initial client may
not always be a user profile. Moving on from this, the lecturer demonstrates
how to establish the varying user needs for each profile. The ‘senses in
architectural context’ graphic is used to provide the students with a resource to
refer back to. They begin to document the user profile needs one sense at a
time.

<table>
<thead>
<tr>
<th>Student Responses Categorised</th>
</tr>
</thead>
<tbody>
<tr>
<td>Customer</td>
</tr>
<tr>
<td><strong>Vision</strong></td>
</tr>
<tr>
<td>Informational needs</td>
</tr>
<tr>
<td>Visual Aesthetic</td>
</tr>
<tr>
<td><strong>Hearing</strong></td>
</tr>
<tr>
<td><strong>Touch</strong></td>
</tr>
<tr>
<td>Territory</td>
</tr>
<tr>
<td><strong>Personal Space</strong></td>
</tr>
<tr>
<td><strong>Smell</strong></td>
</tr>
<tr>
<td>Ventilation</td>
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<tr>
<td><strong>Temperature</strong></td>
</tr>
</tbody>
</table>

Table 6.4 - Student responses to each user profile (Author, 2016).
While the students did encounter some difficulty, this did create awareness, and most importantly provided the students with an approach to potentially account for sensory and emotional need within any user profile. The resource used to profile the user needs to be more structured and incorporate more user perspective. By structuring the resource from the user point of view the student or potential designer has to picture the space from the user’s perspective and not the designers. This is an important aspect to remind the designer to think in user terms and not designer terms. Simon Unwin offers a theory on designing in circles, and establishing circles of places whereby the person is the pivot point of the circle. This is a good exercise to keep the student focused on the user of the space and should be referenced in the resource pack (Unwin, 2012).

Rate of Inference:

A high rate of inference was noted for this topic, which may be rooted in familiarity. The students identified potential user profiles with ease and were able to suggest what these people may need within a potential space. The previous site visit acted like a pre-resource, in that it prepared the students for the task as they had already established familiarity with user profiles. The group discussion eventually went off topic, from the user profiles in Bonfire to their own user profiles within their jobs. The lecturer let this happen and continued to probe the student voice. There is an eagerness to participate in
the discussion and majority of the students are *cognitively engaging* in the discussion.

<table>
<thead>
<tr>
<th>Cohort B - Class 8</th>
<th>Rate of Inference</th>
<th>Rate of Inference</th>
</tr>
</thead>
<tbody>
<tr>
<td>Topic</td>
<td>Topic</td>
<td>Resource</td>
</tr>
<tr>
<td>2.2 questions p/student</td>
<td>1.9 questions p/student</td>
<td></td>
</tr>
</tbody>
</table>

The *rate of inference* with the resource is also high. The first half of the class involves documenting the user profiles within *Bonfire* and the potential sensory and emotional impacts. While the interactive hand-out did prove to be too unstructured, the students did feel the need to document what they were thinking and so utilised the hand-out. The resource has the potential to assist the student further in identifying the sensory and emotional need of each user profile established, and should be considered for the resource pack.

**Topic 6 Identifying and Managing Sensory Stimuli**

<table>
<thead>
<tr>
<th>Class 9</th>
<th>Location</th>
<th>Class Time</th>
<th>Duration</th>
</tr>
</thead>
<tbody>
<tr>
<td>Class 10</td>
<td>3rd Year Studio (Architecture Factory)</td>
<td>12.00am</td>
<td>60 minutes</td>
</tr>
<tr>
<td>Cohort B</td>
<td>3rd Year Studio (Architecture Factory)</td>
<td>12.00am</td>
<td>60 minutes</td>
</tr>
</tbody>
</table>

This topic spans over two classes and builds on the user profiles established in the previous class. *Identifying and Managing Sensory Stimuli* is an essential part in catering for the human sensory and emotional experience within any space, place or environment. The main aim of this topic is to introduce the students to:
a. *Identifying potential sensory cues within a space, place or environment by using a three stage process.*

b. *Realising that sensory output from the location, intended use and user profiles may affect each other and cannot be considered individually.*

In the previous session the students suggested four user profiles that could potentially occupy *Bonfire*. The profiles are put aside for the beginning of this class and the students must now consider the bigger picture, and so are introduced to the three stage process, which looks at the location of the SPE, Intended Use of SPE and the User Profile within the SPE.

![Identifying Sensory Stimuli (Cues) in S.P.E](Figure 6.7 Identifying sensory stimuli model (Author, 2016)).

The students are reminded of their site visit and the sensory stimuli they identified on location, and how they initially approached this. They are now given the new site location, site map, context map, exterior and interior images and some statistical information to give background to the location of the restaurant. Using this information alongside the *three stage process*, the
students must identify the potential sensory cues that may affect the overall human experience within the space. The lecturer adopts a *demonstrator role* first to explain the *three stage process* to the students. Later, a facilitator role is obtained to further assist the groups with their findings. This topic may seem daunting at first and so, the lecturer is conscious of "*over-loading*" the students with too much information and sensory possibility initially.

The first stage *Location* may seem out of discipline to an interior architecture cohort of students had they not had the site visit, but are now aware that this is very relevant. The lecturer directly asks the students "why is location an important factor to consider in terms of sensory output or cues?" Initially the students seem hesitant. The lecturer further reminds the students of the site visit and suggests that they "think about the senses, pick one sense", and ask "how could this sense be affected by location?" Once the students were reminded of how to approach the question, they began to engage the lecturer e.g. Hearing was chosen by one group, who suggested that "the location might have a high level of urban noise", another group chose vision and suggested that "natural lighting may be lost because of the neighbouring buildings", finally the third group chose smell and suggested that "air quality may be affected from city pollution". These are all very valid points which essentially affect the levels of sensory stimuli in that space.

The second stage *Intended Use* of the SPE is another key factor for sensory output. The potential use of any given SPE, can affect the locational sensory output and also affect the user profile within the SPE. In this instance the *Use* is
already established (Bonfire restaurant) as it was in the Opticians, but the sensory output of the space has not been drawn down. The students are now asked to consider the potential sensory output or cues that the use of the space may create. Once again, the same approach is advised, pick one sense and analyse that sense in terms of potential affects.

The third stage User Profiles within the SPE is addressed. The students have had experience identifying user profiles during the site visit, and established four profiles with ease in the previous session. They must now further analyse if these profiles may be affected by the location and actual use of the space. The students are reminded that at this stage, this is an actual analysis of the reality of the space in use. Nothing can be considered individually, not location, not the use or the individual use profiles. Each element has the potential to affect the other element in varying degrees. Scenarios are proposed to help the students grasp the concept threshold. “How might external locational factors such as traffic and pollution affect the intended use and user profiles?” and “How might the user profiles affect the intended use?” These scenarios are provided to give context and to ultimately get the student to realise that each factor may affect the other, and they must be considered inclusively. Schreuder (2016) confirms that “the sensory input from the environment is not simply perceived as the sum of its individual components, but rather as a whole”, hence, the need to acknowledge the location, space (intended use) and user.
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**Rate of Inference:**

A good *rate of inference* with the topic is documented for the first class but wanes in the second class by almost 50%. On review, three classes may have been too much time to allocate to the *Barbican* project. Interest dissipated by the third class, and the student engagement with the topic became repetitive. This particular cohort is particularly small in size (13 students), and so three session may have been too much, but it is important to note that with a bigger cohort of students three session may be needed. This varies on the cohort size, lecturer to student ratio and student motivation.

<table>
<thead>
<tr>
<th>Cohort B – Class 9</th>
<th>Rate of Inference</th>
<th>Rate of Inference</th>
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<td></td>
<td>Topic</td>
<td>Resource</td>
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<tr>
<td>1.5 questions p/student</td>
<td>2.4 questions p/student</td>
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<tr>
<th>Cohort B – Class 10</th>
<th>Rate of Inference</th>
<th>Rate of Inference</th>
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<tbody>
<tr>
<td></td>
<td>Topic</td>
<td>Resource</td>
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<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>0.7 questions p/student</td>
<td>2.0 questions p/student</td>
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</table>

The *rate of inference* with the resource remains high; this is primarily rooted in the need to complete the task. The students at this stage are motivated by the task not the topic, and feel the need to fill the gaps on the hand-out. Again, this is a sign of a “means to and end” approach, which is rooted in completing a task rather than learning (Fry et. al., 2008).
The final topic ‘The Power of Language’ explores oral and written language. After taking the students through the previous stages to introduce them to sensory and emotional intelligence, it is important that they know how to express this knowledge in a confident manner. The main aim of this topic is to:

a. **Develop awareness among the students about the importance of the written and verbal communication of a design scheme.**

b. **Build confidence among the students to incorporate sensory and emotional acknowledgement in their written and oral communication.**

The section is covered over two classes. Literary excerpts are taken from Peter Zumthors ‘Thinking Architecture’, and are utilised to introduce the students to descriptive language in terms of the human experience in architectural spaces. The text is read aloud in class, each student taking a section. This presented a different dynamic in comparison to previous classes. Some of the previously, more confident students displayed hesitancy toward reading aloud among their peers, English as a Second Language (ESL) students also displayed hesitancy toward reading aloud, and one particular student suffering with dyslexia found it particularly daunting. The group sat in a u shape structure within the studio in
order to create a more intimate setting within the open plan studio. The lecturer began, and each student followed in a clockwise manner. After each section, the lecturer asked the students to deconstruct what the author was portraying. This particular passage in the book, which describes a mountain hotel, offers great description of human sensory and emotive experience in a space in a diluted language e.g.

"The atmosphere of the room seemed dark, even gloomy, until our eyes grew accustomed to the light. The gloom soon gave way to a mood of gentleness. The daylight entered through the tall, rhythmically placed windows lit up certain sections of the room, while other part which did not benefit from the reflection of the light from the panelling, lay withdrawn in half-shadow."

"They behaved naturally, undisturbed by other people's presence"

"I liked the feeling of their proximity - in this room in which we all looked our best."

After analysing Zumthors text, the students are given the task of writing a descriptive passage (approx. 300 words), based on a familiar space of their choice. They are encouraged to consider the multi-sensory environment of their chosen space, and how this affects their mood. They must also consider the materials of the space and how they affect their experience, and how the space changes through night and day, and peak and off-peak times. Some students responded more naturally to this task than others. In this particular
cohort there are four ESL students and this task was particularly hard for one of them. The other three student exceeded expectations and one performed above average.

The students then apply this learning to their current design studio project, and are given the task of writing their oral presentations for the Opticians project and must present them during their design studio crit. Oral presentation skills had been previously noted as a weak point by their primary lecturers, and after *the power of language classes*, an overall improvement was noted.

Developing written and oral skills is essential to promote dissemination and education to the broader architectural community. It is also essential that architectural designers are equipped with the skills to educate their clients of the benefits of sensory and emotional acknowledgement within any design scheme.

**Rate of Inference:**

The rate of inference for this topic is collectively lower than the previous classes. This may be as a result of the oral and emotional aspect of the topic. The students are being pushed out of there comfort zone, and which has affected the engagement levels.
During the first session the students are reading and analysing Zumthors' work, in which the rate of inference is below average. In the proceeding class, the students have to present their own work the rate of inference drops by over 200%. This suggests that the students are less comfortable presenting and discussing their own work that the work of an established architect and author. Despite the low rate of inference, the primary lecturing body associated with Cohort B, did report an improvement in oral presentation skills during the design studio crit.

Focusing on familiar scenarios, over a longer period of time may help with the classroom dynamic. "A teacher's awareness of students' ways of perceiving, processing, and reacting to classroom interactions – contributes significantly to the teacher's ability to engage the students in meaningful, engaging education". It is very important that the lecturer attempts to understand the student lived-experience to "reveal the complexities of students' cognitive and emotional development", and essential break down barriers (Mahn and Steiner, 2002).
6.4 Conclusion

Throughout the educational trial various successes and limitations were realised. Firstly, it is important to note that both cohorts performed to different intensities and achieved different levels of learning despite having similar student profiles. Both cohorts are registered within the BSc. Interior Architecture course, and both have a similar mix of ESL students and mature students. On closer analysis, the performance differences are primarily associated with time management, cohort size, student motivation and individual student profiles which are discussed in a running sense.

6.4.1 Preliminary Learning Outcomes

Initially, the module content aimed to achieve the following five learning outcomes with both cohorts over the eleven week academic period. The results varied for both cohorts. It should be noted that, the main aim of the overall resource pack content, is to create ‘awareness’ for sensory and emotional intelligence within the built environment. The action verb ‘awareness’ emphasises the fundamental level of learning in which the resource pack is targeting, and so the following learning outcomes primarily reflect a fundamental level, but also acknowledged intermediate potential. The varying performances of both cohorts, highlighted the need to accommodate differentiated learning within the classroom environment.
Learning Outcome One:

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<tr>
<th>Preliminary learning outcome:</th>
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<tr>
<td>LO1</td>
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The first learning outcome was successfully achieved by both cohorts, in that both cohorts now agree that the architectural design community should acknowledge the human multi-sensory experience when designing any given space, place or environment. This learning outcome is addressed in classes one to three.

While Cohort A recognises the importance of this, Cohort B have also developed an ability to communicate this importance. This is a key factor to note for the resource pack. If dealing with a more advanced or intermediate level of learner, the learning outcome should address the action verb "communicate" also.

<table>
<thead>
<tr>
<th>Revised learning outcome:</th>
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<tbody>
<tr>
<td>LO1 (Level 7)</td>
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<tr>
<td>(Level 8)</td>
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Learning Outcome Two:

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<th>Preliminary learning outcome:</th>
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<tbody>
<tr>
<td>LO2</td>
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The second learning outcome, which is addressed in classes four and five, was achieved by Cohort B, in that they showed ability to list and identify the various primitive needs, both physiological and psychological, within an architectural design context. Cohort A, on the other hand, struggled to identify and list primitive need, especially the psychological aspect. Cohort A achieved a level of awareness on the topic, and displayed a level of understanding, but are not at a level to communicate this unassisted. It is important for the student to be able to achieved unassisted identification of primitive need in context, in order for them to be able to apply this to the design development process. The learning outcome should be more specific in instruction within the resource pack, as this is a vital stage of the learning.

<table>
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<tr>
<th>Revised learning outcome:</th>
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<tr>
<td>LO2</td>
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</table>
Learning Outcome Three:

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<tr>
<th>Preliminary learning outcome:</th>
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<tr>
<td><strong>LO3</strong></td>
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The success of the third learning outcome was affected by language barriers, particularly with Cohort A, who struggled to grasp the discipline specific language. Cohort B did reach a level of understanding in relation to why people connect with SPE, and were able to associate which environmental psychology factors may have assisted the connection. Upon reflection, the wording of the learning outcome does not capture the essence of what should be learnt and so, should emphasise human connection within the wording.

Cohort A and B did achieve a level of awareness, as to why people may identify or connect with a SPE, but may not be able to list the environmental psychology terminology independently, due to the language barrier. It must be acknowledged that the realisation is more important than the language and so, the learning outcome should stress the realisation rather than the environmental psychology factors. If the student can understand and apply this realisation to the design development process in their own terminology, this stands to be more beneficial than a student who can list discipline specific terminology and not apply it. Also by omitting 'environmental', and just using 'factors' within the learning outcome, this allows for a broader interpretation of human connection to SPE, and encourages exploration beyond environmental
psychology factors. The resource pack should contain directional information to expand upon each learning outcome to ensure the potential lecturer is informed.

<table>
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<tr>
<th>Revised learning outcome:</th>
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<tbody>
<tr>
<td>LO3</td>
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Learning Outcome Four:

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<tr>
<th>Preliminary learning outcome:</th>
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<tbody>
<tr>
<td>LO4</td>
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</table>

The educational trial ended for Cohort A after class six, which meant the remaining learning outcomes could not be achieved as the indicative content to date did not address these outcomes. Learning outcome four is addressed in classes 8-10.

Cohort B were very successful with the first part of the learning outcome, “differentiate between the potential user profiles”. On completion of the limited objective project, based on the Barbican centre, the students were able to identify and differentiate between the potential user profiles of the SPE. The latter part of the learning outcome “differentiate between the sensory and emotional intelligence that should be considered for each profile”, proved more
difficult but successful also. The students were able to categorise and suggest basic sensory and emotional need for the varying user profiles identified. They entered debate on the topic and introduced their own personal experiences.

On reflection, the learning outcome for this topic should be separated into two learning outcomes as it does not reflect what the indicative content enabled the students to achieve. This learning outcome currently caters for two key topics "Identifying User Profiles" and "Identifying and Managing Sensory Stimuli" but does not reflect the entirety or importance of the indicative content. Although, Identifying and Managing Sensory Stimuli may be considered too advanced for a fundamental level of learning it is important to acknowledge this outcome in the resource pack as an intermediate or advance learning outcome, which can be used if the opportunity presents itself. Cohort B, reached a level whereby they were able to identify (at a basic level) the potential sensory stimuli which may be apparent in a particular SPE, how this in turn may affect the intended use of the SPE and ultimately how this may affect the potential user. While they may not be able to control or manage what they have identified, an important threshold concept has been achieved.

<table>
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<tr>
<th>Revised learning outcome:</th>
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<tbody>
<tr>
<td><strong>LO4</strong></td>
</tr>
<tr>
<td>Differentiate between the potential user profiles and list the sensory and emotional intelligence that should be considered for each profile.</td>
</tr>
<tr>
<td><em>(LO5)</em> <em>(Level 8)</em></td>
</tr>
<tr>
<td>Identify the potential sensory stimuli relevant to the location, intended use and user profile.</td>
</tr>
</tbody>
</table>
Learning Outcome Five:

| LOS5 | Awareness of the importance of both the written and verbal communication, of sensory and emotional intelligent design concepts and design schemes. |

The fifth learning outcome proved successful in application but ironically not in mentality. The students did not appear to appreciate the importance of written and verbal communication of sensory and emotional intelligence. They displayed hesitancy and lack of motivation but their written and oral presentation skills improved within the design studio context. This topic is a vast one, and realistically need more allocated time to develop written and oral competencies. For the purpose of the resource pack the, it should be suggested that this topic is introduced earlier in the module or in a running sense to allow the student time to develop confidence. Initially, a “Power of Language” journal was proposed for the resource pack, whereby the student would explore design representation and reflection through journal logging, but due to time allocations it was not a feasible option for the educational trial. However, it should be suggested for the resource pack, as an element which can be introduced at any level throughout architectural design education, as a standalone exercise or concurrently with the resource pack topics.
Revised learning outcome:

| LO5 (Level 7) | Awareness generation of the importance, of both the written and verbal communication of sensory and emotional intelligent design concepts and schemes. |
| LO6 (Level 8) | Communicate of the importance, of both the written and verbal communication of sensory and emotional intelligent design concepts and schemes. |

6.4.2 Assessment Strategy

The assessment methods for the resource pack revolve around the interactive hand-outs utilised throughout the educational trial, which are supported by instructor and facilitator teaching methods.

The students across both cohorts responded well to the graphical interactive hand-outs. Each hand-out has a theory element which is followed by an interactive element. The theory element, which is delivered through an instructor teaching method, is supported by the interactive element, which through facilitator methods, contextualises the theory in architectural context.

When the students were asked if they liked this method of learning, both cohorts stated that they found it easier to concentrate on the graphical hand-outs as opposed to text laden hand-outs. They also stated that they were more likely to read the theory on the hand-outs because of the interactive element (task). While this may be argued as a shift back toward rote type learning, architectural education must realise the visual nature of the typical student demographic. The observation would argue that by providing the student with
a visual aid, which requires student engagement, a level of cognitive engagement has to occur to complete the task. The statistics state that 66% of the student demographic are extrinsically motivated, and approach education with a means to an end approach (Fry et. al., 2008). Therefore incorporating interactive resources which allow the student build on what they already know, and encourage ‘making of meaning’, in this case, assisted the students in reaching the concept threshold, and learning outcomes. It is important to note, that the resources are not giving the students all the information, and require them to participate in the class to complete the task.

If the majority of undergraduate students are motivated by means to an end (task orientated learning), it stands to reason to incorporate as much limited objective tasks as possible. Limited object tasks are quick ways to engage the students, without generating cognitive overload. The also allows the lecturer to incorporate real life tasks, both regular and often. Merrienboer and Sweller (2005), advocate for the inclusion of real life tasks to tackle complex learning, which can help high intrinsic cognitive loads, the monitoring of emotional states throughout the educational period and allow for flexible instruction to adapt to individual learners’ needs.

While the majority of the students agreed they identified with the interactive teaching and learning elements, students from Cohort A suggested that they needed more time to engage with the content and resources. They felt that the class was rushed, and found it hard to keep pace with the new theory. The observation would agree that the teaching and learning experience for both
Cohort A and B was vastly different, and time allocations presented itself as a primary factor.

6.4.3 Time Allocations and Management

Time allocations and management are major factors within all educational facilities which impact on the overall teaching and learning experience. Very little control is available at departmental level, with regard to availability of hours. Hours are allocated with a very top down approach, within the institutions or third level facilities which ultimately is governed by the Department of Education and the Higher Education Authority. Throughout the educational trial, the teaching and learning experience was very much affected by time allocation. Even though this was only a trial, it represents the limitations faced by the teaching bodies across the nation, especially in the problem based learning environments.

The 30 minute timeframe allocated for Cohort A proved very challenging to reach and engage the students. Delivering the theory to the students took up most of the class time and as a result became very instructor (theory) orientated, leaving little room for student engagement and understanding.

Cohort B on the other hand, benefited from the 60 minute timeframe. The lecturer was in a position to deliver the theory and had enough time to cater for impromptu questions, directed questions and debate. Also the lecturer was in a position to close the class correctly by recapping on the class main points.
The varying time allocations resulted in a difference in the rate of inference for the both Cohort A and B.

| Overall Rate of Inference | Cohort B | | | | Overall Rate of Inference | Cohort A | | | | Rate of Inference | Rate of Inference | Total Rate of Inference | Rate of Inference | Rate of Inference | Total Rate of Inference |
|---------------------------|----------|------------------|------------------|------------------|--------------------------|------------------|------------------|------------------|------------------|--------------------------|
| Rate of Inference         |          | Topic            | Rate of Inference |          | Resource                  |                  |                  |                  |                  | Total Rate of Inference |
| 1.2 questions p/student   |          |                  | 1.5 questions p/student |          | 2.7 questions p/student   |                  |                  |                  |                  |                          |
| Cohort A                  |          |                  |                  |          |                          |                  |                  |                  |                  |                          |
| Rate of Inference         |          | Topic            | Rate of Inference |          | Resource                  |                  |                  |                  |                  | Total Rate of Inference |
| 0.7 questions p/student   |          |                  | 1.1 questions p/student |          | 1.8 questions p/student   |                  |                  |                  |                  |                          |

The overall rate of inference between the two cohorts varied as expected. Cohort B displayed a higher rate of inference with both the topic and the resource than Cohort A. As the education trial was ended prematurely for Cohort A, a cross comparison of the overall rate of inference between both cohorts would be inaccurate, and so, more accurate information derived from the class comparisons in the earlier section.

The main point of interest is that the rate of inference recorded for the educational trial is higher than the rate of inference recorded for the pre-educational observational period. The overall rate of inference for the observation period was between 0-1 questions per three hour design studio session, whereas the overall rate of inference during the educational trials was, 1.8 for Cohort A and 2.7 for Cohort B. While these rates may be inclusive of
instructional questions centred on the resources, they still represent active engagement within the classroom environment.

6.4.4 **Conclusion**

The student engagement levels are higher primarily as a result of the interactive teaching and learning methods, which operate on regular limited objective tasks and continuous directed questions, based on familiarity. The tasks are rooted in the current class theory and therefore it is easier for the student to identify with the aligned content.

Also, during the initial observation period the rate of directed questions toward the student cohort was quiet low in general. In order to test the student response to directed questions, the educational trial aimed to implement multiple directed questions in each class. The observation noted;

- The students may have struggled to understand the theory without directed questions. On several occasions, the lecturer had to rephrase theory and pose directed questions to establish existing student knowledge, which contextualised the theory for the students.

- Also, the directed questions enabled the lecturer to encourage a student voice, by establishing student familiarity through continuous questioning. Posing and rephrasing questions to give perspective allowed the students identify with the topic and gave them a better chance to engage.
Finally, the Cohort B suggested that they the main reason why they identified with this type of teaching and learning was because they understood *why* they were learning each topic. They further suggested that it was more important to know 'why' than 'how' initially, and that if they know 'why', they would be more likely to learn the 'how'.
CONCLUSIONS + RECOMMENDATIONS

7.0

“In literature and in life we ultimately pursue, not conclusions, but beginnings.”

- Sam Tanenhaus
7.1 **Introduction**

Over 7.5 billion people make up the world’s population today, and these people will spend up to 90% of their lives in indoor spaces (UN, 2017; WHO, 1999). Spaces, which are designed by multi-disciplinary teams of architects, engineers and interior designers etc. but do these professions fully recognise the impact of their role in society? Winston Churchill once said “we shape our buildings and thereafter they shape us”, and this could not be truer in today’s society. Increasingly, our built environment is not considering the human sensory and emotional experience, and as a result, occupant health and well-being is suffering. Architectural designers must recognise their role in society, and further recognise that education offers the best long-term approach to promote a paradigm shift in the profession.

This chapter offers the summarised concluding elements of the research, based on the thematic areas drawn down. *Sensory imbalance within the built environment* focuses in on the current state. *Gap in Knowledge*, suggests the disconnect between the disciplines. *Module design*, highlights the need for an educational tool within higher education and *Educational Trial* further summarises the findings of the case study. This is then followed by the overall recommendations identified by the research.

7.2 **Sensory imbalance within the built environment**

Between 1 million - 1.6 million disability adjusted life years (DALY’s) are lost in Europe yearly as a result of environmental noise pollution, which means at least, “1 million healthy life years are lost every year from traffic-related noise in Western European countries” (WHO, 2001). External sensory stimuli, such as traffic-related noise
pollution, currently accounts for “61,000 years for ischaemic heart disease, 45,000 years for cognitive impairment of children, 903,000 years for sleep disturbance, 22,000 years for tinnitus and 654,000 years for annoyance” (WHO, 2011). These statistics highlight that the current auditory experience, within the built environment, is not considering the adverse effects on human health and well-being.

The olfactory experience is also another sensory area which is harmfully impacting on the human experience within the built environment, in terms of air quality and air pollutants. These two factors can often be associated with external environments, but as buildings and technology advance, this is becoming an increasingly common issue within indoor spaces. Air tightness in buildings has resulted in recirculated air developing chemical compounds and allergens, which has lead to “a growing problem with a range of diseases collectively referred to as Sick building syndrome (SBS), Building-related illness (BRI) and Multiple chemical sensitivities (MCS)” (Gomzi, 2009). While these issues are generally associated with office or commercial environments, domestic environments are also affected by indoor air pollutants, especially in less developed countries. 4.3 million People die each year due to exposure to household air pollutants (WHO, 2014). The lack of olfactory consideration is contributing to poor occupational and domestic human health and well-being within the built environment.

This lack of acknowledgement for both the auditory and olfactory experience for example, may be part rooted in the over prioritisation of the ocular experience. Pallasmaa (2012) suggests that prioritisation of the eye is a recent development which has emerged with the “development of western ego-consciousness” and that “vision separate(s) us from the world whereas the other senses unite us with it”. The over
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prioritisation of the visual sense or visual aesthetics, within the built environment has seen the multi-sensory human experience compromised (Malnar and Vodvarka, 2004), and this validation through the visual aesthetic has created a sensory hierarchy, placing vision in a superior, unbalanced position to its counterparts.

This visual dominance has also filtered into architectural education. Students, consciously or unconsciously, primarily design with their eyes. They are heavily influenced by the visual presence of their schemes and less about the functionality; function following form. The initial observational period, carried out with Cohort A, highlighted the prioritisation of visual presence and bespoke interactive schemes. The students were more concerned with the creative possibility and visual statement of their designs than the functionality. This may be rooted in several elements. Firstly, today's 21st century students occupy a very visually dominant world, flooded with screened imagery, advertising and acceptance through the visual aesthetic. It is not surprising that they identify with or prioritise visual means. Secondly, the crit environment utilised in architectural education, also part prioritises the visual aspect of design. The students, throughout the observational period and educational trial, admittedly prioritised their presentations over the design development folder. When ask why they did this, they suggested that it was because the presentation was “more important” or that the presentation would be the lecturers “first impression” of their scheme.

The acceptance of visual validation and visual dominance appears to begin during the educational journey. While it is hugely important to be able to visually communicate a design scheme, the functionality of the scheme is equally important and must be
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stressed throughout the educational journey. The modernist concept of “form follows function”, while widely debated, is a very valid discussion which should be conversed at fundamental stages of learning. The students should be encouraged to debate and engage with this topic to allow them realise the potential effects when one is prioritised over the other.

7.3 Gap in Knowledge

Ocular-centric dominance may be part responsible for sensory imbalance within the built environment but an over-arching question remains, why is this occurring despite the readily available publication and statistics proving the need for multi-sensory acknowledgement? The literature has established that a gap in knowledge exists between the disciplines of Neuroscience, Anthropology, Environmental Psychology and Architecture. The channels of communication are not active enough between these disciplines, and so, valid knowledge is not being contextualised and disseminated into the design disciplines at fundamental levels. Designers are not receiving the appropriate education to cater for the multi-sensory human experience, and so, in most cases are not in a position to be aware of the emotional implications of their designs.

The role of the architectural designer is changing in today’s society, while the basic need for shelter remains; there are additional factors which affect the design development process. The architectural design team must consider environmental factors, smart building strategies, advancing technologies and more, together with the traditional design development process. Unfortunately as a result of these factors, the
human experience has, either taken a lesser position on the hierarchy or been forgotten, and so is not prioritised.

The lack of awareness together with a lack of education has resulted in a lack of demand for knowledge in the architectural design discipline. In order to create sensory sensitive environments which cater for the holistic human experience, cross-communication between the disciplines is necessary and the education of design teams. If design teams are educated to understand how their designs affect the human sensory experience, they can then better control and manage the emotional impact the built environment has on people. Pallasmaa (2012) states that "architecture is the art of reconciliation between ourselves and the world, and this mediation takes place through the senses". It must be remembered that anything which is designed is to be used by people, therefore a smart, eco-friendly built environment is meaningless if it does not sustain people.

While there are various scenarios which are, or have been, active in cross communication between the disciplines e.g. The Secret Life of Buildings T.V series presented by Tom Dyckhoff, utilises neurological assistance to monitor the typical interference experienced by the user in an open plan office environment. While the documentary is fascinating, and creates awareness, it does not tell the potential designer how avoid this in their own designs. 'Sensory Design' by Malnar and Vodvarka, is a key literary piece which highlights and recognises the importance of sensory acknowledgement within the architectural design discipline, but targets an advanced learner or professional audience. It also relies on CAVE computer software to implement change; this again creates a learning barrier for fundamental stages of
learning. As far back as 1954, Robert Neutra was stressing the importance of recognising the affects the built environment is having on the human nervous system, stating that “nervous friction and wreckage have multiplied in the metropolitan type of surroundings”.

Although these resources are very informative and relevant, the main issue is that they are not contextualised into architectural design education. They are there to be utilised, but the onus is on the practitioner or educator to extract and contextualise the content to suite a fundamental stage of learning. In the more specialised or advanced examples, the content may be too technical or jargon ridden to accommodate a fundamental stage of understanding and learning. Hence, the need for specifically designed educational content to suite varying levels of learning.

Catering for a fundamental stage of learning is arguably the most important stage. Even an experienced architectural designer or industry professional may have information literacy issues due to language barriers. Throughout the educational trial, language barriers did arise frequently with both cohorts, particularly with Cohort A. Providing knowledge in layman’s or more generalised terms is not only necessary for the potential student profile but also for the potential professional profile. Establishing what the student already knew, and building upon this, assisted in coping with language barriers and literacy issues. Consequently, the same theory can also be applied to industry professionals. Knowledge must be contextualised in a legible manner regardless of the learner profile.
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7.4 Module Design

Establishing educational content which better enables the architectural designer to understand how their designs effect the holistic human experience is necessary, in order to promote long-term user-consideration within the built environment. This research focuses on third level education, and has created a module descriptor which is supported by an educational resource pack, which targets a fundamental level of learning. This research has established seven topics for the resource pack which introduce the learner to Sensory and Emotional Intelligence within the built environment, and within these seven topics, the threshold concepts are housed.

Certain limitations were identified when designing the resource pack. No readily available guidelines could be sourced to facilitate structuring an educational resource pack for third level education. The area surrounding resource pack design is very vague and fails to acknowledge what a resource pack should actually be. In order to formulate a resource pack for the educational trial, guidelines were taken from the literature surrounding module and curriculum design, and precedence taken from existing educational resource packs.

Furthermore, guidelines for disseminating or contextualising inter-disciplinary theory into problem based learning environments could not be sourced. Guidelines for module or curricula design, which draw from varying disciplines, needs to be established to assist information literacy or illiteracy challenges. Knight (2002) suggests that there is a lack of material readily available to teachers planning programmes in higher education and that there is a need for advice on module design to ensure that learners will experience coherence, progression and deep learning. The lack of readily
available guidelines for managing inter-disciplinary education, slowed down extracting the indicative content and construction of the overall resource pack.

7.5 **Educational Trial**

This section highlights the main concluding factors from the educational trial.

7.5.1 **Learning outcomes**

The learning outcomes for the resource pack were evaluated after the educational trial. Regardless of the success rate of the learning outcomes in application, they represent the aligned indicative content apparent within the resource pack. The wording and associated 'action verbs' for each learning outcome were reviewed to ensure further clarity, and clear directions are offered on what the learner should be able to do upon completion of the module. Some learning outcomes were divided into two outcomes, in order to differentiate between the different levels of learning applicable to the indicative content. This is important in order to cater for differentiated learning structures, and also more advanced student cohorts.

As this is an educational resource pack, designed to be versatile in its use and application, the learning outcomes should be reviewed by the lecturer delivering the content. Varying cohorts at different stages of learning, and time restraints will affect the overall learning possibilities, and should be addressed prior to delivering any material or content. Very different levels of learning were achieved by both cohorts during the educational trial, mainly as a result of time restraints and cohort size. Upon reflection, Cohort A should have been
given the hour allocation or split into two groups, to allow for a higher lecturer to student ratio. This would have allowed for potentially higher rates of inference and more time for recursive teaching and learning methods.

7.5.2 **Threshold Concepts**

Extensive literary content can be easily accessed in relation to structuring learning outcomes for a module or curricula, but guidelines for structuring threshold concepts are not so easily accessed. Mayer and Land coined the term "threshold concept" in the early 2000's, bringing about a new approach to teaching and learning. The threshold concepts for the educational trial proved very successful in terms of establishing a teaching method. Utilising a threshold concept approach allows the lecturer to "make refined decisions about what is fundamental to get a grasp of the subject they are teaching. It is a 'less is more' approach to curriculum design" (Cousin, 2006). The students responded well to the teaching and learning method in both cohorts, but the observation recognised that a percentage of the students may have entered a liminal state, whereby they may either revert back to a previous mentality or progress to master the concept. This can be quiet a common occurrence with advanced content, but Cousin (2006) would argue that the learners who enters into a liminal space are more engaged with the project of mastery, than the learner who stays in a state of liminality in which understanding may be vague. Therefore the students potentially would have experienced a deeper level of understanding due to the level of cognitive engagement they experienced. The only way to test this potential 'state of liminality', is to assess the student work
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in the following academic semester, to establish if the mastery of the threshold concept remains.

It is also important to note, that due to the fundamental level of learning that both cohorts are currently involved with, critical ability is at a development stage and they are still heavily influenced by varying mentor opinion, which may affect the mastery of the threshold concept. A student who may be in a "stuck place" or "state of liminality" having being exposed to a threshold concept, and may engage in "forms of mimicry" as opposed to mastery of the concept (Meyer and Land, 2006). The threshold or stuck place may need to be revisited, and so, the lecturer should be prepared to "hold" the potential " recursiveness and excursiveness" of the learning process (Cousin, 2006). If the educational resource pack were to be introduced into an academic setting, it is vital that the lecturing body hold awareness for the complex nature of delivering the topic by utilising a threshold concept approach. The lecturing body involved with the potential cohort, must support the threshold concept and the methods utilised to obtain it, to avoid further confusion among the learners.

The research would also suggest, that this type of teaching and learning method would support problem based learning environments e.g. architecture, engineering etc. Threshold concepts require "disciplinary expertise rather than managerial theoretical templates", and so, it allows the lecturer to focus in on and contextualise what needs to be understood, as opposed to entering into the "overload problem". Again, communication is essential among the lecturing
body to ensure the teaching and learning methods support the overall curricula goal.

Threshold concepts have not been tested or validated to a level whereby they have obtained inferior status to that of traditional teaching methods, but they do address the "why", which is important when establishing *intrinsic motivation* and *cognitive engagement* among potential learners. Lastly, threshold concepts tend *not* to be listed on course or module descriptors, which further suggest a lack of awareness or implementation in third level education. Cohort B suggested that it was more important to know 'why' than 'how' initially, and that if they know 'why', they would be more likely to learn the 'how'. This suggests there is a need to acknowledge threshold concepts in the descriptor of a module or curricula, and these should be presented to the students. They resource pack acknowledges them as class goals, to avoid introducing the student to overly complex educational language. The student should always understand why before they begin a new topic.

7.5.3 **Interactive Resources**

The *interactive resources* (hand-outs) used throughout the educational trial, proved successful among both student cohorts. Cohort B did not rely on them as much as Cohort A, but they did provide help in maintaining a structured learning environment for both cohorts. They also acted as a point of referral, as each topic built toward the next. The students appeared to be more comfortable having the physical resource in front of them, especially during weeks 1 to 6 of the trial, when the content was still very new.
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The student response to the educational trial, indicated that when delivering content which may seem out of discipline to a fundamental level of learner, it is important to ensure the material is contextualised, and delivered in a non-intimidating manner. The limited objective task contextualised the material and the interactive resource reduced the potential of "overloading" the learner (Johnston and Webber, 2003). The use of visual aids and theoretical models allowed the learner to identify with the content in a visual manner, and associated the text (theory) with the visual elements. This is an important factor which should be considered with varying cohorts across all design based courses. These disciplines identify and communicate largely through visual means; therefore should they not be taught through visual means where possible?

The physical resources and supporting theory did highlight certain language barriers with the discipline specific language. This is another key factor which must be considered when dealing with inter-disciplinary theory and inter-professional education. It is important to be aware of the "academic tribes" which can manifest within discipline specific education and the "range of literacy" that can act as a barrier to a potential outsider. Beecher (1993) states that even within these "academic tribes", cases of exclusion occur due to the "jargon ridden" language used to communicate (McKenna, 2004). In week 2, 'The Aristotelian Senses' were introduced to both cohorts. This topic did not initially have an interactive resource for the students and did house very technical, discipline specific language. As a result, the rate of inference was one
of the lowest recorded for the entire educational trial. The language utilised was far too advanced and created an immediate barrier. Every effort should be made, to further immerse inter-disciplinary language, in a non-intimidating manner for the initial fundamental introduction, and once a certain understanding has been achieved the formal terminology can be introduced.

Furthermore, this is a key reason to open up the *channels of communication* between the disciplines to encourage *inter-professional education*. Although it is becoming increasingly recognised among many academic and scientific institutions, that an interdisciplinary approach to education is needed (Ewel 2001; National Academy of Sciences et al. 2005), many barriers are preventing this from happening. Barriers which include “a lack of funding for interdisciplinary research, a lack of historical interdepartmental or cross-disciplinary cooperation, extended time requirements, differences in methodologies and disciplinary norms, turfism, and egos” (Morse, 2007).

Regardless of the existing barriers, research and development could be disseminated in layman’s terms, if the need was established. It is essential to break down language barriers and “*academic tribes*” to allow neighbouring disciplines achieve a level of understanding to begin establishing relevance and comfort zones. This knowledge can then be contextualised and applied to their specific discipline in an informed manner. Firstly, the disciplines must be able to understand potentially relevant information established in the neighbouring disciplines, to begin improving cross-disciplinary cooperation and communication.
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In order to assess the student progression throughout the module, key elements were observed; rate of inference, response to teaching and learning methods and limited objective tasks.

7.5.4 Inference Results

The rate of inference within the classroom environment is important to record, in order to establish student active engagement. Different parameters can be measured, but for this research, two types of inference were monitored; topic inference and resource inference. The amount of questions directed at the topic and resource were recorded to establish the engagement with the topic and resource separately. It is important to separate the two areas to identify individual strengths and limitations.

<table>
<thead>
<tr>
<th>Educational Trial (September 2016 – December 2016)</th>
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<tbody>
<tr>
<td>Overall Rate of Inference</td>
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<tr>
<td><strong>Cohort B</strong></td>
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<tr>
<td>Rate of Inference</td>
</tr>
<tr>
<td>Topic</td>
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<tr>
<td>Rate of Inference</td>
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<tr>
<td>Resource</td>
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<tr>
<td>Rate of Inference</td>
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<tr>
<td>Total Rate of Inference</td>
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<tr>
<td>1.2 questions p/student</td>
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<tr>
<td>1.5 questions p/student</td>
</tr>
<tr>
<td>2.7 questions p/student</td>
</tr>
<tr>
<td><strong>Cohort A</strong></td>
</tr>
<tr>
<td>Rate of Inference</td>
</tr>
<tr>
<td>Topic</td>
</tr>
<tr>
<td>Rate of Inference</td>
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<tr>
<td>Resource</td>
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<tr>
<td>Rate of Inference</td>
</tr>
<tr>
<td>Total Rate of Inference</td>
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<tr>
<td>0.7 questions p/student</td>
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<tr>
<td>1.1 questions p/student</td>
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<tr>
<td>1.8 questions p/student</td>
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</tbody>
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<table>
<thead>
<tr>
<th>Observational Period (February 2016 – May 2016)</th>
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<tbody>
<tr>
<td>Overall Rate of Inference</td>
</tr>
<tr>
<td><strong>Cohort A</strong></td>
</tr>
<tr>
<td>Rate of Inference</td>
</tr>
<tr>
<td>Topic</td>
</tr>
<tr>
<td>Rate of Inference</td>
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<tr>
<td>Resource</td>
</tr>
<tr>
<td>Rate of Inference</td>
</tr>
<tr>
<td>Total Rate of Inference</td>
</tr>
<tr>
<td>0-3 questions p/student</td>
</tr>
<tr>
<td>Per three hour session</td>
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</tbody>
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The overall rate of inference recorded for the educational trail proved higher than the rate of inference recorded throughout the observational period carried out with Cohort A. This highlights the potential of interactive teaching and learning methods within the problem based learning environment. The students displayed higher rates of active engagement with inter-disciplinary theory during the educational trial, than with discipline specific theory throughout the observational period. What should be taken from this finding is the potential reach a lecturer may obtain by utilising more interactive methods, especially if dealing with complex topics and/or extrinsically motivated students. This difference in the rate of inference, suggests that the interactive approach of the educational resource pack is effective within the problem base learning environment. It also suggests that a potential 21st century learner identifies with, or is more responsive to, interactive teaching and learning methods.

7.5.5 Teaching & Learning Methods

The interactive teaching and learning methods and resources used throughout the educational trial, proved successful in establishing a higher rate of inference as previously mentioned. While some limitations were highlighted with the indicative content and information literacy, the observation would still suggest the methods were successful in their approach to teaching and leaning within the problem based learning environment.

The previous observational period, highlighted various successes and limitations also. The John Dewey mantra of 'learning by doing' proved
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successful in some cases, but only when the students were directed and guided through the process. The 'making of meaning' aspect of the learning was not always successful and therefore, was not applied to their design studio work. The main learning from this observation is the importance of 'listening for understanding' and 'recursiveness and excursiveness' throughout the teaching and learning process. At fundamental levels of learning, it may take several attempts before a student really grasps the concept of the material. Also, quiet often students will grasp the concept there and then, but may have no idea 10 seconds later (Land et. al., 2005). Until levels of intrinsic motivation are established, the students must be directed and consistently engaged when dealing with new concepts, content and ways of teaching and learning.

7.5.6 Limited Objective Tasks

The limited objective task again highlighted various strengths and limitations, but proved successful in dealing with complex theory and new ways of thinking. The limited objective proved most successful for analysis tasks, which collectively involve several stages. This meant each stage was addressed individually in a manageable manner, and each task had to be completed successfully in order to move onto the next. If this type of learning is compared to the predominant 'John Dewey' approach utilised throughout the observational period, it becomes apparent why one approach might better suit the problem based learning environment at fundamental stages of learning.

- John Dewey: The students are given a task, and encouraged to explore and self-discover ergonomics for example. The overall
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project brief is delivered collectively and not further broken down. This requires levels of intrinsic motivation in order for it to be successful. This type of motivation is usually associated with more advanced levels of learners, who have acquired enough knowledge to have a student voice and so become intrinsically motivated by an area of personal interest or personal development.

- **Limited Objective:** Presenting tasks in a linear, progressive, structured manner, to extrinsically motivated learners, is likely to achieve higher rates of inference, engagement and as a result, higher levels of active learning. Extrinsically motivated students are motivated by tasks, as opposed to self-discovery.

Students which are transitioning from a *rote* type learning environment are not largely familiar with unstructured learning environments and so, must be taught how to develop independent learning competences and critical ability. The module descriptor for *design studio 2* is (module descriptor for Cohort A observational period) is analysed, 12 hours of independent learning is suggested for each student, per week. This transition from rote learning to independent learning could be better assisted by utilising limited objective tasks and interactive resources, to assist the direction of independent learning. Even if a student is intrinsically motivated, they still need direction at fundamental stages of learning, while they are building knowledge. Therefore, limited objective learning provides a good opportunity help the student
transition, engage the student, prevent information overload and develop, over time, their own critical capacity. A certain level of knowledge has to be obtained on any given topic, to develop informed critical ability.

7.5.7 **Time Management**

Notwithstanding the above findings, *time* was the predominant factor which affected the teaching and learning experience for both Cohort A and Cohort B. Cohort A had half the lecturer contact time in comparison to Cohort B, if class contact time is considered as a whole. If the cohort sizes are taken into consideration, together with the class contact times, the potential contact time per student is significantly different.

<table>
<thead>
<tr>
<th>Lecturer to Student Ratio</th>
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<tr>
<td>Cohort A</td>
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<tr>
<td>Cohort B</td>
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*Time management* in higher education holds a very top-down approach. Budgets are given to educational facilities based on varying factors such as level 8 applications and performance of the facility in general. The worrying issue with this type of top-down approach is the potential prioritisation of STEM (science, technology, engineering and mathematics) and MSC (mathematics, science and computing) areas on the hierarchy, in terms of funding and budget. For example, “Ireland aims to have the highest proportion of MSC and ICT graduates in the EU by 2018”, which is rooted in Ireland's *Action Plan for Jobs*.
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(2013). Governmental targets and strategies affect the allocation of budget and funding for particular areas within higher education, which are generally as a response to labour market demand. While this may be rooted in economic logic and statistics, it does limit the potential growth in other areas, which may not have established the same hierarchical significance as the STEM or MSC areas. Areas, such as sensory and emotional intelligence, which are relatively new areas of research, have not yet established enough societal awareness to secure prioritisation in governmental educational budgets. Therefore, it is hard for architectural departments, for instance, to secure time allocations to accommodate new modules.

In order for this module 'sensory and emotional intelligence for architectural design education', to be implemented into an existing course, sufficient time allocations must be afforded. The hour allocation, tested with Cohort B, demonstrated the need for a stand-alone time allocation, which would span over an academic semester, in order to achieve the learning outcomes and threshold concepts of the module. This module has the potential to service not just an architectural department, but in a facility similar to that of CIT, the broader engineering school could benefit also. CIT is currently at the early stages of incorporating modularisation into the educational structure. The indicative content is targeting the future designers, who will be responsible for the built environment as a whole, and therefore should be disseminated into each discipline where possible. The limited objective tasks could be further tailored to cater for the inter-disciplinary cohorts potentially undertaking the
module. This would mean a standalone lecture could service several courses within any institution; therefore, time allocations may be afforded with greater ease. This approach would also promote inter-disciplinary education and open up the channels of communication between the disciplines at the educational stage of their professional careers. This type of inter-disciplinary or inter professional education can only encourage positive systemic reform within industry. Opening up the channels of communication during the educational journey can only encourage greater levels of awareness and communication within industry.

7.6 **Recommendations**

Three main areas have been identified for recommendation; Education, Industry and Further Research. While these areas may overlap in the overarching recommendation, they vary in application for each area.

7.6.1 **Recommendations for Education**

- **Further Open Channels of Communication**

This research focuses on architectural education, and draws from the disciplines of neuroscience and environmental psychology. The module content aims to educate designers on catering for the holistic human experience within the built environment. The overall content accommodates a fundamental level of learning, and so further research and communication between the disciplines is needed to develop more advanced educational content.
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Furthermore, this type of educational content, which evaluates and analyses the human experience within the built environment, must be communicated to the broader educational community e.g. engineering disciplines. Creating awareness among the neighbouring disciplines is important to register its significance and the acknowledgement of the human experience on the hierarchy. Inter professional education is becoming more recognised “after almost 50 years of enquiry, the World Health Organization and its partners acknowledge that there is sufficient evidence to indicate that effective inter professional education enables effective collaborative practice” (Lewitt et. al., 2015).

Introduction of Threshold Concepts

Currently, threshold concepts are not a key feature within module design or module descriptors. Emphasis is generally placed on the learning outcomes, indicative content and workload. While these factors are necessary and assist in creating aligned module content, occasionally they do not capture the essence of the module, and why the module is necessary. Threshold concepts offer perspective on why a particular topic or method is necessary to the discipline, and offer an applied stance on education. Threshold concepts can be classed as “troublesome” for the learner “because they demand an integration of ideas and this requires the student to accept a transformation of their own understanding” (Land, 2005). This can be quiet and evolutionary process for a learner but does encourage cognitive engagement and understanding, while mastering the concept. Land (2005) suggests that a threshold concept may be
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characterised by the following three categories, in that “they are *transformative* (occasioning a significant shift in the perception of a subject), *irreversible* (unlikely to be forgotten, or unlearned only through considerable effort), and *integrative* (exposing the previously hidden interrelatedness of something)”. If concept thresholds, built around these three categories, were integrated into module descriptors, the potential lecturer should hold a better understanding of the modules “stuck points”. The indicative content can then be structured around these potentially problematic areas.

The learning outcomes should support the threshold concepts, and also address the affective domain, to ensure the ‘why’ is established. Quiet often learning outcomes centre on the cognitive domain or maybe the psychomotor domain, if the trades are considered. The research would argue that the;

- Cognitive domain caters for “what must be known?”
- Affective domain caters for “why it must be known?”
- Threshold concepts establish the interrelatedness of the educational content and reality, offering new perspective on the content. Therefore offering the ‘what’ and the ‘why’ in an inclusive manner

This three stage process, only stands to create more clarity for the student overtime, and represents a realistic approach to learning. Incorporating a concept threshold approach, considering it draws on professional or tacit knowledge, may create a more balanced educational journey. The students must actively engage to achieve the threshold concept, therefore, they are
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benefiting from developing deep learning competencies, which are fused with tacit knowledge. It could be argued that a threshold concept approach may be the answer, to fusing the traditional foundations of education with the current demand for industry ready skilled graduates. This approach may encourage the supply of graduates with student voice and critical ability fused with tacit knowledge.

- **Time management**

Time allocations for higher education must be addressed to ensure the timeframes allocated reflect the needs of the course or programme. More regular programmatic reviews (currently every five years) may promote a more bottom up approach to higher education, which would allow more control at departmental level. Although there are intermittent review intervals, yearly and mid-point, these are only to cater for minor changes.

7.6.2 **Recommendations for Industry**

- **Education**

The research has established that not enough weight is given to the human experience within the built environment. Architectural designers, along with engineers and all other parties involved in the design process must be educated to realise the impact their designs and specifications have on the human experience. This realisation may help the prioritisation of the human experience throughout the design development process and encourage long term change. Not only do they need to be educated on human impact, but the
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potential benefits human acknowledgement can have on productivity in the workplace, healing rates in hospitals, cognitive engagement in educational facilities and general human behaviour in society etc. It is equally as important to acknowledge the potential societal and economic benefits.

CPD's, conferences and workshops are some of the ways to educate industry practitioners. Content should be designed to cater for the industry professionals, which can be delivered in shorter timeframes than that in an academic situation.

- **Guidelines and Legislation**

Currently there is very little legislation to guide architectural designers in terms of the holistic human experience. The *International Well Building Institute* (IWBI) has launched a Well-Building campaign in conjunction with the *American Society of Interior Designers* (ASID) to establish building standards which centre on occupant experience and well-being. As of the 7th of March 2017 the IWBI, along with RESET, the Building Research Establishment (BRE) and the Green Building Council of Australia (GBCA) have agreed to work together to establish aligned guidelines which support human well-being in the built environment (Stanton, 2017). While this is a positive movement, which supports massive collaborations between global bodies, this information needs to be further disseminated. Guidelines do not ensure acknowledgement or implementation and must be pitched to ensure appreciation occurs in industry, as it is not legislative and therefore not mandatory! ARUP have further supported this movement and are currently the only body (excluding IWBI) implementing the
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*Well-Building* movement outside of the US and Canada. ARUP offer the *Well-Building* option as part of their services, in the form of in-house *consultancy* services. *Consultancy* is a very positive movement, but is optional also. Therefore, education is essential in industry to establish the need for human acknowledgement, which will promote the use of such guidelines provided by the IWBI.

Education, together with developed guidelines can inform legislation over time. Currently there is not enough research and development carried out to implement informed legislation.

- **Thorough Validation**

Ocular-centric dominance within society has seen the emergence of validation through the visual aesthetic. More thorough validation matrix should be implemented to ensure buildings are evaluated both pre and post occupancy, in terms of actual usability and function. If buildings are to be awarded for visual presence or visual innovation (form), it should be acknowledged that the award has been obtained for that category. There is potential for legislation within the field of validation. If a building has not been thoroughly evaluated for its overall performance it should be declared, and if awarded for a specific category declared also. For example, a building may be excellent in terms of energy efficiency but poor in user functionality. Strengths and limitations should be acknowledged for every scheme.
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Currently, students and industry practitioners are being influenced by what the awarding bodies are suggesting to be leaders in the field. More transparency must be implemented to allow for a better understanding of the overall merit. Also, mandatory publicised post-occupancy evaluations may help counteract visual validation within industry.

7.6.3 Recommendations for Further Research

- Developing the Indicative Content

Each of the seven topics identified in the resource pack should be further researched to establish more advanced educational content for both the academic field and industry. The initial resource pack targets a fundamental level of learner within an architectural discipline, and so is limited in its wider reach, but acts as a good foundation for further research. These topics should be further developed to accommodate a more advanced level of learner and also need to be contextualised into neighbouring design disciplines e.g. engineering, to ensure the content appears relevant to the potential learner.

- Sample Size

The sample size utilised for the research (observational period and educational trial) was sufficient in meeting this research requirement, and establishing new research grounds in a largely undocumented area. It must be acknowledged that the sample size may be considered too small to generalise the research findings, but it does act as a sufficient starting point. The research would stress
that establishing preliminary findings and results on a typical case sample, was necessary before a larger sample could be obtained, due to:

- **Research time restraints**

  The 21 month period for the research accommodated the observational period, the educational trial and construction of the educational resource pack. Further research, in areas such as, time management in education and further development of the module content to cater for more advanced levels, was not possible during this timeframe.

- **Funding**

  The initial research carried out has provided a strong case for further research and is currently a position to apply for funding with bodies such as the Irish Research Council (IRS) and Science Foundation Ireland (SFI). The interdisciplinary nature of the initial research, although necessary, proved difficult to target funding bodies initially. The research findings now support strong logic for further research into inter-professional education, between the disciplines of neuroscience, environmental psychology and architectural education.

7.7 **Conclusion**

It must be remembered that the built environment is there to serve people, and exists to provide a safe environment for people to carry out their daily lives. Therefore, it stands to reason that, people's needs should be at the core of the design development process and also at the core of the evaluation measures of a space, place or
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environment. The educational system has a responsibility to promote and encourage the delivery of modules such as ‘sensory and emotional intelligence’ in the design disciplines, to encourage and re-prioritise the need for human acknowledgement. After all, “the room is there for the human being – not the human being for the room” (El Lissitzky, n.d).

Currently, industry demands are influencing the educational system and are putting pressure on institutes to produce a “skilled” graduate, but at what cost? The architectural design disciplines, among others, have a responsibility to cater for spaces where people spend up to 90% of their lives, and this societal responsibility should be realised at the fundamental stages of learning. Is this not as equally important as computer competences and technical ability? Encouraging a shift in mentality within the higher education system, is a practical long term approach to encourage change at industry level, and ultimately within the physical built environment. Education has the power to challenge the current sensory imbalance within the built environment and create emotive spaces which “receive the human visitor” and “enable him to experience it and live in it”, but essentially theses spaces “should not constantly talk at him” (Zumthor, 2010).

The research has established that a gap in knowledge does in fact exist, and is heavily affecting the quality of people’s lives within the built environment. Our design teams are not equipped to understand the impact of their designs on the user, and must be educated to do so. Therefore, education has presented itself as a sustainable, practical approach to implementing change, and this research has resulted in the conception of a module descriptor which is supported by an educational resource pack. The resource
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pack, which harbours an inter-disciplinary approach, is designed to create an overarching awareness of *sensory and emotional intelligence* within the built environment. The initial resource pack evidenced many successes in achieving this aim, and any limitations identified were not associated with the relevance of the indicative content but with time restraints or information literacy.

On a broader scale, the *gap in knowledge* identified and the extracted *indicative content* have been widely accepted as relevant, and necessary, by the architectural department and school of civil and structural engineering within CIT, and also on a national scale by the ESAI (Environmental Sciences Association of Ireland). Dissemination of the research has only begun, and so positive interdisciplinary feedback can only stand to benefit the growth and presence of *Sensory and Emotional Intelligence* within the educational field, and over time, industry.

There is an onus for the built environments to sustain people, as much as there is an onus for people to sustain the built environment. Therefore, the people responsible for designing and creating these spaces people occupy, must firstly recognise the importance of understanding how people need to occupy and want to occupy their environments. This can then act as the first step in creating a paradigm shift within both the realm of architectural education and within the realm of the architectural discipline. Introducing educational content which provides architectural designers with this essential competency, at least places them in a position to argue and defend the importance and affordance of human acknowledgement within the design development process. Debate can create awareness from the grassroots up, which can further educate and inform students, practitioners and governing bodies. Awareness
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through education is the key to achieve long-term change. Finally, the research concludes in the words of Ada Louise Huxtable (2008), which encompasses the importance of the role of the architectural designer in today's society;

"Today, when so much seems to conspire to reduce life and feeling to the most deprived and demeaning bottom line, it is more important than ever that we receive that extra dimension of dignity or delight and the elevated sense of self that the art of building can provide through the nature of the places where we live and work. What counts more than style is whether architecture improves our experience of the built world; whether it makes us wonder why we never noticed places in quite this way before."
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  - Familiarity hand-out
  - Primitive group discussion template
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