An investigation into the commercialisation of Final Year Projects within Creative Design Courses

By

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Declaration

Declaration of ownership: I declare that the attached work is entirely my own and that all sources have been acknowledged.

Signed: .....

Date: .....

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Abstract

The aim of this study is to identify and investigate the barriers to commercialisation of Final Year Projects within Creative Design courses. The term Creative Design refers to Creative Design, Product Design and Industrial Design courses in the Republic of Ireland.

How do Design courses in ROI address the issues of commercialisation? Failure to incorporate key course elements such as entrepreneurship, intellectual property law and business studies, as core studies, results in long term loss for both Institution and student.

Research related to design education will be collected and organized through interviews with educators, students and practitioners of Creative Design.

The research will be qualitative and quantitative. It will include a study of product identification and development methods within industry. The development of student product designs through to commercialisation will be monitored through ten Case Studies. It will also include statistical research of student major projects over the last five years.

This research is important as there is a low rate of students successfully commercialising their work. Having completed their Degree, students will have acquired the necessary skills and capabilities of designing successful products yet these often fail to realise their full potential. There is a need for a system that encourages and supports students entering the professional world of design; in the current economic situation there is a clear need for such entrepreneurship. This research is aimed at identifying and recommending best practice for overcoming obstacles to students commercialising their college work.

The aim of this study is to raise awareness of the issues and challenges facing undergraduate students in the transitional period between college and professionalism, as they attempt to commercialise their work. This research will consider the communication of complex ideas, and the difference between successful or unsuccessful products through a series of case studies.

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List of Abbreviations

ROI	Republic of Ireland
TTO	Technology Transfer Office
CTT	Corás Tráchtála
KDW	Kilkenny Design Workshops
IDI	Institute of Designers in Ireland
RIAI	Royal Institute of Architects in Ireland
IDA	Industrial Development Agency (Ireland)
CEBs	County Enterprise Boards
BEDA	Bureau of European Design Associations
ICSID	International Council of Societies of Industrial Design
SMEs	Small and Medium Enterprises
GDP	Gross Domestic Product
IP	Intellectual Property
ACE	Accelerating Campus Entrepreneurship
NCAD	National College of Art and Design
IT	Institute of Technology
UPC	Universitat Politècnica de Catalunya
NCGE	National College for Graduate Entrepreneurship
SEE	Symposia for Entrepreneurship Educators
GEM	Global Entrepreneurship Monitor
RTA	Road Traffic Accidents
SEE	Symposia for Entrepreneurship Educators

GEM Global Entrepreneurship Monitor .....

Creative Design

The generic term Creative Design has been used. This refers to Creative Design, Product Design and Industrial Design courses offered in Ireland at the moment.

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1.0 Introduction

The purpose of this research is to explore the barriers to commercialisation of Final Major Projects within Creative Design courses. This research will result in enhanced knowledge and improve the practice of design education.

The primary question explored within this research is: 'Why do so many Final Year Projects within Creative Design courses not achieve their full potential?

The overall aims of the research are:

- To investigate the commercialisation of Final Year Product design students' projects
- To identify the best practice for design education
- To identify Intellectual Property rights with regard to the commercialisation of student work after college
- To identify the legal implications and requirements for the commercialisation of products.

This study will analyse ten case studies in the Republic of Ireland. Five commercially successful projects and five commercially unrealised projects were chosen to form the basis of the study. This chapter will highlight the barriers and steps to project commercialisation in ROI through knowledge generated from the case studies.

Product Design students successfully create a product in an area that is a radical break from the past, and show the way to a new future. Everywhere we turn, virtually everything we use, the things we own, the cars we drive; a designer has been involved in their creation. Why are some products or services so much more desirable, innovative and successful than others?

There is an ever increasing requirement by both industrial and domestic markets for new products of all varieties which has resulted in a thriving industry for businesses in the area of Product Design.

Students complete both individual and group projects which are designed to introduce and develop creative problem solving, communication and 3D modelling skills. It is evident that a substantial gap exists in the design education sector. Although courses provide students with knowledge of design, engineering technology, computer aided design and marketing many students fail to realise the full commercial value of the research conducted in their final year. The Creative Design courses focus on both aesthetics and technological challenges when designing new products.

Many of the designs incorporate significant technological changes which could be capitalised on by the designer/student. Research shows that design students do not further explore their designs after their final graduate show. Statistics show that this is because students lack the confidence to pursue their designs as they receive little or no follow on support from their Institution or assistance in pursuing potential investment (See appendix 2, qu.9).

Creative Design courses currently available in ROI equip graduates to design products for a variety of sectors. Graduates pursue a wide range of careers such as product designers in manufacturing companies and as designers within consultancy or research and development organisations.

The study of people and their relationship with used/valued objects is essential to the course. So developing the student's ability to define user needs – aesthetics, function, ease-of-use and safety factors are the primary concern of design education. Lectures on materials, manufacturing technologies and on the history of visual culture are additionally important course components.

Design education focuses on developing core design skills but provides no real insights or methodologies by which students may further advance their major project-work. There is no clear guidance given of how to commercialise an innovative product or service. This, of course, prevents the development of the abilities that are essential to prepare students for the world of design after college and is a major obstacle that needs to be addressed. In the present economic climate, Design education is facing an ever increasing challenge between balancing core skills and the demands of entrepreneurship (See appendix 6, qu.9).

Design education in ROI will require some substantial reforms if the Irish design industry is to compete with established industrialised nations on the global stage. Graduates need to be able to serve both local and international clients with professional skills and vision for the future. Many graduates find employment opportunities but may not necessarily work as industrial designers. A survey of Irish design graduates shows that graduates move into other design disciplines such as graphic and web design (See fig. 1 below).

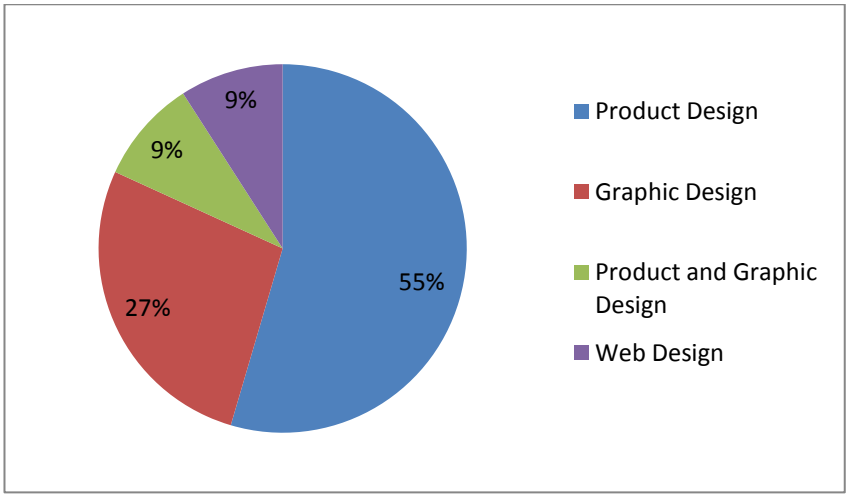


Figure 1 A survey of design professions

Innovative challenges and economic opportunities have changed our priorities dramatically. Design education has to target emerging industrial and commercial sectors for our graduates.

Most colleges have realised that the definition of course goals must be industry led (See appendix 6, qu.8). Entrepreneurship and Innovation are key aspects of the design industry. Fostering a study of entrepreneurship and linking major design projects with institutional procedures and supports for commercialisation are essential to the national interest in fostering innovation. Design education is required to balance teaching values with commercial interests; to achieve this colleges must promote close relationships between final year students and partners in industry.

1.1 Rationale

The research is divided into eight main chapters followed by an appendix containing references but also, significantly, the interview transcripts.

Chapter 1 provides an Introduction to the research question, and gives some reasons as to why the research question was undertaken, as well as the relevancy of the research question.

Chapter 2 is the Literature Review. This chapter aims to find out what has been written about the topics raised by the research question and to comment on them. The literature is reviewed and a review of the literature is produced. Gaps in the literature that need further research are identified.

Chapter 3 outlines the research methods that have been used in this dissertation. It looks at the theoretical underpinnings and positions adopted in acquiring the research. The design stance taken with regard to theoretical perspective, research methodology and research methods is explained. Issues of ethics and confidentiality are outlined.

Chapter 4 relates to Design Education. This chapter reviews literature relevant to the creative practices in general and Creative Design education in particular. Data collected from students and stakeholders at five Institutes of third level education are used to illustrate the positive and negatives aspects of the practice of Creative Design in ROI. It looks at the approaches needed to link essential areas of academia and industry.

Chapter 5 relates to the Stakeholder questions asked at interview. These seek to find data that is incomplete or not found in the literature review that may help to answer the research question. What questions were asked, why they were asked, what the key points in the answers are and what conclusions can be drawn from the answers are discussed in detail.

Chapter 6 relates to Design Professionalism. This chapter seeks to find why Design education needs to be professional. Student and stakeholder insights illustrate many aspects that must be taken into consideration to foster better Creative practice.

Chapter 7 presents 10 Case Studies. Five commercially successful projects and five commercially unrealised projects were chosen to highlight the barriers and steps to project commercialisation on Creative Design courses in ROI.

Chapter 8 presents Conclusions and Recommendations. Key points that propose solutions to issues that arose throughout the study of the research question and recommendations for further areas for study are stated.

1.2 Scope of the Study

Design students, academics and business professionals from the ROI were chosen intentionally. All interviewees are from design institutions and design companies within the ROI. The research explores people linked to creative design. This study highlights the steps and barriers to commercialisation.

1.3 Background

This study is exploratory and uses the case study method to investigate commercialisation in ROI. This method was chosen as it is one of the more appropriate ways to evaluate the approaches of five different Institutes. The research was commenced, by initial face to face interviews with relevant students in the area of Creative Design. To complete the second phase of the research, the researcher travelled to each case study location. This involved conducting a survey with students. A semi-structured interview with the course coordinators at each Institute also took place.

The main objective of this study therefore is to add to the body of design education research. The presentation of ten case studies identifies the barriers and steps to commercialisation. This is necessary to validate theory and to enhance the formulation of a model to develop commercialisation in the creative courses in ROI. This model could be used by all of the Creative Design courses in ROI.

1.4 Research Problem

The primary question explored within this research is: What are the barriers to commercialisation of Final Major Projects within Creative Design courses? The overall aim is to explore the barriers and steps to commercialisation of Final Major Projects. In order to research the problem all case studies were examined by in-depth interviews.

1.5 Overview of Literature Review and Methodology

The literature review analyses and outlines the existing gap in Irish design education. It highlights information regarding marketing strategies, finance and funding, best

design practice and government policies. The literature review explores the positive and negative aspects of design education. The literature review adds to the existing body of knowledge on the topic. The identification of gaps generates new knowledge that facilitates original insight.

The methodological approach used triangulation in order to extrapolate key findings. This involved two phases, initial qualitative in-depth interviews followed by case study research.

1.6 Possible outcomes of the Research

The completed research formulates a set of recommendations for the commercialisation of Final Major Projects in Creative Design courses in ROI. A possible outcome of the research would be the creation of a model that can promote commercialisation in Creative Design courses. This model can be implemented by academics to guide and direct best practice for students as they attempt to commercialise their work. It is hoped this study will build upon existing theory of design practice while proposing practical recommendations.

1.7 Summary

This chapter introduces the research topic and justifies why the study is necessary. The focus of this study is to investigate how design courses in ROI address the issues of the commercialisation of Final Major Projects. The study is based upon stakeholder insight coupled with the analysis of ten case studies of Final Major Projects in ROI. It is hoped that this study will enhance existing knowledge in the area of major project commercialisation.

2.0 Literature Review

2.1 Introduction

The purpose of this research is to discuss the current practice in Creative Design education and propose a new educational framework to engage commercialisation as a design programme objective.

This chapter reviews literature relevant to the practice of Creative Design education. It identifies areas where there is there is a substantial gap in the Design education sector in ROI.

In this literature the researcher will also consider past and current trends and challenges in Design education in ROI. Examples of Government reports are presented to explain a proposed approach that could be a useful model for implementation in Irish Creative Design courses.

2.2 The Irish design reform Movement of the 1960s

John Turpin, a former director of the National College of Art and Design, in Dublin, has over the past 30 years published extensively both on the history of Irish sculpture, painting and art and design education. In 1986, John Turpin wrote a report on the arts in Ireland *'The Irish design reform Movement of the 1960s'.*

Ireland has a long historic design background that includes the eighteenth-century School of Ornament of the Dublin Society[1], as well as traditional urban and rural crafts. In 1853, 1865, and 1907, large international exhibitions of art and industry comparable to those abroad were held in Dublin, and these gave Irish manufacturers some idea of foreign design. However, these exhibitions tended to be dominated by luxury products, which only high-lighted the inadequacies of Irish production. Irish linen, silk, lace, and the cast iron of Richard Turner[2] were the most distinguished local products.

[1] The ideal of the nobility of the fine arts was the commercial aim and the chief motivation behind the foundation of the School of Ornament of Design.

[2] Richard Turner (1798-1881) was an Irish iron-founder and manufacturer of glasshouses, born in Dublin. His works included the Palm House at Kew Gardens (with Decimus Burton), the glasshouse in the Winter Gardens at Regent's Park in London, the Palm House at Belfast Botanic Gardens and the Curvilinear Range at the Irish National Botanic Gardens, Glasnevin, Ireland. He was a pioneer in the structural use of wrought iron. The glasshouses which he designed were sophisticated and innovative, as the use of wrought and cast iron was at the leading edge of building technology at the time.

There were also local trade exhibitions for art and industry in Dublin in the 1880s and Cork in 1852 and 1902. Twentieth-century design was marked by the exhibitions of the Irish Arts and Crafts Society[3] between 1895 and 1925. It is interesting to note that when Ireland's most famous product, Guinness Stout, was advertised between the wars, in the 1930s and 1940s, it utilised English graphic design/advertising agencies as Dublin had no comparable professional agencies that could provide an integrated programme to promote the beverage (Turpin, 1986, p4).

The Irish Free State (which became a self-governing dominion of the British Commonwealth in 1922) pursued an economic policy of free trade. This policy was overturned with the advent of the Fianna Fail Government in 1932, with its strongly nationalist, separatist, and self-reliant ideology, a policy of protective tariffs was inaugurated to shelter promising Irish industries, such as clothing, footwear, and car assembly. This was a move to foster self-sufficiency and to substitute imports, primarily from Britain. The issue of industrial design had to be addressed, and on October 22, 1937, Sean Lemass, Minister for Industry and Commerce, set up a Departmental Committee '*to advise on matters affecting the design and decoration of articles'* manufactured in the Irish Free State. Although the Committee met 42 times, little seems to have resulted, and it ceased to exist in 1939 when war broke out; its final recommendation was for an exhibition of design in industry, but nothing came of this until 1954. Nevertheless, as in Britain, there was a great deal of useful innovation during World War II, spearheaded by Sean Lemass's Ministry of Supplies [4] (Turpin, 1986, p5).

[3] Function: Art society, Policy: 'To foster and promote the development of artistic industries in Ireland. To hold Exhibitions, when desirable, of Irish Arts and Crafts. To promote artistic culture by providing instruction by means of lectures, by the supply of designs, and by such other methods as may seem desirable. To issue a Journal and other publications bearing on the objects of the society.' (Journal & proceedings, 1896)

'Our efforts are directed to efface, as far as possible, the distinction between artist and the artisan, and to carry the contemplation of beauty from public galleries and buildings into the homes of people and into their daily life.' (Journal and Proceedings, 1901)

[4] Lemass is widely regarded as the father of modern Ireland, primarily due to his efforts in facilitating industrial growth, bringing foreign direct investment into the country, and forging permanent links between Ireland and the European community.

2.3 Report on the Arts in Ireland

In 1949, Thomas Bodkin, director of the Barber Institute, Birmingham, and former director of the National Gallery of Ireland, was commissioned to write a report entitled *'Report on the Arts in Ireland'* (1949). Returning to its initiative of ten years before, the Department of Industry and Commerce insisted that this report include consideration of industrial design. Bodkin's remarks in this area inaugurated the post-World War II story of Irish design consciousness. Bodkin stated '*There never has been a sustained alliance between the arts and industry in Ireland; and little has been done in the last fifty years to promote such a desirable aim, beyond the efforts made for over thirty years by the Arts and Crafts Society*' (Bodkin, 1949, p.6).

Bodkin admitted that the Irish Countrywomen's Association, through the energy of Dr. Muriel Gahan, had done much to encourage handcrafts and to facilitate their sale through country markets in Dublin. Bodkin pointed to Sweden as an example for Ireland and also showed what Britain's Council of Industrial Design had done since 1944; particularly its propaganda for design reform by Gordon Russell and Robin Darwin. By contrast Bodkin saw a picture of poor industrial design in Ireland. He stated '*No civilized nation has neglected art and design to the extent that we have done during the past fifty years, with consequent injury to our industries*' (Bodkin, 1949, p.7).

During the 1950s, while Britain and Europe were rebuilding their industries, the Republic of Ireland's economic situation, with a declining population, was stagnant (Turpin, 1986, p.5).

As a consequence of the Bodkin Report, the Irish Arts Council was set up in 1951, with the promotion of industrial design as one of its aims. The Council sought to generate design awareness by holding two important exhibitions in the mid-1950s. The first was the International Design Exhibition of 1954, produced by the Design Research Unit of Ireland, with Misha Black, the prominent British design theorist, as consultant. Patrick J. Little, the director of the Irish Arts Council, wrote that the exhibition's aim was:

> To impress upon our people the vital importance of attractive craftsmanship in our industrial products, first because it helps to raise the standards of good taste and artistic judgment at home, and again because

> without it our exports cannot compete in world markets (Little, 1954, p54).

Herbert Read cited Sweden, Finland, and Denmark as examples to be followed. '*Ireland has a great tradition – Dublin is its witness. But that tradition has been lost, but there is no reason why it cannot be recovered'* (Turpin, 1986, p.6). The clear message was that Irish design should model itself on Scandinavia.

Another major Arts Council design exhibition was devoted to Irish products. It was called simply *Irish Design Exhibition 1956* and was also produced by the Design Research Unit of Ireland, with Misha Black as consultant and Thurloe Connolly as designer. Ake Huldt, director of the Swedish Council of Industrial Design, was invited to select the exhibits. Patrick. J. Little commented about Huldt that: although searchingly critical, he was most encouraging. He emphasized the importance of freshness of imagination, grace, simplicity, and practical utility of articles in ordinary use, rather than stressing luxury articles. Whilst good tradition was not condemned, unimaginative imitation was not approved. Our textiles, especially our tweeds, received the commendation as leading in their kind for Europe.

The exhibition showed exclusively Irish products. It was a sampling of the leading designers of the 1950s and Irish firms that were interested in design. This 1956 exhibition travelled from Dublin to Waterford, Cork, Limerick, Galway, and Sligo, and thus, for the first time, there was an attempt to reach a countrywide audience and to spread the gospel of good design (Turpin, 1986, p.7).

Apart from the Design Research Unit, the major movement to innovation in Irish design came from an influx of post-World War II Dutch -trained graphic designers. The training of the Dutch graphic designers was based on Bauhaus[5] principles, which they introduced into Ireland (Turpin, 1986, p.8).

The design profession was itself beginning to develop by the late 1950s. The Irish Packaging Institute was established in 1958, and in 1960 the Institute of Creative Advertising and Design was founded. Both were forerunners of the Society of Designers in Ireland, founded in 1972. By 1960, there was already significant design

[5] Bauhaus (1919-1933), was a school in Germany that combined crafts and arts, in order to produce industrial prototypes through a system of workshops.

awareness and a modern outlook in certain circles in Ireland; because of this, a more wide ranging initiative developed in the 1960s (Turpin, 1986, p.9).

The main Government agency that pushed for improvements in design for industry was Corás Tráchtála which was set up in 1952. It had taken over responsibility for design promotion from the Arts Council, through its new responsibilities as outlined in the Export Promotion Act of 1959, and confirmed in 1960 by Sean Lemass, Taoiseach in the Dail. This led immediately to the establishment in 1961 of a Design Section within Corás Tráchtála. William H. Walsh, manager of CTT and a former businessman, was thus in a strong position, having the confidence of the Taoiseach (Prime Minister) to recommend policy changes (Turpin, 1986, p.11).

In this advantageous position, Walsh became the central catalyst of the design reform movement of the 1960s. Walsh knew the value of design in marketing through his personal experience in private enterprise. He had a particular interest in contemporary design in Denmark, a country parallel in some respects to Ireland as it was small and largely agricultural. Walsh was instrumental in having a panel of distinguished Scandinavian designers visit Ireland to advise on what needed to be achieved in design. (In the 1950s, the Scandinavians were internationally acknowledged as design leaders in Europe) With Ireland's entry into the Common Market (1975), Irish products had to compete with foreign ones in a free-trade environment. This, too, was a spur to better design.

2.4 John Turpin

John Turpin traces the history of professional art and design education in Ireland from the 18th century to the present day. He writes extensively about the promotion of government and industry supported design organisations. Turpin notes many initiatives such the Kilkenny Design Workshops (KDW), Córas Tráchtála and the Irish Export Board that were granted administrative responsibility for improving standards of industrial design in Ireland. Turpin emphasizes how many of these initiatives have failed. Turpin also emphasises how art and design education has drastically changed over the years.

2.5 Government-Supported Design Organisations

2.5.1 The Scandinavian Report - Design in Ireland

In 1962, a group of eminent Scandinavian designers was invited to Ireland. Their report, *Design in Ireland*, was published. The report, a manifesto for modernism in design, was the most controversial one on the visual arts ever written in Ireland. They recommended that young Irish designers go to Scandinavia on study trips. They reserved their strongest condemnations for Irish art schools and particularly for the National College of Art which, '*as it is presently constituted cannot be a starting point for education of people in the different crafts or indeed for the education of painters, sculptors, or designers'* (Marchant & Addis, 1985, p.40). One of their particular theories was that design education was to be linked closely to architectural education; they envisaged a new Irish Institute of Visual Art including architecture to spearhead reform in design education. The main value of the report was not in the evidence it collected or its recommendations, but in its exposure of Irish design to the shock of international comment. The report came like a bombshell into the provincial and complacent atmosphere of Irish art and design education.

It was decided to create a community of experienced designers who, together with craftsmen and technicians, would interact, share resources and pool ideas, in prototype form, before being adopted by industry. The decision was made to seek a location outside Dublin. Thus, in 1963, Kilkenny Design Workshops was founded as a private company wholly owned by Córas Tráchtála. The KDW was the first industrial design practice set up by any Government but the exact role of KDW changed substantially in subsequent years.

The definitive history of the Kilkenny Design Workshops has yet to be written. It can be argued that in setting up an 'in-house' consultancy, Córas Tráchtála and the Government held back the development of a totally independent design-consultancy sector. Likewise, it could be argued that the creation of KDW showed what good design could achieve for Ireland.

As noted by Marchant and Addis, *'The broadening of Kilkenny Design's scope, from its beginnings in the traditional crafts to its interaction with Ireland's new industries, has been a hand-to-mouth affair, one successful project being used to gain the next'* (Marchant & Addis, 1984, p. 96).

This lack of an overall vision led to the elimination of Kilkenny Design as a force for Irish design. KDW closed in 1988.

It employed 130 people; 82 in the Kilkenny workshops and 48 in the Dublin and Kilkenny retail shops. It was financed by an annual grant-in-aid from the Department of Enterprise and by fee and royalty income – it was receiving £1 million per year in grants when it closed. (In 1981 the grant-in-aid was £688,000 and fee income was £136,000. By 1982 the grant-in-aid had gone up to £874,000 and fees had declined to £120,000. KDW expanded into the UK market and could not sustain the level of sales it required).

So, in actual fact, an initiative that was supposed to be a catalyst for change and growth in the industry actually had the opposite effect. Instead of providing opportunities for the indigenous design industry to grow, in many ways KDW neutralised the ability of indigenous design industry to develop effectively. (Stokes in Sheehan, 2009, p.106)

2.5.2 Design Ireland

Design Ireland, an initiative of the combined representative bodies of the Irish design community, was established in 2000 as a result of the Government review of the Irish design consultancy sector. The objective of Design Ireland is to inspire and encourage a positive understanding and utilisation of design by all strands of society, in particular business bodies and Governmental agencies, while internationally demonstrating the creative success and vitality of Irish Design (Design Ireland, 2009).

Design Ireland is the voice of the design industry in Ireland. It's a business-focused enterprise and encompasses all the design disciplines.

> Design Ireland grew out of the Enterprise Ireland-commissioned report *Opportunities in Design: Strategies for Growth in the Irish Design Sector* (1999): The Design consultancy sector in Ireland is fragmented and diverse, comprising many small design consultancy practices, operating within different design arenas. While there are a number of different industry associations ie. the Institute of Designers in Ireland, Royal Institute of Architects in Ireland (RIAI), the Graphic Design Business Association, Institute of Creative Advertising and Design, no one organisation represents the interests of all designers. As a consequence design is not represented

> at an industry level; there is no cohesion, poor networking, both within design areas and across design disciplines and little cross-fertilisation of ideas (Enterprise Ireland 1999, p. 20).

The Design Coalition document, *Design Ireland Background* (2000), notes that Design Ireland was funded with the sum of £225,000 from the Small Business Operational Programme (SBOP). Additional funding was initially provided to the sum of £50,000 in total per annum.

Tom Finlay notes in his Design Ireland study report:

> It was originally envisaged by the proposal to secure initial funding from the SBOP (Small Business Operational Programme) that Design Ireland would be self-financing after a number of years. However, this has not been achieved and I believe could not be achieved. Specifically, as Design Ireland was increasingly perceived as an umbrella representative body for the design industry, the individual constituent bodies saw it as usurping their roles and their potential revenue streams (Finlay 2003, p. 4).

Finlay also notes that,

> The board of Design Ireland should be added to without delay to include customers of design from both the private and public sectors. In addition, an independent chairperson should be appointed who has the necessary profile and business background (Finlay 2003, p. 2).

In 2006, Design Ireland developed the Design Ireland Skillnet. The Skillnet created a revenue stream used by Design Ireland to ensure its survival. With a structure that contained no mechanism to raise other revenue, Design Ireland existed on a voluntary basis, supplemented by Skillnet funding. However, with cutbacks in Skillnet funding in 2009, Design Ireland could no longer survive and ceased trading.

2.5.3 Mapping of Design Organisations

In 1998, InterTradeIreland was established under the Belfast Agreement to coordinate the work of business and trade development on an all-island basis. In February 2009 it published a study on the design-services sector on the island of Ireland. As part of this study, a report was commissioned by the Centre for Design

Innovation in Sligo, entitled *A Micro Study of Design Promotion and Design Support on the Island of Ireland*. This micro-study was published in April 2008.

The first proposition states that design promotion could be more effective at an all-island level, whilst the second proposition states that best practice in design support should be shared, where possible. In detail it states:

> The research has shown, that whilst there are plans North and South for growing the capacity of the main economic development agencies to manage and/or deliver design support programmes, nevertheless taken from a whole-island perspective, the design support is fragmented (with little sharing of expertise or information across the different providers) (Design Connect 2008, pp.31- 32).

The executive summary categorises the weaknesses: There are significant strengths in current provision of design services and support on the island of Ireland, however there are also opportunities to optimise areas of weakness and thereby enhance the competitiveness of businesses on the island. In particular, the fragmentation of design promotion and support activity leads to incomplete regional coverage, inconsistent messages, poor policy congruence and ineffective use of resources. The fourth proposition states that policies for design on the island of Ireland should be aligned with emerging EU policy for design (Design Connect, 2008, p. 3).

The proliferation of state agencies in the Republic and confusion as to their roles is not confined to the design sector. In 2004 the Enterprise Strategy Group published *Ahead of the Curve: Ireland's Place in the Global Economy*. It recommends:

> The Boards of Forfás, IDA Ireland and Enterprise Ireland should have a number of directors in common and in particular a common Chairperson. The enterprise activities of Shannon Development should be brought within the remit of Enterprise Ireland and IDA Ireland. The City and County Enterprise Boards (CEBs) should be integrated into the mainstream enterprise development system by establishing a Central Coordination Unit in Enterprise Ireland. This unit should provide central direction, technical support, shared services and quality assurance, to further enhance the effectiveness, efficiency and impact of CEBs (Enterprise Strategy Group, 2004, p. 115).

Such a central coordination unit could simplify and clarify design support in the Republic. What then of Northern Ireland? InterTradeIreland notes:

> It is clear that individually, each of the design support bodies and economic development agencies in both jurisdictions work very hard to promote the role of design and thereby build the market of potential clients. Indeed the approach taken by agencies North and South is very similar, so the natural question is how much more efficient and effective they might be if a consistent and coordinated all-island approach was taken (InterTradeIreland, 2009, p. 33).

2.6 Charting Our Education Future

In 1995, a Government White Paper on Irish Education was launched called '*Charting Our Education Future'.* This White Paper is the culmination of a lengthy and broadly based consultation process. It reflects a widespread desire among all the partners in education to take stock of the achievements and trends in educational provision and practice and to chart future directions *(Charting Our Education Future*, 1995, p.90).

This White Paper reaffirmed the fundamental importance of excellent teaching and learning, and seeks change and development for future education. In particular, it identified the need to develop new ideas, new knowledge and new applications of existing knowledge, through research. Higher education institutions also have a responsibility to ensure that all partners respond to the changing needs of students and achieve these changes.

This White Paper outlines policy directions and targets for future development including significant organisational developments. Within an enabling framework, it seeks to allow for flexibility to meet particular needs and circumstances, respects legitimate rights and responsibilities among the partners and the different levels of the educational system, and clarifies the role of the Minister and the Department of Education in educational policy and provision. It also indicates the manner in which an appropriate legislative framework will be provided for key aspects of educational provision in the future. This White Paper heralds a major programme of legislation (Bhreathnach, 1995, p1).

Major partners in education identified the need for sustained effort over time to implement the policies and decisions described in this White Paper. Carefully planned implementation strategies will also be necessary, consolidating the best

achievements of the past, while adapting to changing needs and circumstances in the future. These partners recognised that new approaches and firm commitment is needed to achieve such changes. Changes will continue to be implemented on a partnership basis, involving consultation with all the concerned interests where this is necessary and appropriate.

The Government will aim to provide, during its period of office, the resources for the development needs identified in this White Paper, within the framework of the budgetary parameters set out in the *Government of Renewal* policy document, including the acceptance of the Maastricht Treaty[6] expand and reference convergence conditions. The amount which can be made available in any given year will have to be decided by the Government in the context of its financial position and its other public expenditure priorities at that time. In this context, the Government will have the opportunity to consider any potential which may exist to reallocate resources within the education sector in the light of demographic changes *(Charting Our Education Future,* 1995, p.90).

This paper focuses primarily on the need for leadership and commitment across the education system. The education of students is fundamental to the role of the higher education sector. This teaching function seeks to impart a body of advanced knowledge and to develop the creative, critical, problem-solving and communicative skills of students.

This paper recognises that the best prospect for long-term success is for institutions to collaborate. This implies a diversity of institutions with distinctive aims and objectives within a shared philosophy of education. The State will respect the autonomy of the institutions to determine the ways and means through which they will fulfil their particular roles, within the overall aims for the system and the policy framework articulated by the Minister.

[6] Maastricht Treaty (formally, the Treaty on European Union or TEU) was signed on 7 February 1992 by the members of the European Community in Maastricht, Netherlands. On 9–10 December 1991, the same city hosted the European Council which drafted the treaty. Upon its entry into force on 1 November 1993 during the Delors Commission, it created the European Union and led to the creation of the single European currency, the euro.

2.7 Europe's Design Leadership - Design for Growth & Prosperity

In September 2012, the European Design Leadership Board set up by the European Commission under its Design and Innovation Initiative, handed its report, *'Design for Growth and Prosperity'* to Commission Vice-President Tajani in Helsinki. Antonio Tajani is the current European Commissioner for Industry and Entrepreneurship and has also been one of the five Vice-Presidents of the European Commission since May 2008.

The Commission has identified six strategic areas for policy action. They are the global stage, Europe's innovation system, Europe's enterprises, the public sector, the research system and the education system. The report sets out in detail the Boards 21 wide-ranging recommendations within these key areas.

This much-anticipated report, (which co-incidentally was edited by Michael Thomson working with Tapio Koskinen the Director of the Secretariat of the Leadership Board), if taken on board by the wide range of relevant and expert stakeholders intended, will have an impact in bringing a more systemic approach to policy-making for design at a European level. It will stimulate actions and programmes across Europe to assist in embedding design education as a key component of success for the benefit of all of Europe's citizens.

It targets both the private and public sectors as well as governments across Europe. It focuses on the needs of small and medium enterprises (SMEs) and seeks to support the journey of growth for medium companies with the ambition and capacity to become successful, design-aware, larger companies contributing to Europe's economy. And of course, it seeks to embed design-led innovation behaviours within the hundreds of thousands of SMEs that make up the greater proportion of Europe's gross domestic product (GDP) and where Europe's design innovation future will be determined. Design Research, design consultancy, design management and very importantly design education are all seen as key tools for user-centred, design-led innovation.

The report states that never before has so clear an opportunity existed for the Member states and regions to take bold action to enable a new level of awareness about the importance of design as a driver of user-centred innovation across Europe. According to Vice President Tajani, we must enhance design's long term

contribution to smart, sustainable and inclusive growth through increased competitiveness and the pursuit of a better quality of life for all the citizens of Europe. The response of the report has been to create twenty-one enabling recommendations that will drive a change in innovation behaviour and practice across Europe. The opportunity is to set in place framework conditions and infrastructure, supported through targeted measures and actions that will enable a far-reaching and long-lasting impact on Europe's design innovation capability.

The recommendations call for the development of Europe's competencies in design innovation as a key strategy for promoting growth and jobs. Within the context of continuous and life-long learning, they address the need for the inclusion of design learning in the general education of all the citizens of Europe, as well as within Vocational and Higher Education. Maintaining Europe's leadership position in the design sector is addressed through meeting the future competence needs of the design professions, as well as improving the design competence of the leaders and entrepreneurs of the future (Thomson & Koskinen, 2012, pp.10-11).

Whilst promoting the concept of design literacy for all, it still remains critical to Europe's future competitiveness that, in parallel, the highest possible quality of specialised design education and training is made available to Europe's current and future professional designers and design management practitioners. Embedding design as a fundamental aspect of the European systems of education and training is an ambitious vision that will require a long term, coordinated approach at both European and Member State levels. Priorities for action arise in a number of areas.

Changes to the education system are needed if the concept of Modern Craft is to be better enabled to produce practical artisans with added-value skills in design, modern manufacturing, (including digital technologies), business and entrepreneurship (Thomson & Koskinen, 2012, p.66).

The European model of design education has been exported all over the world with Europe boasting some of the world's finest, (and oldest), design schools. Many of the schools are internationally competitive with, for example, eight institutions featured in the 'Bloomberg 2009 Business Week D-Schools Top 32 Global List'. It is estimated that approximately 300–350 European design schools produce

somewhere in the region of 25,000 graduates annually (Thomson & Koskinen, 2012, p.69).

Europe's design schools already encourage entrepreneurship and support innovation skills with strong links to business and industry. However, this activity often remains at the level of a designed product or service concept. More could be done to help design graduates to engage with design's role in business as a strategy for innovation in order to help them develop strategic thinking skills for business.

Recommendation Sixteen is highlighted as it considers recommendations for the promotion of Design education. Considerable effort is required to bring design schools' connectivity with the public sector institutions up to the same level as it is currently in the private sector. Key points are noted:

- Increase the use of design/ designers in public sector innovation through establishing a Design Lab within the Commission to run small-scale demonstration projects showing the value of design-led public sector innovation
- Supporting designers' greater involvement in 'living labs' where social innovation and public services are critical challenges
- Exploiting the potential of the European Structural Funds, in particular the European Regional Development Fund on design innovation for social change across policy areas (Thomson & Koskinen, 2012, p.61).

The professional practice of design continues to evolve rapidly. Traditional discipline boundaries are blurring and the demands of clients are increasing in complexity as they face the challenges of the global economy. Europe needs to act strategically to build on strengths and to drive and maintain the global leadership of its design sector (Thomson & Koskinen, 2012, p.62).

Christian Guellerin, President of Cumulus, the International Association of Universities and Schools of Design, Art and Media and executive director of the acclaimed Ecole de Design Nantes Atlantique, supports the 2012 report *Design for Growth and Prosperity* but would have wanted the role of design education and design internships to be emphasized much more strongly. He continues to say:

> Designers will play a key role in new types of economic structures, those that are flexible, adaptable, and mobile. And companies will have to think differently. They will need to adapt to their model and their management to industrial mobility. The idea is not to relocate elsewhere, but to adapt to change where you are (Core 77 design magazine, 2012).

According to research, the Erasmus programme today takes the lead globally in the field of industrial design. For example, several Irish colleges and universities have shown great interest in carrying out cooperative projects with European colleges and universities.

Erasmus is the most successful student exchange programme in the world. Each year, more than 230,000 students study abroad thanks to the Erasmus programme. It also offers the opportunity for student placements in enterprise, university staff teaching and training, and it funds co-operation projects between higher education institutions across Europe.

The Erasmus programme aims to provide a platform and framework for the creation of sustainable, multilateral partnerships that link the education sector, Government and business communities to drive forward global, regional and national knowledge economies (The Erasmus Programme, 2012).

2.8 European Best Practice

As noted in the Methodology section, there are currently no best practice models existing for Creative Design courses in ROI. However, these do exist in the UK. The following papers identify best practice in the UK.

2.8.1 Multi-disciplinary Design Education in the UK

In November 2010, Design Council handed in its report, *'Report and recommendations from the Multi-Disciplinary Design Network'.* This report states that design and innovation are critical to the UK reaching its economic goals. Commercialising technology, and embedding innovation in the public sector, is vital for the country's future economic and social success.

This report states that in 2006, the Design Council set up a Multi-disciplinary Design Network, supported by the Higher Education Funding Council for England (HEFCE) and the National Endowment for Science, Technology and the Arts (NESTA), which aimed to facilitate the sharing of knowledge and best practice across universities, to

improve curriculum design and assess the impact of these new programmes. As well as organising and facilitating knowledge-sharing events attended by academics from more than 30 universities, it also arranged fact-finding missions to universities and design companies in the US, Scandinavia, China, Korea and the UK. These enabled academics setting up new courses and centres to benchmark their activity against international examples, and hear directly how multi-disciplinary design teaching is seen to be relevant to industry across the world (Design Council, 2010, p.6).

The british education system has championed the introduction of multi-disciplinary courses and projects, and design-led approaches have acted as the glue that brings course, faculties and researchers together. By bringing other disciplines into the design curriculum, particulary business studies and entrepreneurship and engineering and technology subjects. This enhances skills gaps identified by employers (Design Council, 2010, p.20).

2.8.2 Best Practices in Education Technology

In 2010, a White Paper on best practices in UK Education was launched called '*Best Practices in Education Technology'.* This White Paper identifies innovative projects and initiatives in the UK, where technology, is or was, used to support learning.

This Paper notes that is critical to look at the underlying conditions that provide the foundations of success, including culture, relationships and approach. The success of the model is contingent on the context, culture, and circumstances to which the model is applied (*Best Practices in Education Technology,* 2010, p.3).

This Paper discusses how recent education developments in many UK colleges have seen a move away from traditional delivery toward more collaborative models. Collaboration with industry, brings a wealth of knowledge and expertise to design students, while providing them with valuable insights and market edge. These projects illustrate how a partnership between local organisations and businesses provides new streams of income that can benefit education, society and the commercial technology sector (*Best Practices in Education Technology,* 2010, p.4).

Case studies suggest that industry collaboration can help students engage more directly with learning, and gain confidence in their own skills. Industry collaboration has been promoted as an example of good practice by key education authorities in

the UK and also works with partners in other countries to introduce it as an alternative form of education for various target groups (*Best Practices in Education Technology*, 2010, p.5).

2.8.3 The Higher Education Academy Strategic Plan 2012–2016

The HEA (Higher Education Academy) is a UK national body for enhancing learning and teaching in higher education. The purpose of The HEA is to bring about positive change across higher education institutions in the UK and to improve outcomes for all students.

The HEA regularly reviews, identifies and supports changing priorities that are relevant to the development of best practice in higher education. The HEA also applies expertise and knowledge to push boundaries and foster a culture of innovation in all disciplines across UK institutes (HEA, 2012, p.7).

Through collaboration with higher education providers, funding bodies, academics, students, researchers and industry, the HEA can research and share best practice, to shape and implement policy. These professionals and researchers share common ideas and seek best practice on the basis of their expertise.

2.8.4 Enterprise and Entrepreneurship

In 2012, QAA (Quality Assurance Agency for Higher Education) published the UK Quality Code for Higher Education (the Quality Code). This covers a range of matters to do with the design and delivery of undergraduate and postgraduate provision and the management of students' academic experiences. It is intended to be of practical help to those working with students in higher education to foster their skills in enterprise and entrepreneurship (QAA, 2012, p.1).

This guidance reflects current thinking in enterprise and entrepreneurship education. It is intended to illuminate contemporary best practice in order to inform, enhance and promote the development of enterprise and entrepreneurship education among higher education providers in the UK. This guidance is intended to help practitioners seeking to embed enterprise and entrepreneurship across the curriculum.

The call for a greater emphasis on enterprise and entrepreneurship education is compelling. Driven by a need for flexibility and adaptability, the labour market requires graduates with enhanced skills who can think on their feet and be innovative

in a global economic environment. There is an acknowledged need, as well as a political imperative, for an infrastructure that supports and enhances enterprise development across the curriculum (QAA, 2012, p.2).

QAA actively seeks to promote teaching and learning strategies that will foster enterprising and entrepreneurial mind-sets, and encourage students to consider new venture creation and self-employment as valid graduate career options. This will help them to learn new skills allowing them to contribute to economic growth and to society more generally (QAA, 2012, p.3).

2.8.5 Funding

In terms of financial support, the UK also has many registered independent charities with a mission to help people and organisations bring great ideas to life.

NESTA (National Endowment for Science, Technology and the Arts) is a charity in the UK whose mission is to advance education, and in particular the study of innovation, by the promotion of research and the publication of the useful results in: Science and technology, the arts, the efficiency of public services, the voluntary sector and social enterprise, industry and commerce.

They do this by providing investments and grants and mobilising research, networks and skills. Nesta works with organisations that deliver initiatives to promote innovation. Ireland could follow by example as there are currently no registered charities in Ireland (NESTA, 2013).

2.9 Why does Design Education need to adopt a 'Professional Approach'?

In the present economic climate, Design education is facing an ever increasing challenge between balancing core skills and the demands of entrepreneurship. Design education in ROI will require some substantial reforms if the Irish design industry is to compete with established industrialised nations on the global stage. Graduates need to be able to serve both local and international clients with professional skills and vision for the future.

To encourage and sustain Creative Design graduates and prepare those graduates for creative industry, Design Courses must increase the number and quality of students and create graduates who are entrepreneurial thinkers and doers. Such courses have a duty to explore how they can develop and deliver a framework for embedding entrepreneurship education and to fulfil the aim of Creating the Entrepreneurial Graduate (ACE Initiative, 2012).

Tom Kelley is a business consultant, author, and public speaker who is globally recognized as an expert on innovation, design thinking, organization design, and related business topics.

In 2008 in his book *The Ten Faces of Innovation: Strategies for Heightening Creativity*, he commented that, Innovation had recently emerged as one of the hottest topics in design. Experienced people can tell you how a new venture might fail, but entrepreneurs have the enthusiasm, confidence and naiveté to 'wing it' anyhow. Great products and services are usually inspired by a deep understanding and empathy for the people who use them. One of the best ways to develop or inform that empathy is by observing real people in real life settings.

Ethnographical studies have become popular in design education. Ethnographic studies are interviews, observations and participant observation. Participant observation involves spending a great deal of time with and participating in the everyday lives of the users (Helander, Landauer & Prabhu, 2013). This is a useful method as it builds on relationships between the designer and user which leads to better products and services.

Most successful projects are undertaken by groups. If you can foster 'hot groups' in your organization, you can build your own innovation factory. Research evidence

supports multidisciplinary team working as the most effective means of delivering a successful product or service (See appendix 2).

Multi-disciplinary teamwork facilitates the sharing of knowledge and best practice across Creative Design courses, to improve curriculum design and assess the impact of new programmes. Multi-disciplinary design teaching is seen to be relevant to industry across the world.

Mind-mapping also takes practice, and the more open participants become the more rewarding the experience can be.

In their enthusiasm for new concepts, innovators sometimes overlook barriers that can stand in the way. If innovators anticipate those barriers, whether they be social, cultural, financial or technological, they can often find ways to overcome them. Most organisations plan next year's strategy by extrapolating from the present. A valuable alternative is to envision the future, and then work backwards. Design courses must collaborate and have a vision of the long-term direction of technological and social change. This may enhance graduates to be better positioned to compete in the near-term future for employment (Kelley, 2008, p.6).

2.10 Creativity

Creative thinking in all areas of Creative Design is a must in today's extremely competitive world, due to the high demand of highly skilled and innovative designers.

Creative thinking is the first step to innovation, which is a desirable feature of a design graduate. Creativity or creativeness is a mental process involving the generation of new ideas or concepts, or new associations between existing ideas or concepts (Creativity, 2013). Innovation is the process of selecting/combining, refining and turning the best creative ideas into reality. Both are equally important for Institutes and companies to be competitive. Investing generously in education to tap into future professional's creative capacities is viewed as one of the top priority items for Higher Education (Chung & Shaw, 2006).

In Creative Design education, creativity, according to stakeholders is classified as a higher order thinking skill. Encouraging this type of skill is a desirable teaching goal in every Creative Design studio. Stakeholder's state that with any Creative Design

course there needs to be a culture of innovation and creativity with a view to commercialisation for the benefit of the user and the environment. Stakeholders also note that the design process and studio based education in its essence produce self-motivated driven designers that understand commercialisation, creativity and ethics (See appendix 6, qu.7).

Edward De Bono currently holds the Da Vinci Professor of Thinking chair at University of Advancing Technology in Phoenix, USA. He was one of 27 Ambassadors for the European Year of Creativity and Innovation 2009.

He has taught his thinking methods to government agencies, corporate clients, organizations and individuals, privately or publicly in group sessions. He has started to set up the World Center for New Thinking, based in Malta, which he describes as a *'kind of intellectual Red Cross*' (De Bono, 2009, p.7).

In many of Edward De Bono's books, he calls for the important need for creative thinking as a constructive way that is deliberately designed. De Bono, in his first book *The Mechanism of Mind* (1969) wrote of the importance of disrupting the dominant patterns preferred by human brain design, in order to facilitate potential creative abilities. Many of de Bono's speculative models about how the brain works were vindicated by later brain research. De Bono proposes that most of the problems in thinking are perceptual. Many more mistakes are made by jumping to the wrong conclusion too soon than by thinking irrationally once factors are known. Creativity should be producible on demand. Formation and design from new ideas cannot merely be left to chance. Because of these opinions, de Bono continues to invent ways to teach creative thinking as a separate skill.

2.11 Teamwork

Teamwork is an important aspect of any Creative Design course or design profession. As stated by stakeholders: '*Team training promotes teamwork and enhances team performance'* (See appendix 11, qu.7).

A single brain can't bounce different ideas off each other. Each team member has a responsibility to contribute equally and offer their unique perspective on a problem to arrive at the best possible solution. Teamwork can lead to better decisions, products, or services (Benefits of Teamwork, 2013).

In his most recent book *Lateral Thinking: A Textbook of Creativity* (2009), De Bono states that the real secret to success is in the selection of the team. In a design consultancy good teamwork is essential. If teaching staff and students can apply the same method to the studio then they will be more equipped to apply this in the real life situations encountered after graduation.

Almquist, J and Lupton, J (2010) stress that *'Some techniques will work for you, some will not'*. This is something design courses can work on. Great team work is crucial in all aspects of industry. Design courses should focus on putting students together to form dynamic teams to prepare graduates for life after college. One of the important reasons for forming teams is the ability to bounce different ideas off each other. Teamwork can lead to better decisions, products, or services. Every team member can offer their unique knowledge and ability to help improve other team members. Through teamwork the sharing of these qualities will allow team members to be more productive in the future.

This also is supported by student findings. Question 5 (See appendix 2) asked students '*Who contributed to your project design criteria?'* This question sought to establish who contributed to the definition of the project's design criteria.

All of the respondents interviewed had a large number of people contribute to their projects. As part of their research, respondents noted that they met with many people such as academics, hospital patients, manufacturing companies, design companies, emergency services, other students and the general public. Research suggests that students that utilize a methodology of team research are able to propose more balanced project solutions.

Statistics show that 60% of students who worked alone on their Final Year Projects, from concept to product realisation, did not go any further with their designs after their final Graduate show (See appendix 2, qu.15). The majority of student projects were also self-selected. Research suggests that students that work completely alone and choose their own projects often lack the confidence to pursue their designs. Teamwork is essential when designing new products and services and will also aid in pursuing potential investment.

2.12 Innovation / User Centred Design

In his book *The Ten Faces of Innovation* (2008), Tom Kelley also emphasizes that products and services are usually inspired by a deep understanding and empathy for the people who use them. One of the best ways to develop or inform that empathy is by observing real people in real life settings. Success depends on both what you do and how you do it. We all have a creative side, and it can flourish if you spawn a culture to encourage it, one that embraces risks and wild ideas and tolerates the occasional failure. A worthwhile innovation will capture the public's imagination and strengthen the company's brand. It is essential to ensure that both designers and clients are part of the observation process and that the discovery process is organic because it's not enough to see or hear what people say. It is necessary to interpret and intuit shades of meaning to divine their underlying motivation or needs. Sometimes even the best innovations fail because of simple, preventable miscalculations.

Successful innovations recognise that people don't always do the right thing or make the necessary leaps to bridge the gap between familiar and genuinely new ideas. Tom Kelley supported this in 2002 when he stated that *'Widespread adoption often takes time'* (Kelley, 2002, p12). Astute observation is one way to shorten that cycle and make great products that users will accept.

Roberto Verganti is a Professor of Management and Innovation at Politecnico di Milano, Founder and Chairman of PROject Science and an expert in Innovation and Research in Design.

In his book, *Design-Driven Innovation,* Verganti (2009) argues that there is a *'Third Way of Innovation'*, driven by meaning, or to be more precise, by those cultural interpreters who have the ability to make sense of things and give existing things new meaning — and thus create new markets. He states, '*Consumption-driven wealth and status are being replaced by identity, belonging, and a strong desire to contribute and do something meaningful rather than just acquire things'* (Verganti, 2009, p.15).

Verganti emphasizes that '*Innovation allows the success of any activity'* (Verganti, 2009, p.16). This is particularly true for business and, even more so, in the challenging times we are living in. Verganti's passionate and accurate study offers

valuable information and a fundamental reference for all those interested in design and determined to pursue innovation as a driving factor in their education.

Verganti asks the question *'Can design save the world'?* He states: '*No, but it can definitely help make it better, especially if integrated within the systems that already have direct impact on the economy and on policy-making'* (Verganti, 2009, p.21).

2.13 Design Professionals

The following individuals were reviewed as they had a key role in placing design on the agenda of Government and business in both Ireland and Europe in recent years. All individuals state why they feel governments play a key role in the promotion of design.

2.13.1 Toby Scott

Toby Scott set up the Centre for Design Innovation when he moved from London to Ireland early in 2006. He was previously a Director of the Design Council in the UK where he played a key role in placing design on the agenda of the Irish Government and business as a means of generating competitive advantage. He is part problem solver, innovator and facilitator; interested in concrete ideas that are affordable and work in practice.

He has been working in this way for some years in a number of environments, as a government advisor on innovation and creativity, as a policy maker within the arts and creative industries and as business consultant. He has evolved a participative, inter-disciplinary approach that he believes is best suited to solving some of the more complex, systemic economic and social issues of our time. (Centre for Design Innovation, 2013)

Scott was interviewed in 2009 as a direct result of his position as forthcoming president of the Institute of Designers in Ireland (2009). The IDI is the professional body representing the interests of Irish designers. Its function is to promote high standards of design, to foster professionalism and to emphasize designers' responsibility to society, to the client and to each other.

The Institute represents designers from different disciplines that practice in Ireland. Formed in 1972, the Institute is recognised at national, EU and international level as

the representative body for the Irish design profession. The members, whether they are in private practice or in salaried employment, work in the fields of consumer and capital projects, interiors and exhibitions, textiles and fashion, all aspects of visual communication, new media, design management and design education.

Scott's background is mixed between the creative industries and advocacy within the creative industries. During the interview, Scott was asked '*Who do you think should take primary responsibility for the promoting the interest of design'?* Scott emphasizes that it comes down to an issue of market failure. He stated,

> Let's assume that we are in a very open economy which is predominately market led. We are not a command economy, we are not a socialistic economy, and we are quite open. But having said that, the government in Ireland has taken a view which is to support various parts of the economy where there is what I would describe as market failure. That is to say that normal market forces have meant that certain activities don't happen (Scott in Sheehan, 2009, P.141).

Scott argues that an understanding and an appreciation of the impact design can have on business is one of those areas and the reasons for that market failure are really straightforward. They are similar to other European countries but there are a couple of things which are very particular to Ireland. He noted that what's particular to Ireland is that it has no great industrial heritage. He also noted that he doesn't mean that in any way to be rude, but it didn't experience the industrial revolution in the same way that other countries did (Scott in Sheehan, 2009, p.141).

Scott also emphasizes that particularly in Irish businesses, without any industrial heritage, there is no great tradition of industrial design and therefore limited awareness of the impact that the design profession can have on everyday objects. That's a problem. Jackson also stressed that,

> Ireland is very similar to other countries in that there is a degree of risk aversion around the use of design, because it is investing upfront in something which needs to be validated only by experience. It can't be pre validated, that's a problem. There's a cost issue, it's perceived as being expensive and that then is very hard to calculate or justify that expense at the early stage of a product (Scott in Sheehan, 2009, p.142).

Scott also noted that there is a lack of skill both at managerial level and in organisations and doesn't think that there is an enormous amount of design skill

being taught at an academic level. (Scott in Sheehan, 2009, p142) He feels that Ireland fails as a country when it comes to industrial design and that is without even touching the areas of interaction design, service design, experience design and some more challenging areas (Scott in Sheehan, 2009, p142).

In relation to this question, Scott was asked '*Would you see it as a role of the government to promote design'?* (Scott in Sheehan, 2009, p.142).

Scott noted that we do have market failure and if we have market failure then it is the role of the State, because the State has indicated it will do that in other circumstances (Scott in Sheehan, 2009, p.142). He argues therefore that it is the role of the state to intervene and adjust for market failure.

He gives an example where he thinks the industry should be supporting itself. The Government needs to do two things: one is to encourage demand by demonstrating the impact that design can have, but it also needs to work on the supply side, to undertake some activity which better aligns the education of young designers to the future needs of an economy.

Scott feels that Ireland is preparing designers very badly for a new economy. He states:

> We are still teaching them to do things which were relevant twenty years ago and in the end design has changed. The role of design has changed fundamentally: it's not that it's no longer about two and 3D rendering but it is increasingly about facilitation and collaboration and co-creation. I'm not that sure we are educating people particularly effectively to learn those behaviours and then apply them effectively in the workplace (Sheehan, 2009, p.143).

Scott stressed that the job of government is to encourage education to provide the right sort of people that we need and create demand within business to ensure that it is using design more effectively, because it works.

Another question asked was '*With the exception of architects, why do so few designers join professional design organisations'?*

Scott noted that is mostly to do with the structure and scale of the industry. As he had previously done numerous surveys on this topic, one in Ireland on behalf of InterTrade

Ireland and three in the UK on behalf of the Design Council, he knows what the industry looks like. He states that the first reason is because the economy is bad, and the second reason, which is just as important, is because there is no need.

The last question Scott was asked was *'Would you welcome a Design Council, an all-Ireland one'?* In his reply he emphasized that he would very much welcome such a Design Council. He stated that ultimately an all-Ireland one would be best, as design promotion is better done on an all-Ireland level, in order to simply benefit from economies of scale (Scott in Sheehan, 2009, p.146).

2.13.2 Michael Thomson

Michael Thomson, consultant, design strategist, facilitator, keynote speaker and founder of Design Connect was also interviewed by Sheehan in 2009 in relation to his professional design background.

In 1995, Thomson set up Design Connect working internationally on design strategy: working with design companies helping them understand where they are going and working with Governments on design policy. An expert on national design policy, Thomson has worked with Governments and their national and regional design promotion bodies in the UK, Asia, Austria, Iceland, Ireland, Italy, and Qatar.

Thomson initiated and led the introduction of design as a key policy issue for the European Commission and managed the lobbying process with The Bureau of European Design Associations (BEDA) that helped to drive the inclusion of design into Europe's innovation strategy for the first time in 2010. He also served as (BEDA) President from 2007-2009. Thomson previously served on the Board of ICSID, the International Council of Societies of Industrial Design from 2001-2005.

During the interview, Thomson was asked *'Who do you think should take primary responsibility for the promoting the interest of design'?*

Thomson noted that he thinks that is a wider discussion than the practice of design. He stressed that it relates back to strategy for the economy, it relates back to the bigger dimension, the bigger picture of innovation and innovation strategy. He stated that if you see design as a component of a bigger picture for economic growth or development of a nation, then design hopefully can be represented by many other

types of players, the stakeholders other than just designer's per se (Thomson in Sheehan, 2009, p.154).

Thomson emphasized that designers need to be involved and engaged in those levels of discussions to be able to bring the credibility of practice as it is today into those discussions. There often is a very understandable, identifiable concern from practising designers that the organisations of government or other types of bodies, such as Business Links in the UK, don't really understand design and in a sense that, at various levels is true. Thomson noted that the higher you go up the political value chain, the discussion of whether or not the design sector should receive Government support is simply not a decision that designers alone can make. You have to involve other stakeholders in the game (Thomson in Sheehan, 2009, p.157).

2.13.3 James Dyson

James Dyson is a British Industrial Designer and founder of the Dyson Company[7]. Dyson plays a key role in the promotion of Design through his annual international design competition for designers and engineers.

The *James Dyson Award* supports designers not only with monetary prizes but also by promoting and recognizing good quality entries. As a result of entering the competition, aspiring designers were able to set up their own companies. Many designers noted that the international exposure opened many doors from television appearances to meetings with government officials (James Dyson Award, 2013).

Dyson is best known as the inventor of the Dual Cyclone bag-less vacuum cleaner, which works on the principle of cyclonic separation (James Dyson, 2013). Dyson famously went through 5,127 prototypes of his Dual Cyclone bag-less vacuum cleaner before settling on the model that would make him a billionaire. His company now also makes blade-less fans and energy-efficient hand dryers, and operates in 49 countries.

While growing a successful global company and amassing a $1-billion personal fortune, James Dyson has become a tireless advocate for young entrepreneurship. He

[7] Dyson is a British-based company and manufacturer of bag-less vacuum cleaners that use cyclonic separation, bladeless fans, brushless electric motors and heatless dryers. While initially made in England, all of its products are now made in Malaysia and its brushless electric motors in Singapore.

believes governments have an important role to play in inspiring innovation. He feels the government should nurture those who have entrepreneurial spirit, turning fledging ideas into patentable, exportable technology. He has called for government supported investments for young entrepreneurs, particularly in Ireland (ASME, 2013).

2.14 Summary

The role of industry and government-supported design organisations has been investigated. There have been numerous government initiatives to fund design. Many of these initiatives have failed. This research shows that ROI is not currently participating in the organisation of design at a European or international level. Best Practice models exist in the UK and their recommendations need to be studied, and considered in an Irish context.

Clarification of the roles and responsibilities of all organisations is essential in reducing overlap and wasted resources. The structure of the organisations must be streamlined. Resources are limited and must be used to their full advantage. It is essential for Design education in ROI.

As stressed by Scott, Thomson and Dyson, Design Initiatives are crucial to aspiring designers. Today's young designers face an opportunity divide, a gap between those who have the access, skills and opportunities to be successful and those who do not. Closing this opportunity divide is essential to secure the future of designers. The Government must create design initiatives to create more opportunities.

Through partnerships with governments and businesses, designers can realize their full potential by connecting them with greater education, employment, and entrepreneurship opportunities.

3.0 Methodology Chapter

3.1 Introduction

A research gap exists relating to design courses in ROI and there is a lack of focus on commercialisation in design courses. The purpose of this research is to examine how Creative Design education and Design practice is conducted in ROI and what support and assistance is in place for design students to commercialise an innovative product or service. Research shows that the majority of design students do not explore the commercial realisation of their projects (See appendix 2, fig.6). 81% of students stated that they did not explore their Final Major Projects further due to lack of time, a lack of knowledge of how or where to seek potential investment and funding, for project realisation.

Based on this observation, the rationale for this research is to close the research gap by exploring the understanding of the practice of Creative Design education in ROI. The significance of the research is to identify the current best practices in this area and is of relevance, interest and value to the practice of Creative Design education today.

In developing an understanding of the barriers to commercialisation, this thesis identifies the people involved and examines the complexity of these barriers. This is followed by a perspective of how area of commercialisation in design education has impacted on Irish institutions in previous years. The main area of focus is the commercial routes, IP policy, finance and funding, design supports and teaching practice. This is undertaken through an analysis of data gathered from a design survey (including 30 design graduates), case study research and stakeholder interviews.

This chapter identifies the approach taken to the research design, the methodology used and defines the collection of the data that attempts to answer the research question ‘An investigation into the commercialisation of Final Year projects within Creative Design courses’. The primary methods of research include: surveys/questionnaires with Creative Design students at Institute of Technology Sligo, Dublin Institute of Technology, Limerick Institute of Technology, Carlow Institute of Technology, National College of Art and Design, business professionals and interviews with academic/legal professionals. All of the respondents interviewed had a background in Creative Design. Their insight into Creative Design education

and more specifically the commercialisation of final year projects was a major contribution to the research approach.

Secondary methods of research include: Design Reports, Intellectual Property Policies, of Institutes, academic books and articles on Design education and entrepreneurship, creativity, teamwork and innovation, online journals, databases, newspaper articles, documents and papers. This chapter details the aims and objectives, analysis, ethical considerations, findings and conclusions in relation to the research.

3.2 Research Aims and Objectives

- To investigate the commercialisation of final year Product Design student projects
- To identify the best practice for Design education
- To identify Intellectual Property rights with regard to the commercialisation of student work after college
- To identify the legal implications and requirements for the commercialisation of products and their application to undergraduate design projects.

3.3 Research Process

The research process involved a literature review, quantitative (questionnaires/survey) and qualitative (interviews) that lead to a triangulation being formed.

A mixed method approach of both quantitative and qualitative research was used in gathering primary data with a combination of semi-structured interviews and surveys/questionnaires with Creative Design students, academic professionals and business professionals. A quantitative method was used to gather data from surveys/questionnaires drawn from creative design students. The purpose of this was to determine how Creative Design courses are run in all Institutes of Technology in ROI and to establish if there was a best practice model currently being used. This method was used to achieve the widest possible range of viewpoints of those actively participating in the learning of Creative Design.

A qualitative method was important for gathering data in the form of semi-structured interviews with academic professionals and business professionals. This method was used to achieve the widest possible range of viewpoints of those actively participating in the teaching and practice of Creative Design.

3.4 Primary Research

The main method adopted is case study research. Five chosen successful projects and five chosen commercially unrealised projects formed the basis of the cases. The case study research highlights the barriers and steps to commercialisation. Each successful project has key findings on how they broke the barriers to commercialisation. Each commercially unrealised project has key findings on what barriers they faced when trying to commercialise their Final Year Project. These findings are critical to the thesis as they illustrate key points that future designers can follow when trying to commercialise their design output. Questionnaires and surveys were handed out to Creative Design students. This lead to a qualitative technique of semi-structured interviews been carried out with academic professionals and business professionals.

3.5 Quantitative Research

3.5.1 Administration of Survey/Questionnaires

An invitation to participate in an online questionnaire was sent to Creative Design courses in five 3rd level Institutions in 2012. These courses were identified as offering Bachelors' Degrees in product, industrial or creative design. A total of 30 design students responded.

The questionnaire contained 12 questions (See appendix 5), of which the first was administrative, to ascertain the breadth of response and the following 14 questions were open ended. This gave the option for academics to specify their own answers, or entering their own thoughts in the additional comments section.

Students were provided with a range of questions in relation to their education experience, asked to identify what is currently taught on their courses and asked to select which design requirements 'could' or 'should' be taught on their courses specifically related to Creative Design.

3.6 Qualitative Research

3.6.1 Interviews with Professionals

Academic professionals, business professionals and one legal professional were contacted by email. A cover letter with a description of the research was attached with a semi-structured questionnaire and forwarded by email in advance of the interviews. The interviewees were specifically chosen because of their professional expertise and knowledge in the area of Creative Design. Four semi-structured questionnaires were carried out with academic/ business/ legal professionals in order to obtain information on Creative Design. Eight semi-structured interviews with academic professionals, ten semi-structured interviews with business professionals and one semi-structured interview with a legal professional were conducted.

Interviews Conducted

Interview	**Administration**
Academic Professional	Face to face / Via email
Business Professional	Face to face / Via email
Design Students	Face to face / Via email (Questionnaire and Focus Groups)
Legal Professional	Face to face

Table 1

In the case of design students, all of the interviewees were asked the same questions in relation to their education experience. The opening questions were closed questions, and gradually the questions were altered to more open questions, leading to more complex discussions as the interview progressed. The purpose of this approach was to establish the best practice of design education. An investigation of the commercialisation of final year Creative Design students' projects was subsequently undertaken. The information gathered from the student body (30 past students) formed a statistical analysis of the research.

The interviews conducted allowed the researcher to identify the legal implications for the commercialisation of student projects and criteria to selection of case studies. Respondents in this study noted their personal experiences with regard to the

commercialisation of their Final Major projects. 10 of the 30 students interviewed went down the commercial route. 5 had reached project commercialisation and 5 had commercially unrealised projects. These students formed the case studies. Case studies were used as each study identifies key points in commercialising a product or service idea.

Academic professionals were questioned in relation to the current practice of Creative Design courses in ROI. The interviewees are senior academics from different design courses so as to achieve an accurate all ROI view. Each academic highlighted the different aspects of their programmes that helped to get student projects to market. All academics commented on their current methods and outlined their best practice model. They highlighted many points which could add to a best practice model for all ROI Creative Design courses. There are no current best practice models for Creative Design in this respect. However, these do exist in the UK as discussed in the Literature Review.

Two Erasmus students were interviewed in relation to their design education experience. Both students were asked about their experience in both ROI and Spain and how the course differentiated in terms of support, finance and modules taught. Each student was also asked what changes they would make to improve the Creative Design course in ROI. It was revealing to find out how the courses varied and what each thought was the best practice. Both interviewees made recommendations on how to improve Creative Design courses in ROI.

A legal professional was questioned in relation to design student's intellectual property. Research shows that students are unaware of their Intellectual Property rights and as a result of this do not explore the potential of their projects further. Intellectual Property Law is a necessary aspect of every Design course. It is essential for designers to be aware of their IP rights.

Stakeholders were questioned in relation to the commercial development of their projects following their college experience. The semi-structured approach allowed for some variation in the questions asked of each interviewee. All interviews were conducted face to face to accommodate a semi-structured approach. In this respect, it was necessary to travel to Sligo, Dublin, Galway, Longford and Offaly to ensure that the appropriate interview could take place. All of the interviewees were asked a

common set of questions, irrespective of their background or position. The exact phrasing of each question was slightly modified to reflect the interviewee's background, but the overall structure and format was consistent. The questions were not outlined in advance so as to allow a free flow of thoughts and ideas, rather than methodical and overtly structured answers.

Entrepreneurship programme managers were interviewed as each had vast experience and knowledge in design support, promotion and entrepreneurship. These entrepreneur development programmes are currently being delivered at a local level by the 3rd level Institutes. The programmes are designed to help creative designers, who have an innovative business idea, to establish and run their own companies. These programmes provide the designer with a package of supports to help accelerate their products development and to equip them with the skills and contacts that they need to be future business leaders (See appendix 10).

The Programme Manager in the Business Innovation Centre, Sligo, was interviewed in regards to the New Frontiers entrepreneur development programme. As programme manager and past lecturer in IT Sligo, she has great experience and knowledge of design support and promotion.

The Programme Chairperson of the Accelerating Campus Entrepreneurship Initiative (ACE) was interviewed in regards to the Initiative, as it involves a joint collaboration between many Institutes in ROI. She also has vast experience and knowledge in design support, promotion and entrepreneurship.

The final interviewee was the Technology Transfer Officer at Sligo Business Innovation Centre. As manager of the Innovation Centre, the interviewee has extensive experience and knowledge of commercial aspects, funding support and promotion. The Technology Transfer Officers questions were related to the conclusions derived from the research.

3.7 Analysis of Survey/Questionnaires

All data was analysed using a triangulation method thus formulating conclusions and recommendations. There are different systems that can be utilised for data analysis encompassing, broad questioning, categories, coding, fine-combed analysis and generalisation. Valid generalisations were used for the qualitative recorded

interviews and questionnaires. When the survey/questionnaires were completed by all participants the data was then analysed. The findings were then presented in a statistical format with the aid of charts to illustrate results to determine case studies and to establish the best practice in each institute.

3.8 Reliability and Validity

It was important that the correct methods were chosen and justified to solve the research question. Given the disciplinary background and the exploratory nature of the study, case study and in depth interviews were deemed appropriate. The transcriptions are printed in full to allow other researchers to validate the conclusions of this study.

3.9 Scope

The research question contains an ROI dimension. All interviewees are from design institutions and design companies within the ROI.

3.10 Summary

This dissertation takes an empirical approach and that it was necessary to obtain, collect and analyse primary data in order to answer the research question. The study is a project that aims at finding the best practice model for all Design courses in ROI. The research methodology uses a phenomenological approach, seeking to ascertain the interviewees' experiences to inform the answer.

Qualitative interviews form the basis of the primary research. The sample size, whilst small, allows for in-depth analysis of the subject and a rich variety of responses to emerge. The transcripts were published, allowing the validity and reliability to be independently assessed, as well as allowing other researchers to utilise it for further research. The scope, although wide, is defined, and the interviewees have the breadth of experience and knowledge to inform answers to the research question.

This chapter states the research paradigm and methods used in this research. It explains the interview procedures, and other issues in the initial interview process, of which results will be presented in the following chapters.

4.0 Creative Design Education in Republic of Ireland

The National College of Art and Design (NCAD) started as a private drawing school and has become a national institution educating over 1,500 day and evening students as artists, designers and art educators. The College was founded in 1746 as a private drawing school. This school was taken over by the Dublin Society and later the Royal Dublin Society (RDS).

Throughout the eighteenth century there were three schools: Figure Drawing, Landscape and Ornamental Drawing and Architectural Drawing. In 1811, the school of modelling was added. The Department of Science and Art, in London controlled the institution from 1854 - it was renamed the Dublin Metropolitan School of Art in 1877. Control was taken by the Department of Education in 1924, and in 1936 it became the National College of Art.

The college was established as the National College of Art and Design in 1971 by an act of the Oireachtas and is now governed by a board (An Bord) appointed by the Minister for Education (National College of Art and Design, 2013).

In 1975, the Faculty of Design at National College of Art and Design (NCAD) was established.

Michael Ozmin, the Head of Faculty of Design at that time, proposed and developed a course of Industrial Design, in collaboration with Peter Hogart in the National Institute for Higher Education at the University of Limerick. It was one of the first collaborative courses of any kind in the country, and represented a major step forward for Irish Design. In 1976, the college had its first intake of students in the Industrial Design Department (The Irish Times, 2011).

Table 2 discusses Creative Design in Ireland within a historical context. Developments of Creative Design education are shown.

History of Design Departments

Name of Institute	Established	Degree offered
Institute of Technology Sligo (ITS)	Industrial Design was established at the Institute in 1989. It offered a Diploma in Industrial Design.	IT Sligo BDes honours since 2005.
Dublin Institute of Technology (DIT)	DIT was established officially in 1992. DIT started its Product Design course in 2003.	Four year Honours BSc programme since 2003.
National College of Art and Design (NCAD)	In 1975, the Faculty of Design at National College of Art and Design was established. The Industrial Design course began in 1976 as a University of Limerick (then called National Institute for Higher Education, Limerick) and an NCAD joint course. The joint arrangement was discontinued in 2006 when NCAD became a recognised college of the NUI.	NCAD BDes Honours since it began in 1976.
Institute of Technology Carlow (ITC)	Industrial Design has been taught at the Institute of Technology Carlow, since 1977.	ITC BDes Honours since 1977.
University of Limerick (UL)	Established in 1976 in collaboration with NCAD. UL taught the first year of the NCAD Industrial Design course until 2006. In September 2006, Product Design and Technology in UL took in its first tranche of students.	UL Honours BSc. course since 1976.

Table 2

Though Irish Creative Design education and the profession itself are gaining more and more attention, ROI is not participating at the same level as many international courses.

Creative Design education in ROI is the teaching of theory and application in the design of products and services. In recent years the impact of new technologies has

seen Creative Design education shift its focus from solving design problems to solving problems in terms of business sense such as marketing, entrepreneurship and business plans (See appendix 6, qu.7). The design process has always involved elements of researching and product design but the new design approach includes ways of eliciting user needs by focus groups and user observation techniques.

Until the late 1980s, the designing process in education tended to take place in isolation, away from the final user. Users would only have been involved in post-production evaluation when only slight amendments to the design are possible. Whatever efforts were made to simulate live projects, there is inevitably a distance between a design student and the client, real or simulated, and the equally inevitable problems of accessing real users within the constraints of timetable and educational curriculum (Weightman, 2013).

'Live' projects are now becoming an important part of the curriculum. 'Live' projects help students form relationships with industry which is essential in today's economic climate. Students today, develop their knowledge and skill sets through modules in the areas of design, such as user centred design, universal design, human centred design (ergonomics) and sustainability. Using this approach brings students closer to users in design project work, as the users become directly involved in the design process.

This research shows that modern education is seeking ways of coming to terms with dramatic social, technological and cultural changes of the contemporary world. Design is constantly evolving and fresh approaches are needed in order to link areas of academia and industry.

The aim of any Creative Design programme must be to prepare students to become professional designers. The researcher suggests that attempts should be made to provide design students with experiences and knowledge which will facilitate their chances of being able to participate meaningfully in the professional world of design. This paper will attempt to discuss such strategies.

In order to increase the chances of gaining commercialisation, graduates should be aware of their prospects in relation to the culture of the profession and/or organisation they wish to enter. As a means of identifying issues related to the

commercialisation of Final Year Projects, this paper focuses on Case Study findings presented in Chapter 5 and Chapter 7.

In this section the researcher will be providing examples of both student and stakeholder feedback which directly relates to Creative Design education. The following chapter will highlight the positive and negative aspects of Creative Design education, as identified by those respondents.

4.1 Entrepreneurship

Supporting and fostering entrepreneurship and innovation in the region is central to the role of the Institutes of Technology and their Innovation Centres – Terri Scott, President of Institute of Technology, Sligo (13 March, 2013).

This section undertakes a critical analysis of academic entrepreneurship within an Institute setting. In so doing, it examines the role of technologies in facilitating entrepreneurship. Entrepreneurship plays a huge part in the commercial process.

This research presents literature and findings explaining why entrepreneurship in Creative design education and Creative practices plays such a large role. This research also shows how Creative Design courses try to encourage creative thinking and foster the spirit of entrepreneurship among Creative Design students.

Entrepreneurship education seeks to provide students with the knowledge, skills and motivation to encourage entrepreneurial success in a variety of settings. It is becoming increasingly important that Creative Design courses start to produce entrepreneurs who will create employment or be self-employed, rather than simply becoming employees. This initiative has become an important educational theme, especially in the creative disciplines. It can be difficult for design students to grasp the importance of, and the basic principles of entrepreneurship. Their talents and their goals are generally focused on designing and producing tangible objects. Similarly, their creative mind-set tends to reject the business world as being pre-defined and inflexible, the very antithesis of the creative mind-set. The aim of entrepreneurship education is to help make the process of starting a business more readily academically accessible to the creative mind, and to help stimulate students to think about business in a new, creative way. This will help produce graduates who both want to and can start their own businesses (Barnes, 2012, p.116).

This study draws on three sources. The first focuses on the student who is at the centre of academic entrepreneurship, the second focuses on the teaching of entrepreneurship and the third focuses on 'best practice'. The method of investigation involves an analysis of academic entrepreneurship within five Institutes of Technology. The empirical work takes place within the qualitative research tradition and involved interviewing design students, practicing academic entrepreneurs and practicing business entrepreneurs over a two year period.

According to Heidi Neck, Associate Professor of Entrepreneurial studies at Babson College, teaching entrepreneurship requires *'continual innovation, fearless experimentation, and structured chaos'* (Neck, 2013). As Faculty Director of the Babson Symposia for Entrepreneurship Educators (SEE), she is working to improve the pedagogy of entrepreneurship education as she believes new venture creation is the engine of society. As a guest speaker at Enterprise and Innovation Week (2013) at the Institute of Technology Sligo, Neck stated that entrepreneurship is about creating new opportunities.

She believes that entrepreneurship is incredibly important but current mainstream approaches are dated. Real world experience contributes significantly to the learning. Entrepreneurship within a formal education structure requires a new approach based on action and practice; entrepreneurship should be taught as a method. The method is teachable, learnable but not predictable. The method is people dependant but not dependant on a particular type of person. The entrepreneurship method goes beyond understanding, knowing and talking and demands using, applying and acting. Most importantly such a method requires practice. Learning a method is often more important than learning a specific content because in an ever changing world we need to teach methods that stand of dramatic changes. Entrepreneurship is often taught as a process, a process of identifying an opportunity, understanding resources requirements, acquiring those resources, planning and finally implementing (Neck, 2013).

Design students also feel that entrepreneurship is essential to Creative Design education. This is supported in the answers provided by the students interviewed. Question 11 (See appendix 2) asked students '*Does a culture of design entrepreneurship exist in your college?'*

The answer provided an indication of the Creative Design course's ability to influence entrepreneurial skills among their design students. 57% of design students believe that a culture of entrepreneurship fails to exist on their course.

The participants interviewed stated that there is no major design entrepreneurship on their Design course. There are always one or two students who are 'natural' entrepreneurs, but overall courses do not seem to be very focused on transmitting these skills. Statistics show that very few people from any Creative Design course in ROI have gone on to design successful products or services related to their Final Year Projects and this is an area that needs to be improved.

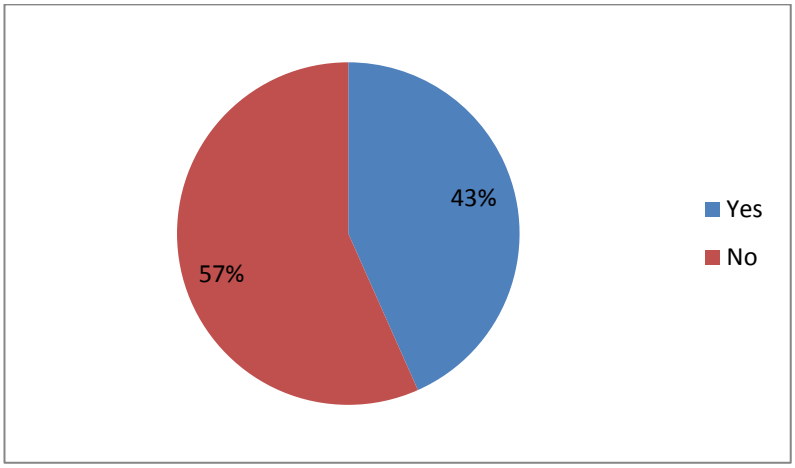


Figure 2 Percentage of students who stated if there was/was not a culture of entrepreneurship in their course

Respondents considered that their course lacked major components such as entrepreneurship. They also feel that they were never encouraged to put their products or designs on a commercial footing. 'Concept' seems of more importance, but the reality of the outside world is rarely talked about. Respondents stated that there was a culture of freedom of expression and creativity, but there is a significant lack of design entrepreneurship. Entrepreneurship is not considered a big part of the course.

However, 43% of the design students interviewed believed that a culture of entrepreneurship did exist in their course, in the form of competitions that take place throughout their period of study. The respondents agreed that such a culture of entrepreneurship was fostered through engagement with various external design competitions. In some colleges design students are encouraged to enter as many

enterprise competitions as possible. Some of their modules even had competition entry as a requirement. The main competitions undertaken are the Bolton Trust, Enable Ireland, Braun Prize, Tidi Solutions, Enterprise Ireland, James Dyson Award and the Microsoft Imagine Cup. There was a strong emphasis on such projects having commercial viability.

Students noted that Design Competitions provide a disciplined framework of commercial deliverables which focuses design students and aspiring entrepreneurs to develop their projects. Not all courses offer these competitions; students on other courses felt that entrepreneurship happened only when they were working on 'live' projects.

4.1.1 Positives

Question five (See appendix 2) '*Who contributed to your project design criteria?'* sought to establish who contributed to the project design criteria of student's final major projects during their course of study.

Case study respondents stated that a large number of people contributed to their projects. The respondents sought advice from external experts as well as 'super' users and the general public. They were guided somewhat in the selection of contributors by course staff.

Communication with external bodies and industrial contributors enabled many students to expand development contacts and advisors, leading to more credible project targets and relevant design criteria. Findings show that seeking advice from a broad range of sources enabled students to produce viable products.

This research shows that new entrepreneurship programmes are being brought into the Institutes to help nurture students who want an entrepreneurial education. The programme chairperson of the Accelerating Campus Entrepreneurship (ACE) Initiative notes that this initiative gives design students' knowledge in the area of entrepreneurship, promotion and also supports them financially (See appendix 15). The ACE initiative aims to develop a range of educational programmes that will help to create entrepreneurial graduates who can generate indigenous employment or deliver benefit to employers of all kinds.

The ACE Initiative involves a joint collaboration between IT Sligo, Blanchardstown Institute of Technology, Cork Institute of Technology, National University of Ireland Galway (NUIG) and Dundalk Institute of Technology. The purpose of the organisation is to instil a module of entrepreneurship in each course in the institute. The goal of ACE is to extend these modules to other colleges within ROI.

Key findings of the ACE report suggest that:

- 78% of undergraduate students surveyed expressed an interest in starting their own business at some point in future
- Entrepreneurship education is not readily available to all students. It is fragmented and delivered mainly only in business schools
- There is a lack of communication about, and visibility of, entrepreneurial supports and policies
- There is insufficient joined-up thinking between institutions, academics and practitioners
- Despite some initiatives, industry engagement with the third level sector is neither widespread nor intensive
- Entrepreneurship education is under-resourced and lacks an articulated strategic policy
- Higher Education institutions need to adopt a framework to embed entrepreneurship education across all disciplines
- Experiential learning, not theory based lectures, will most benefit entrepreneurial students.

Welcoming publication of this report, the previous Tánaiste, Ms Coughlan (2011) stated that:

> Central to maximising the job creation potential of our investment in the smart economy is the fostering of a new entrepreneurial culture in Ireland. Key to achieving this is ensuring that, through our approach to education and training across all levels, we empower our workforce with the confidence and skills set necessary so that each individual can be considered a potential entrepreneur. Reports have

> shown Ireland to be one of the most entrepreneurial countries in the world so we are building on a strong foundation. We must continue to work in strengthening this base, tackling obstacles such as the fear of failure and further embedding a wider societal appreciation of the importance of entrepreneurship (Coughlan, 2011).

The analysis contained in this report is an important first step for our third and fourth level institutions in identifying the gap that exists between the current reality and where the sector needs to be in terms of entrepreneurial education. The ACE project, which aims to create a forum for the sharing of knowledge and experience in the field across all institutions, is one of the ways to achieve this.

At a presentation to Presidents and senior personnel from across the sector before the Report's launch, Professor Paul Hannon, Director of Research and Education at the National College for Graduate Entrepreneurship (NCGE) in the UK, stressed the critical importance of visible leadership in successfully embedding entrepreneurship education across higher education. He also highlighted the need for the development of an entrepreneurial culture in the sector among management, academic staff and students at a time of diminishing state funds.

The Programme Manager of the Business Innovation Centre, Sligo, was interviewed in regards to the New Frontiers Entrepreneur Development programme. As programme manager and past lecturer of IT Sligo, she has great experience and knowledge of design support, promotion and entrepreneurship (See appendix 10).

The New Frontiers programme is Ireland's national entrepreneur development programme that is delivered at a local level by the Institutes of Technology. This programme targets people who have an innovative idea, with the ultimate objective of creating new business opportunities that will lead to sustainable job creation and exports resulting in a diverse and dynamic regional economy. This intensive programme equips students with the skills they need to establish and run their new business. They will have access to expertise and contacts to commercialise their business ideas quickly and will learn the latest management and leadership techniques (New Frontiers Entrepreneur Development Programme, 2012).

This programme offers students training in areas of business and entrepreneurship. Its mission is to advance education and in particular the study of innovation. It offers training in financial management, market research and validation, business process, patenting, product development, sales training which is essential to Creative Design education. Mentoring from experienced business advisers and practitioners is also provided.

The programme consists of three phases: testing, planning and developing the business. These three phases teach students how to validate the market potential of their business idea, determine whether a viable proposition exists and if successful, students receive intensive support for six months to develop both their own skills and to work up their business proposition (New Frontiers Entrepreneur Development Programme, 2012).

These workshops provide students with information, general start-up training and students also receive intensive support for six months to develop both their own skills and to work up their business proposition. This entails full-time participation in workshops, mentoring and regular reviews. Using these supports, students detail and validate their business proposition and identify potential customers, sales channels and funding options.

New Frontiers programme offers scholarship funding of up to up to €15,000. It supports participants in their development of an investor-ready business proposition. Other programmes must follow by example to support Irish education.

Speaking at a recent conference at Enterprise & Innovation Week 2013 in IT Sligo, Niall Mc Evoy (Head of Innovation) said:

> Enterprise and innovation are of major importance nationally and at the European level given their potential contribution to job creation and economic recovery. The combined resources of Galway-Mayo Institute of Technology, Letterkenny Institute of Technology and Institute of Technology Sligo working with the State development agencies will play a major role in fostering our region's economic recovery, hence our tagline – stronger together (Mc Evoy, 2013).

An invitation to participate in an online questionnaire was also sent to five Institutes (See appendix 5). A total of five academics responded, representing the five Institutes. The interviewees were specifically chosen because of their professional expertise and knowledge in the area of Creative design. Question 7 (See appendix B) asked the academics if a culture of design entrepreneurship was fostered in their college. The question attempts to identify the academics ability or willingness to encourage entrepreneurial skills among their design students.

As noted in my Stakeholder findings (See chapter 6, qu.7) academics state that entrepreneurship is slowly being fostered in such Institutions.

Academics also state that all Creative Design courses need to foster a culture of innovation and creativity with a view to commercialisation for the benefit of both the user and the environment. Academics feel that the word 'Entrepreneur' can be interpreted in many different ways, similar to the word 'Innovation'. If the word is used in a context based around good design and creativity then it is used in the correct context, however if it is just a sound bite used to advertise, then it holds little value. Academics feel that the design process and studio based education, in its essence, produce self-motivated driven designers that understand commercialisation, creativity and ethics. These are the seeds of an entrepreneur.

Academics stated that they openly commend students who show initiative towards entrepreneurship. Entrepreneurship is embraced in some of the Institutes through the recent introduction of business studies and entrepreneurship modules.

According to both the students and academics it is vital that Creative Design courses develop strong links with state funded Enterprise organisations. In the current economic climate it is more important now than ever that Design organisations and Design Courses work together in a proactive and flexible way.

4.2 Growing up Through Entrepreneurship: Case Studies of Student Ventures

In his paper *Growing up Through Entrepreneurship: Case Studies of Student Ventures*, Vernon examines a five-year history of business plans developed by senior and graduate-level industrial design students. The intellectual growth and innovation of student teams is reviewed through the semester-long process of refining business propositions. Discussion focuses on a selection of business plans of product/service

concepts and key elements in the course that nurture that development, such as contemporary literature on innovation, intellectual property searches, and venture capitalist reviews of the plans. Intellectual property of students' work is traced through patent filing and awards using the supportive Virginia Tech Intellectual Properties infrastructure (Vernon, 2009, p.1).

Vernon notes that team building and leadership skills are important aspects of the course. In particular, he identifies the challenge and opportunities of incorporating business plans into the course. The need to provide students with entrepreneurial skills is also identified. This paper recognises that new approaches to the creative courses are necessary to expand the Creative Design students' understanding of the product development process.

In this paper, Vernon focuses on the structure of the Professional Practice & Entrepreneurship (PP&E). Professional practice coursework is a typical part of any design curriculum, but this course approaches the concept of practice typically through business plan development (Vernon, 2009, p3).

This paper focuses primarily on the building of a business. Vernon notes that there is a huge focus on viable business concepts. Students must learn what the key components to success start-ups are in order to have a full semester to develop plans.

According to Vernon, collaboration with industry is vital. Local experts in start-up thinking are invited into the class to help prepare design students for forward and professional thinking. Vernon notes that preparing students for an investor presentation is an essential part of the curriculum and requires a more focused and professional disposition.

This paper establishes important insights of performance in the creative course. Irish creative courses could follow by example. These insights allows the researcher to make suggestions in the recommendations in chapter 9.

4.3 Design Competitions

Question 1 (See appendix 3) asked students *'Is your major project issued by the college or self-selected'?*

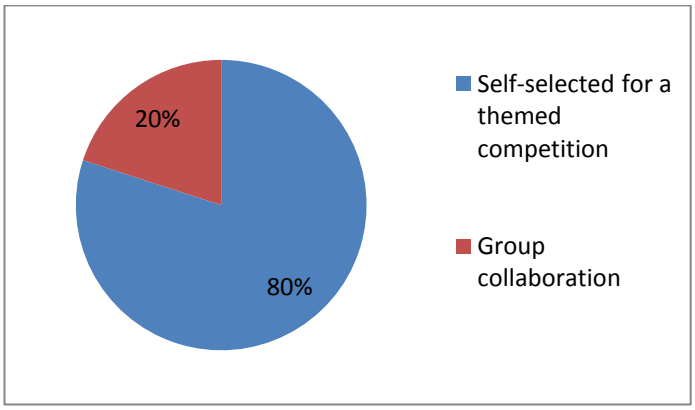


Figure 3 Final Major Projects Issued

The purpose of question one was to establish the proportion of Final Year Design Projects that were self-selected, issued by the Institution or jointly undertaken in cooperation with an external client. The results are displayed in figure 3. 80% of projects were self-selected by the final year student for a themed competition. 20% of projects were self-selected as group collaboration. All of the chosen respondents went on to explore the commercial realisation of their projects.

All projects were developed as part of a college project for an external competition such as the James Dyson Award or the Microsoft Imagine Cup. All selected projects identified real problems as an area for research. This enabled the students to become focused on more specific user issues within the competition's requirements and guidelines. This enabled the student to achieve greater focus.

In relation to my earlier question (See appendix 2, qu.4), *'Should students be allowed to select their own projects? Are they mature enough to select their own major projects?'* findings show that students who had chosen a theme within a competition went further with their Final Major projects than those students who selected their own projects and defined their own parameters.

There are a significant number of external organisations with which Creative Design courses could set up in order to improve the prospects of their design students.

Students noted that Design Competitions provide a disciplined framework of commercial deliverables which focused design students and aspiring entrepreneurs to develop their project and business development collaboratively. This includes business planning and helps to gain a keen understanding of what is required to bring their concept to market.

Question 12 (See appendix 2) '*What circumstances stimulate students to originate a viable product or service idea?'* notes that good investigative design methodology and continuous creative exercise would stimulate students to identify potential product or service opportunities. Identifying the customer needs through careful observation of the user environment enables students to originate viable products and services. Customers will not spend on products that do not meet their mix of needs.

Respondents felt that more direct experience of the field is needed in order to encourage students. This is an issue that is constantly being discussed among design students. Students feel they need more experience in the outside world of design instead of spending the majority of their time in the studio. By showing students more projects created by professional designers both national and international, meeting entrepreneurs and visiting design businesses would all be a way of stimulating the students to design their major projects in a more professional way.

Respondents note that having an open and supportive environment within their institutions with experienced members available for consultation on a range of manufacturing, design and entrepreneurial queries would have better helped the students to originate viable product or service ideas. They also felt that being isolated from external experts for feedback and experience made their concepts viability weaker.

4.4 Professional Practice

Question 6 (See appendix 2) asked students *'During your project were you in contact with any Enterprise organisations? Innovation Centre/ Enterprise Ireland'?*

From the responses given, it is apparent that most students do not seek advice from outside their Institution to help with their products. There are no links set up with external organisations to help aid design students to further their designs/products.

The respondents noted that they were not introduced to commercialisation, or put in contact with any organisations during their Final Year projects. All of the successful respondents contacted external bodies themselves. Organisations such as Enterprise Ireland, Northern Invest and the Business Innovation Centres were consulted as part of the respondent's research.

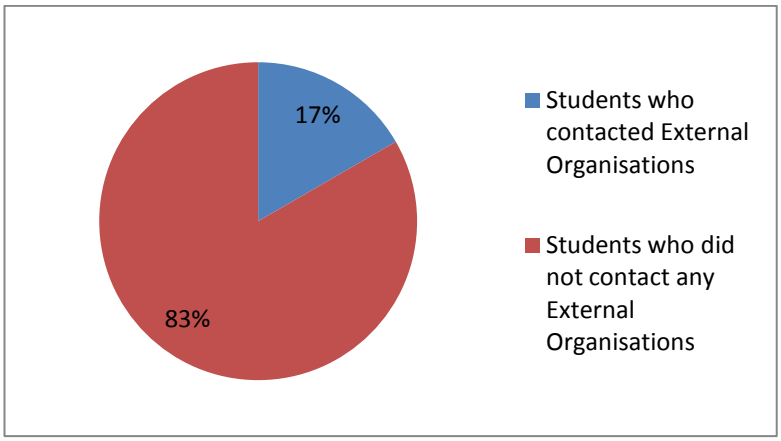


Figure 4 Percentage of students who made contact with an external organisation during their course of study

Stakeholders were also asked if their course was actively linked with any Enterprise organisations. ie. College Innovation Centre, Enterprise Ireland, local Enterprise board or other (See chapter 6, qu.4).

It was important to establish if Design courses are actively linked with any Enterprise organisations. This section addresses current supports available and long term sustainability of supports within their Institutions.

Stakeholders noted that there are many existing industry links for Creative Design courses such as Enterprise organisations, Innovation centres and the Technology Transfer office. These are the main contacts for stakeholders. Stakeholders also suggest that much more could be done to actively link with these organisations on a regular basis. More active communication from local Enterprise organisations could assist in the future of the Creative Design courses.

4.5 Final Year Degree Show

Creative Design courses utilize their end of year shows as a vehicle to advertise Final Year student works. Some of these projects have been presented at these annual exhibitions.

The variety of projects reflects the broad field of creative design proposals. The exhibition demonstrates the design process for Creative solutions. The graduate shows allow visitors to meet the designers, look at presentations and interact with the researchers and staff.

Figures 5, 6 and 7 show the comparisons between Degree shows in ROI and Europe.

Figs. 5 and 6 show how small scaled Irish Creative Design Degree shows are. Small boards are used to display the product images and small stands are used to hold product models. There is also little room for visitors to move around and enjoy each product and what it has to offer.

Fig. 7 shows a European Creative Design show. European degree shows are much larger scaled. Each design student has his/her own display area. Models are made life size and are displayed on large stands. Design students also have access to monitors to display their products and services on. Visitors are given the opportunity to walk around each model, watch each product film and have access to business cards and small booklets to take away with them.

4.6 Industrial Support

Many European courses receive industrial support from their local businesses. *Dutch Design week (DDW)* and the *London Design Festival* are both excellent examples of high-profile annual platforms where design students can present the full scope of their work to an international audience.

Dutch Design Week, in cooperation with strategic sponsors and media partners, ensures an open, informal setting in which the main principles are inspiration, connection and interaction. Through challenging industry, knowledge institutions, governments and media to (actively) participate in the programme, *Dutch Design Week* aims at achieving widespread recognition and acknowledgment of design as the missing link between the creative sector, business and industry (Dutch Design Week, 2012).

Design Academy Eindhoven (DAE) is an interdisciplinary educational institute for art, architecture and design in Eindhoven, Netherlands. The work of its faculty and alumni have brought it international recognition. It is known for its links to global

industrial organisations. Every year the graduation exhibit (featuring the works of that year's graduates of the DAE) takes place at the DDW.

London Design Festival is one of the world's most important annual design events. The event is held to celebrate and promote London as the design capital of the world, and as the gateway to the international creative community (London Design Festival, 2012*).* New designers looking to stage an exhibition are given the opportunity to take part. Relevant advice, help and funding are available to make this happen.

Mass exposure and feedback from these shows allow the designers a window of opportunity to further explore their products. It gives new designers the opportunity to meet with the public and professional visitors and the opportunity to raise their design profiles. This plays a large part in getting products to market as new industry relationships are established.

Figure 5 Creative Design Degree Show - Institute 1

Figure 6 Creative Design Degree Show - Institute 2

Figure 7 Creative Design Degree Show - Institute 3

Irish Creative Design courses must follow by example if they are to compete on an international level. Degree shows must be used as a way of getting primary business contacts and employment. It is a huge opportunity for students to show off their talents and make good business contacts. It is no longer just for family and friends

to come and visit. In today's economic climate students must use this as an opportunity to gain employment.

4.7 Erasmus Programme

Two Erasmus students at Institute 1 were interviewed in relation to their design education experience. Student 1 was an exchange student from Spain, studying a creative module in ROI. Student 2 was an exchange student from ROI, studying a creative module in Spain. Both interviewees were asked the same questions in relation to their Erasmus experience. It was interesting find out how the courses varied and what they felt was the best practice. Both interviewees made recommendations on how to improve the Irish creative design course.

Both students were asked '*Is your major project issued by the college or self-selected'?* Student 1 stated that it was self-selected from a chosen theme. Student 2 stated that it was issued by the Institution on behalf of an external company.

Question 4 asked students '*Who contributed to your project design criteria'?* Student 1 stated that she interviewed many sources, a dyslexic student, a person who worked with dyslexic children and playschool staff. Student 2 stated that the lecturers in the college, along with external business professionals, contributed to the project design criteria. Both students sought advice from various sources.

Question 5 asked students '*During your project were you in contact with any Enterprise organisations? Innovation Centre/ Enterprise Ireland'?* Student 1 did not contact any organisations. Student 2 was in contact with the external company. Both students felt that that their projects had commercial potential. Student 1 worked alone on her project while student 2 worked as part of a group on her Final Major Project.

Both students were asked '*What are the differences between Design Education in ROI and Design Education in Spain'?*

Student 1 stated that ROI is more focused on the creative aspects. She feels the course here is self-learning with guidance from lecturers. She stated that mentorship is a key aspect of the course in ROI and Spain has a greater focus on engineering. She also noted that aspects such as physics and maths are core elements of the course module in Spain (See appendix 3).

Student 2 stated that ROI's focus is on Product Design and is more relaxed learning. She noted that Spain has a wide variety of areas and classes and that there is much more engineering there. She feels she has learned a lot from the Institution in Spain. She also feels she has gained a huge knowledge in engineering and eco design, from her Erasmus experience (See appendix 4).

The final question I asked the students '*What would you change about the Creative Design course here in ROI'?*

Student 1 noted there needs to be more structured classes. Core subjects such as engineering need to be taught more. Irish Design courses lack major engineering elements.

Student 2 noted there needs to be more structured classes and more effective time use. There also needs to be more classes focusing on software, for example; InDesign or Adobe Illustrator. During her 3 years of study in ROI, the only software she knows is Photoshop, Solid Edge and Solid Works.

4.8 Design Support

4.8.1 Positives

Question 9 asked students '*What other supports were offered to you to further explore the commercial realisation of your project by your college or external bodies/institutions'*? (See appendix 2).

The results show that only two of the Creative Design courses in ROI have a model in place to help support students to further their Final Year designs.

These supports include:

- A professional practice module which includes Legal aspects of Product Design.
- A visiting legal professional to educate students on Intellectual Property Law.
- Venture Capitalists division to support any commercial efforts that students may have.
- Assistance to find mentors and create contacts with Enterprise Ireland, with possible grants available.
- Patent Issuer.

Students noted (See appendix 2, qu.9) that helpful advice was given throughout their Creative Design course as to what their next step should be after creating a product. Institutions provided support through the provision of professional advice and provided them with considerable PR coverage. Some offered seed funding for a percentage interest in future IP profits. The Technology Transfer Office was also available to offer advice and assistance.

Respondents stated that businesses are also open to helping students with developing commercial ideas. Companies contributed to develop patents for their products. In this respect designs from Case Study one have been patented in Europe, Japan, United States, Russia, Far East, and Africa.

Many of the respondents were contacted by businesses or consortia that were willing to put money into developing and protecting the designs for a percentage of the respondents IP holding company. These business investors created momentum and brought in commercial contacts and funds that helped to bring projects to the marketplace. The additional PR coverage went a long way to promoting the project to buyers.

4.8.2 Negatives

The majority of students (See appendix 2, qu.9) noted that they were not offered supports to further explore the commercial realisation of their projects. Fig. 8 below shows the number of students that were offered supports.

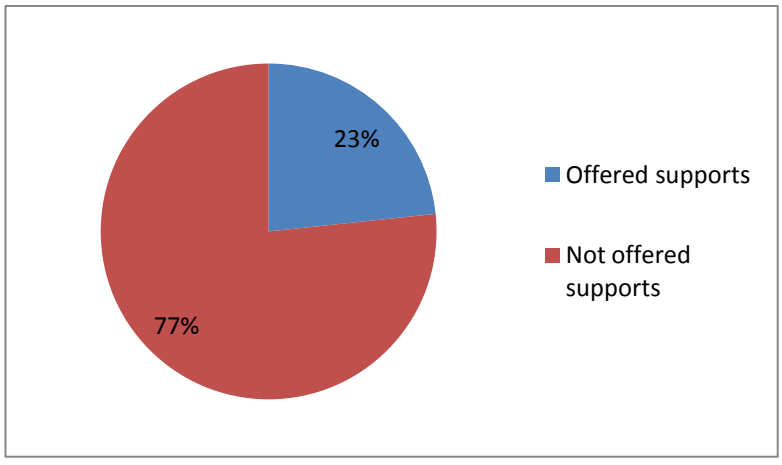


Figure 8 Percentage of students who were offered supports to further explore the commercial realisation of their projects

Stakeholders were asked '*What supports are offered to students to realise the commercial potential of their projects by the college or external bodies/institutions (Financial, other and by whom)'?*

The evidence provided shows that little support is provided in the Institutions for Creative Design students. Minimal funding is offered by various bodies such as Enterprise organisations and through the Innovation Centres. Some Institutes offer advice and assistance on Patenting and Intellectual Property.

4.9 Summary

Design education is an attempt to give future designers a broad perspective of how design fits in the real world. It provides designers with the analytical, conceptual and creative skills required to create various designs. Students and stakeholders argue that there are aspects of the creative design courses in ROI that needs to be re-evaluated. Students must develop their knowledge and skill sets through modules in the areas of design, such as entrepreneurship, user centred design, sustainability and human centred design (ergonomics).

Design education must equip designers with the necessary skills and provide clarity to the study of design. Design education must foster an atmosphere where students take practical projects and solve them individually or in groups through shared research development.

Entrepreneurial activity and linking up with enterprise societies provide opportunity for exploration. This should be improved through additional competitions, visiting entrepreneurs to advise on projects with students and guidance from lecturers with a focus on entrepreneurial skills.

Enterprise and Innovation Week is a sign of the strong relationships that exist between Institutes of Technology and the regional and international business community. Business and industry needs highly skilled graduates in order to thrive, and in the interests of balanced regional development, it's imperative that such students are given every opportunity to gain the most appropriate education.

Research will identify best practice in each Institute to form a model for Creative Design education. These insights of performance will allow the researcher to make suggestions in the Recommendations in chapter 9.

5.0 Stakeholder Interviews and Analysis

5.1 Introduction

In order to make recommendations for consideration in the future of Design education, it is essential to embed the localised viewpoint with the strategic insight of stakeholders. In this chapter strategic analysis from a stakeholder perspective will be integrated with the experimental knowledge and insight of academics and business professionals at each Institute. The insight of professional designers is also taken into consideration. This is critical to fully assimilate and discover new knowledge.

The stakeholders are listed, in chronological order in which they were interviewed. The most senior position they hold, or have held in design institutions/organisations is listed (See fig. 9, p.68, and fig. 10, p.81).

The research design indicated that a qualitative interview with a semi-structured approach was the most appropriate research technique to provide information that would address the gaps in the available knowledge.

Questions were devised to provide answers that would address these gaps. A detailed list of the interviewees, their positions and the interview transcripts are included in the appendices, with each full transcript following. Each extracted quotation is taken directly from the interviewees answer to each particular question.

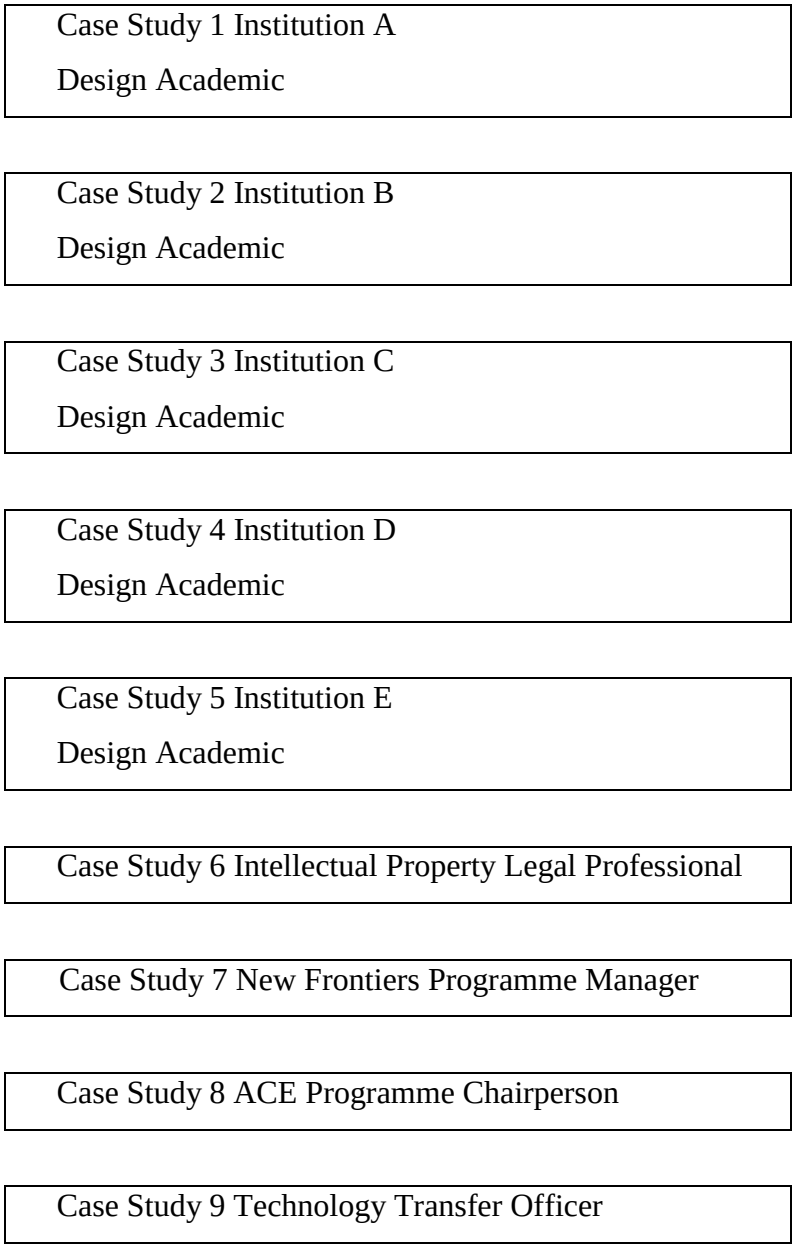
The focus here, in contrast to the previous chapter, is on the policy formation and strategic development. Ultimately, a model for Design education needs to draw from practical insight.

The following section will discuss and analyse stakeholder insights at each Institute. There are a number of emergent themes from this section:

- IP Policy
- Pedagogy
- Entrepreneurship
- Design Support

The above themes are discussed in context in relation to the role of Design education in the past, current situation and the possibilities for the future.

Figure 9 Academics/Legal Professionals



5.2 Stakeholder Case Studies Part 1

5.2.1 Question 1

It was important to establish what was the approximate percentage time division in the Award year of study in each institution.

Extract 1 Time Division per Module in Award year

Institute A Studio (major) projects – 75% Labs and workshops – 15% Academic lectures (ie. Professional Practice) – 10%
Institute B Studio (major) projects – 75% Labs and workshops – 10% Academic lectures (ie. Professional Practice) – 15%
Institute C Studio (major) projects - 50% Labs and workshops - 20% Academic lectures (ie. Professional Practice) - 30%
Institute D Studio (major) projects – 70% Labs and workshops – 15% Academic lectures (ie. Professional Practice) – 15%
Institute E Studio (major) projects- 65% Labs and workshops - 10% Academic lectures (ie. Professional Practice) - 25%

It is important to establish how the various Design Course schedule their programmes and to gain an insight into why the Creative Design courses spend more time on certain subjects.

The evidence presented confirms that each Creative Design course in ROI is run differently. Each of the five Institutes has a different approach to design education.

The evidence confirms that there is a gap in design education. Although each course offers similar modules, they can be of different length and emphasis. All Design courses should offer similar modules. Technology is constantly evolving and design courses need to keep on top of new course elements so they can compete on a national and international level (See appendix 6, qu.1).

All of the Institutes need to work together. It is imperative that students are given every opportunity to gain the most appropriate education possible.

5.2.2 Question 2

It was important to establish if Final Year Projects were self-selected by the student, or selected by the student from a college issued theme or provided by an external company.

Extract 2 Assignment Process for Final Major Projects

Institute A Project selected by the student from a college issued theme 50%. Project provided by an external company 50%.
Institute B Five research Areas are initially proposed by the student and one of these is selected with the agreement of lecturing staff.
Institute C Project self-selected by the student. Projects are not usually provided by an external company.
Institute D Project self-selected by the student.
Institute E Group Final Project is issued by the college (1 of 2 final year projects). Individual Final Projects maybe selected by the student (1 of 2 final year projects). Projects are occasionally provided by an external company.

The methods by which Final Year Projects are selected may have both positive and negative impacts. Research shows that students who self-selected their own projects are less likely to achieve the project outcomes as they had no clear guidelines or

requirements to follow. However, research also showed that students who were provided with a brief, such as design competition criteria, were able to follow the guidelines provided and reached their full potential (See appendix 2, qu.11).

5.2.3 Question 3

It was important to establish if the project brief was provided by course staff or established by the student through primary research or provided by an external agency.

Extract 3 Determine of Project Criteria

Institute A The brief was established by the student through research. Occasionally, a brief maybe provided by an external agency such as RSA (Royal Society of Arts).
Institute B The brief is established through student research.
Institute C The student establishes a draft brief which is agreed and confirmed by lecturing staff.
Institute D The brief is established by the student through research.
Institute E The brief outline is initially provided by course staff but it is completed by the student through research.

This shows that all Creative courses have an emphasis on research. Active learning, practical experience and training are only a few of the many benefits students gain when conducting their own original research. More emphasis must be placed on linking both research and industry together, to promote innovation.

2.4 Question 4

It was important to establish if the Creative design courses are actively linked with any Enterprise organisations. This section addresses the current supports available and the long term sustainability of financial supports within Institutes.

Extract 4 State and other Design Support Initiatives

Institute A The Design Course had been linked with the Innovation Centre, but this is no longer the case, due to a lack of funding. The course is linked to Enterprise Ireland to utilise the Innovation Voucher System, (€4000 for design and €1000 for patents). This funding may only be used by the college. The course is also linked with the Local Enterprise Board - Leader Projects, IDEA for foreign projects/businesses.
Institute B This course is linked with the following Enterprise organisations: Innovation Centre - DesignCORE Research Centre, Enterprise Ireland, Local Enterprise board and Invest Northern Ireland.
Institute C In this Institute, the course is currently linked with Enterprise Ireland.
Institute D This course is linked with the following Enterprise organisations: Innovation Centre – Hothouse, Enterprise Ireland, Local enterprise board (Enable Ireland) and Bolton Trust and I.E.D (Irish Engineer Designers)
Institute E This course is linked with the following Enterprise organisations: Innovation Centre - Commercialisation office Enterprise Ireland - Through the processing of Innovation vouchers

There are many existing industry links for colleges such as Enterprise organisations, Innovation centres and the Technology Transfer office. These are the main contacts for stakeholders. Much more could be done to actively link these organisations on a

regular basis. More communication from local enterprise organisations may assist in the future of the Creative Design courses.

5.2.5 Question 5

Academics were asked how many final year students (annually) explore the commercial realisation of their projects. This information was requested in order to ascertain their awareness of the issues of commercialisation.

Extract 5 Commercialisation of Final Year Projects

Institute A Very few student projects lead to commercialisation, generally due to funding.
Institute B Very few. It depends on the drive of the individual student. However, we are developing a programme that externally identifies commercial viability in projects and encourages incubation of student and concept with a view to commercialisation through private and state funding.
Institute C Approximately 1 project in each year.
Institute D Approximately 1 project in every other year.
Institute E None.

Evidence shows that very few Final Year Projects proceed along the commercial route. This is generally due to lack of time, knowledge and financial support. There was an acknowledgement among all stakeholders that the issue of commercialisation in design education needs to addressed.

5.2.6 Question 6

Stakeholders were asked what supports (financial or other) are offered to students to realise the commercial potential of their projects whether by the college or external bodies/institutions.

Extract 6 Supports Available to Students

Institute A Financial support is minimal. The Business Innovation Centre used to offer the Innovation Voucher.
Institute B This Institution has a Commercialisation Fund. There is some funding by design CORE. The source of funds is Enterprise Ireland.
Institute C There is some financial assistance available. The source of funds is Enterprise Ireland. Enterprise Ireland has a Commercial Case Feasibility Support. This support can be obtained by researchers, in partnership with their Technology Transfer or equivalent office, for a short Feasibility Project (up to 3 months) to scope and develop the commercial case for their innovation. Awards for Commercial case feasibility projects will typically be €10,000 to €15,000. Innovation Vouchers worth €5,000 are also available to assist a company or companies to explore a business opportunity or problem with a registered knowledge provider.
Institute D This Institute provides a Hothouse and funds patenting and Intellectual Property. Students are also encouraged to enter the Bolton Trust Student Enterprise Competition. This competition provides a platform for students to present business plans with real investment potential and the opportunity to win cash prizes. The competition is, proudly, the largest third level competition in the country with a total prize fund of €13,500. The top individual prize is €5000.

Institute E This Institute has a commercialisation office which provides various types of support, such as some funding for Intellectual Property, access to expertise and use of lab facilities.

This evidence shows that there is little commercial support provided in the Institutions for Design students. Minimal funding is offered by various bodies such as Enterprise organisations and through the Innovation centres. Some Institutes offer advice and assistance on patenting and Intellectual Property.

This question allows the research to include it in the Recommendations chapter so that the issue of design support is addressed. Enterprise bodies need to be involved in the promotion of design. Each participant answered this question very positively. They would love to see more supports to help foster entrepreneurship in the Creative Design courses. Mentorship is also needed to help students grow professionally. Mentoring students can help with career exploration, networking, and professional skill building.

5.2.7 Question 7

Stakeholders were asked if a culture of design entrepreneurship was fostered in their college and to discuss this.

Extract 7 Culture of Design Entrepreneurship

Institute A This Institute is starting to slowly foster entrepreneurship.
Institute B There needs to be a culture of innovation and creativity with a view to commercialisation in all Creative Design courses.
Institute C Yes, although scarce resources and poor staffing levels mean that it is often the last on the list.
Institute D Yes, a survey is sent out once a year to establish what the students like or dislike

about the course. Entrepreneur competitions are part of our modules. The Technology Transfer Office is also on board to help design students further their Final Year projects.
Institute E It is embraced. We openly commend students who show initiative towards entrepreneurship: i.e. Entrepreneur competitions, academics willing to advise out of hours on business initiatives if approached by students. Our course curriculum includes business and entrepreneurship modules. Staff have experience in entrepreneurship, all staff have a grounding in industry before joining the realms of academia.

Evidence shows that entrepreneurship is embraced by all Institutions. Entrepreneurship is slowly being fostered in the Design Courses, who are changing the way they approach things. Institute B notes, that with any Product Design Course there needs to be a culture of innovation and creativity with a view to commercialisation for the benefit of the user and the environment. This statement is in agreement with student findings (See chapter 7).

5.2.8 Question 8

Stakeholders were asked what circumstances should stimulate students to originate viable product or service ideas.

Extract 8 Viable Product and Service Ideas

Institute A Learning how to identify design issues. Emphasis on extensive research methods to establish problems.
Institute B Provides a studio based environment with enthusiastic staff, flexible support from the Institute and a greater understanding by Enterprise Ireland of the benefits and processes within Creative Design.
Institute C External collaboration with commercial entities. Tutors working externally. Focus on

Intellectual Property.
Institute D Design Supports (mentorship and financial)
Institute E Fostering confidence that leads to individual drive and determination. Access to expertise.

Respondents noted that having a network of supports will stimulate students to produce viable products. Support from lecturers and external tutors will benefit students and create an environment that will stimulate them to progress their projects towards commercialisation.

5.2.9 Question 9

It was important to establish whether students understand how to commercialise an innovative product or service.

Extract 9 Understanding Market Viability

Institute A The students understand the basics of it. It is a very difficult thing to do.
Institute B In reality no, but I do not see this as being a driving force for all students going through a Design Course, they need to have an understanding of it and the language used. Design students also need to have support in this area post-graduation.
Institute C The students are not knowledgeable in this area and there are no formally taught classes.
Institute D The students are very well informed. IP, patents and professional development need to be taught.
Institute E The students have some theoretical understanding, possibly more in some cases if

they have some background experience through, for example, family business or previous professional experience. I feel however they will not truly understand until they try it.

Respondents noted that understanding how to commercialise an innovative product or service is a difficult thing to do. As stated by respondent B, Design students need to have support in this area. Respondent E states that students will not truly understand until they try it. This question was important as it emphasises the need for this area to be included within teaching modules.

5.2.10 Question 10

It was important to establish if the stakeholders were aware of any Intellectual Property contractual arrangements between the college, the academics and the undergraduates. Stakeholders were also asked if they felt that Intellectual Property should be taught as part of the course programme. This information was sought in order to ascertain their awareness of the topic as a whole and from a design perspective.

Extract 10 Intellectual Property Contractual Arrangements

Institute A Intellectual Property Law is starting to be taught in the Creative Design course and if students design projects in their own time, there should be no problem when it comes to their IP.
Institute B Intellectual Property should be taught through the professional practice module. However like everything in Design education, 3 to 4 years does not give enough time to cover every aspect of the Design world, so each course must shape their delivery to what they feel are the best skills that equip their graduates to enter the Design world. There are so many areas that could, or should be, included in Design education (behavioural psychology, ethics, biomimicry. electronics, computer programming, user centred design, emotional design, sustainable design etc.) It is about finding a good balance and allowing the students to be exposed to all of them

and allowing them to run in the direction they feel appropriate to their own needs and skills. Since the development of the research centre it has become extremely important for students to understand their IP rights.
Institute C Yes, vaguely.
Institute D Intellectual Property Law is taught. Students own all rights to their designs unless they are working for an external client in which case they must sign over the rights to the client.
Institute E Intellectual Property is taught.

All stakeholders were aware of the Intellectual Property Rights in their college, and also felt it was essential to make students aware of their Intellectual Property Rights. Since the development of the Creative Design courses in recent years, it has become extremely important to understand Intellectual Property law.

5.3 Summary

This research highlights the potential benefits for all Creative Design courses in ROI to work together. The common theme emerging from this section is that there is evidence that the stakeholders should network and suggests how inter college collaborative efforts can be strengthened.

There is a need for a structured network between each of these Institutions. This would benefit the development and enhancement of the creative courses. There is also potential for an Advisory body to be established with responsibility for Creative Design. This would require membership from government, industry and academics.

All stakeholders throughout the interviews spoke very positively about nurturing these stakeholder relationships for best creative design practice. All key stakeholders would like to see collaboration between Creative Design courses to ensure concrete relationships develop in ROI (See Recommendations chapter for proposed model).

In order for Creative Design courses to develop their full potential, there is a need for additional financial supports to foster entrepreneurship. It is essential to establish what level of financial supports are currently in place, for instance, the Enterprise Ireland Commercialisation Fund which offers mentorship and funding.

There are several funding opportunities available through design competitions and enterprise organisations. Useful insight can be gained from the dissemination of stakeholder knowledge on such supports. For instance, the Bolton Trust Student Enterprise Competition. The main objective of the competition is to foster a spirit of entrepreneurship among design students and to encourage and support a rigorous business planning approach to entrepreneurial activities.

Figure 11 Business Professionals

Case Study 10 Curve Creative Product Designer Dublin
Case Study 11 Kovet Product Designer Sligo
Case Study 12 Verus Product Designer Sligo
Case Study 13 Geelan Design Web Designer Sligo
Case Study 14 Spear Design Graphic Designer Galway
Case Study 15 Edit Print Graphic Designer Longford
Case Study 16 Dan Leydon Illustration Product and Graphic Designer Sligo
Case Study 17 Ian Burnell Designs Product Designer Dublin
Case Study 18 Clevermiles Graphic Designer Sligo
Case Study 19 StableLab Product Designer Sligo
Case Study 20 Farfela Design Product Designer Sligo

5.4 Stakeholder Case Studies Part 1

5.4.1 Question 1

All business professionals were asked whether they are currently working in a Freelance capacity or in a Partnership.

Extract 11 Type of Business

Curve Creative Partnership
Kovet Freelance
Verus Partnership
Geelan Design Freelance
Spear Design Freelance - Sole Trader
Edit Print Freelance - Self Employed
Dan Leydon Illustration Freelance
Ian Burnell Designs Freelance
Clevermiles Limited Company
StableLab Limited Company
Farfela Design Freelance

Each of the business professionals was familiar with different aspects of setting up a Design business. This information was important as it enabled the researcher to analyse the benefits of setting up a Design company and what it entails.

5.4.2 Question 2

It was important to establish who advised the stakeholders on setting up their company/partnership. Sourcing advice from professional bodies will enable designers to set up their new ventures easily.

Extract 12 Advisors

Curve Creative Our solicitor and accountant.
Kovet My existing employers who set up their own business from scratch with the help of the Business Innovation Centre in Institute of Technology, Sligo. They are also co-founders of Kovet.
Verus 1. I would have known quite a lot regarding business as I was part of the senior management team in my previous employment. 2. Research via the internet 3. Speaking with other business owners. (Networking)
Geelan Design I applied for the 'Back To Work' Enterprise allowance through the Sligo Leader programme. I registered my business with the Inland Revenue.
Spear Design An accountant in Dublin who has experience of working with design agencies.
Edit Print Longford County Enterprise Board and relatives, friends.
Dan Leydon Illustration I am completely self-taught. To even call what I do a company would be labelling it unduly. I see it more as a system of using my interest in being creative to fund my lifestyle. That may sound vague but it's the best description of it. I regularly ask people in different fields for advice when I need it. I've met with accountants, lecturers and established illustrators to deduce what steps I need to take to have a more streamlined approach to carrying out jobs.
Ian Burnell Designs We were advised throughout our course what our next step should be after creating a product. I then contacted the Technology Transfer Office.

Clevermiles Business accelerator and ‘Start-up’ boot camp mentors.
StableLab Enterprise Ireland.
Farfela Design Enterprise Board Sligo.

It is worth noting here that there are several organisations available to advise and assist new start-up ventures. Stakeholders stated that Enterprise Ireland was a major factor in setting up their companies. Other advice was sought from solicitors, accountants, business accelerators and start-up boot camp mentors.

Most of the stakeholders received help and assistance from Enterprise organisations. Each of the stakeholders expressed how helpful these organisations are. The evidence indicates that Enterprise organisations play a key role in design business start-ups offering financial supports, work space, mentorship, contacts and assistance. Linking up with these organisations is essential to designers.

5.4.3 Question 3

Business professionals were asked what factors influenced their decision to set up as a sole trader, partnership or limited company.

Extract 13 Factors sought when setting up Type of Business

Curve Creative Easy to do, cost effective. A limited company didn't have any benefits.
Kovet We decided to set up as a limited company so that we can grow faster and have the option to take on more partners if and when needed.
Verus 1. Limited Company 2. Owner/Directors. 3. More safety as a limited company. The industries we serve prefer to deal with limited companies.
Geelan Design I got some work creating websites and I thought that web design would be my best

chance of getting more work.
Spear Design Small client base on starting up meant it was only myself working as Spear Design so made it financial sense to set up as a sole trader.
Edit Print Advice. As it was a new venture, I decided that the sole trader option was the best option for me, being my own boss and not having to seek approval from a partner for any decisions I wanted to make.
Dan Leydon Illustration After college, I was determined to follow my gut instinct which was that I never wanted to work under anyone. Being my own boss is the best way to keep on top of myself and prevent it from being a boring routine job.
Ian Burnell Designs The business end of the industry does not really appeal to me, so I am currently trying to licence the product out to companies rather than set up my own, especially when I have little to no experience in that field what so ever.
Clevermiles It was the only real option to sell products. It cost approximately 1000 euro to set up.
StableLab There was little debate; I needed to set up a limited company.
Farfela Design As it was freelance work, it was my best option.

The stakeholders considered many factors when setting up their business. The scale of the business, cost, benefits, time limits, safety and the industry all needed to be considered when making such a decision. These factors are crucial to know when starting up a new venture.

5.4.4 Question 4

It was important to determine how stakeholders advanced their company profile to make customers more aware of their services.

Extract 14 Marketing Strategies

Curve Creative Getting featured in online publications.
Kovet We used social media extensively and also hired a PR company; these factors along with the unique properties of our product enabled us to gain massive adoption in a quick timeframe.
Verus 1. Client Visits (Face to Face) 2. Web Site 3. Notifications via e-mail.
Geelan Design Website.
Spear Design Totally through recommendations. The business grew organically.
Edit Print Promoting a new venture is essential. I used the local radio station with a series of adverts for one month which ran in conjunction with local newspaper adverts, a huge company sign on front of the building. I used the Enterprise Boards business directory to email and post information to local companies and schools , clubs etc.
Dan Leydon Illustration The only thing I have used is Twitter. I make football artwork and there are many high profile football journalists who operate on Twitter. I basically pestered them with my work until they started to take notice. From there I got my first book illustration job and now I sell prints of my work from an Etsy shop I have set up. I'm beginning to gather a following so whenever I post a ‘work in progress’ picture of my latest piece it gets people interested.
Ian Burnell Designs Online and advertising.
Clevermiles Online, advertising, PR adverts and general marketing.

StableLab Going out to meet with customers. Winning the Seedcorn competition achieved a lot of publicity/credibility for us.
Farfela Design Online and word of mouth. Meeting with customers.

This question was asked to determine how effective the company's marketing strategy is. All stakeholders used online advertising as their main way of marketing their business. Promoting a new venture is essential. Kovet stated that they used social media extensively and also hired a PR company; these factors along with the unique properties of their product enabled them to gain massive adoption in a quick timeframe.

Having a good marketing strategy is extremely important to make people aware of a new company. This will go a long way to getting products on the market quickly.

5.4.5 Question 5

Stakeholders were asked *'What enables people to produce viable products?'* This question was important to understand how businesses design products from concept to realisation.

Extract 15 Product Viability

Kovet Iteration, creative thinking, the ability to know when you are wrong and start over.
Verus Function, price point and aesthetics.
Geelan Design Meeting with clients, working to their needs.
Spear Design Working to customer requirements.
Edit Print In my business it is demand, cost, quality of the products, service-lead time.

Dan Leydon Illustration Meeting with clients and having a good discipline to carry out jobs.
Ian Burnell Designs Identifying the customers' needs and providing a product that fills those needs. These days people and organisations do not have money to spend on products that do not do what they are required to do.
Clevermiles Hard work and determination.
StableLab User feedback.
Farfela Design Imagination and creativity. Awareness of demands on the market. Good knowledge of the field in which they're working. Skills necessary to execute their ideas (knowledge of design process, research, computer programmes, communication skills) Passion about products that they create.

This purpose of this question enabled the researcher to identify the steps necessary to take when producing a viable product. Furthermore, it was necessary to explore all stakeholders' views of how to get a product market ready. This is in agreement with student/academic findings. Findings show that seeking advice from a broad range of sources enabled design students and business professionals to produce viable products. This question allows the researcher to include it in the Recommendations chapter.

5.4.6 Question 6

Stakeholders were asked have they ever patented/trademarked/registered their design output.

Extract 16 Patents and Trademarks

Curve Creative Yes, all three, on most Continents.
Kovet We have registered designs on all our properties for simple protection and Kovet is a trademarked name.
Verus Yes - iPhone Protective Cases by Kovet.
Geelan Design No.
Spear Design No. But clients have trademarked logos, logotypes and brand names that we have provided them.
Edit Print I patented my logo. The designs I do are for customers belong to them so they pay to patent the designs output.
Dan Leydon Illustration No.
Clevermiles We buy in the hardware, no patents necessary.
StableLab Yes.
Farfela Design No.

Each of the stakeholders was familiar with aspects of patents and trademarks. These are important aspects that need to be taken into consideration when trying to get a product to market. All new products must be patented to protect them from being copied. It is necessary to enlist the help of a patent issuer when filing for protection.

5.4.7 Question 7

Stakeholders were asked what advice they would give to first time business starters. It was interesting to find out what the stakeholders thought was the best action to take when starting up a new venture.

Extract 17 Advice for New Business Start-ups

Spear Design Get good, solid advice from people with experience in the design sector. Keep it small to start with and use freelance help during busy times. At start-up, budget for a second workstation as part of the initial capital so you can employ freelance help. Get a good finance programme that can quote, book jobs, invoice etc.
Edit Print Get as much advice from an Enterprise Board before you start up, get financial aid and be prepared for a long struggle; make as many contacts as you can. Project what your sales may be and see how viable your business is. Do market research in your locality.
Dan Leydon Illustration Ignore all criticism. Focus on yourself and relentlessly follow what you want. Think as big as you can. Then revise it and think bigger. Hard work is the best way to success.
Clevermiles Go to your local Enterprise Board. Good business proposal.
StableLab Get a mentor.
Farfela Design Do your research: is there need for your product/services? What improvement does it offer in relation to what's already on the market? What impact does it have on society/environment? Make your plan: what is your aim? How are you going to achieve it? What resources do you need? How will you fund your business at the start? Can you get help (grants, mentorship, advice)? Be enthusiastic and persistent.

It was interesting to see that most stakeholders found that their local Enterprise Organisation was very helpful. These local enterprises offer funding and mentorship

for new ventures. Funding is an essential part of any new venture. Having a good business plan is also a necessary asset as this will help new businesses to project how the business will run and what they need to achieve to realise their goals.

5.5 Summary

This evidence reinforces findings from student interviews that collaboration is necessary for new ventures in order to develop new products and businesses in ROI. It is evident that relationships and networks are essential. In order for such networks to be effective, collaborative teamwork is key.

Stakeholders identify many providers of design promotion and support in ROI. There are significant strengths in current provision of design services and support in ROI. For instance, local Enterprise Boards. It is clear that individually, each of the design support bodies works very hard to promote the role of design and thereby build the market of potential clients.

This research shows that ineffective use of these resources is the current problem that faces design students. Institutes are aware of current design supports but do not avail of their services. The use of this research is intermittent and is not being transmitted to students. Design courses must utilise these support bodies. This would be very effective for design students when trying to commercialise a new product or service.

There is a weakness in Creative Design courses in ROI in regards to funding, support and poor policy. However, this research shows that there are also many opportunities for students to capitalise on; linking up with these Enterprise organisations is essential to the practice of Creative Design education, and should be a priority for Final Year projects.

Organisations such as Enterprise Ireland were set up to assist new ventures with funding, support, advice and mentorship. Design support and promotion needs to be on-going and sustainable. Long term funding and linking up with existing organisations is essential if Creative courses are to be sustainable.

6.0 Design Professionalism

6.1 Introduction

This chapter will discuss and analyse student and stakeholder insights at each Institute and outline why Design education in ROI needs to be more fully aware of Professionalisation and how this can impact on students.

Creative Design education is constantly changing and evolving. Students must now develop their knowledge and skill sets through modules in the areas of economics and Intellectual Property Law.

The design method no longer focuses just on creating and designing 3D forms from computer renderings and blue foam! It now takes a more professional approach. Design students must consider business aspects such as Intellectual property law, patents and trademarks, marketing strategies and business plans when designing new products for market. The business plan has fast become a critical deliverable in the area of design education project assignments.

The following section will discuss each emergent theme in great detail and why they should be given greater consideration within Creative Design education.

6.2 Intellectual Property Law

6.2.1 Definition of Intellectual Property

> Intellectual Property (IP) is an area of very substantial importance in the academic environment. The purpose of defining an IP policy is to encourage the generation of IP by staff and students. The IP policy is intended to provide support and guidance regarding commercial exploitation, ownership and income from Intellectual Property and the use of Institute facilities and resources to ensure that the development of Intellectual Property is mutually beneficial for Personnel and the Institute involved. (IT Sligo, 2008, p.2)

6.3 Student Knowledge

Intellectual Property Law is a necessary aspect of every Creative Design course. Students should be made aware of their IP rights from year one. It is essential that as designers they are aware of their rights for each product they produce. Designers need to know how to protect their ideas as they try to commercialise them.

An understanding of Intellectual Property Law provides students with the necessary knowledge, to avoid pre exposure of their projects and to competently discuss their intellectual property needs with lecturers and other professional advisors.

6.4 Advantage of Institutes obtaining IP rights

In many cases, where projects are collaborated on, research shows that in some cases, the college takes all IP ownership rights, resulting in the college having 70% ownership and the supervisor 30%. This results in students losing all rights to their projects with no share in any profits obtained. (See appendix 2, qu.14)

How IP Share is managed in each Institute

Institute	**Intellectual Property Assignment Agreement for Students**	**Division of percentage between student and institute**
Institute of Technology Sligo	Any intellectual property rights created by students in the course of their work with IT Sligo are the property of and vest solely and absolutely in IT Sligo.	Creators – 0% IT Sligo – 100%
Limerick Institute of Technology	All Inventions, devices, products, methods, results and technologies arising out of the research or other work of students of the Institute made during the normal course of the students duties shall be the property of the Institute.	Creators – 0% LIT – 100%
Dublin Institute of Technology	DIT recognises that Colleagues and students who create IP own the products of their intellectual efforts and are free to publish those products without commercial intent, to pursue commercialisation with the assistance of the TTO, or to pursue commercialisation of the IP in their own right.	**Division of income from patents** **0 – 100k€** Creators – 75% DIT – 15% Research Group & Faculty & School – 10%
Institute of Technology Carlow	Any inventions created by students in the course of their work with IT Carlow are the property of and vest solely and absolutely in IT Carlow.	Creators – 0% ITC – 100%
National College of Art and Design	Where any invention, design or artistic creation has been created in the course of a person's studies with NCAD as a student, whether full-time, part-time, undergraduate or post-graduate, then the IP rights are the property of and vest solely and absolutely in NCAD.	Creators – 0% NCAD – 100%

Table 3

From gathering research at each Institute, findings show that each Institute is at liberty to develop their own Intellectual Property policy. Table 3 above is taken verbatim from each Institute IP Policy.

IT Sligo Policy on Intellectual Property (2008) makes the point that:

> Commercialisation is often the most efficient means of promoting the widest possible dissemination and use of Institutes of Technologies Intellectual Property. In such circumstances, it is appropriate and desirable for both the Institute and the originator of the Intellectual Property to benefit from the commercial exploitation of Intellectual Property produced (IT Sligo, 2008, p.1).

From the student survey (See appendix 2, qu.14), it was clearly evident that there is a major gap in Creative Design courses; students are generally unaware of the Intellectual Property contractual arrangements between themselves and the Institution. They should be made aware of their Intellectual Property rights. There is little evidence of Design students commercialising their work in the ROI. Research results from the various Institutes that offer Creative Design courses, have shown that very few of the products designed by award year students proceed to commercialisation. It is essential for colleges to actively encourage design students to pursue their projects if they clearly have commercial potential.

An online questionnaire was sent to Creative Design students in five Irish Institutes of Technology. A total of 30 students responded, representing all five. Question 13 (See appendix 2) asked students *'Do you think Intellectual Property Law should be taught as part of your course programme?'*

90% of students interviewed answered 'yes'. The majority of students felt that Intellectual Property law should be taught as a separate module on their Design course as it is such an important part of their future as a designer.

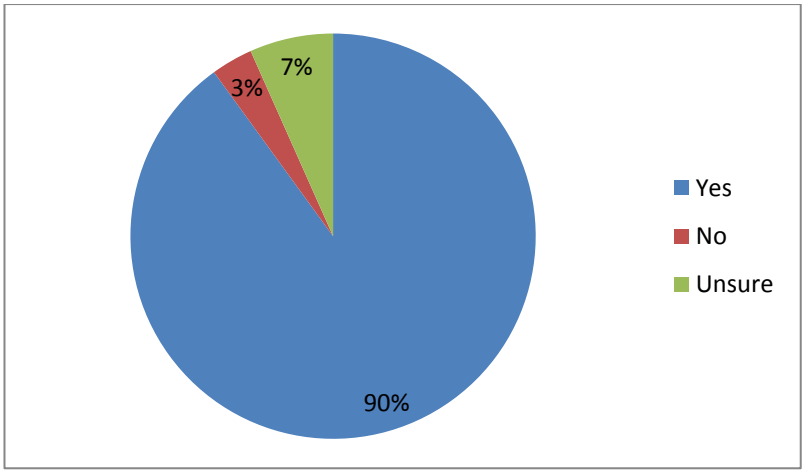


Figure 11 Percentage of students who thought Intellectual Property Law should be taught as a separate module

Respondents felt it was essential to know about their Intellectual Property rights. It is imperative to know what Intellectual Property means for designers and how they can effectively use their IP in relation to their projects and how they can protect them. It is necessary for designers to be aware of their rights for each product they design. Designers need to know how to protect their ideas in order to commercialise their ideas independently.

Respondents noted (See appendix 2, qu.13) that it is critical to know about IP rights and how to protect designs. If ideas are placed in the public domain without any provisional protection or registration IP may become invalid through careless exposure.

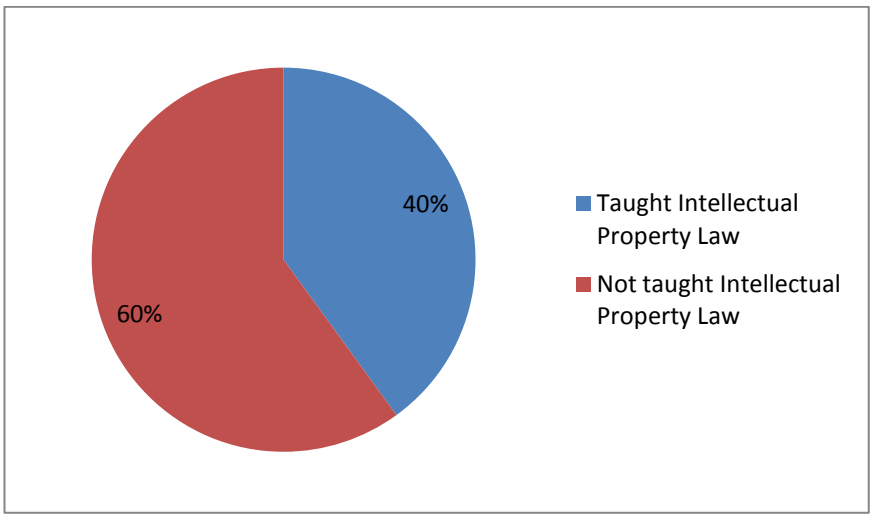


Figure 12 Percentage of students that have been taught Intellectual Property Law

In some Institutions Intellectual Property Law is already taught as part of either of two modules, Professional Practice and Legal Aspects of Creative Design. The respondents felt that this was really helpful. Learning the basics in each of these areas provided the students with a significant knowledge, to safely bring their product to market.

This module develops the student's awareness and knowledge of professional practice and administration in the field of design. The syllabus includes, Managing Design, Business Basics, Design and the Law, Employment Law, Human Resources and Contracts (Dublin, Institute of Technology).

Question 14 (see appendix 2) asked respondents what are the Intellectual Property contractual arrangements between you and your learning institution?

The aim of the question is to determine if students are aware of their Intellectual Property rights. Of the respondents, 57% were not aware of their Intellectual Property rights. Most stated that the college did not make the arrangements clear to them. However, 43% of the respondents interviewed, answered that they did know of their IP rights. Answers varied, with some saying they knew of an agreement but were unsure as to its details, whilst others stated that they had full ownership of their Intellectual Property.

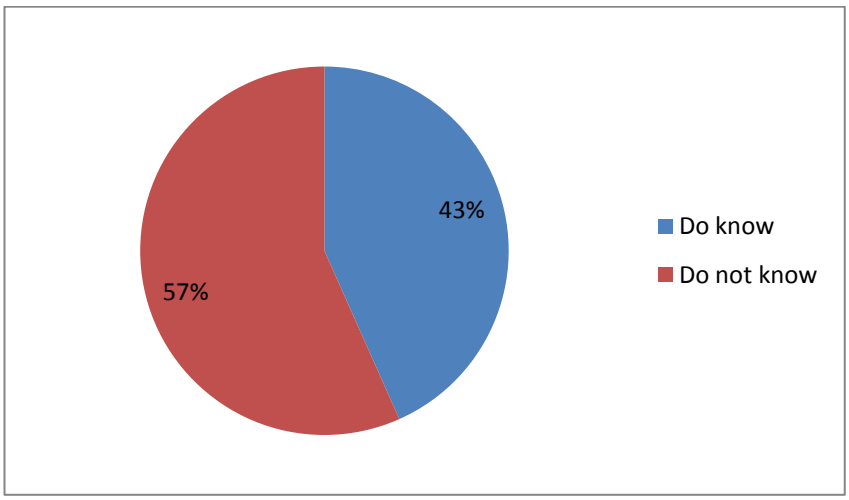


Figure 13 Percentage of students who know/ do not know what their Intellectual Property rights are.

There is a significant difference in all answers provided by the students interviewed. Throughout the research it is clearly shown that there is a need to develop an

Intellectual Property Policy with a clear strategy for all Creative Design courses in ROI. This would aid success across the Design courses. This implementation of such policy should have benefits for graduates that should improve product delivery.

Some respondents stated (see appendix 2, qu.14) that the colleges involved did not take ownership of their designs. They were free to use them. In the case of colleges investing in a student project a structured procedure is in place with a proposed shared ownership of the resulting IP.

Throughout the research it is clearly shown that there is a need for colleges to incentivize student design projects through the adoption of an intellectual property procedure that places primary IP ownership with the student. This strategy would clearly reward the student's efforts and motivation. The implementation of such a policy should have benefits for both the college and its graduates that should provide commercial opportunities for industry.

6.5 European IP

An online questionnaire was sent to a Creative Design student in Eindhoven, University of Technology (TU/e), to get a European perspective on student IP. Question 3 (See appendix 12) asked the respondent *'What are the Intellectual Property contractual arrangements between you and your learning institution?'*

The respondent noted that the university owns the rights to all student products created at the TU/e. All of the projects are thereby protected from commercial clients and other third parties. When anything of a project is sold to a client the designer will get a third of the profit, a third will go to the faculty and a third to the university. This is mainly to protect IP and to avoid having to draw up a single contract for each case.

This model in place is to the advantage of the students, as they will get professional support from IP consultants and the relevant stakeholders to file a patent. There are also quite generous start-up loans for students who want to take a design into production (See appendix 12, qu.3). Irish models could follow by example.

6.6 Professional Practice

Design is constantly user-centered changing relationships between users and designers brought about by shifts towards and professional design. This paradigm shift, with users becoming more involved and empowered in the design process, creates a corresponding shift in our approach to design education. This chapter describes the development of a more insistent approach.

6.7 Economics (Business Plan)

Business plans have recently become an important part of Creative Design practice. Students must learn the basics elements of a business plan. The purpose of a business plan is to identify the aspirations of the business and to determine if these aspirations are feasible in the current economy. The business plan is needed to outline the steps students will take to reach their main objective. The aim of the business plan is to be able to hand it over to lecturers, peers and investors. It is important for Design students to address the areas of business such as executive summary (mission, vision, purpose), target market (who products are intended for), competitors (define competitors, what are the differences?), human resources (additional staff needed to run the business), vendors/supplies (requirement of outside sources or supplies), marketing plan (how to get products/services in front of ideal clients), operations (how to run the business) and financial projections (how much money is needed to start/run the business).

Stakeholders from various design companies in ROI were also interviewed with regards to setting up a new venture/company (See appendix 7, qu.1-8). Questions were devised to provide answers that would address the issues and challenges facing undergraduate students in the transitional period between college and Professionalisation, as they attempt to commercialise their work. Stakeholders' knowledge and experience in setting up their companies addressed these gaps. All stakeholders make valuable points to consider when commercialising an innovative product or service and setting up a design business. Stakeholders discuss current issues that face design professionals when setting up a new venture such as finance and support, mentorship, product viability, patents and trademarks in great detail.

Question 8 (See appendix 2) asked students, '*Did you explore the commercial realisation of your project'?*

Respondents stated that they are currently striving to create future design businesses. In order to achieve this goal they have negotiated with investors and acquired a Business Angel. Some of their products are currently on the market.

6.8 Patents and Trademarks

Question 8 (See appendix 7) asked stakeholders if they ever patented/trademarked/registered their design output. Most stakeholders had patented their designs, or had clients who bought the design and patented them afterwards.

Patents and trademarks are important aspects that need to be taken into consideration when trying to get a product to market. As noted in Case Study One (See chapter 7) it is important to patent your designs as premature exposure without adequate IP protection in place has the potential for losing claims of novelty in patent applications. The respondents also noted that in the case of students, colleges will register the projects trademark without cost. This allows the designers a window of opportunity to independently explore the commercial viability of their design.

6.8 New Venture Start-ups

Stakeholders were asked who advised them on setting up their company/partnership (see chapter 8, qu.2). All stakeholders sought advice from different sources; but Enterprise Ireland was a major factor in setting up their companies. Other advice was sought from solicitors, accountants, business accelerators and start-up boot camp mentors.

Question 4 (See appendix 7) asked Stakeholders what factors influenced their decision on whether they decided to set up a sole trader, partnership or limited company.

This question was important as it showed the various processes that Stakeholders followed to set up a business that suited their needs. Many factors were taken into consideration, the scale of the business, cost, benefits, time limits, safety and the industry. These factors are crucial to know when starting up a new venture.

Question 5 (See appendix 7) questioned Stakeholders about existing supports that are being currently offered to new start-up ventures. Most of the stakeholders received help and assistance from Enterprise organisations, and each of them expressed how helpful these organisations are. The evidence indicates that Enterprise organisations play a key role in design business start-ups offering financial supports, work space, mentorship, contacts and assistance. Linking up with these organisations is essential to designers.

Question 6 (See appendix 7) addressed how Stakeholders advanced their company profile to make customers more aware of their services. All stakeholders noted that they used online advertising as their main way of marketing their business. Having a good marketing strategy is extremely important to make people aware of the company, and goes a long way to getting new products on the market quickly.

Kovet noted that they used social media extensively and also hired a PR company; these factors along with the unique properties of their product enabled them to gain massive adoption in a quick timeframe. Promoting a new venture is essential to any start-up company.

Question 7 (See appendix 7) asked Stakeholders *'What enables people to produce viable products'?* This question was important to understand how businesses develop a product from concept to realisation.

Farfela Design noted, imagination and creativity, awareness of demands on the market, good knowledge of the field, skills necessary to execute their ideas (knowledge of design process, research, computer programmes, communication skills) and having a passion about products that they create, were all important factors to consider when producing a viable product (Personal interview, 20 March, 2013).

Ian Burnell Designs noted, identifying the customers' needs and providing a product that fills those needs. These days' people and organisations do not have money to spend on products that do not do what they are required to do (Personal interview, 06 March, 2013).

Verus stated, innovation - know what the market wants (function), know much they are willing to pay for it (price point), good looking product (aesthetics) (Personal interview, 11 January, 2013).

These are all fundamental factors to consider. All Stakeholder findings show that seeking advice from a broad range of sources enabled both design students and business professionals to produce viable products.

6.10 Summary

Research shows that for design to be professional; many aspects must be taken into consideration: Intellectual Property Law, economics (business plan), patents and trademarks, sources of financial support and professional advice, and the development of funding and market strategy.

For commercialisation to be successful and sustainable at third level education all educators believe that Intellectual Property Ownership is vital, and that students should be educated in all aspects of commercialisation including Intellectual Property ownership. This will enhance the development of Creative Design in ROI. Intellectual Property Ownership means that graduates play a key role in the furthering of their products. For graduates to be successful it is important that the colleges are willing to participate and support students in order to aid them to continue to be successful with their products, even after they have graduated.

Modules such as Economics, Marketing and Legal Aspects of Product Design must also be taken on board by all Creative Design courses. Having knowledge in these areas will allow students to bring all these various areas together in order to propose, conceptualise, design and develop their ideas to a professional and industrial standard. Students must be supported by their Institute so that they can compete nationally and internationally in competitions and professionally.

Bringing a concept to market must be outlined and planned in modules. Research shows that students would like to commercialise their design output. Leaving the consideration of the commercialisation of their designs until after their degree show is no longer an option.

7.0 Case Studies

7.1 Introduction

The researcher had to decide which research methods would best suit this study. The chosen method is through Case Studies. Five commercially successful projects and five commercially unrealised projects were chosen to form the basis of the study. This chapter will highlight both the barriers and the steps required for project commercialisation on Creative Design courses in ROI, through knowledge generated from these case studies. From this process, findings and recommendations have emerged.

- Each study will be based on a triangulation of results
- Graphs that represent the primary data gathered from surveys distributed to design students are illustrated
- Information retrieved from the interviews with each design student will be presented
- The findings from each of the student interviews will also be outlined.

7.2 The Case Studies are:

Case study 1 The Kug

Case study 2 Ergostop Wheelchair Brake system

Case study 3 The Enhanced Emergency Lighting (EEL) Barrier

Case study 4 Kovet protective case for the iPhone 4/4s

Case study 5 RUOK (Are you O.K)

Case study 6 ParkIT

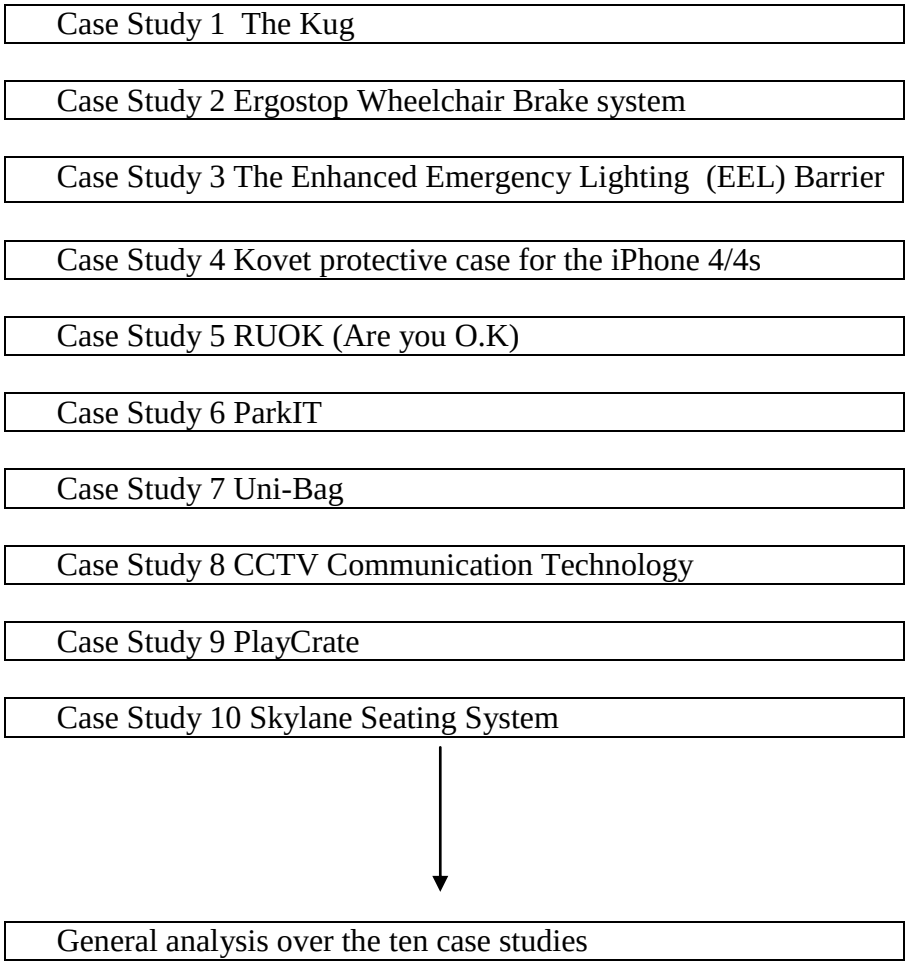
Case study 7 Uni-Bag (Improved environmentally friendly laptop bag)

Case study 8 CCTV Communication Technology

Case study 9 PlayCrate

Case study 10 Skylane Seating System

Figure 14 Analytical Approach



7.3 Successful Case Studies

Five design graduates who broke the barriers to commercialisation were selected. These successful students had commercially realised their Final Major projects. These case studies examine the role of Creative Design courses in the development of successful product design.

7.4 Case Study 1 – *Kug*

Product Images

Figure 15 Working model

7.4.1 Detailed Description of the Product

The Kug is a combination kettle mug hence the name *KUG (Kettle Mug).* The Kug heats cold water, with the outside layer of the mug holding the heat filament. When docked to the charging-base, it boils the water. Users can make a hot drink in their mug without having to utilise a kettle. The Kug comes with a heating element that can boil water in just 90 seconds to make a cup of tea or coffee. The Kug was

originally designed for persons with arthritis but has since proven to be universally popular.

7.4.2 Nature of the Project

The Kug started life as a joint major design project for two students. It won the *Pfizer and Arthritis Ireland Easy to Use Award* in 2010 and since then its developers have been on a roller-coaster ride!

This Final Major project was self-selected by the two designers. They developed it as part of a college project to create a gadget that would make life easier for arthritis sufferers, who often have difficulty lifting heavy kettles.

As part of their research, they met people with the condition (arthritis) to talk to them about the kind of problems they encountered on a day-to-day basis. When they stopped for lunch one day, they noticed some of the ladies trying to pour a cup of tea. After chatting to them they found out how difficult it was for them to actually lift a kettle - that was the starting point for their design.

Following their success in the *Pfizer and Arthritis Ireland Easy to Use Award*, the designers did everything themselves from concept to product realisation. They got advice both from lecturers and Euro Swiss International, a Hong Kong company that is based in England.

A week after the event the PR hit the papers. This died down for a few weeks then it was picked up by the Daily Mail UK website where it was featured on their gadget tech page. The next day they had 3,000 emails. It went global and was on every gadget blog you could imagine. Companies then started contacting them about the commercialisation.

The designers sought advice from outside the college in order to protect their design. They were told by a patent issuer that it would cost nearly €20,000 to protect it. They were wondering how they would get the money to pay for the applications, pay for the research and buy the applications. The college registered the trademark for free for them; in light of their situation they would make free applications (pro-bono) for the trademark for the logo. In the meantime Euro Swiss came on board and they took over that part and put their money into trademark applications. The amount of exposure the designers got on the internet was really great because a lot of people

got to see it, but it also meant people could copy it. There was no control over it, it went viral. There was no time to try and protect it before it went public.

The designers are currently finalising their design for production, and are hopeful that this will happen in the next few months. It has been a long and slow process. Because of the size, the parts have to be custom made. They have to make smaller parts with the same efficiency as the bigger parts. The elements and controls are being tested and reports by engineers show that they are trying to figure out what the best way of doing it is. The only products on the market at the moment are full sized kettles.

On being asked '*What other supports were offered to you to further explore the commercial realisation of your project by your Institute or external bodies?',* the respondents stated that they were informed by their Institute that if they funded a project, they expected 50% of the sale. They usually offer funding between €5,000 to €10,000 but the current system in place is mostly reserved for fourth year projects.

Sean Gallagher and Bobby Kerr from *Dragons Den* (RTE programme featuring entrepreneurs pitching their business ideas in order to secure investment finance from a panel of venture capitalists) were also interested in developing it and were willing to put the money up. At the same time, other companies such as Morphy Richards, Marks and Spencer and Asda began contacting them, emailing them through the website. Other companies were also contacting them, wanting to actually purchase the final product. Retailers in Japan also wanted it. Meanwhile, the designers were in talks with *Dragons Den* who wanted to go with it. The Dragons both wanted 25% each which meant half of the designers' company went straight away. The designers finally went with Euro Swiss as they were free to market. As they signed with them, Euro Swiss took care of the patents; it is now patented in Europe, Japan, United States, Russia, the Far East and Africa.

The respondents were asked '*Do you think Intellectual Property Law should be taught as part of your course programme?'* (See appendix 1, qu.13), and they stated that:

> It is important to know about rights as a student and to know how to patent designs. If you put yourself out into the market without checking it first you limit yourself to the exposure. Learning the basics in each of these areas provides us with a broader knowledge to help bring our product to reality (Personal interview, February 18, 2011).

7.4.3 Outcome of the Project

The two designers received a global response to their design after winning the *Pfizer and Arthritis Ireland Easy to Use Award* and have since been working to develop the Kug concept and bring it to market. The Kug is currently in the development process and will be sold online in 2013.

7.4.4 Conclusion of Case Study

Key Finding: Collaboration with Industrial Partner

The designers stated that when they sought professional advice on how to best protect their designs they discovered that the patent protection could cost almost €20,000.

In their case the Institute registered the project's trademark without cost. This allowed the designers a window of opportunity to further explore commercial viability. Exposure and feedback from the design competition played a large part in getting the product to market. Various companies made links with the designers to gain joint IP protection.

The designers noted that the only negative aspect they came across was having their design exposed without having it patented. They noted that premature exposure without adequate IP protections in place is the potential for losing claims of novelty in patent applications. This is due to unprotected exposure at public events, such as the end of year show or exhibition.

7.4.5 Areas for Improvement

The designers felt that working jointly with companies gave them a broader and more relevant perspective, allowing them to explore their projects. They felt that there needs to be more course direction on running live projects with companies and external bodies, rather than working solely on 'canned' studio project work.

Creative Design courses need to have a strong commitment to the development and support of the knowledge economy and a proactive approach to building successful links with industry. Working jointly with industry experts is key to successful commercialisation.

To enable students to explore the commercial realisation of their projects they must:

- Work with their Technology Transfer Office to get the product to market
- Seek advice from investors
- Identify and cooperate with an appropriate business professional.

7.4.6 Knowledge

The students need to be trained in a number of areas of professional practice to be able to deliver a viable product.

Training needs to be provided in:

- Intellectual property law
- Cost and complexities of patents
- Preparing a business plan
- Entrepreneurship / Presentation skills
- Investment / Seed capital

7.5 Case Study 2 – *Ergostop Wheelchair Brake system* (A hydraulic brake that meets the needs of all manual wheelchair users)

Product Images

Figure 16 Working model of Brake

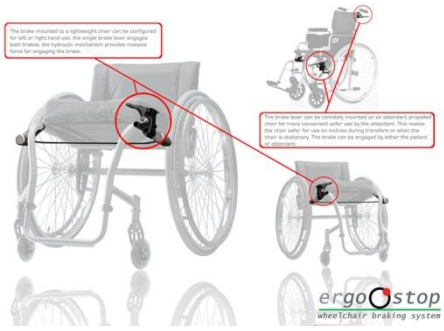


Figure 17 Brake attached to wheelchair

Figure 18 CAD rendering of Brake

7.5.1 Detailed Description of the Product

The brake system utilizes a sealed hydraulic mechanism to provide the force required to apply the brakes. The hydraulic system offers massive power for minimum effort. The brake is entirely reversible to allow for use on either side of the chair and it can be retro fitted to nearly all manual wheelchairs. The brakes' ergonomics allows the user to know by touch the actuation points on the brake. It is constructed from aluminium and polypropylene for lightweight and increased durability.

This product concept was developed to address the problems associated with brakes on wheelchairs and the needs of the users. It was designed to be used by anyone who uses a manually propelled wheelchair. It was a winner of the *James Dyson Award, Ireland* and a finalist in the global competition. *Nordigo*, a sister company of *Stira*, is working on the brake system as part of a range of products they supply.

7.5.2 Nature of the Project

This Final Major project was self-selected. This product concept was developed to address the problems associated with brakes on wheelchairs and the needs of the users. It was designed to be used by anyone who uses a manually propelled wheelchair. As a wheelchair user, the chief designer found the existing braking system on his wheelchair too awkward and decided to solve the problem. The Ergostop Wheelchair Brake uses a hydraulic braking system, which requires less strength, effort and time to employ the brakes.

The project won the prestigious 2009 all Ireland *James Dyson Design Award*. It also made the top 15 shortlisted for the Global award - the first time an Irish student has made it so far - and a major achievement, considering there were over 400 hi-tech designs entered from across the world. This resulted in major media attention across Ireland.

The *James Dyson Award* celebrates, encourages and inspires the next generation of designers and engineers. An international award, it is organised by the James Dyson Foundation, a charitable trust set up as part of Dyson's mission to inspire young people about design engineering. Put simply, design is something that solves a problem.

7.5.3 Outcome of the Project

There was a lot of PR generated after the campaign. *Stira*, a company that produces folding stairs for attics, contacted the designer and wanted to back the design. They have a sister company called Peller Technologies which manufactures a propulsion system for wheelchairs and they needed a braking system. They were therefore very interested in this design.

Stira have been established since 1982 and are a hugely successful company with sales in both the UK and America. They have since developed the product and it is currently on the market.

7.5.4 Conclusion of Case Study

Key Finding: Design Competitions

The project's potential commercial viability was suggested by positive placement in a design competition. The designer won the competition prize thereby generating an amount of beneficial PR. The project was featured both online and in national newspapers. Showcase type functions were held which allowed the designer to extend his business networks and establish company contacts. Entering the competition resulted in major media exposure for the designer, nationally.

7.5.5 Areas for Improvement

Design competitions should be mandatory. Enticing students to enter into more design competitions is a way to help students realise the potential of their work. The designer felt by organising meetings with professional organisations such as Enterprise Ireland allowed him to have a more realistic knowledge of how to further his project, and give him the confidence to do so.

An open and supportive environment with experienced members available for consultation on a range of manufacturing, design and entrepreneurial queries provides students with a better understanding of how to originate a viable product or service.

7.6 Case Study 3 - *The Enhanced Emergency Lighting (EEL) Barrier*

Product Images

Figure 19 Working model

7.6.1 Detailed Description of the Product

The *Enhanced Emergency Lighting* (EEL) Barrier provides the Emergency Services with a highly visible, advanced warning system for oncoming traffic. The EEL is portable and can be quickly deployed in any situation where the emergency services require traffic to be directed away from the scene of an incident. It has a completely reflective front surface and built-in LED lights indicating to traffic which direction to turn either left or right or indicating that the lane is closed. These features make the EEL ideal for use in either daylight or night-time scenarios; creating a safe working area for both the emergency service personnel and any casualties on the scene. The EEL is quickly deployed by simply placing the unit on the ground, extending the legs and then pulling the barrier apart. The LED strips are activated by pressing either of the on/off switches placed on the front post on either side of the unit. This will activate the directional arrows or the Triple X pattern.

7.6.2 Nature of the Project

This Final Major project was also self-selected but the designer chose to enter it for the 2012 *James Dyson Award.*

The idea for the EEL Barrier came about while conducting observational research with the Emergency Services. It was noticed that a large amount of time was spent setting up the safe working area. This was done by using a series of cones and lights to close off the area to oncoming traffic to not only protect the passengers of the vehicles but also to protect the Emergency Services personnel. After conducting further research and talking with the Dublin Fire Brigade crew members, it became apparent that walking in the direction of oncoming traffic, especially on a motorway or badly lit road at night, is one of the most dangerous parts of their job. This is what gave the designer the idea to try and improve not only safety for emergency personnel, but also for other road users so that they have adequate time to change lane or slow down before approaching the scene.

Once a strong understanding of the Emergency Services procedures and Standard Operating Guidelines was established the respondent changed his approach and began to talk to the crews to get their experiences and their understanding and ideas on where improvements could be made. This was done by conducting several focus groups concentrating originally on Road Traffic Accidents (RTA) and then finally moving the topic onto the equipment used for creating the Safe Working Area. With this input in mind, a design brief was created. Using several mind tools a large quantity of different concepts were created. One was chosen and developed and then taken back to Dublin Fire Brigade (DFB) to get their opinion on possible improvements. From here a concept was developed for production and a prototype was produced. This prototype was then brought back to DFB for testing.

The designer was asked '*During your project were you in contact with any Enterprise organisations? Innovation Centre/ Enterprise Ireland?'* He stated that members of the Incubation Centre and Technology Transfer Office contacted him to enrol on the New Frontiers programme. The designer declined their offer as his goal is to work in a design team, collaborating with other designers. He would ideally like to licence the product rather than set up on his own as he has no experience in that field.

When asked '*From your course of study do you clearly understand how to commercialise an innovative product or service?',* he noted that before leaving the course he felt he had a good understanding of how to commercialise a product, however, after trying to get it to market he realised the main thing he is missing is industrial experience and contacts, which counts for quite a lot.

7.6.3 Outcome of the Project

After making it through the first round of the Dyson Award, the respondent approached the Technology Transfer Office within his Institution. He has been working with them since, trying to get the product to market. He noted that it seems to be taking some time but he feels he is making some progress. The second generation model is currently being developed.

7.6.4 Conclusion of Case Study

Key Finding: Technology Transfer Office

The respondent contacted the Technology Transfer Office himself to further this project. The Technology Transfer Office manages IP Protection, commercialisation and enterprise development. The TTO is responsible for the trademark registration. It also helps to identify the most appropriate funding opportunity for the technology and supports the inventor throughout the application process.

7.6.5 Technology Transfer Office

The Office of Research and Technology Transfer, amongst its many functions, has two key objectives: (1) To provide high quality services to assist and support the College's research staff in securing and managing research funding and other contract; (2) To promote the effective commercialisation of research by protecting and exploiting Intellectual Property Rights generated in the College.

Working alongside the college Technology Transfer Office will enable students to commercialise their designs (Dublin Institute of Technology, 2008, p.2).

7.6.6 Areas for Improvement

Participation in external meetings with officials from the Technology Transfer Office and other organisations such as Enterprise Ireland will assist students to gain knowledge and expertise in the area of commercialisation.

7.7 Case Study 4 – *Kovet protective case for the iPhone 4/4s*

Product Images

Figure 20 Kovet Case

Figure 21 Hot air balloon cover

Figure 22 Rugby player cover

7.7.1 Description of Product

The Kovet case is made from TPU (Thermoplastic polyurethane), a plastic which is soft to the touch but extremely tough. Most other protective cases are made from silicone. The Kovet case feels fantastic in your hand and offers amazing protection. Drop tests from up to one metre were carried out, with the case taking the full impact. The results spoke for themselves, the iPhones being dropped had zero damage and the most the cases suffered was a little scuff! This case became Kovet K1.

The product is aimed at a young target market. It features various illustrations such as sport and comic illustrations to suit the user. Many of the illustrations are done by Irish graphic designers.

7.7.2 Nature of the Project

While working on an iPhone 3GS case for a Final Major project in the iPhone accessories market, the designers noticed that a great looking case usually came at the expense of protection or vice versa.

They began working on the first Kovet protective case for the iPhone 4/4s. The criteria was that it had to look and feel great and give un-matched protection.

During the interview, the designer was asked '*Who contributed to your project design criteria'?* The designer noted that a large number of people contributed to his project. The designer sought advice from external experts as well as user groups and the general public. He was guided somewhat in the selection of contributors by lecturing staff.

7.7.3 Outcome of the Project

The product was developed and is currently available on the market. One of Kovet's main tasks was to keep production on Irish soil. The designer stated that he believes that the highest standard of design and manufacturing is achievable right here in ROI.

7.7.4 Conclusion of Case Study

Key Finding: Teamwork

Communication with external bodies and industrial contributors enabled the designer to expand development contacts and advisors, leading to more credible project targets and relevant design criteria.

The designer noted that after speaking to the various stakeholders a deeper understanding of the user needs was established. The group met with people with project relevant conditions to discuss what kind of issues they encountered on a day-to-day basis in order to define user requirements. After these focused discussions, they established a live understanding of the problems these participants need to overcome in order to live and work effectively.

Once the user needs were established the participants were interviewed to relate their experiences and draw out their insights on where users suggested improvements might increase their efficiency, or satisfaction with the particular study. This was undertaken by conducting several focus groups.

Focus group contributions were adopted for inclusion and resolution within the project design brief. Suggested strategies for solution to these criteria could then be presented to the participants to gauge their reaction. Concepts were refined at an early stage, prior to prototypes being produced leading to more relevant developments.

7.7.5 Areas for Improvement

Focus group interview is a qualitative method which can be used alone or with other qualitative or quantitative methods to bring an improved depth of understanding to the needs and requirements of users and customers.

The goal is to elicit perceptions, feelings, attitudes, and ideas of participants about a selected topic. Focus group interviews can be applied at any time in the development process of the project in order to perform a market analysis, a user needs and requirements analysis, to communicate with target users about design concepts, ideas, and prototypes, and to investigate users' views when the application is already in use. However, the best use of this technique is in the early phases of the development process.

7.8 Case Study 5 – *RUOK (Are you O.K)*

Product Image

Figure 23 RUOK System

7.8.1 Detailed Description of the Product

RUOK is an integrated system using television, mobile applications and the Internet of Things (IoT) to enable older people to remain at home for longer. By connecting the RUOK set-top box to a standard Television, RUOK enables older people and their carers to address three of the key issues of independent living, namely medication management, physical well-being and the problem of social isolation.

The system the team designed uses a Windows phone, Skype and Kinect to enhance TV systems of the product. These provide online physical fitness classes as well as a revolutionary new idea called *TAG TV*, which allows an older person to watch TV with peers or their family remotely. The design also incorporates a notification system which can send an alert from the person's home should they encounter a problem or difficulty.

The finals were hosted by Microsoft as part of their National App and Gaming Conference which was held in The Aviva Stadium in Dublin. The team were supported by their computing lecturer, who had also worked with Team Hermes in 2011, when they won the Irish finals of the competition. They then went on to be the first team from ROI to win the Global finals, beating 350,000 competitions from around the world. A third IT Sligo team also won the Irish Finals in 2008.

7.8.2 Nature of the Project

This Final Major project was entered into the *Microsoft Imagine Cup* competition in 2013 and has progressed to the World Finals in Russia, July 2013. A group of students from different design disciplines (engineering, design and computing) worked together on a project designed to support the physical and social needs of older people in their homes.

Microsoft Imagine Cup is the world's premier student technology competition. It provides an opportunity for student technologists, developers, and aspiring entrepreneurs from all academic backgrounds to collaborate, develop a technology application, create a business plan and gain a keen understanding of what they need to do to bring their concept to market.

To inspire more students and encourage a wider variety of aspiring innovators to participate, Microsoft redesigned Imagine Cup around three new core competitions – World Citizenship, Games and Innovation – and more than doubled the prize money to US $300,000. The 2013 competition builds on the core elements that have been most popular with students in the past 10 years – social impact and gaming – while expanding the competition's focus on innovation and entrepreneurship.

The respondent was asked '*Did your project conclusions have commercial potential?'* The respondent stated that the project had huge commercial potential after progressing to the World finals of the Microsoft competition. The team are looking at creating a future business with this project and have talked to investors, and acquired a business angel to do this.

Another question asked was '*From your course of study do you clearly understand how to commercialise an innovative product or service?'*

> Our course's broad nature gives us a very wide scope of knowledge and this allows us to have an idea of how to go through the different stages required in bringing a concept into reality. There is no major emphasis on design entrepreneurship in our college but there have been a few people from our course who have gone on to design successful products and/or services. Elements such as Intellectual Property Law should be taught as part of the course as it provides the student with a broader knowledge to help bring their product to reality. Enticing students to enter into competitions is a great way to help them realize the potential of their

work. Also, working with industry will give the students confidence in furthering their ideas (Email interview, March 7, 2013).

7.8.3 Outcome of the Project

The college has supported the project by offering its expertise in the commercial area and have provided the team involved with extensive PR coverage. The design team has also received help from Microsoft, who are currently helping them to develop their product.

7.8.4 Conclusion of Case Study

Key Findings: Knowledge / IP

7.8.5 Knowledge

The designer felt that working jointly with companies gave the group a broader and more relevant perspective, allowing them to explore their project further. He noted that on account of the diversity of design courses a broad scope of knowledge is imparted. This allows participants to have an idea of how to go through the different developmental stages required in bringing a concept to reality. The designer also noted that he felt the group had a good understanding of how to commercialise their product. However, they realised that the main thing they lacked was the commercial experience and business contacts for their development.

7.8.6 Intellectual Property

Acquired understanding of Intellectual Property Law provides students with the necessary knowledge to avoid pre exposure and to competently discuss their IP needs with professional advisors. The designer stated that the college involved did not take ownership of this project. They were free to develop it.

7.8.7 Areas for Improvement

Elements such as Intellectual Property Law should be taught as part of the Creative Design course as it provides the student with a broader knowledge to help bring their product to reality. Enticing students to enter into competitions is a great way to help them realize the potential of their work. Also, working with industry will give the students confidence in furthering their ideas.

7.9 Commercially Unrealised Case Studies

Five design graduates who had outstanding Final Major Projects and achieved excellent degrees results were selected to identify why some products fail to break the barriers to commercialisation.

7.10 Case Study 6 – *ParkIT*

Product Image

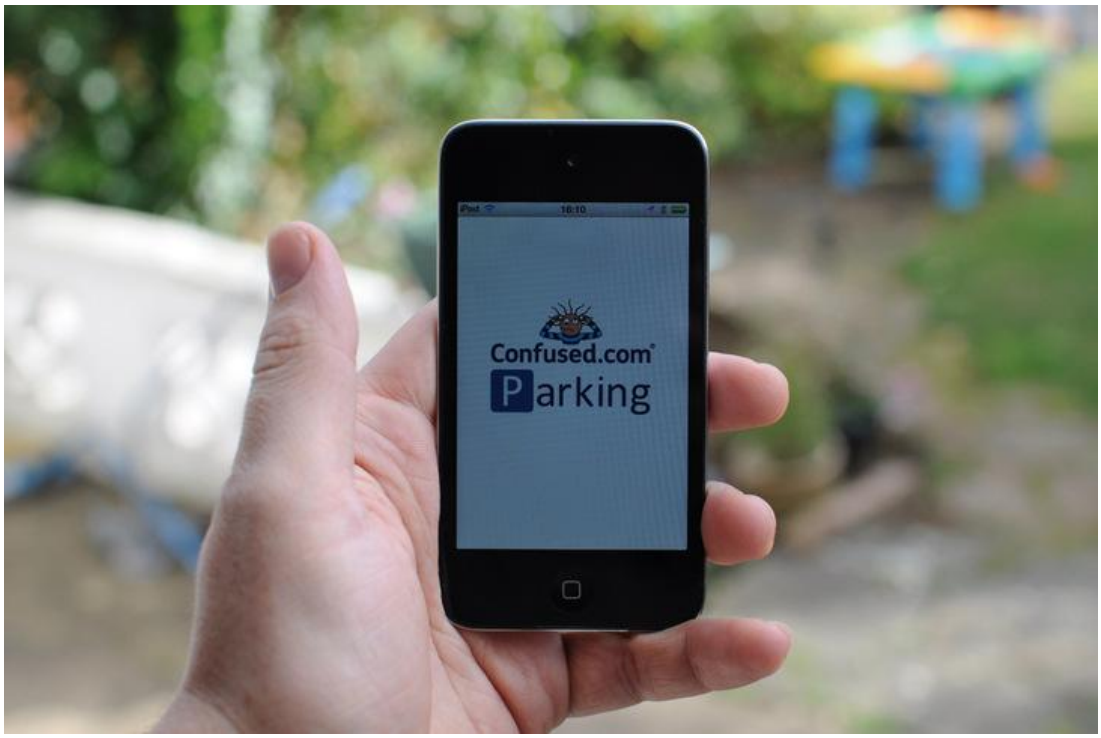


Figure 24 ParkIT Application on mobile phone

7.10.1 Detailed Description of the Product

ParkIT is a product that directs motorists to free parking spaces, by calling them through an automated voice or texting them the location of these spaces. The software uses existing CCTV technology to recognize available parking spaces, as opposed to sensors, which are more expensive to install and maintain.

7.10.2 Nature of the Project

This project was also created and developed for the *Microsoft Imagine Cup* competition. The team consisted of two design students who were supported by their mentor.

The design team went to Paris and represented ROI in the World Finals of the *Microsoft Imagine Cup* competition, winning the 2009/2010 competition. When the design team returned from Paris, Microsoft put them through a business innovation accelerator programme that coached and taught them what they needed to know about starting a business. However, at the end of this programme the college informed the designers that they did not own the Intellectual Property rights to the project, the college owned 70% and their supervisor owned the other 30% of it. This discouraged the students and made them give up the idea of commercialisation. The respondent noted that there was no support given from the college.

When asked '*What are the Intellectual Property contractual arrangements between you and your learning institution',* the respondent stated that she was initially unaware of her Intellectual Property rights and was asked to sign a document to give all rights of the project to the Institution.

7.10.3 Outcome of the Project

The respondent did not pursue the project as the Institution took full ownership of it. There is a need to develop an Intellectual Property Policy with a clear strategy for all design courses in ROI. This would aid success across such courses. The implementation of such a policy should have benefits for all graduates and should improve product delivery.

7.10.4 Conclusion of Case Study

Key Finding: Lack of IP communication

The designer noted that she was unaware of any Intellectual Property contractual arrangements between herself and her learning Institution during the period of her study. This is an area that was not discussed during the duration of her study.

7.10.5 Areas for Improvement

Students should be made aware of their Intellectual Property arrangements between themselves and the college right at the start of their design studies, in year one. Intellectual Property Law should be taught as part of every Creative Design course programme. It is a necessary aspect of every design course.

7.11 Case Study 7 – *Uni-Bag* (Improved environmentally friendly laptop bag)

Product Images

Figure 25 Rendering of UNI Bag

7.11.1 Detailed Description

The designer noticed a gap in the market for laptop bag users. She found that she had difficulties carrying a laptop bag daily and, as a result of market research, found that this was a problem for many other people. Further research identified two more issues: space and the different ways of carrying a bag. The laptop bag had a

changeable front pattern so the user can get a new look for the bag anytime that they want.

7.11.2 Nature of the Project

The project was self-selected for a Final Major project. It was developed for people who have difficulties carrying their laptops. The designer sought the advice of lecturers and a professional bag designer.

When asked '*During your project were you in contact with any Enterprise organisations? Innovation Centre/ Enterprise Ireland?',* she stated,

> I contacted the Innovation Centre and they offered me a space there for the summer. The only problem is that everyone kept telling me to take the project to the next level, but no one told me what the next level is (Personal interview, March 20, 2011).

The respondent was also asked *'Did your project conclusions have commercial potential?'* She noted that it would be a great solution for people who have to carry heavy bags every day. It can be sold not only as a laptop bag but as a school bag for kids.

7.11.3 Outcome of the Project

The respondent did not subsequently explore the commercial realisation of her project as she did not know how to do this and there were no supports or advice offered to her. The respondent also noted the life of student projects are over after final presentations. She felt that elements such as Intellectual Property Law need to be brought into the teaching of design.

7.11.4 Conclusion of Case Study

Key Finding: Lack of Supports

The designer was offered a space in the Innovation Centre to work on her Final Major Project. She stated that she did not pursue this as she did not understand how to initiate or progress the commercialisation of her product.

The designer noted that she was given no support or funding by her college or external bodies to further explore the commercial realisation of her project and felt that the Creative Design course is not particularly focused on commercialisation.

7.11.5 Areas for Improvement

Supports and mentorship should be offered to design students to further explore the commercial realisation of their projects both by the college and external state institutions charged with the promotion of innovation.

7.12 Case Study 8 – *CCTV Communication Technology*

Product Images

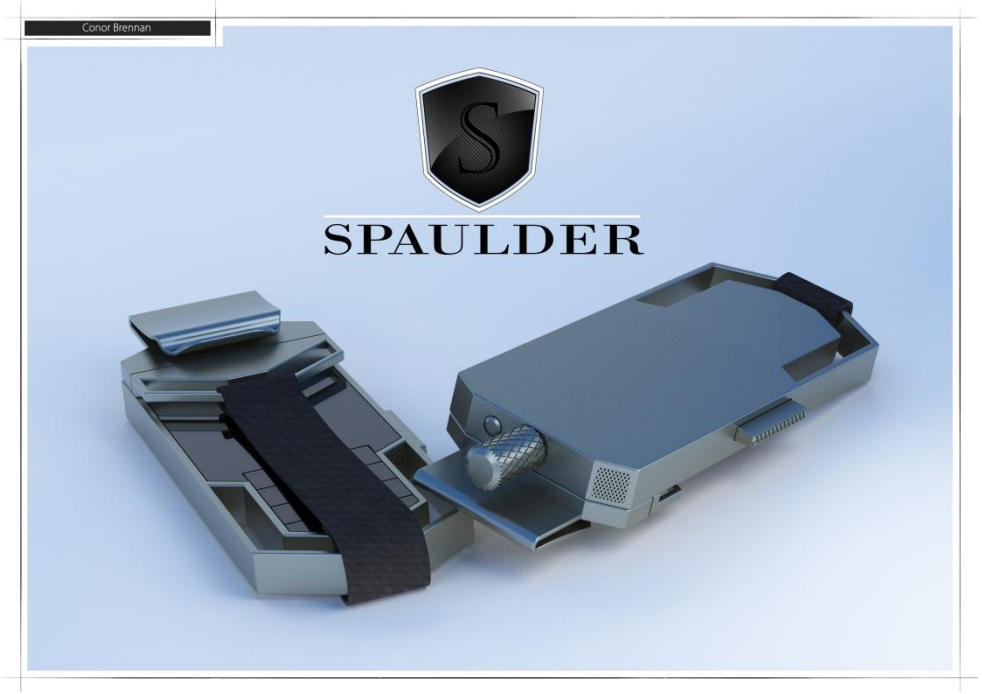


Figure 26 CAD Rendering of Spaulder

7.12.1 Detailed Description of the Product

Spaulder is an audio visual advice for urban police officers. It allows users to live stream CCTV footage otherwise only available to operators. Currently CCTV footage is used reactively as evidence, after an offence has been committed and it is for this reason that the public perception of CCTV is one where the system fails to actively protect citizens in the urban environment.

Spaulder aims to utilise CCTV as a proactive tool for aiding police in their response to crimes by increasing the efficiency of communication between operators and officers on the ground. Traditionally, this communication was done via radio; however through using the live stream function of Spaulder, officers can see the perpetrator, vehicle or area of the city which requires their attention before they arrive on the scene.

7.12.2 Nature of the Project

This project was self-selected at Final Major Project stage. The respondent was asked '*Did your project conclusions have commercial potential'?* The respondent replied stated that as it was a future projected solution, it would not have commercial viability (due to need for commercialisation of materials and manufacturing processes used) at present.

The respondent was also asked *'From your course of study do you clearly understand how to commercialise an innovative product or service?'*

> I have never attempted to commercialise any of my previous products/ services, because I was never given any direction. There is currently little weight given to viability of projects (as opposed to physical design elements) as there is no structure in place to teach these skills. Designers need to know how to protect their ideas as they try to commercialise them, independently. There is discourse about design entrepreneurship in so much as looking at other design entrepreneurs, and what they have achieved (not necessarily how). Again, there is little guidance or practical application in the college (Personal interview, May 21, 2012).

7.12.3 Outcome of the Project

The respondent did not attempt to take this project further as it was targeted far into the future; it would not currently be viable due to the unavailability of appropriate materials and technologies.

7.12.4 Conclusion of Case Study

Key Findings: Lack of Knowledge

The designer felt that the course lacked direction in the area of commercialisation. Students should be given advice on whether their projects are viable at the start of their projects. Utilising a patent issuer is necessary as it allows students to establish whether their product is viable or not.

7.12.5 Areas for Improvement

- Project briefs should be kept contemporaneous
- Live projects should be incorporated at certain stages of the course
- The course curriculum must include business and entrepreneurship modules.

7.13 Case Study 9 – *PlayCrate*

Product Images

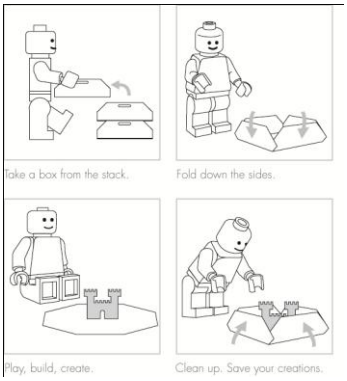


Figure 27 Working model of PlayCrate

7.13.1 Detailed Description of the Product

PlayCrate is a product designed to enhance the experience of playing with LEGO. PlayCrate has two functions. It serves as a play mat and a toy box. The play mat also serves as a storage container, allowing instant clean-up. The boxes can be stacked or stored separately on shelves. Creations can also be protected with relevant pieces surrounding them in a closed box.

7.13.2 Nature of the Project

This project was selected as a Final Major project. It was also selected for an exhibition of Graduate Design in *Designist*, Dublin. *Designist* is a retail outlet offering the best of Irish and International product design. Run by designers,

schemers and plotters, their ethos is that all products should be beautiful, useful and affordable. They hold product launches, events and design forums on a regular basis. The project was also selected for the Institute of Designers in Ireland's *Best of Graduate Design 2011* exhibition.

The designer was asked *'From your course of study do you clearly understand how to commercialise an innovative product or service?'*

> No. I have struggled with this aspect of design. On my Erasmus exchange, the Design course I attended in France had weekly seminars on marketing, business practice, and getting products to market. The course in ROI was entirely lacking on this front, and I feel the students suffer because of it. We had one hour long seminar on Intellectual Property Law and it was amazing how much I didn't know. I guess this is where our independent attitude which has led to self-motivated entrepreneurship originated (Email interview, May 25, 2012).

The designer was also asked *'What circumstances should stimulate students to originate viable product or service ideas?'*

> A creative and open community of designers. I found that in our course, when we all had the same brief for a project, people were secretive, and protective of their ideas. However, when we did our final project, everyone chose their own brief. This meant we could freely and openly discuss our ideas with each other. The discussions, experimentations, and opinions that were conducted and shared made all of our projects better. It was refreshing, and I feel that all of our projects benefited (Email interview, May 25, 2012).

7.13.3 Outcome of the Project

The designer is currently exploring the commercial realisation of his project. After trying to get it to market he realised the main thing he is missing is a fundamental knowledge of marketing and business practice.

7.13.4 Conclusion of Case Study

Key Finding: Lack of knowledge

The designer stated that he did not know how to further progress his design as the course lacked major components such as computing, engineering and IP law.

7.13.5 Areas for Improvement

Core subjects such as engineering and computing need to be integrated with the creative classes. IP law and business studies are also essential components as they provide students with a broader knowledge to help bring their product to market.

7.14 Case Study 10 – *Skylane Seating System*

Product Images

Figure 28 CAD Rendering of Skylane Seating System

7.14.1 Detailed Description of the Product

While travelling in an aeroplane the biggest drawback is the space provision to store passenger luggage, near to the designated seats. Overhead compartments are a good option, but for a plane reference of 149 passengers only 114 lockers are available to place full-sized bags. To overcome such difficulties, the designer has designed the Skylane seating system for short haul flights.

The concept requires eliminating the overhead bins to create additional space at the bottom of each seat. The seats will be raised a few inches above the ground to allow more useful storage space below. This will ensure that passengers get a place to keep bags right below their seat. The seats will be slim in nature but the edges will be enhanced with the help of slightly raised upholstery. To provide extra legroom, the luggage wall can be opened. The slight incline of the wall will ensure that passengers are unable to project their feet into the luggage area.

The baggage placement areas will be clearly identified by rubber strips. This method of construction ensures that luggage items are unable to fall over or move about in-flight. Before the flight takes off, automatic compartment doors will shut, keeping all damage at bay. Cabin weight will be reduced with the usage of carbon fibre for seats and elevated flooring. Skylane seating system is revolutionary and is designed to make short haul flights much more convenient.

7.14.2 Nature of the Project

The project was self-selected by the respondent. She noted that she chose an area of interest, researched it broadly, and then focused on a key area for development.

The respondent was asked *'Who contributed to your project design criteria?'* She stated that she reached the design criteria through research, tutorials and testing. She also consulted some experts.

In relation to entrepreneurship, the respondent stated there are always one or two students who are entrepreneurs, but the college is not very focused on this. She feels that it would help to have more visiting tutors who are entrepreneurs to work on projects with design students.

During the time of the project, a patent issuer visited the Institution to talk to the design students about their projects. The respondent's project was not considered patentable as it is very difficult to change a seating layout in a commercial aircraft. A huge investment would need to be undertaken on the part of aircraft manufacturers (Airbus and Boeing) and there is no real competition in the industry.

7.14.3 Outcome of the Project

The designer received some media attention after the Degree Show through radio and newspapers but as the project was not considered patentable, she did not pursue

it further. The respondent also received a request from Michael O'Leary (Ryanair) to forward on her project as he could not attend the Degree Show, but she did not pursue this as she moved abroad.

7.14.5 Conclusion of Case Study

Key Finding: Lack of Entrepreneur Training

The designer felt that Design Courses are not very focused on entrepreneurship. She felt that the course should have more visiting tutors who are entrepreneurs to work on projects with Creative Design students.

7.14.6 Areas for Improvement

Creative Design courses must focus on Entrepreneur Training. Working alongside entrepreneurs will give students a head start in building their own business. Design students have the creativity to start their own business, but don't have the knowledge or tools to realise it. Entrepreneur Training will ensure that aspiring designers are equipped with the skills and contacts they need to make such ventures successful.

8.0 Conclusions and Recommendations

8.1 Introduction

This chapter illustrates the discussions and insights and theoretical development from previous chapters. To fully address the research question comprehensive conclusions will be provided. Subsequent recommendations suggest how to develop Creative Design courses may be furthered developed.

8.2 Research Question

The primary question explored within this research was: 'An investigation into the commercialisation of Final Year Projects within Creative Design courses'.

The overall aims of the research were:

- To investigate the commercialisation of Final Year Product design students' projects
- To identify the best practice for design education
- To identify Intellectual Property rights with regard to the commercialisation of student work after college
- To identify the legal implications and requirements for the commercialisation of products.

8.3 Theoretical Development

Literature pertaining to the topic of commercialisation in academia is narrow. The secondary research within this study outlines the implications of not having a model in place to aid students. One of the aims of this study was to identify the critical success factors of commercialisation. The success factors of commercialisation were investigated discovering such fundamentals as collaborations with industry, the teaching of design, research and services. To achieve greater realisation in the output of successful products, the course must be more clearly industry led. Each of the success factors were confirmed by educators as important to the future development of the Creative Design courses in ROI.

The main positives that were identified through the primary research are that there are many entrepreneurial opportunities within Industry for graduates such as '*New*

Frontiers programme' (See appendix 10). One of the major conclusions of the primary study was that the future development of any Creative Design course in ROI will be dependent on the direct involvement of industry.

8.4 Issues emerging from the Research

The research highlights several facts:

- The world of design is changing and colleges are faced with the challenge of preparing students for an increasingly technological world and an evolving relationship between promoter, manufacturer and customer.
- The beneficial approach to commercialisation is to have a structure of design entrepreneurship in place for undergraduate students
- Colleges and lecturers need to form a dynamic that fosters a culture where entrepreneurship and innovation flourishes
- Colleges need to create ideal conditions to encourage innovation and growth
- Creative Design courses need to focus on methods for entry to markets
- Colleges should ensure that IP is properly understood and reflected in the course programme
- Issues surrounding the use of IP by students have been highlighted and numerous suggestions cited regarding how successful commercialisation might be achieved in a college environment
- Promotion of the creative industries and supports for innovation should be at the heart of the college's aims and objectives
- Design students should be able to capitalise on their creations
- Colleges should ensure that IP is properly understood and reflected in the course.

8.5 Commercialisation of Products

Research shows that approximately only one Final Year project, annually, makes it to market. This is an issue that needs to be addressed throughout all of the Creative Design courses within ROI (See chapter 7, qu.5).

8.6 Design Practice

This research is based in ROI so the Creative Design courses within ROI were explored. The research has shown that educators in the design sector are aware of the positive implications that success can have on graduates. Results strongly indicate that there is rich potential for growth of commercialisation in ROI. What is required is leadership in this area through Government support. What is strongly evident throughout the research are the consistent gaps that emerge through a lack of leadership. In effect there are four major gaps:

- Lack of a National Policy
- No structured approach
- Limited funding opportunities
- Ad-hoc nature of current collaborations (with industry and local enterprise organisations).

This leadership gap needs to be addressed in order to foster design and innovation in ROI. In order to fully embrace the development of commercialisation within the Creative Design courses, collaboration with industry is vital.

8.7 Recommendations

If the mission of a creative course is to prepare the students for innovative and professional thinking, then there are key points in the case study findings worth considering for the process of programme evolution.

8.7.1 Suggested Advisory Body/Panel

The aim of this research is for design students to have a full understanding of project commercialisation. A recommendation of this research project is to develop a system/model to provide information to undergraduates.

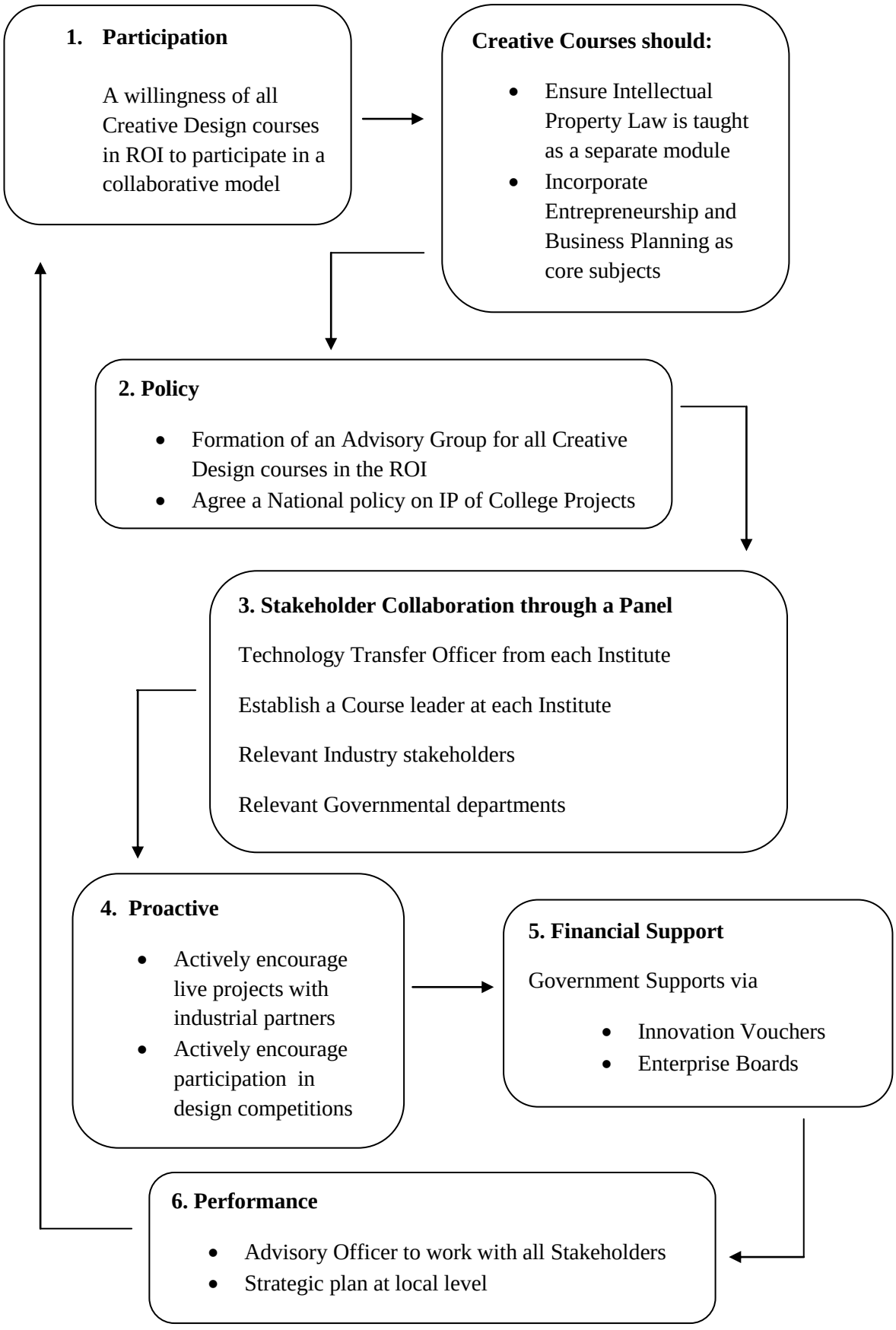
The primary research in this study illustrated the necessity for collaboration. The students themselves feel strongly that these collaborations and relations with industry are a key factor in their success and need to be maintained in order to succeed. Design and Industry collaboration on any Creative Design course could be implemented in a more structured way through the establishment of an advisory body or panel of entrepreneurs to facilitate a system of joined-up thinking.

This collaborative model will:

- Provide knowledge with unique expertise in design output
- Provide expertise from within the Institutes of Technology and the supportive environment of their Business Incubation Centres
- Enable networking with other entrepreneurs and business development agencies
- Offer mentoring from experienced business advisers and practitioners
- Deliver training in all areas of commercialisation including product development, financial management, market research and validation, business process, intellectual property and patent law.

To allow this model to develop in ROI there will need to be an on-going process. Course lecturers and industrial partners will need to keep in constant consultation with one another through workshops, seminars, conferences and advisory panel communication.

8.7.2 Collaborative model specifically for Creative Design courses in ROI.



8.7.3 Technology Transfer Office (Suggested model to be put forward)

From researching Case Study 3, Institute D was identified as a major hot spot, in terms of design innovation. This institute has a Technology Transfer Office (TTO) to promote, develop and enhance their IP. (See appendix 6) The TTO provides a professional service to the internal research community, to assist colleagues and students negotiate IP and subsequent commercial terms of research, as well as providing consultancy agreements.

As stated in their literature, the TTO will:

- Assess the commercial potential of IP resulting from research and scholarly activities
- Protect and market the IP and negotiate options/licences
- Assist in the preparation of business plans to justify assignment of the IP to Start-up companies or joint ventures.

8.7.4 Funding Office

Institute D have also established a Funding Office (Hothouse) to back up and assist with issues of Patenting and Intellectual Property. Institute D is unique in terms of its funding opportunities. Their funding office registers design rights and files patents for student inventions, ensuring that the intellectual property associated with this invention is protected.

As stated in their literature, the funding office will:

- Share up to 75% of Net Revenues received from commercialisation with the Creators
- Assign IP to Students in return for a negotiable equity stake for the institute of typically 15% in their start-up companies.

Institute D has shown leadership, innovation and knowledge about commercialising Final Year Projects (See appendix 6, qu.5). The dissertation recommends that all Technology Transfer Offices work together to promote the commercialisation of Final Year Projects. Best practice at Institute D could be put forward as a recommended model for future use.

8.7.5 Ownership of student Intellectual Property

For commercialisation to be successful and sustainable at a local level all stakeholders believe that IP ownership is vital. Students should be informed of their rights in relation to commercialisation and IP ownership. This should enhance the development of product design in ROI. IP ownership means that graduates play a key role in championing the development of their products. For graduates to be successful it is important that the Institutes are willing to participate and support students in the development of their Final Year Projects, both during their studies, and after graduation.

8.7.6 Industrial Collaboration

Some networks are already in place led by Enterprise organisations and these could aid in the setting-up of an official (national Government body) panel for Creative Design in ROI. The New Frontiers programme and the A.C.E Initiative are both excellent examples of how entrepreneurship opportunities can work within education.

8.7.7 Live Projects

Live projects should be incorporated at certain stages of the course. Live projects give students real opportunities to work with companies and other outside bodies to develop essential innovative and technical skills. This should be an essential focus of a proactive course.

8.7.8 Innovation Voucher Initiative

The Innovation Voucher Initiative is an Initiative put in place by Enterprise Ireland to fund new business opportunities. The objective of this Initiative is to build links between Ireland's public knowledge providers and small businesses and create a cultural shift in the small business community's approach to innovation.

The Innovation Voucher Initiative offers funding for new ventures up to €5,000. These must be capitalized on by Creative Design courses as they could aid designers with the essential funding needed to get their products to market. Financial funding is of critical importance to design students.

8.7.9 Competitions

Design competitions should be made mandatory in all Creative Design courses. Competitions provide a disciplined framework of commercial deliverables which inspire students to develop their project and business development collaboratively. Having set requirements and guidelines enables students to have a greater focus and understanding of what is required to bring their concepts to market.

The main objective of these competitions is to foster a spirit of entrepreneurship among design students and to encourage and support a rigorous business planning approach to entrepreneurial activities.

Entering these competitions provides students with the opportunity to win a range of cash prizes, gain national and international exposure, extend business networks, establish company contacts and the also gives them the opportunity to work alongside experts in real-life settings.

8.8 Future Research (PhD)

Through this study the researcher has highlighted an area where future research may be valid:

Through further research of these Institutes a best practice model could be assembled. This would benefit the creative courses as there are currently no 'best practice' models existing for Creative Design in this respect.

- Models from other countries could be explored, in addition to this research to enhance the development of Creative Design courses (ch.4, Fig.12).
- The study of Intellectual Property law, economics and marketing in the creative courses would be of benefit in terms of policy and product development.
- Comparative studies could take place within the following areas
    - IP Policy
    - Innovation
    - Challenges and issues of Industrial collaboration

- Entrepreneurial activity and linking up with Enterprise societies could be an opportunity for exploration.

8.9 Importance of Research

This research is important as there is currently a low rate of graduates successfully commercialising their work. After completing their Degree graduates have the skills and capabilities necessary for designing successful products yet these fail to achieve their full potential. There is a need for a system that would encourage and support students to enter the professional world of design. In the current economic situation there is a need for design entrepreneurs. This research identifies solutions for overcoming obstacles to the commercialisation of college project work.

The outcome of this research would be to create a culture of innovation and entrepreneurship that in turn is easily accessible; to provide students with the facilities and a stimulating supportive environment to nurture entrepreneurs.

Design is incredibly important. It's the chair we sit on, the cup we drink out of, the handbag we carry. Our future depends on exploiting knowledge and ideas to their full potential; ultimately success will come down to the creativity of people and innovation by students, colleges and businesses working together.

8.10 Summary

There is rich potential for the entrepreneurial evolution of the Creative Design education sector in ROI. Within the Institutes, there is a perceived gap in terms of both funding and development. A lack of Government strategy, policy and limited funding is evident from this research within ROI. Each case study confirmed and added to the critical success factors outlined in the literature. Recommendations have addressed both design practice and industry collaboration. The commercialisation of students Final Year Major Projects is an under researched area and there is huge potential for further research in ROI.

Bibliography

Almquist, J. & Lupton, J., 2010, 'Design-Oriented Research from the Humanities and Social Sciences', *Design Issues*, vol. 26, issue 1, winter, pp. 3-14

ASME, 2013, 'The man behind the vacuum cleaner', *asme.org*, available from http://www.asme.org/kb/news---articles/articles/entrepreneurship/the-man-behind-the-vacuum-cleaner, [accessed 20 May 2013]

Babson College, 2013, 'Heidi Neck', *babson.edu*, available from http://www.babson.edu/faculty/profiles/Pages/neck-heidi.aspx, [accessed 12 March 2013]

Baker, T.L., 1994, *Doing Social Research*, McGraw-Hill Inc., New York

Baxter, M., 1995, *Product Design: A Practical Guide to Systematic Methods of a New Product*, Chapman and Hall, London

Bayley, S, 2002, *General Knowledge*, Booth-Clibborn Editions, London

Baynes, K. 1969, *Attitudes in Design Education*, Lund Humphries, London

Blaxter, L., Hughes, C. & Tight, M. 2010, *How to Research*, Open University Press, Maidenhead

Blijlevens, J., Creusen, M. & Schoormans, J. 2009, 'How Consumers Perceive Product Appearance: The Identification of Three Product Appearance Attributes' *International Journal of Design*, vol 3, issue 3

Bodkin, T. 1949, 'Report on the Arts in Ireland', *The Stationary Office*, September, vol. 3, issue 1, pp.5-7

British Council, 2012, 'UK China Higher Education Collaboration on New Energy Concept Car Design', *www.britishcouncil.org*, available from http://www.britishcouncil.org/china-education-higher-neccd.htm, [accessed 12 June 2012]

Brown, T. 2009, *Change By Design: How Design Thinking Creates New Alternatives For Business and Society: How Design Thinking Can Transform Organizations and Inspire Innovation,* Collins Business, United Kingdom

Bürdek, B. E., 2005, *Design: history, theory and practice of product design,* Birkhäuser-Publishers for Architecture, Basel; Boston

Burton, L. 2011, 'Innovation and Entrepreneurship', NUI Galway, *Designing New Models for European Public Universities,* NUI Galway, November 24, 2011

Centre for Design Innovation, 2013, Toby Scott, *www.designinovation.ie*, available from http://www.designinnovation.ie/test/who.html, [accessed 13May 2013]

Cherkasky, T., 2004, 'Changing Dominant Design Practice', *The Journal of Design Research,* vol 20

Cisco, 2010, *White Paper on Best Practices in Education Technology,* Cisco, UK

Cope, B. & and Kalantzis, M. 2009, 'Design Principles and Practices', *An International Journal of Design,* vol 3

Cri7eria, 2013, James Dyson – Biography of an Entrepreneur, *pagehanify.com*, available from http://pagehanify.com/7criteria/coaching/james-dyson-biography-of-an-entrepreneur/, [accessed 21 May 2013]

Cruickshank, 2007, 'Patents', *www.cruickshank.ie*, available from http://www.cruickshank.ie/patents.html, [accessed 03 January 2012]

Dal Cacio, R., 2010, *Product design in the Sustainable Era,* Taschen Verlag, Köln, Germany

De Bono, E., 1990, *The Mechanism of Wind*, Penguin, London

De Bono, E., 2009, *Lateral Thinking: A Textbook of Creativity*, Penguin, London

Design Business Ireland, 2010, 'Design Sector Survey Spring', *www.designbusinessireland.org*, available from http://www.designbusinessireland.org/publications/design-sector-survey-spring-2010/, [accessed 01 May 2012]

Design Council, 2010, *White Paper on Multi-disciplinary design education in the UK, Report and recommendations from the Multi-Disciplinary Design Network,* Design Council, UK

Design Connect, 2008, A *Micro-Study of Design Promotion and Design Support on the Island of Ireland,* Design Connect, London

Design Ireland, 2009, 'Design Ireland', *www.designireland.ie,* available from http://www.designireland.ie, [accessed 26 April 2012]

Design United, 2011, 'Design United', *www.designunited.nl,* available from http://www.designunited.nl/, [accessed 01 September 2011]

DMI, 2013, 'Biography: Michael Thomson', *www.dmi.org,* available from http://www.dmi.org/dmi/html/conference/europe12/sp_thomson.htm, [accessed 1 May 2013]

Doordan, D. P., 1996, *Design History: An Anthology,* MIT Press, Cambridge, USA

Dublin Institute of Technology, 2008, *'Policy on Intellectual Property'*, Intellectual Property Policy, Dublin Institute of Technology.

Dundalk Institute of Technology, 2012, 'About the ACE Initiative', *www.dkit.ie*, available from https://www.dkit.ie/ace/about-ace-iniative, [accessed September 2012]

Dutch Design Week, 2012, 'Now Future Eindhoven', *www.dutchdesignweek.nl,* available from http://www.dutchdesignweek.nl/content.php?pageID=4, [accessed October 2012]

Enterprise Ireland, 1999, *Opportunities in Design: Strategies for Growth in the Irish Design Sector,* Enterprise Ireland, Dublin

Enterprise Ireland, 2010, *'Enterprise Ireland-Innovation Voucher'*, www.enterprise-ireland-.com/en, available from http://www.enterpriseireland.com/en/Funding-supports/Company/HPSUFunding/ InnovationVoucher.html, [accessed 12 May 2011]

Enterprise Ireland, 2012, 'Innovation Vouchers', *www.innovationvouchers.ie,* available from https://innovationvouchers.ie/Page.aspx?SP=3735, [accessed 23 January 2010]

Enterprise Strategy Group, 2004, *Ahead of the Curve: Ireland's Place in the Global Economy,* Enterprise Strategy Group, Dublin

Esslinger, H., 2009, *A Fine Line: How Design Strategies are Shaping The Future of Business,* Jossey Bass, San Francisco.

Fiell, C. & Fiell, P., 2006, *Industrial Design A-Z,* Taschen, Köln

Finlay, T., 2003, *'Design Ireland study'*, Unpublished, The Finlay Consultancy, Dublin

Fitzpatrick, L., 2013, *'Industrial Design Schools in Europe'*, *www.ehow.com,* available from http://www.ehow.com/about_5486414_industrial-design-schools-europe.html, [accessed 03 March 2013]

Flick, U., 2007, *Designing Qualitative Research,* Sage Publications, London

Giudice, F., 2006, *Product design for the environment: a life cycle approach,* CRC/Taylor & Francis, Boca Raton

Goldschmidt, G., 1995, 'The designer as a team of one', *Design Studies,* vol.16, pp.189-209

Gray, B.W. & Bouzalaz, E., 2001, *Industrial Design Rights, an International Perspective,* Kluwer Law International, The Netherlands

Gray, D., 2009, *Doing Research in the Real World, 2nd ed.,* Sage Publications, London

Guffey, E., 2010, 'Design and Culture', *The Design Journal,* vol.2, issue 2

Humphries-Smith, T., 2007, 'To embed or not to embed (sustainability in the curriculum) that is the question - and do we have a choice?' in *Shaping the Future the 9th International Conference on Engineering & Product Design Education*' Barcelona, Hadleys Ltd

Institute of Designers in Ireland, 2009, *Best of Irish Design Handbook 07/08,* Institute of Designers in Ireland, Dublin

InterTradeIreland, 2009, *A Study of the Design Services Sector on the Island of Ireland,* InterTradeIreland, Newry

IT Sligo, 2008, *Intellectual Property Policy and Procedures,* Intellectual Property Policy, Institute of Technology Sligo

IT Sligo, 2013, 'Enterprise & Innovation week 2013', *www.itsligo.ie,* available from http://itsligo.ie/research-innovation/innovation/innovation-week/latest-news/, [accessed 13 March 2013]

James Dyson Award, 2013, 'James Dyson', *www.jamesdysonaward.org,* available from http://www.jamesdysonaward.org/Prize.aspx, [accessed 14 April 2013]

Kelley, T., 2002, *The Art of Innovation: Success Through Innovation the IDEO Way,* Profile Business Publishing, London

Kelley, T., 2008, *The Ten Faces of Innovation: Strategies For Heightening Creativity,* Profile Book Limited, London

Kennedy, B. P., 1998, *Dreams and Responsibilities, The State and the Arts in Independent Ireland,* www.artscouncil.ie, available from http://www.artscouncil.ie/Publications/DreamsandResponsibilities.pdf, [accessed 12 June 2012]

Kolko, J., 2009, 'The Drivers of Design Synthesis', *Design Issues,* vol.26, issue 1, pp.15-28

Kvale, S., & Brinkmann, S., 2009, *Interviews: Learning the Craft of Qualitative Research Interviewing,* 2nd ed., Sage Publications, London

Lave, J., & Wenger, W., 1991, *Situated Learning: Legitimate peripheral participation,* New York, Cambridge University Press

Leedy, P.D., & Ormrod, J.E., 2010, *Practical Research: Planning and Design,* Pearson Education, Upper Saddle River, New Jersey

Limerick Institute of Technology, 2010, *Intellectual Property Policy for Research*, Intellectual Property Policy, Limerick Institute of Technology, Limerick

Lockwood, T. 2010, *Design thinking: integrating innovation, customer experience, and brand value,* PhD Thesis, Design Management Institute, New York

London Design Festival, 2012, *Design is everywhere, www.londondesignfestival. com,* available from http://www.londondesignfestival.com/about, [accessed October 2012]

Marchant, N. & Addis, J., 1985, *Kilkenny Design: Twenty-One Years of Design in Ireland,* Lund Humphries, London

Margolin, V. & Buchanan, R., 1995, 'The idea of design', *'Design issues',* pp. 281-282

Neck, L. 2013, 'Entrepreneurship', IT Sligo, *Student Entrepreneurship Scholarship Launch,* IT Sligo, March 14, 2013

NESTA, 2013, *NESTA, www.nesta.org,* available from http://www.nesta.org.uk/about_us, [accessed 07 October 2013]

Hothouse, 2012, *New Frontiers Entrepreneur Development Programme, www.dit.ie,* available from http://www.dit.ie/hothouse//entrepreneurs/new%20frontiers/, [accessed March 2012]

NCAD, 2013, *Design Sustainability, www.ncad.ie,* available from http://www.ncad.ie/art-design-research-institute/research-priorities-2012-2016/deign-sustainabilty/, [accessed 22 April 2013]

NSEAD, 2013, *What do we do*?, *nsead.org*, available from http://www.nsead.org/about/about02.aspx, [accessed, 02 January 2013]

NGO Committee on Education, 2013, *Our Common Future, Chapter 2: Towards Sustainable Development*, www.un-documents.net, available from http://www.un-documents.net/ocf-02.htm, [accessed 17 April 2013]

NIVAL, 2013, 'Kilkenny Design Workshops', *National Irish Visual Arts Library*, available from http://www.nival.ie/collections/ collection/archive/kilkenny-design-workshop/view/collection/, [accessed February 2013]

Pottage, A., & Sherman, B. 2010, *Figures of Invention: A History of Modern Patent Law*, Oxford University Press, University of Texas School of Law

Purcell, A. T. & Gero, J. S., 1996, 'Design and other types of fixation', *Design Studies*, vol 17, pp.363-383

Quality Assurance Agency for Higher Education, 2012, *White Paper on Enterprise and entrepreneurship education, Guidance for UK higher education providers*, QAA, UK

Ramirez, M., 2007, 'Sustainability integration in industrial design education: a worldwide survey', in *Connected 2007 International Conference , Design Education*, University of New South Wales, Sydney, Australia

Richardson, J., Irwin, T., & Sherwin, C., 2005, *Design & Sustainability- A Scoping Report*, Design Council, London. p. 1-136

Rugg, G., & Petre, M., 2007, *A Gentle Guide to Research Method*, Open University Press, England

Sheehan, B. 2009, 'What is the Optimal Structure for Organisations Representing Design and Designers on the Island of Ireland?', MA Thesis, Dublin Institute of Technology.

Silverman, D., 2011, *Qualitative Research: Theory, Method and Practice*, Sage Publications, London

Stamm, B. V., 2008, *Managing Innovation, Design and Creativity*, John Wiley and Sons Ltd, Chichester

The Economist, 2010, *The Drivers of Design Synthesis, www.economist.com,* available from http://www.economist.com/search/apachesolr_search/The/%20 Drivers%20of%20Design%20Synthesis%202010, [accessed10 July 2012]

The Economist, 2010, *Science and Technology, www.economist.com,* available from http://www.economist.com/search/apachesolr_search/apachesolr_search/Science%20 and%20Technology%202010, [accessed 13 July 2012]

The Higher Education Academy, 2012, *White Paper on The Higher Education Academy Strategic Plan 2012-2016,* The Higher Education Academy, York.

The Irish Times, 2011, *Ex-NCAD head and champion of disability design, http://www.highbeam.com,* available from http://www.highbeam.com/doc/1P2-28992228.html, [accessed June 2011]

Thomson, M., & Koskinen, T., 2012, *Design for Growth and Prosperity Report and Recommendations of the European Design Leadership Board*, Helsinki, Finland

Tischler, L. 2010, *The 2010 Masters of Design, www.fastcompany.com,* available from http://www.fastcompany.com/1689205/2010-masters-design, [accessed 02 August 2012]

Turpin, J. 1986, 'The Irish Design Reform Movement of the 1960s', *Design Issues,* spring, vol.3, issue 1, pp.4-11

Ulrich, K.T., 2008, *Product design and development,* McGraw-Hill, Boston

UNCTAD, 2010, 'The Challenge Of Assessing The Creative Economy Towards Informed Policy-Making', www.unctad.org, available from http://www.unctad.org/en/docs/ditc20082cer_en.pdf, [accessed 13 September 2011]

University College Dublin, 2013, *University Sustainability Policy*, *www.ucd.ie*, available from http://www.ucd.ie/t4cms/UCD_Sustainability_Policy_Issue. Pdf, [accessed January 2013]

Vanderbeeken, M., 2012, 'The Crucial Role of Design Education in Europe's Recovery', *Core 77 Design Magazine and Resource*, 04 October

Verganti, R., 2009, *Design-Driven Innovation: Changing The Rules of Competition by Radically Innovating What Things Mean,* Harvard Business School Press, Boston

Vernon, M.R., 2009, *Growing up Through Entrepreneurship: Case Studies of Student Ventures, www.nccia.org*, accessed 10 April 2012, available from http://ncciia.org/conf09/papers/Vernon.pdf

Weightman, D. & Mc Donagh, 2004, *Developing Industrial Design Education,*www.citeseerx.ist.psu.edu, available from http:// citeseerx.ist.psu.edu/ viewdoc/summary?doi=10.1.1.129.3736, [accessed 11 April 2013]

Appendix 1

Questions for Design Students participating in Research

1. Name, email and Institution attended

2. Is your major project structured through project based learning?

   What is the approximate time division between studio / projects / labs?

3. What is your Final Year design project title?

4. Is your major project issued by the college or self-selected?

5. Who contributed to your project design criteria?

6. During your project were you in contact with any Enterprise organisations? Innovation Centre/ Enterprise Ireland?

7. Did your project conclusions have commercial potential?

8. Did you subsequently explore the commercial realisation of your project?

9. What supports were offered to you to further explore the commercial realisation of your project by your college or external bodies/institutions?

10. From your course of study do you clearly understand how to commercialise an innovative product or service?

11. Does a culture of design entrepreneurship exist in your college? If so, can you talk briefly about this?

12. What circumstances should stimulate students to originate viable product or service ideas?

13. Do you think Intellectual Property Law should be taught as part of your course programme?

14. What are the Intellectual Property contractual arrangements between you and your learning Institution?

15. Did you collaborate on project research or execution with other students in a project group on your Final Year project?

Appendix 2

Student Questionnaire Findings

Q1. Contact Information

	Gender of Student	Name of Institution
1	Female	Institute of Technology Sligo
2	Female	Institute of Technology Sligo
3	Male	Institute of Technology Sligo
4	Male	Institute of Technology Sligo
5	Male	Institute of Technology Sligo
6	Female	Institute of Technology Sligo
7	Female	Institute of Technology Sligo
8	Male	Institute of Technology Sligo
9	Male	Institute of Technology Sligo
10	Female	Institute of Technology Sligo
11	Male	Institute of Technology Sligo
12	Male	Dublin Institute of Technology
13	Male	Dublin Institute of Technology
14	Male	Dublin Institute of Technology
15	Male	Dublin Institute of Technology
16	Male	Dublin Institute of Technology

17	Female	Dublin Institute of Technology
18	Male	Dublin Institute of Technology
19	Male	Dublin Institute of Technology
20	Male	Dublin Institute of Technology
21	Male	Dublin Institute of Technology
22	Female	National College of Art and Design
23	Male	National College of Art and Design
24	Male	National College of Art and Design
25	Male	National College of Art and Design
26	Male	National College of Art and Design
27	Male	National College of Art and Design
28	Male	Institute of Technology Carlow
29	Female	Institute of Technology Carlow
30	Female	Limerick Institute of Technology

Q2. Is your Major project structured through project based learning? What is the approximate time division between studio / projects / labs? (*Mandatory)*

1	1st to 3rd year is taught through lecturing and projects however 4th year was taught through Problem based learning. The course is structured through project deadlines and Set lecture times (timetable)
2	Course is structured through project deadlines and set lecture times.
3	Studio 45% Projects 55%
4	It's hard to define the time given to each sector of the design process but in an average week I would say Studio – 65%. Projects - 25% Labs – 10%
5	It varied from year to year, but mainly we worked on live projects where we would be given a brief to work to. Continuous assessment with multiple subjects
6	Problem Based learning; this is an experiential learning method that emphasises teamwork and self-directed learning. External clients and teamwork.
7	Design was delivered in taught, classroom based form, focusing largely on Continuous assessment. Lecturers would spend small amounts of one on one time with students in design studio classes, and about 70/30% of time split between group teaching and one on one attention respectively in computer and academic subjects.
8	I assume you are referring to tutorials when you say 'labs', so about 90% of our time-table is allocated to studio/ projects.
9	Yes. Our work is carried out mainly in studio. The time split would be nearly 80% studio and during this time we work on our projects with input from lecturers.
10	Yes; methodologies, context and discourse and how they knitted themselves into the structure which produced the project - if that makes sense
11	Yes, project based learning forms the core part of the course. Project lengths can vary from one up to six weeks.
12	From what I remember we had one day scheduled with no other modules except for our Major project. Throughout the entire year we had several other large projects running as part of other modules which regularly consumed valuable time that could have been spend on the Major project.
13	Yes; Studio – 25% Projects – 50% Labs – 25%
14	Studio 25% Project 60% Lab 15%

15	Well, most of the modules are project based and the major project involves meetings with our supervisors to discuss our work and how everything is going along and where they can help. In this semester we don't have specific studio time set aside with a lecturer but there are rooms booked for us specifically 2 days a week so we can work uninterrupted.
16	Final year: studio, labs, lectures all overlap into projects.
17	Yes, it is very much project based learning.
18	It never ends; I'm in the studio during the day, working at home at night. We do other projects that are not related to our Final Year project that run at the same time.
19	Yes, it is project based. We meet our individual advisors for 2 hours as a group and have the rest of the day free to work on it. On Monday Semester 1 we had 2 extra modules taking the whole day for research and conceptualisation.
20	I don't really understand the question; surely all major projects are structured through project based learning? By that I mean, it is impossible to undertake a Major project without becoming both educated in the subject matter of the project and also developing the skill of successfully carrying out a project. Time division for final year is 20% studio/60%Project/20% labs (Labs are only necessary once prototyping begins).
21	Mostly through studio and project.
22	Our final year consists of one sponsored project (November to January). The Major project runs from February to May. It is a single self-directed project and is not structured through project based learning. It consists of 4 phases as is usual with any design project, and private tutorials are held throughout, usually three times weekly. Studio and lab is about 80% to 20% respectively. During the research phase much time is spent doing field work.
23	My major project in college was a self-directed project. We had 2 hour long tutorials per week with a tutor. Sometimes more, sometimes less. Periodically there were presentations. Labs and smaller projects were conducted in the years leading up to the final project.
24	With this project in the beginning I would estimate 90% of time spent in college was spent in studio. The other 20% in the workshop making moulds and prototypes etc. People assume designers are always making things but it's a lot of sitting down thinking, going out and talking to people. It also really depends on the stage of the design process. Now, personally because I'm working on my own doing my final project I do more at home because studio can be distracting and noisy.
25	Yes 100 % studio; no labs, very little tuition in the last four years.
26	50% Studio Projects 25% Labs 25%.

27	80% Studio 20% Labs.
28	No response.
29	Over the final year there are stages of assessment, i.e. research, concept development, product architecture.
30	Yes, my major project is structured through structured project based learning. The time division is 4 and a half days a week in studio, working on the project and half a day for written work.

Q3. What is your final year design project title? (*Mandatory)*

1	Improved environmentally friendly laptop bag-(unibag).
2	4th Year Project was based around a client; we were hired to redesign a keyboard layout that would be ergonomic and easier to use.
3	Urban, Lifestyle, Futures; Food, Back to cooking.
4	Accessing future urban living conditions through space saving techniques.
5	Future Mobility.
6	4th year- Connacht Gold and Keyboard.
7	Future Mobility.
8	CCTV Communication Technology.
9	R.U.O.K (Are you o.k.)
10	I selected the area of hairdressing in which I discovered many problems however I needed to be realistic and find a solution which I could focus on and develop into my project. The project concentrated on the health of hairdressers - the solution was finding a way to aid the fitness and wellbeing of the hairdresser and my product resulted in the form of a seat/chair.
11	Velostand - Innovating Cycling Through Design.
12	The Enhanced Emergency Lighting (E.E.L.) Barrier.
13	(Provisionally) Embodying Music - A Musical Interface for Non-Musicians.
14	Fire Fighting Technology.
15	A swimming aid for arm amputees.
16	It is an open ended brief. Personal title: Water Safety.
17	To design sustainable accommodation for use at a festival.
18	Oral hygiene device designed for third party use.
19	Improving Airsoft face protection: A modular face protection system.
20	Design and production of a cleat-based wattage metric used in the sport of cycling to display (in real-time) the power output of the user while on a bicycle.
21	A portable device to measure hydration status in real time scenarios.

22	Skylane Seating System.
23	Playcrate.
24	The title of the project was 21st Century Learning.
25	Improving the experience of waiting.
26	Cois Farraige.
27	Kug.
28	Hydraulic Braking System for Wheelchairs.
29	Footforthot.
30	Precious Little Things.

Q4. Is your major project issued by the college or self-selected? *(Mandatory)*

1	Self-selected.
2	Main title is selected by college for a client, design was self-selected.
3	Main title is selected by college; research follows with myself selecting the design direction within the title given to us by a lecturer.
4	Self-selected (chosen theme).
5	Self-selected (chosen theme).
6	Main title is selected by college for a client, design was self-selected.
7	Main title is selected by college for a client, design was self-selected.
8	Self-selected (chosen theme).
9	Self-Selected (chosen theme).
10	My project was self-selected.
11	Self-selected.
12	Self-selected.
13	Self-selected topic with supervision by the college.
14	Self-selected.
15	Self-selected.
16	Topic is personal, self-selected.
17	Self-selected.
18	Self-selected.
19	Self-selected.
20	Self-selected.
21	Self-selected.
22	Self-selected, we chose an area of interest, researched it broadly then focused on a key area for development.
23	Self-directed and self-selected.

24	The project was issued by the college and an internal research company.
25	Self-selected.
26	Self-selected.
27	Self-selected.
28	Self-selected.
29	Self-selected.
30	Self-selected.

Q5. Who contributed to your project design criteria? *(Mandatory)*

1	Professional bag designer in Sligo.
2	Users of the items in commercial and industrial spaces, as well as lectures regarding materials and ergonomics.
3	Lectures only.
4	Some design lecturing staff.
5	In third year, my young brother, sister and cousins contributed to my project. I also went to Toy stores. In fourth year we did group research, some of us talked to the general public, friends and family.
6	Lecturers, clients and within the team.
7	In both cases we spoke to the client, teaching staff and other members of the group.
8	Lecturing staff.
9	The team of four (myself and 3 others) and our mentor (a lecturer).
10	Trained and qualified hairdressers and students both sides of the border (northern and southern Ireland) schools/colleges both northern and southern Ireland; medical experts - Manorhamilton hospital, Erne hospital, Enniskillen dentist and chiropractor. Metal fabricator - White Park motors user experts - salon owners, salon suppliers - internet and salon services for students tutors/teachers - South West College, Enniskillen and Ballinode College Sligo, Other designers - internet and design books. Material suppliers - internet and local (metal suppliers, fabric suppliers, gas cylinders etc.)
11	Research informed the design criteria. This included input from national government, local authorities, campaigning organisations and specific user groups.
12	The design specification was written by me after I had gathered all my research. However there were certain topics and "checkpoints" we needed to complete throughout the year so the lecturers could gauge our progress.
13	Myself and course tutors.
14	Fire fighters and armed forces.
15	Myself.
16	Ourselves influenced by lecturers.
17	Lecturers and peers as well as individual research into an area of choice.

18	We were given a very rough/ broad structure to follow at the start of the year but it is pretty much all up to us.
19	We are given sections e.g. research and prototype deadlines to show our work.
20	Myself, along with Primary research conducted with other cyclists.
21	A number of lecturers from a variety of backgrounds.
22	I reached the design criteria through research, tutorials and testing. Also consulted some experts.
23	Research and tutor input.
24	No response.
25	Myself.
26	Myself - A love of the sea shore and its environs.
27	Companies started contacting us, emailing us through the website (Morphy Richards, Marks & Spensors, Asda) We went with a company called Euro Swiss International, a Hong Kong company that is based in England, they were free to market so that was the better deal and we went with them.
28	Myself.
29	Individual project with contributions from professionals in medical area, lecturers, users.
30	There are set criteria to pass, selected by the college, such as creative development, technical skill etc. and then our own personal goals.

Q6. During your project were you in contact with any Enterprise organisations? Innovation Centre/ Enterprise Ireland? *(Mandatory)*

1	I contacted the Innovation centre and they offered me a space there for the summer. The only problem was that everyone kept telling me to take the project to the next level, but no one told me what the next level is.
2	No.
3	Very little communication, if any, between us and external organisations.
4	No.
5	No.
6	No.
7	Not at that time, not for the purpose of a college project.
8	No.
9	Yes we have consulted EI, the BIC at the IT and also we have been in contact with Invest NI.
10	Contacted Enterprise Ireland, Cavan office by email who were absolutely brilliant. They provided all/any information I needed and I also spoke with Invest Northern Ireland through Enniskillen office who invited me for a chat.
11	No.
12	No, not during the project.
13	Not yet.
14	No.
15	No.
16	Not yet but will be.
17	Not as of yet
18	Neither of the above but I have been in contact with other organizations and companies in relation to my project.
19	I was in brief contact with a couple of forums and companies to ask information and permission to post surveys. I was also in direct contact with several members of the Irish Airsoft association who govern Airsoft in Ireland, I also contacted the European body. They wished me well but couldn't help.

20	No.
21	No.
22	No. A patent issuer visited us and talked to us about our projects. Mine was not considered patentable.
23	No.
24	No response.
25	No not at that phase, yet.
26	No.
27	No.
28	No.
29	No.
30	No.

Q7. Did your project conclusions have commercial potential? (*Mandatory)*

1	I think it would be a great solution for people who have to carry heavy bags every day. It can also be sold not only as a laptop bag but as a school bag for kids.
2	My product should have been commercialised because it met requirements, needs and wants for easier usage, time saving abilities, improvement on hygiene and ergonomics to save people getting arthritis.
3	Potentially, yes. However there was always a rush to get onto the next project, leaving the previous project behind without the knowledge of how or where to pursue potential investment, if indeed there was a commercial potential in the first place. Perhaps lecturing staff should have more input when it comes to this stage.
4	Definitely. It is a requirement which was asked of us when we had a meeting with the external examiner months ago.
5	The fourth year one couldn't as it wasn't that type of project.
6	Yes, because it was taking a shopping experience to a new level.
7	My product for Audi provided the end user with the ability to create energy for their use, it augmented existing power sources thus lengthening their life-span and reducing use of vital energy sources. It also provided an alternative to some power use. As it was so conducive to increasing the sustainability of other products as well as being a sustainable design solution in itself, with further development it could have taken huge pressure off several depleting energy sources. It also did not impact negatively on any aesthetic of the existing product (car) or the brand identity of the overall company. (The client)
8	As it was a future projected solution, it would not have commercial viability at present, (due to need for commercialisation of materials and manufacturing processes used).
9	Yes. We entered our project into a Microsoft competition and we have progressed to the World Finals. We are also looking at creating a future business and have talked to investors and have acquired a business angel.
10	Yes, most definitely and considering the design has not been done before it is original and therefore would have a commercial potential in relation to exporting, creating employment and aiding the problem it was designed to do - contributing to the health and well-being of its users.
11	Definitely, business planning was an integral part of the project.
12	Yes, this was a major part of my design spec.

13	They are currently unfinished although there is much potential.
14	Yes.
15	Some commercial potential but very limited due to the small market size.
16	Yes.
17	Not concluded yet but I hope so.
18	It's not over yet but I hope so.
19	Yes I think it does, my research got around 180 responses from direct Airsoft players from all over Europe and America, a spread of different ages and level of interest in the project. This gave me a very clear problem that needed to be solved and the product fits in it.
20	The final product should have commercial potential as the identified target market is currently not served as similar products are upwards of €1500. With the design of this device, novice riders can purchase a Power Meter for a price which is more justified for their amateur status.
21	Hopefully.
22	No, I received some media attention afterwards through radio/newspapers but it is very difficult to change a seating layout in commercial aircraft as a huge investment would need to be undertaken on the part of aircraft manufacturers (Airbus and Boeing) and there is no real competition in the industry.
23	Yes, all of my tutors agreed that my project had very high commercial potential.
24	There were talks about whether the project should be taken further and there still is. It was a very commercial idea with various people from abroad being very keen to see it being produced. We also talked to someone about the IP but the project just wasn't long enough.
25	I'm sure it will, it always does.
26	Yes. I will try to sell vessels at a cafe by the sea and maybe rent a studio space.
27	Yes.
28	Yes.
29	Yes, I believe so.
30	To a certain extent.

Q8. Did you subsequently explore the commercial realisation of your project?

(*Mandatory)*

1	No, I didn't explore it further.
2	No.
3	Never, as other projects which followed did not allow for the exploration of commercial realisation.
4	No.
5	I currently haven't developed it any further.
6	I made it user friendly and up to date with today's technology. I did not explore it further.
7	No.
8	Not at this stage as the project is not fully complete.
9	We have yet to explore this area as the product is still in the development stages but we do have strong plans to realise the true potential of the product.
10	Yes I did, following market research. I am confident that a market exists locally which could, with the correct marketing and advertising, become global. I have medical research to support my evidence which could be used as a tool to market the product. Completing a business plan also proved that this product could be manufactured at a profit and as mentioned produce employment.
11	Not yet, but I may return to it in the future.
12	To a certain extent yes, I primarily focused and researched on one potential market, but was aware of other markets which I felt I could enter at a later stage.
13	No response.
14	I am currently.
15	Have not yet ventured into it as I've yet to finalise the design.
16	Have not finished yet, but due to extreme risk and start-up costs probably not unless I can find funding and guidance.
17	Not concluded yet.
18	Still not finished.

19	No, not yet. I am hoping to look into IP protection soon enough.
20	I plan to explore the possibility of patenting the product as well as possibly selling or leasing it to a larger business.
21	Yes I am currently doing so.
22	No.
23	I am in the process of doing so. I have secured a European and International Design Protection.
24	No response.
25	I will when it happens if I see it as commercially fit for market.
26	On-going.
27	Yes.
28	Yes, is on the market.
29	Currently working on a business plan to assess further market viability.
30	The work can be sold at our Degree show, but it is not strictly a commercial enterprise.

Q9. What supports were offered to you to further explore the commercial realisation of your project by your college or external bodies/institutions? (*Mandatory)*

1	I didn't really get any support.
2	I was given good support from lecturers and usage of workshops and computer labs. No other support to explore further.
3	I did not explore it further due to a lack of courage, lack of time and knowledge in this area.
4	No support to explore further.
5	I didn't seek any.
6	None.
7	None.
8	As I have not sought support I cannot say what resources are available.
9	The College have supported the project by offering their expertise in areas and also have provided us with a lot of PR coverage. We are also receiving help from Microsoft who are helping us to develop the product.
10	Tutors offered one-to-one guidance which was essential given that this project covered new ground not yet studied in the previous two college years of my Degree. However, given my previous legal experience and selling skills I was confident in communicating with the necessary people I needed to in order to gain knowledge, awareness and statistics, it was comforting to know that should I experience difficulties my tutors were on-hand to offer guidance in order to reach my potential. It was also reassuring to know that there was someone available to talk to - we have tutors who specialise in certain areas and some who have worked in the industry who can provide their expert advice.
11	Business and marketing staff provided entrepreneurial guidance.
12	At the time there was none, I had to approach the technology transfer office myself.
13	Project unfinished, will have an answer in 4-5 months.
14	None so far.
15	Within DIT there's Hot House who are the venture capitalists division so I could contact them if I wished

16	Hothouse DIT help patent, find mentors and create contacts with enterprise Ireland. Possible grants also.
17	Not concluded yet.
18	Still not finished.
19	Hothouse can help DIT students develop ideas but they only do a couple a year across the whole of DIT and they seem to like tech based stuff.
20	DIT has included Legal aspects for a product design module as well as invited in an external patent law firm (Cruickshank's Attorneys) to educate students on IP. DIT Hothouse has also extended their services to support any commercial efforts we may have.
21	I have not yet looked into any supports.
22	The only support was the patent issuer.
23	NCAD organised the design protection through an Associate Lawyer. They paid for it, and were very helpful.
24	We were awarded a grant of €1800 to develop it further. We were also given €1000 from the company/college (50:50)
25	They offer a paid Masters scheme as of this year but you need to get a grant to complete it.
26	None.
27	External company- We went with a company called Euro Swiss International, a Hong Kong company that is based in England. Euro Swiss took care of patents because we signed with them; it is patented in Europe, Japan, United States, Russia, Far East, and Africa. Trademarks are everywhere.
28	Stira, (which is a successful attic stair making company) have got behind the design over the summer months and they are backing me.
29	N/R
30	The advice of our tutors, workshops and the career officer.

Q10. From your course of study do you clearly understand how to commercialise an innovative product or service? (*Mandatory)*

1	I don't think there is such a thing on our course. The life of our designs is over just after presentations.
2	No.
3	The problem does not lie within the current system of study. As product designers we are shown how to create a product or service, however it is the stage after the design process which tends to complicate matters. I have been shown marketing techniques and strategies, which have nothing to do with bringing the product into market. There seems to be a gap or a link missing between creating the finished product and getting it into the marketplace. How this is achieved I am not sure, but it is without doubt the missing link.
4	Honestly, no.
5	Not particularly. I can't recall being introduced to it.
6	We studied the basics of marketing for one year.
7	No.
8	Definitely not, as I have never attempted to commercialise any of my previous products/ services, exclusively because I was never given any direction.
9	Because of our course's broad nature it gives a very wide scope of knowledge and this allows me to have an idea of how to go through the different stages required to bring a concept into reality.
10	Commercialising an innovative product or service is a little bit of a grey area.
11	Yes.
12	Before leaving the course I felt I had a good understanding of how to commercialise the product, however after trying to get it to market I realised the main thing I am missing is experience and contacts which counts for quite a lot.
13	Yes.
14	Yes.
15	Yes.
16	Yes.
17	From my studies so far I feel I have a firm understanding of this

18	Yes, I can contact the relevant bodies in order to try and start up a company on my own or I could pitch the idea to current companies in the industry.
19	Yes, I know the steps involved with in the commercial/enterprise process. I know the development cycle, IP issues and even how to write a full business plan. Product design pushes people to explore this sector and last year several teams, DIT and nationwide awards in competitions (my team got to the final of enterprise Ireland awards). Students know the theory behind it but putting it into practice is another thing completely and DIT pushing competitions and large scale presentations helps students develop confidence in this.
20	Yes, the business wing of the course adequately prepares the student for this possibility.
21	I have a fairly good understanding.
22	No, not really, but I have made contacts who could help me if I needed it.
23	No. I have struggled with this aspect of design. On my Erasmus course, the ID course I attended in France had weekly seminars on marketing, business practice, and getting products to market. NCAD's course was entirely lacking on this front. And I feel the students suffer because of it.
24	Not at all really, but I'm aware of it. I see more technology and designs requiring patents. We should get some sort of lessons about IP, but I think it would just be another thing for us to know. Often after college in a company this role would be taken on by someone else within the company.
25	No, I learned more on my work experience than in college about it .
26	No.
27	I learned this through the experience of the project.
28	I learned this from dealing with the company.
29	To some level, yes, but I feel this is where Enterprise Ireland or a similar body could make a contribution to students in third level colleges.
30	No, but I know where to start.

Q11. Does a culture of design entrepreneurship exist in your college? If so, can you talk briefly about this? (*Mandatory)*

1	Unaware of any.
2	Only when in the college working on projects with 'live' clients i.e. Connacht Gold Project, Nomadic Display.
3	Only recently Industrial Design students have teamed up with other courses in a method which looks to explore entrepreneurship. However, at this time I was unavailable due to work-placement. So unfortunately I do not know much about this project offered to 3rd year students in Creative Design.
4	If there is, I am not aware of it.
5	No.
6	Not really.
7	Not really. The framework for learning how to work with others is there, and all creativity is encouraged. There are no bad ideas as such. But there is also not enough time given to life after college or how to move onto the next step. You will always be encouraged if you speak up but not necessarily guided in that direction.
8	I would not describe it as a culture, however there is discourse about design entrepreneurship in so much as looking at other design entrepreneurs, and what they have achieved (not necessarily how). Again, there is little guidance or practical application.
9	There's no major design entrepreneurship in our college but there have been a few people from our course who have gone on to design successful products and/or services.
10	Yes - We do have an Innovation centre but I feel it is marketed more towards external designers or those with ideas. Perhaps students are producing ideas or products which are potential but a long shot off production - is this a lack of teaching or lack of effort on the student's behalf? I think this is an area which should be looked at! There is a culture but it just seems to exist rather than implemented.
11	Yes, as a design student the importance of the commercial aspect of any product is clearly outlined and taught.
12	If I understand the question correctly, yes there is. We are encouraged to enter into as many enterprise competitions as possible as well as some of the modules having them as a requirement. The main competitions would be the Bolton Trust, Enable Ireland, Braun Prize, and Tidi Solutions. There would be a strong emphasis on the product having commercial viability

13	Yes. Our course has encouraged many projects for entry into competition and I am part of an ongoing project that is pushing for commercialisation.
14	No.
15	There is not a massive one.
16	Yes, via DIT hothouse and competition Bolton Trust (with considerable prize fund) promoting innovation is open to all students of all Degrees.
17	Yes it does. As a fourth year student I have already participated in many competitions including the Bolton Trust and Enterprise Ireland; they are very supportive and suggest many competitions and opportunities for us.
18	Yes, I guess there is. As product designers we all have a bit of individuality and are good at expressing ourselves, I think this leads on to a strong feeling of design entrepreneurship
19	Yes I think it does, everyone is coming up with new ideas. The competitions mentioned above are part of DIT/Bolton Trust run an enterprise competition where you propose an idea and write a business plan. Product design students are strongly encouraged to enter and last year the 1st, 2nd and 3rd prizes, were won by product design students. This pushes the class to compete with each other and get better products and more viable plans. After that competition, there are the nationwide Enterprise Ireland Awards, which we are also encouraged to enter, and this year 3 teams even entered an international competition in Hong Kong with the same plans.
20	I will say no but am not entirely sure. I have not seen or heard of any past students taking the entrepreneurial route. The culture is certainly encouraged and well catered for but so far nothing has been taken along this route as far as I know.
21	Yes. Resources like HotHouse are prevalent and from what I have seen they can help quite a bit.
22	There are always one or two students who are entrepreneurs, but overall I would say NCAD is not very focused on this. It would help to have more visiting tutors who are entrepreneurs to work on projects with us.
23	We have to be very self-motivated. There are people who have started their own brands and businesses. The strength of the course in my mind is the talent of the students who are selected for the course. This is why NCAD ID graduates have been successful. I feel that most of the merit and praise should lie with the students, as the course is poorly organised, and lacks major components of a good design course. Our year was notorious for complaining, and we had some positive effects. The work-shop in NCAD is probably the best-run and most important facility. But aspects such as Photoshop and CAD classes were too few, and that is where we first realised, if we want to learn this profession, we pretty much have to do it ourselves. I guess this is where our independent attitude which has lead to self-motivated entrepreneurship originated.

24	There is definitely a culture of freedom of expression and creativity in NCAD, and although the department would hate for me to say this, but I do not feel there is a culture of design entrepreneurship in industrial design at all. Fashion design perhaps, because they are competitive. I think some of the clients we have brought into the college have been poor which has affected this as it is a de-motivating factor. For example, I remember the class below us had a guy from Aston Martin cars in working with them and they were definitely motivated to impress him. I actually feel that lots of odds are often against me. I also feel that if I was to showcase things I would do it online and would not need the Institution. We have had success stories all the same.
25	Yes, some of the more driven students try and get their products manufactured but there are a lot of students that just worked for the grade and dropped it after.
26	Not really. Our products or designs are never really put on a commercial footing. Concept seems of more importance, but the reality of the outside world is rarely talked about.
27	They have a system in place that because it is mostly art that is coming out of it they don't charge on patents. They weren't getting a percentage on those sales, they won't do it for design. The students work for most of the percentage of it. We talked to the college and they have a new system in place, it was put in place last year where they build up funds to help students with Intellectual Property and stuff like that. If they give you 5/10 grand then they want 50% of the sale. It was mostly reserved for 4th year projects, we were in 3rd year at the time, and the college didn't express any interest at all.
28	No response
29	Yes, there are throughout undergrad programme, outside or live collaborative projects that engage companies in start-up or development to seek assistance of students. These offer awareness to the student of markets and products in the 'real' world.
30	Yes; we are all encouraged to exhibit and sell our work outside of college as well as organise our own exhibitions as a part of our course.

Q12. What circumstances should stimulate students to originate viable product or service ideas? (*Mandatory)*

1	Unsure.
2	By showing us projects and listening to owners/designers on different projects in the world that start from a small ideas and are now known worldwide.
3	No response.
4	Field experience, my classmates and I have discussed this many times. We need more experience in the outside world of design, instead of simply repeating each project in the studio producing 4 A3 boards, sketchbook, concept book, models etc.
5	Good education throughout the course and creativity.
6	This didn't happen.
7	Often their own initiative, while in college I saw very little of this.
8	I do not think there should be marks allocated for attempting to commercialise projects, as if there was some support or guidance, students who wanted to, would do so. There is currently little weight given to viability of projects (as opposed to physical design elements) as there is no structure in place to teach these skills, so they can't be marked.
9	I think that enticing students to enter into competitions is a great way to help them realise the potential of their work. Also by organizing outside meetings with maybe people from Enterprise Ireland or Invest NI or something like that, this will allow them to suggest ideas to students which could make their concept stronger and give the student confidence in their idea.
10	We should hear more about the products and designs coming through the Innovation Centre and students, as part of work experience or assignments, should be loaned to the selected ideas and taken on apprenticeships perhaps. As mentioned earlier there is also the issue of patent/copyright which is not clear - does the college own the ideas produced or does the student? We also need a legal body on campus - perhaps there is and in which case more needs to be done to make students aware of this!
11	Lack of employment opportunities will encourage students to further individual commercial enterprises.
12	No response.
13	An open and supportive environment with experienced members available for consultation on a range of manufacturing, design and entrepreneurial queries.
14	No response.
15	That they are passionate about the idea and have the capacity to follow through with it.

16	Personal interests.
17	No response.
18	A market need, or else a current product, annoying a product designer so much that they take it into their own hands to fix.
19	Being pushed to do it. Being told to keep working at the idea and improve it, try to get a working prototype and to contact outside experts for feedback and experience.
20	I believe that the product design course in DIT stimulates viability in its student's ideas by affirming the need for realistic primary and secondary research before creating something which may be wholly unnecessary and unwanted by the public.
21	Creative brainstorming and solid research combined with a hopeful 'eureka' moment.
22	Students always have the ideas. Meeting other entrepreneurs, developing projects with them, visits to businesses, networking events and making sure students have important contacts is necessary. It is vital to see what is happening in Ireland, what is needed, what manufacturing facilities are available to us if we want to develop a product.
23	A creative and open community of designers. I found that in our course, when we all had the same brief for a project, people were secretive, and protective of their ideas. Nobody wanted to give anything away. However, when we did our final project, everyone chose their own brief. This meant we could freely and openly discuss our ideas with each other. The discussions, experimentations, and opinions that were conducted and shared made all of our projects better. After 3 and a half years of secretive nonsense, we were finally able to share our plans. It was refreshing, and I feel that all of our projects benefited.
24	Motivation and autonomy.
25	For me it's getting a good grade and the idea should be commercially viable,
26	Some type of organised system so students can sell their products. A financial reward especially to poor students would go a long way and stimulate design ideas with a foot in reality.
27	Hard work.
28	Good discipline.
29	Personal experience, interest in subject area.
30	Projects which have a commercial brief, right from conception to prototype and how to sell them.

Q13. Do you think Intellectual Property Law should be taught as part of your course programme? (*Mandatory)*

1	Yes.
2	Yes.
3	I think it is important to know what IP means for designers and how they can effectively use IP for their projects to protect them. I am unsure as to when it should be introduced.
4	If you have students in the course eager to pursue design after they finish, then yes. If there isn't then no. This would have to be addressed with the registration of the new 1st years I would imagine.
5	It would be a good addition.
6	Maybe a bit on patents.
7	Yes, more specifically IP law. We had very little understanding of it coming out of college, unless it's what we picked up ourselves.
8	Yes. In the current economic climate, designers are less likely to secure work in a large firm, where IP is protected by non-disclosure agreements, and need to know how to protect their ideas as they try to commercialise them, independently.
9	We already study a semester in IP law and this was really helpful. As I said in an earlier question, learning the basics in each of these areas, provides the student with a broader knowledge to help bring their product to reality.
10	It is! This is a very important module within our course. I think the college should work alongside law firms perhaps. Students need to become familiar with the process of IP Law.
11	I do and it is.
12	IP law is taught as part of two modules, Professional Practice and Legal Aspect of Product Design.
13	It is.
14	It is taught.
15	It already is and I do think it should be taught within the course.
16	Yes.
17	Yes most definitely, it is taught on my course and is necessary to know for the person's own rights.

18	It is.
19	Yes I think so. We do it in third year, Semester 2 as a subject by itself and as part of new product introduction in Semester 1.
20	It is. So yes.
21	Absolutely.
22	Yes, we get a couple of hours on it but I think more is needed.
23	Absolutely. We had one hour long seminar on it, and it was amazing how much I didn't know.
24	Yes, I think it should. But only an introduction or filtered down to exactly what we need to know. I think the actual role should be someone else's though. I think getting bogged down in IP would actually affect the outcome of the quality of the end result.
25	Of course.
26	No way. That is exactly what would defeat this train of thought before it is taught. It must be practical. Do not blind students with science. A practical business orientated plan is the way to go in my opinion.
27	Yes.
28	Yes.
29	I think an awareness of Intellectual Property should be shared, however it would need to be sensitively done so as to ensure it doesn't 'scare' someone from their ideas and the share of same.
30	Yes.

Q14. What are the Intellectual Property contractual arrangements between you and your learning Institution? (*Mandatory)*

1	Unaware of any.
2	There was nothing between me and the college for my final 3rd and 4th year project, however for working on projects like Connacht Gold an agreement was signed to state we would lose all right to our designs.
3	Unaware of any contractual arrangements between myself and the Institution.
4	From what I am aware there is a sector of the Innovation Centre which deals with this area, but as I have not approached them with a previous idea/project I don't know.
5	Not sure, but I think the IT retains near to or over 50%.
6	Don't know.
7	I'm not sure as they were never made clear to us. It is my understanding that any designs or academic discovery made during one's time in college is the property of the college as well as the individual.
8	I believe the student owns the rights to their own work in 1st, 2nd & 3rd year; however the college owns the rights to their Honours Degree work in 4th year, but I'm not sure.
9	I am actually not sure of the IP agreements between myself and the college; however I do know that there is an agreement there.
10	I haven't a clue.
11	It has never been clearly stated.
12	All the IP belongs to the student and not the Institute.
13	Our IP is our own.
14	They get a percentage.
15	I retain all Intellectual Property.
16	We retain full IP.
17	The college does not take anything designed by an individual. It is their own right to protect any designs they have.
18	As far as I know, we own the IP to everything we do in DIT which is used as one of its selling points for product design as it is very important.

19	To the best of my knowledge all IP belongs to the student and DIT cannot interfere with it.
20	DIT does not claim ownership over any ideas, creations or projects which are produced by their students, unlike most large colleges in ROI. DIT Hothouse will however aid the student in launching and finding a buyer for the IP in exchange for a percentage of the profits.
21	I don't know fully.
22	NCAD pays the IP and receives 20% of profits which I think is generous.
23	If they pay for patenting and protection, they are entitled to 20% of any royalties earned. They choose projects which they feel deserve patents or protection, and then they offer you the choice of whether you want to go ahead with it or not.
24	As far as I know the college owns 10-20% of your idea but they pay for the patent. I don't know of this really being done though, perhaps for Master students it is.
25	College owns it I think 50/50 with you. Not sure, they are very vague about it.
26	Very little, that is obvious.
27	If they give you €5000 to €10000 then they want 50% of the sale. It is mostly reserved for 4th year projects.
28	College has some ownership.
29	I believe there is an ownership of my Intellectual Property by the college. I think this is perhaps something that could be shared as a protective element, that the student is not exploited by commercial entities, and has the back up and reassurance that the college weight and strength will be a disincentive to commercial exploitation.
30	They own the work we make in our time here.

Q15. Did you collaborate on project research or execution with other students in a group on your Final Year project? (*Mandatory)*

1	Yes, with marketing students, who were doing research and a business plan for me.
2	I used people in the area of design I was working in i.e. kitchens-chefs, cleaners etc., Keyboard users-Gamers, Internet cafés and also shops that sell similar products.
3	Yes in the beginning we executed project research as a group for our Final Year project, however it was not as successful as one would like. Even though teams created by lecturing staff were given instructions and a breakdown of research to be conducted, it seemed a very individual exercise. Perhaps lecturing staff should not create these teams and allow students to form groups of their own, as this will allow those who wish to work together to do so, perhaps even more effectively.
4	Yes, for the Degree project in 3rd year we collaborated with marketing students. It did not work out to our advantage.
5	No.
6	Yes.
7	No
8	In the primary research stage, yes.
9	Yes. Our project was created and worked on by a group of 4 students.
10	No and that was through my choice as I trust myself (students can be unreliable and I like working on my own)
11	Not on the final project, but collaborative projects were undertaken in previous years.
12	No, I conducted all of the research.
13	No
14	No.
15	No, but we collaborate on separate projects throughout the year which involve other modules.
16	No.
17	Not in final year. It is an individual project but we also work on smaller projects throughout the year which are often group based.
18	No.

19	We are divided by advisors so sometimes we meet our advisors one on one or as a group and talk individually with group feedback. As part of the research module we split into groups but that was just for small exercises and discussions.
20	Weekly sessions, where students in designated groups would give updates about their project research, took place and was a good sounding board to bounce ideas and suggestions from.
21	I used insights from many peers and experts.
22	Not formally but it is good to throw ideas around with the other students.
23	Yes, we had organised brainstorming sessions, and we put up our ideas on a wall with a white board, and were able to leave comments, tips, suggestions, ideas, or critiques for our class mates.
24	No response.
25	No it is kind of frowned upon. You can but your work is graded separately.
26	No.
27	Two people in group/business.
28	No.
29	No.
30	No.

Appendix 2 – Part 2

Findings and statistics of student questionnaire findings

Please tick the category which is relevant to you (*Mandatory)*

Institution attended	**Number of Students who answered questions from each Institution**
Institute of Technology Sligo	11
University of Limerick	1
Dublin Institute of Technology	10
Carlow Institute of Technology	2
National College of Art and Design	6

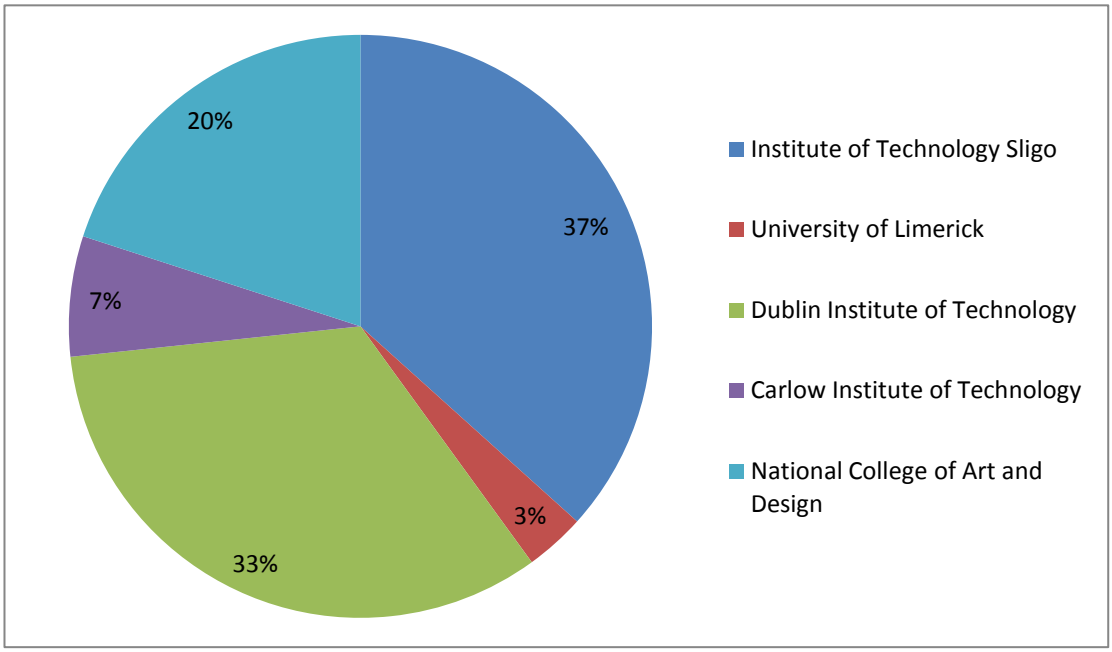


Figure 2 Percentage of Students who answered from each Institution

Q2. Is your major project structured through project based learning? What is the approximate time division between studio / projects / labs?

Question two sought to establish if the projects were structured through research based learning and what was the approximate time division between studio/projects/labs?

The results of the question varied with many answers. Design students note that it is hard to define the time given to each sector of the design process in an average week. They also state that most of their time is spent in studio working on projects with no specific set time allocated to any one subject. Throughout the academic year students had several other large projects running as part of other modules which regularly consumed valuable time that could have been spend on their major projects.

It is visibly evident that there is no clear uniform structure in the design courses in ROI. All students' answers varied indicating that all of the design courses have the same concern. The design courses lack a specific focus. Courses need to focus on having a clear definition of their course and a clear structure set out so as students can have a better understanding of what is expected of them. A more structured course may help with student's needs.

Q3. What is your Final Year design project title?

Question three sought to establish the titles of the major design projects and if they varied. Overall it is clear from the responses given that all major projects were different. There is no exact commonality between the chosen projects.

Q4. Is your major project issued by the college or self-selected?

The purpose of question four was to establish the number of Final Major projects that were self-selected, issued by the college or issued by an external client. The results are displayed in figure 2. 72% of projects were self-selected by the final year student. Five out of the thirty chosen participants went on to explore the commercial realisation of their projects.

This leaves the question: Should students be allowed to select their own projects? Are they mature enough to select their own major projects?

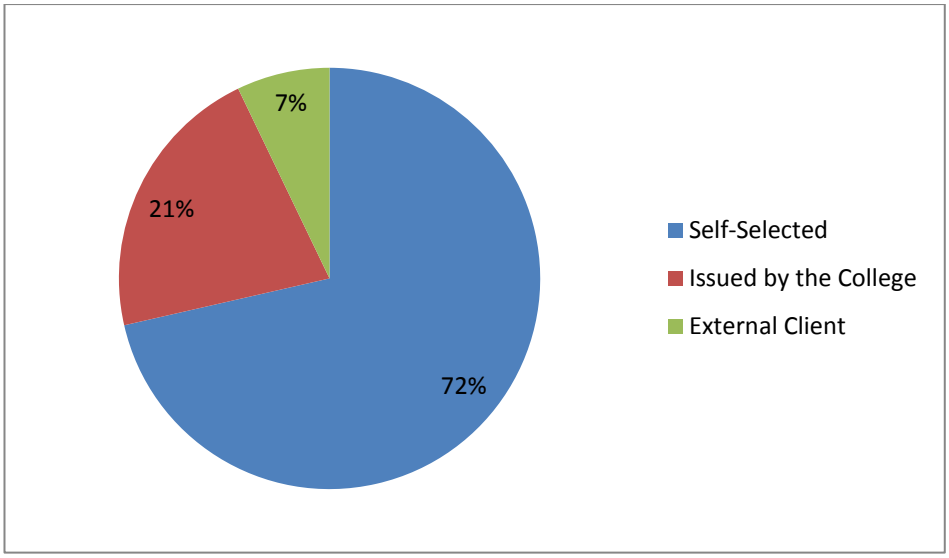


Figure 3 Final Major Projects Issued

Q5. Who contributed to your project design criteria?

Question five sought to establish who contributed to the project design criteria of student's Final Major projects during their course of study. Most participants felt that they alone contributed to their projects, with some help from lecturing staff. Other participants sought the advice from external clients and the general public. This demographic is useful to understand whether students are more or less likely to rely on the opinions of lecturers or source advice from external organisations.

Q6. During your project were you in contact with any Enterprise organisations? Innovation Centre/ Enterprise Ireland?

Question six sought to establish if students had contacted any organisations such as Enterprise Ireland/ Innovation Centre during the period of the project. From the responses given, it is apparent that most students do not source advice from outside the college to help with their products. There are no links set up with external organisations to help aid design students to further their designs/products.

There is a lack of collaboration with industry and design institutions. This leadership gap needs to be addressed in order to grow and excel in ROI. In order to embrace the development of commercialisation within the creative courses, collaboration with industry is vital.

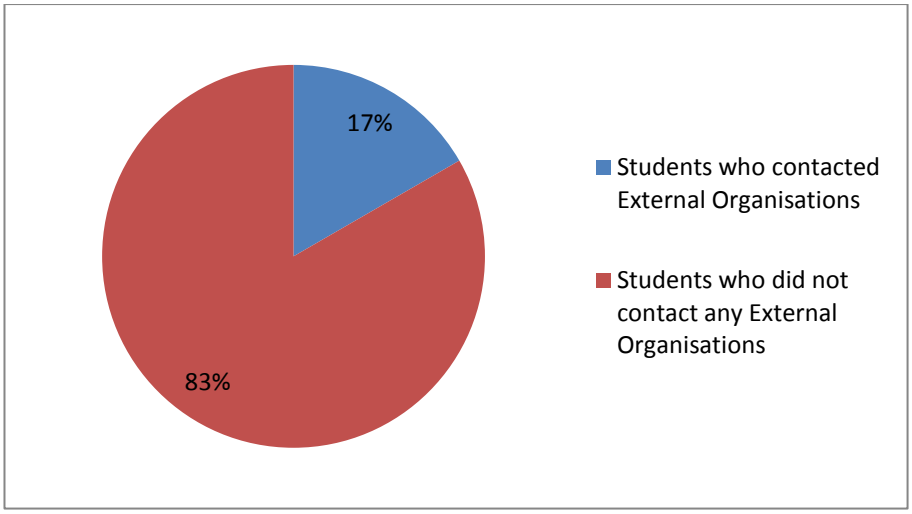


Figure 3 Percentage of students who made contact with an external organisation during their course of study

Q7. Did your project conclusions have commercial potential?

Question seven sought to establish if students major design projects had commercial potential. From the responses given, it is evident that most students felt that their projects had commercial potential. The participants stated that they did not further explore their designs due to lack of time and a lack of knowledge of how or where to pursue potential investment.

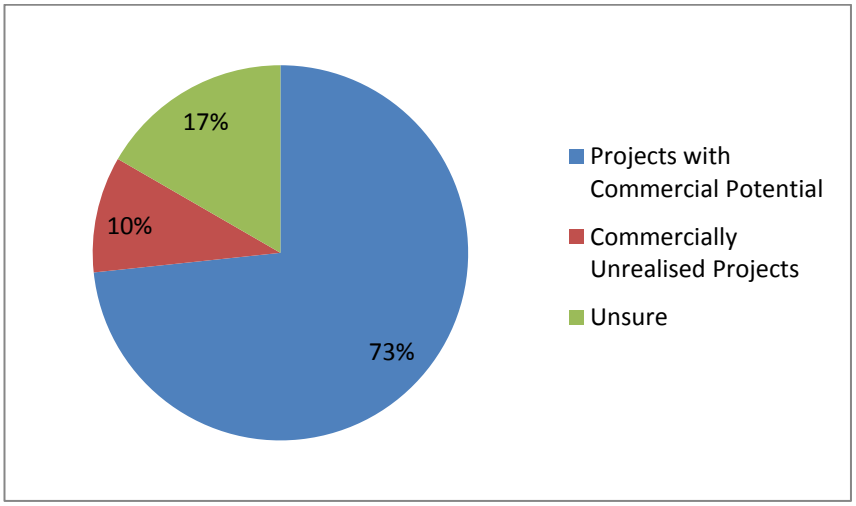


Figure 4 Number of projects that have commercial potential

Q8. Did you subsequently explore the commercial realisation of your project?

Question eight sought to establish if students had explored the commercial realisation of their projects. From the responses given, it is evident that most students

did not explore the commercial realisation of their projects. The participants stated that they did not further explore their designs due to lack of time, lack of knowledge of how or where to pursue potential investment, extreme risk, start-up costs and funding.

For commercialisation to be successful and sustainable in the design courses, students should be educated in commercialisation and IP ownership. This should enhance the development of product design courses in ROI. For graduates to be successful it is important that the colleges are willing to participate and support students in order for them to be successful with their products.

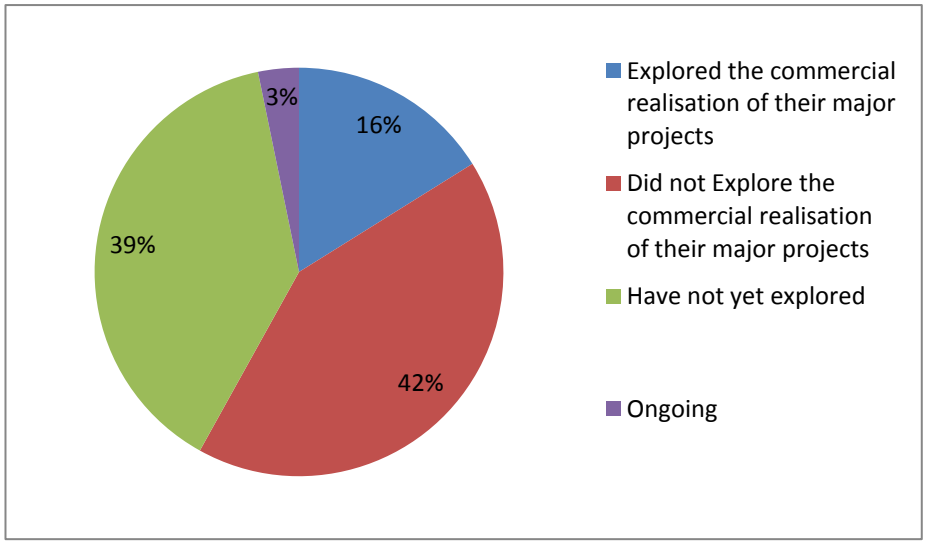


Figure 5 Percentage of students who explored the commercial realisation of their projects

Q9. What supports were offered to you to further explore the commercial realisation of your project by your college or external bodies/institutions?

Question nine sought to establish what supports were offered to students to further explore the commercial realisation of their projects by the college or external bodies/institutions. From the responses given, it is evident that the majority of students were not offered supports to further explore the commercial realisation of their projects.

The results show that only two of the design courses in ROI have a model in place to help support students to further their chosen designs.

These supports include:

- A module including Legal aspects of Creative Design
- Legal and professional advice to educate students on IP
- Venture capitalists division to support any commercial efforts that students may have
- Assistance to find mentors and create contacts with Enterprise Ireland with possible grants available
- Patent issuer

This research has shown that a gap does exist within the Creative Design courses. This research will show how the design courses in ROI should all follow a similar model to help develop success in this area.

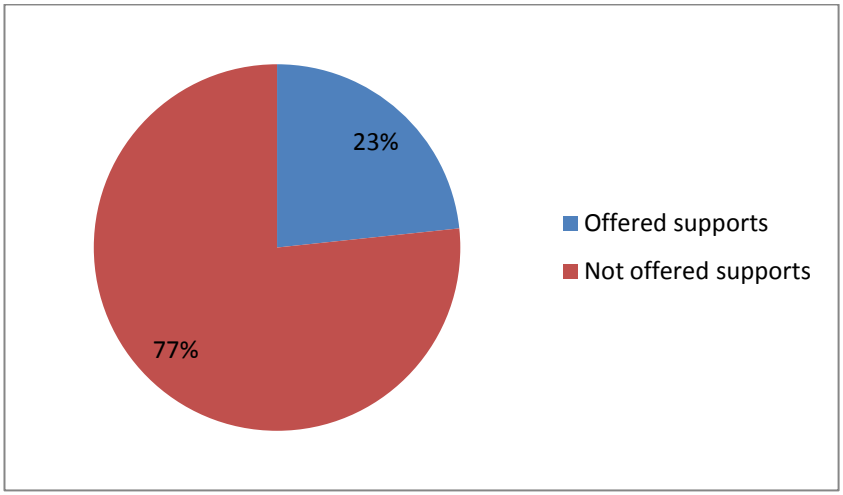


Figure 6 Number of students who were offered supports to further explore the commercial realisation of their projects

Q10. From your course of study do you clearly understand how to commercialise an innovative product or service?

Question ten sought to establish if students clearly understood how to commercialise an innovative product or service from their course of study. As can be seen from the

table below, 67% of the students do not understand how to commercialise a product or service.

This study outlines the effects not having a model in place can have on graduates. One of the aims of this study was to identify the critical success factors of commercialisation. An analysis of the success factors of commercialisation was investigated uncovering such fundamentals as collaborations with industry, the teaching of design, research and services. To achieve more success in the output of successful products the course must be more clearly industry led. Each of the success factors were confirmed by educators as important to the future development of Creative Design courses in ROI.

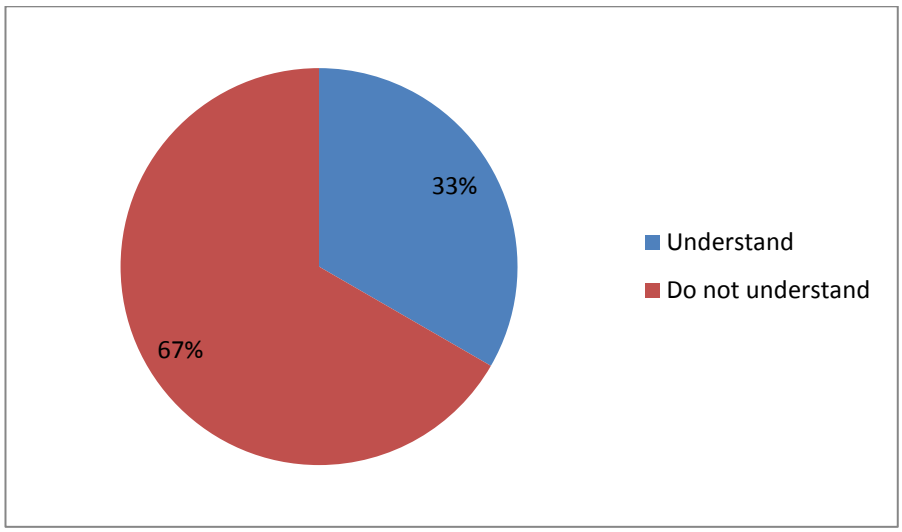


Figure 7 Percentage of students that clearly understand how to commercialise an innovative product or service

Q11. Does a culture of design entrepreneurship exist in your college? If so, can you talk briefly about this?

Enticing students to enter into more design competitions is another positive way to help students realise the potential of their work. The participants also felt organising meetings with professional organisations such as Enterprise Ireland would allow them to have a better knowledge of how to further their projects and would give them the confidence to do so.

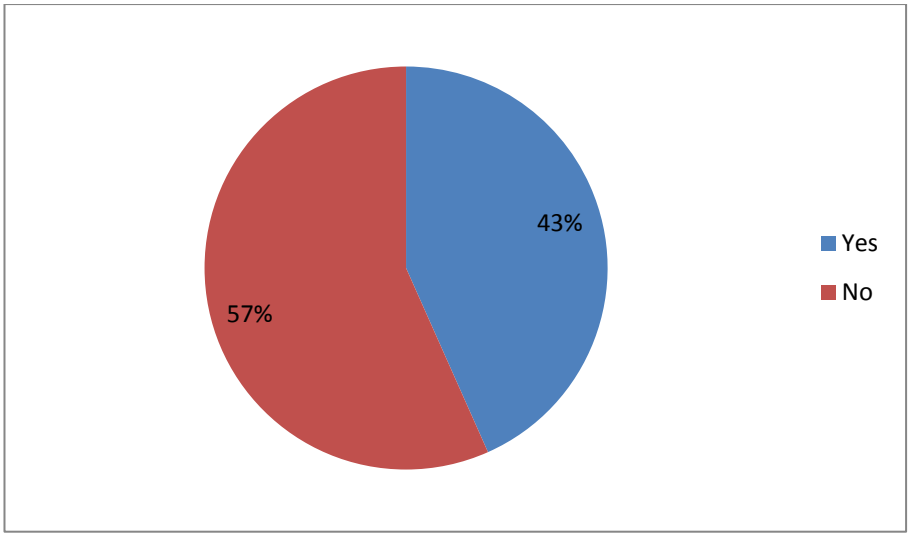


Figure 8 Percentage of students who felt if there was/was not a culture of entrepreneurship in their course

Question eleven sought to establish if a culture of entrepreneurship existed on the Creative Design courses. The answer will provide an indication of the courses ability to influence entrepreneurial skills among their design students. 57% of design students believe that a culture of entrepreneurship fails to exist in their course.

The participants interviewed state that there is no major design entrepreneurship on the design courses. There are always one or two students who are entrepreneurs, but overall the course is not very focused on this. Statistics show that very few people from the design course have gone on to design successful products or services and this is an area that needs to be improved.

Students feel that their products or designs are never really put on a commercial footing. Concept seems of more importance, but the reality of the outside world is rarely talked about.

Participants state that the culture is one of freedom of expression and creativity, with a lack of design entrepreneurship. Entrepreneurial activity and linking up with Enterprise societies could be an opportunity for exploration.

However, 43% of the design students interviewed believed that a culture of entrepreneurship does exist in their course. Some participants felt that there was a culture of entrepreneurship in the form of competitions that take place throughout the course including the Bolton Trust and Enterprise Ireland competitions, but not all courses offer these competitions. Other students felt that this happened only when they were working on live projects with real clients.

Those design courses lacking an entrepreneurial focus could be improved through:

- More competitions
- More visiting tutors who are entrepreneurs to work on projects with students
- More guidance from lecturers.

Q12. What circumstances should stimulate students to originate viable product or service ideas?

The question aims to clarify what circumstances should stimulate students to originate viable product or service ideas.

The participants felt that more field experience is needed in order to encourage students. This is an issue that is constantly being discussed among design students. Students feel they need more experience in the outside world of design instead of spending the majority of their time in the studio.

An open and supportive environment with experienced members available for consultation on a range of manufacturing, design and entrepreneurial queries would give students a better understanding of how to originate a viable product or service.

There are a significant amount of external design organisations that colleges could set up links with in order to improve the prospects of their design students.

Q13. Do you think Intellectual Property Law should be taught as part of your course programme?

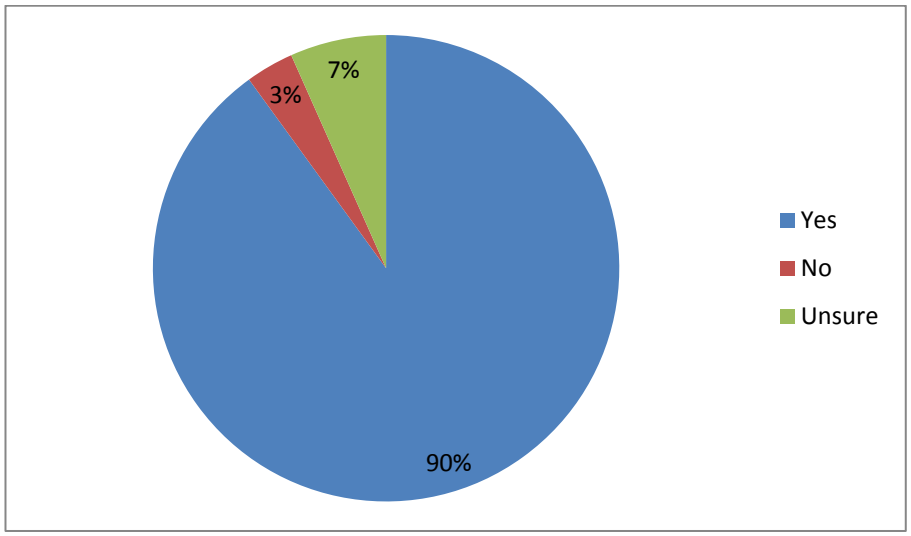


Figure 9 Percentage of students who thought Intellectual Property Law should be taught on their course as a module

The aim of question thirteen was to establish if students felt that Intellectual Property law should be taught as a separate module on the design course. 90% of students answered 'yes'. The majority of students felt that Intellectual Property law was an important aspect of the course.

The participants felt it was necessary to know about their Intellectual Property rights. It is important to know what Intellectual Property means for designers and how they can effectively use their IP in relation to their projects and how they can protect them.

Some of the students already study a semester in Intellectual Property law and found this was extremely helpful. Learning the basics in each of these areas, provides the student with a broader knowledge to help bring their product to reality.

Q14. What are the Intellectual Property contractual arrangements between you and your learning institution?

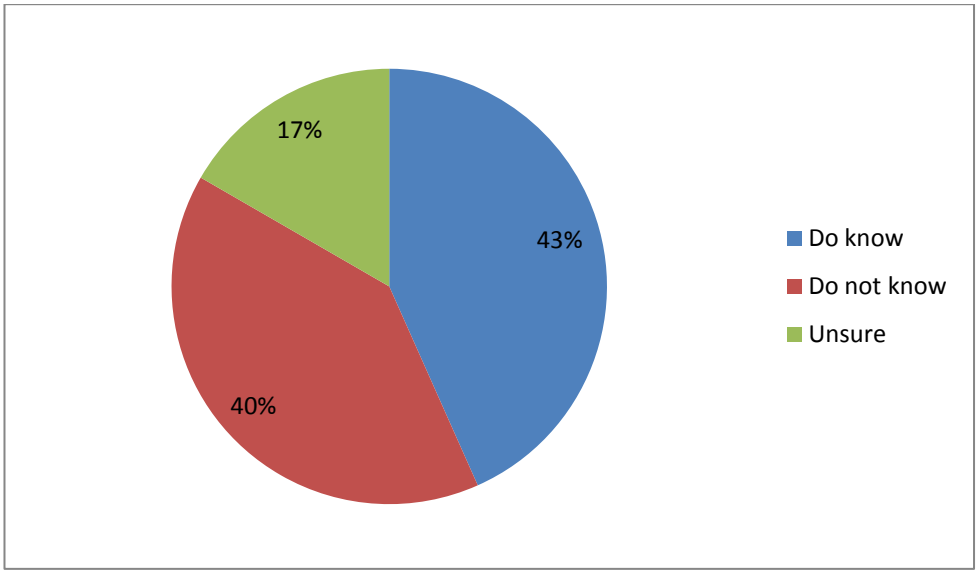


Figure 40 Percentage of students who know/ do not know what their Intellectual Property rights are

The aim of the question is to determine if students are aware of what their Intellectual Property rights are. 43 % of the students interviewed did not know what their Intellectual Property rights were. Many stated that the college never made the student aware of what their rights are, others unaware that this even existed. 40% of the students interviewed answered that they did know what their rights were but all answered differently to the question asked. The answers varied, some saying they knew of an agreement but were unsure as to what it was and others saying they had full ownership of their Intellectual Property. 17% of the interviewees stated that they were unsure of what their Intellectual Property rights were.

There is a significant difference in all answers provided by the students interviewed. Throughout the research it is clearly shown that there is a need to develop an IP Policy with a clear strategy for all design courses in ROI. This would aid success across the design courses. This implementation of such policy should have benefits for graduates that should improve product delivery.

Q15. Did you collaborate on project research or execution with other students in a project group on your final year project?

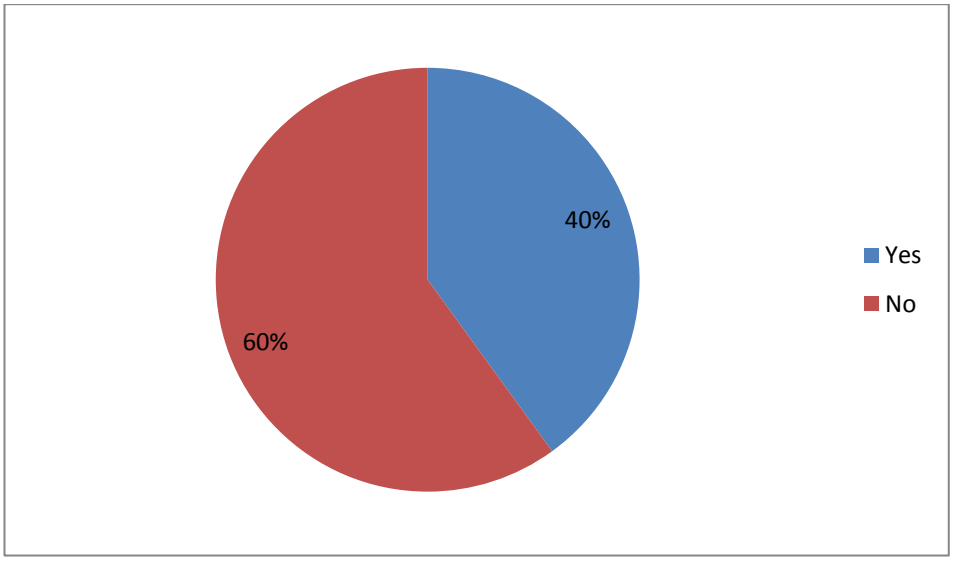


Figure 5 Percentage of students that collaborated with other people on their final year projects

The purpose of question 15 was to show if students had worked alone on their Final Major projects or had worked in a team to finalise their designs. Statistics show that 60% of students worked alone on their Final Major projects from concept to product realisation. The majority of student projects were also self-selected. Research suggests that students that work completely alone and choose their own projects do not go any further with their designs after their final graduate show.

Findings

At the start of the questionnaire students were asked how their course was taught and structured. Questions three to five asks students about their individual designs, questions six to twelve asks about commercialisation and industry, and the following questions ask about patents, Intellectual Property and entrepreneurship. The results shown in questions seven to ten detail the prime themes in the answers given and suggest that the majority of students do not understand product design in terms of commercialisation. Question eleven goes on to ask 'Does a culture of design entrepreneurship exist in your college?' to which most students answered no or were unaware of one existing. Question thirteen asked students 'Do you think law should be taught as part of your course programme?' to which most answered 'yes'.

Question fourteen suggests that students do not understand product design in terms of Intellectual Property Law.

These results suggest that the Creative Design courses overlook the subject of entrepreneurship. Failure to link design with industry will result in long term loss for both the Institute and the student.

Students were provided with a range of questions in relation to their education experience. They were asked to identify what is currently taught on their courses and then asked to select which design requirements ‘could’ or ‘should’ be taught on their courses specifically related to Creative Design.

In all the responses, students recommended that the subjects of Intellectual Property Law, patents and entrepreneurship should be brought in as part of their teaching. Suggesting, therefore that Design Education in ROI will require some substantial reforms.

Appendix 3

Interview with Erasmus Student (International Experience)

Student 1 (Exchange student from Spain studying Creative Design module in ROI)

Institution attended

Universitat Politècnica de València.

What is your final year design project title?

Sustainability. I am designing a computer game to develop skills for dyslexic children, aged 3-7 years old.

Is your major project issued by the college or self-selected?

It was self-selected from a chosen theme.

Who contributed to your project design criteria?

I interviewed a dyslexic student, a person who worked with dyslexic children and a playschool. I also worked as a volunteer in a primary school in Spain, with dyslexic children. The school was for children who had difficulties and whose parents could not afford their education. I helped them with their homework. I noticed a gap in the market from my experience working there.

During your project were you in contact with any Enterprise organisations? Innovation Centre/ Enterprise Ireland?

No.

Did your project conclusions have commercial potential?

Yes, I feel it would help children with disabilities.

Did you subsequently explore the commercial realisation of your project?

I am going to put it online when the project is over. I would like to see it on the market so I don't mind if someone sees it online and develops it.

What supports were offered to you to further explore the commercial realisation of your project by your college or external bodies/institutions?

I have not looked into what supports are available yet.

From your course of study do you clearly understand how to commercialise an innovative product or service?

In Spain there is a focus on commercial viability. That element is missing here in ROI.

What circumstances should stimulate students to originate viable product or service ideas?

Having mentors to guide them in the right direction. Students should have access to advice on whether their project is viable or not. They should also have assistance in bringing their products to market, if they wished to do so.

Do you think Intellectual Property Law should be taught as part of your course program?

Yes, students need to know what rights they have and how to protect their designs.

Did you collaborate on project research or execution with other students in a project group on your final year project?

No, I worked alone on the project. I got advice from a dyslexic student and lecturers. I had the option to collaborate with others on the ACE (Accelerating Campus Entrepreneurship) programme, but I chose not to. I wanted to work alone on the project.

What are the differences between Design Education in ROI and Design Education in Spain?

ROI is more focused on the creative aspects. I feel the course here is self-learning with guidance from lecturers. Mentorship is a key aspect of the course in ROI. Spain has more of a focus on engineering. Aspects such as physics and maths are core elements of the course module in Spain.

What would you change about the Design course here in ROI?

There needs to be more structured classes. Core subjects such as engineering also need to be taught more. Irish Design courses lack major engineering elements.

Appendix 4

Interview with Erasmus Student (International Experience)

Student 2 (Exchange student from ROI studying Creative Design module in Spain)

Institution attended.

UPC, Vilanova I la geltru, Barcelona, Spain.

What is your Final Year design project title?

WC Cubicle - reinventing the toilet for the developing countries (India).

Is your major project issued by the college or self-selected?

It was issued by the college.

Who contributed to your project design criteria?

The lecturers in the college.

During your project were you in contact with any Enterprise organisations?

No, but we are working for a Ceramics company called Roca.

Did your project conclusions have commercial potential?

Yes.

Did you subsequently explore the commercial realisation of your project?

Yes, the company will be producing the finished product.

What supports were offered to you to further explore the commercial realisation of your project by your college or external bodies/institutions?

The toilet company Roca is worldwide based.

From your course of study do you clearly understand how to commercialise an innovative product or service?

Yes, in Spain there is a focus on commercial viability.

What circumstances should stimulate students to originate viable product or service ideas?

Having clear guidelines to work to.

Do you think Intellectual Property Law should be taught as part of your course programme?

Yes.

Did you collaborate on project research or execution with other students in a project group on your final year project?

Yes, we worked as a group on our Final Major project.

What are the differences between Design Education in ROI and Design Education in Spain?

ROI: More product design and more relaxed learning.

Spain: A wider variety of subject areas and classes. There is much more engineering in Spain. I have learned a lot from UPC in Spain. I have gained a lot more knowledge in engineering and eco design.

What would you change about your Design course in ROI?

There needs to be more structured classes and more effective time use. There also needs to be more classes focusing on software, for example; InDesign or Adobe Illustrator. During my 3 years of study in ROI, the only software I know are Photoshop, Solid Edge and Solid Works. No InDesign or Adobe Illustrator.

Appendix 5

Questions for Academics participating in Research

1. Name, email and Institution

2. What is the approximate division of time (as a percentage) in your Award year of study between:

    a) Studio major projects?
    b) Labs and workshops?
    c) Academic lectures?

3. Are the Final Year major projects:

    a) Issued by the college?
    b) Self-selected by the student?
    c) Selected by the student from a college issued project theme/subject?

4. Is the project design criteria:

    a) Provided by course staff?
    b) Provided by an external agency?
    c) Established by the student through research?
    d) Issued by the college?
    e) Originated by the student?
    f) Selected by the student from a college issued project theme/subject?

5. Is your course actively linked with any Enterprise organisation?

    a) College Innovation Centre
    b) Enterprise Ireland
    c) Other
    d) Local Enterprise board

6. Do many of your final year students subsequently explore the commercial realisation of their projects? Annual approximation?

7. What supports are offered to students to realise the commercial potential of their projects by the college or external bodies/institutions?

8. In your opinion, do students understand how to commercialise an innovative product or service?

9. Is a culture of design entrepreneurship fostered in your college? If so, please discuss briefly?

10. What circumstances should stimulate students to originate viable product or service ideas?

11. Do you think Intellectual Property or Contract Law should be taught as part of your course programme?

12. Are you aware of any Intellectual Property contractual arrangements between yourself, the Institution and the undergraduates?

Appendix 6

Institution Findings

Question 1

What is the approximate percentage time division in your Award year of study between:

- **Studio (major) projects?**
- **Labs and workshops?**
- **Academic lectures? (I.e. Professional Practice)**

A	Studio (major) projects? – 75% Labs and workshops? – 15% Academic lectures? (ie. Professional Practice) – 10%
B	Studio (major) projects? – 75% Labs and workshops? – 10% Academic lectures? (ie. Professional Practice) – 15%
C	Studio (major) projects? - 50% Labs and workshops? - 20% Academic lectures? (ie. Professional Practice) - 30%
D	Studio (major) projects? – 70% Labs and workshops? – 15% Academic lectures? (ie. Professional Practice) – 15%
E	Studio (major) projects? - 65% Labs and workshops? - 10% Academic lectures? (ie. Professional Practice) - 25%

Question 2

Are the Final Year Major projects:

- **Issued by the college?**
- **Self-selected by the student?**
- **Selected by the student from a college issued project theme/subject?**
- **Provided by an external company?**

A	Selected by the student from a college issued project theme/subject 50%. Provided by an external company 50%. Mixture of both.
B	5 Research Areas proposed by the student and 1 selected in concert with all lecturing staff and student.
C	Self-selected by the student. Not usually provided by an external company.
D	Self-selected by the student.
E	Group Final Project issued by the college (1 of 2 final year projects). Individual Final Project selected by the student (1 of 2 final year projects). On occasion , it is provided by an external company.

Question 3

Is the project design criteria:

- **Provided by course staff?**
- **Established by the student through research?**
- **Provided by an external agency?**
- **Other?**

A	It is established by the student through research. On occasion provided by an external agency. On occasion provided by design competitions such as RSA competition.
B	It is a combination of all of the above, academic criteria, insure industry needs but more importantly is following the research trail.
C	The student is asked to come up with their initial brief and a conversation determines the final brief.
D	It is established by the student through research.
E	It is provided by course staff and it is also developed by the student through research (in part).

Question 4

Is your course actively linked with any Enterprise organisations?

- **Innovation Centre?**
- **Enterprise Ireland?**
- **Local enterprise board? (ie County Council)**
- **Other?**

A	It was originally linked with the Innovation Centre; it's not linked anymore due to lack of funding. It is linked to Enterprise Ireland to utilise the Innovation Voucher, (4000 euro for design,1000 euro for patents) It can only be used the college. It is also linked with the local Enterprise Board - Leader Projects , IDEA for foreign projects/businesses.
B	Innovation Centre- designCORE research Centre In Carlow. Enterprise Ireland. Local enterprise board. Other - Invest Northern Ireland.
C	Enterprise Ireland
D	Innovation Centre – Hothouse. Enterprise Ireland Local Enterprise Board - Enable Ireland. Other - Bolton Trust and I.E.D (Irish Engineer Designers).
E	Innovation Centre - Commercialisation office. Enterprise Ireland - Through the processing of Innovation vouchers.

Question 5

Do many of your final year students subsequently explore the commercial realisation of their projects? Annual approximation?

A	None, very few lead to commercialisation generally due to funding.
B	Minimal. It depends on the drive of the individual student. However we are developing a programme that externally identifies commercial viability in the project and encourages incubation of student and idea with a view to commercialisation through private and state funding.
C	Approximately 1 in 10 or 1 in 20 each year.
D	Maybe 2 every few years.
E	Not sure.

Question 6

What supports are offered to students to realise the commercial potential of their projects by the college or external bodies/institutions?

- **Financial?**
- **Other?**
- **By whom?**

A	The Business Innovation Centre used to offer the Innovation Voucher.
B	Financial - Commercialisation Fund. Other - minimal funding by designCORE. By whom - Enterprise Ireland.
C	Financial – Occasionally. Other - Occasionally. By whom - Enterprise Ireland.
D	Hothouse - funding office in place to back up patenting and Intellectual Property.
E	Commercialisation office can provide various types of support such as some funding for Intellectual Property, access to expertise and use of lab facilities.

Question 7

Is a culture of design entrepreneurship fostered in your college? If so, please discuss briefly?

A	It is starting to do it. It is being fostered slowly. The course is changing the way they approach things. It has changed from the traditional Industrial design to having more emphasis on solving problems, ie user centred design. The focus has shifted from solving design problems to solving problems in terms of business sense such as marketing and business plans.
B	With any product design course there needs to be a culture of innovation and creativity with a view to commercialisation for the benefit of the user and the environment. If that is what you mean by entrepreneurship then yes. However I feel the word Entrepreneur can be interpreted many different ways similarly to the word innovation. If the word is used in a design context based around good design and creativity I feel it works however if it is just a sound bite used to advertise then it holds little value. The design process and studio based education in its essence produce self-motivated driven designers that understand commercialisation, creativity and ethics. This in my opinion is the seed of any entrepreneur.
C	Yes, although scarce resources and poor staffing levels mean that it is often the last on the list.
D	Yes, a survey is sent out once a year to establish what the students like or dislike about the course. Entrepreneur competitions are part of our modules. The Technology Transfer office is also on board to help design students further their Final Major projects.
E	It is embraced. We openly commend students who show initiatives towards entrepreneurship: i.e. Entrepreneur competitions, academics willing to advise out of hours on business initiatives, if approached by students. Our course curriculum includes business and entrepreneurship modules. Staff have experience in entrepreneurship, all staff have a grounding in industry before joining the realms of academia.

Question 8

What circumstances should stimulate students to originate viable product or service ideas?

A	Teaching of design i.e. Identify problems. Emphasis on heavy research- Research will identify the current problems.
B	Studio based environment with enthusiastic staff, flexible support from the Institute and a greater understanding by Enterprise Ireland of the benefits and processes within Industrial/ Product Design.
C	External collaboration with industry. Tutors working externally Focus on Intellectual Property.
D	Designers need to look at the problem.
E	Support networks including: individual drive and determination, access to industry expertise, and educational background.

Question 9

Do students understand how to commercialise an innovative product or service?

A	They understand the basics of it. Very difficult thing to do.
B	In reality no, but I do not see this as being a driving force for all students going through a design course. They need to have an understanding of it and the language used. Design students also need to have support in this area post-graduation.
C	Not very well. No formally taught classes.
D	Not very well. IP, patents and professional development need to be taught.
E	Some theoretical understanding, possibly more in some cases if they have some background experience through, for example, family business or previous professional experience. I feel however they will not truly understand until they try it.

Question 10

(a) Do you think Intellectual Property or Contract Law should be taught as part of your course programme?

(b) Are you aware of any Intellectual Property contractual arrangements between yourself, the college and the undergraduates?

A	(a) Yes, it is starting to be taught in the Design course. (b) If students design projects in their own time there should be no problem when it comes to their IP.
B	(a) Yes I think it should be taught and through Professional Practice it would be covered. However, 3 to 4 years does not give enough time to cover every aspect of the design world, so each course must shape their delivery to what they feel are the best skills that have their graduates equipped to enter the design world. There are so many areas that could or should be included in design education (behavioural psychology, ethics, bio mimicry. electronics, computer programming, user centred design, emotional design, sustainable design etc.) it is about finding a good balance and allowing the students to be exposed to all of them and allow them to run in the direction they feel appropriate to their own needs and skills. (b) Yes, since the development on the research centre it has become extremely important to understand.
C	(a) Yes (b) vaguely.
D	Yes it is taught. Students own all rights to their designs unless they are working for an external client in which case they must sign over the rights to the client.
E	Intellectual Property is taught on our course.

Appendix 7

Questions for Business Professionals participating in Research

1. Contact Information
   Name:
   Company:
   Country:
   Email Address:

2. Are you currently working as:
   ie. Freelance/ Partnership

3. Who gave you advice on how to set up your company/partnership?

4. What factors influenced your decision on whether you decided to set up as a sole trader, partnership or limited company?

5. Did you get advice or assistance from any Enterprise organisations? Innovation Centre / Enterprise Ireland?

   If so, what support were you given? Financial, Mentoring or other resources?

6. How did you advance your company profile to make customers more aware of your services?

7. What enables people to produce viable products?

8. Have you ever patented/trademarked/registered your design output?

Appendix 8

Business Professional Findings

Contact Information (*Mandatory)*

Q1. Name and location of Company (*Mandatory)*

	Company Name	**County**
A	Curve Creative	Dublin
B	Kovet	Sligo
C	Verus	Sligo
D	Geelan Design	Sligo
E	Spear Design	Galway
F	Edit Print	Longford
G	Dan Leydon Illustration	Sligo
H	Ian Burnell Designs	Dublin
I	Clevermiles	Sligo
J	StableLab	Sligo
K	Farfela Design	Sligo

Q2. Are you currently working as? Freelance or Partnership (*Mandatory)*

A	Partnership
B	Freelance
C	Partnership
D	Partnership
E	Freelance
F	Freelance - Sole Trader
G	Freelance - Self Employed
H	Freelance
I	Freelance
J	Limited Company
K	Freelance

Q3. Who gave you advice on how to set up your company/partnership? (*Mandatory)*

A	Our solicitor and accountant.
B	My existing employers who set up their own business from scratch with the help of the Business Innovation Centre in the Institute of Technology, Sligo. They are also co-founders of Kovet.
C	1. I would have known quite a lot regarding business as I was part of the senior management team in my previous employment. 2. Research via the internet 3. Speaking with other business owners. (Networking)
D	I applied for the 'Back To Work' Enterprise allowance through the Sligo Leader programme. I registered my business with the Revenue.
E	An accountant in Dublin who has experience working with design agencies.
F	Longford County Enterprise Board, relatives and friends.
G	I am completely self-taught. To even call what I do a company would be labelling it unduly. I see it more as a system of using my interest in being creative to fund my lifestyle. That may sound vague but it's the best description of it. I regularly ask people in different fields for advice when I need it. I've met with accountants, lecturers and established illustrators to deduce what steps I need to take to have a more streamlined approach to carrying out jobs.
H	It was mentioned throughout our course what our next step should be after creating a product.
I	Business Accelerator and start-up boot camp mentors.
J	Enterprise Ireland Mentor Family.
K	Enterprise Board Sligo.

Q4. What factors influenced your decision to set up as a sole trader, partnership or limited company? (*Mandatory)*

A	Easy to do, cost effective, limited company didn't have any benefits.
B	We decided to set up as a limited company so that we can grow faster and have the option to take on more partners if and when needed.
C	Limited Company 1. 3 Owner/Directors. 2. More safety as a limited company. 3. The industries we serve prefer to deal with limited companies.
D	I got some work creating websites and I thought that web design would be my best chance of getting more work.
E	Small client base on starting up meant it was only myself working as Spear Design so it made financial sense to set up as a sole trader.
F	Advice, as it was a new venture, I decided that the sole trader option was the best option for me, being my own boss and not having to seek approval from a partner for any decisions I wanted to make.
G	After college I never sent out any CV's as I was determined to follow my gut instinct which was that I never wanted to work under anyone. Being my own boss is the best way to keep on top of myself and prevent it from being a boring routine job.
H	The business end of the industry does not really appeal to me and so I am trying to licence the product out to companies rather than set up my own, especially when I have little to no experience in that field what so ever.
I	It was the only real option to sell products. It cost approximately 1000 euro to set up.
J	There was little debate that I needed to set up a limited company.
K	Scale of the business.

Q5. Did you get advice or assistance from any Enterprise organisations? Innovation Centre / Enterprise Ireland? If so, what support were you given? Financial, Mentoring or other resources? (*Mandatory)*

A	We only sought advice from our solicitor and accountant.
B	Not for Kovet, it was set-up solely by us.
C	Sligo County Enterprise Board – Financial Business Innovation Centre - Mentoring
D	I got some advice from a couple of business owners and approached the head of the Sligo leader programme. I also had access to a thousand euro to invest in the business. I did a one day course on how to do a business plan.
E	No.
F	Longford County Enterprise Board was fantastic with advice. They enrolled me in a course and offered start-up financial assistance and continue to do so.
G	No. I'm thinking of looking into it though.
H	Financial and other resources, primarily contacts.
I	Comprehensive start-up fund from Enterprise Ireland.
J	Yes. County Enterprise Board Feasibility Study HotDesk at the Innovation Centre; CEIM Enterprise Ireland Feasibility and CORD Enterprise Ireland HPSU InterTradeIreland Seedcorn and Fusion.
K	Enterprise Board: I asked for advice on organisational issues before setting up the business.

Q6. How did you advance your company profile to make customers more aware of your services? *(Mandatory)*

A	Getting featured in online publications.
B	We used social media extensively and also hired a PR company; these factors along with the unique properties of our product enabled us to gain massive adoption in a quick timeframe.
C	1. Client Visits (Face to Face) 2. Website 3. Notifications via e-mail.
D	Website.
E	Totally through recommendations. The business grew organically.
F	Promoting a new venture is essential. I used the local radio station with a series of adverts for one month which ran in conjunction with local newspaper adverts, a huge company sign on front of building. I used the Enterprise Boards business directory to email and post information to local companies and schools , clubs etc.
G	The only thing I have used is Twitter. I make football artwork and there are many high profile football journalists who operate on Twitter. I basically pestered them with my work until they started to take notice. From there I got my first book illustration job and now I sell prints of my work from an Etsy shop I set up. I'm beginning to gather a following so whenever I post a work in progress of my latest piece it gets people interested.
H	Online and advertising. Meeting with the clients.
I	Online, advertising, PR adverts and general marketing.
J	Going out to meet customers. Winning the Seedcorn competition achieved a lot of publicity/credibility for us.
K	Online and word of mouth. Meeting with customers.

Q7. What enables people to produce viable products? (*Mandatory)*

A	Good teamwork. Good team training will enhance team performance.
B	Iteration, creative thinking, the ability to know when you are wrong and start over.
C	Innovation. Know what the market wants (Function), know much they are willing to pay for it (Price Point), good looking product (Aesthetics)
D	No response.
E	Not sure I understand this question. If you could expand a little then I'd be happy to answer via email
F	In my business it is demand, cost, quality of the products, service-lead time.
G	No response.
H	Identifying the customers' needs and providing a product that fills those needs. These days people and organisations do not have money to spend on products that do not do what they are required to do.
I	No response.
J	User feedback.
K	Imagination and creativity, awareness of demands on the market, good knowledge of the field in which they're working, Skills necessary to execute their ideas (knowledge of design process, research, computer programmes, communication skills) Passion about products that they create.

Q8. Have you ever patented/trademarked/registered your design output? (*Mandatory)*

A	Yes, all 3, in most continents.
B	We have registered designs on all our properties for simple protection and Kovet is a trademarked name.
C	Yes - iPhone Protective Cases by Kovet.
D	No.
E	No. But clients have trademarked logos, logotypes and brand names that we have provided them.
F	I patented my logo. The designs I do are for customers belong to them so they pay to patent the designs output.
G	No.
H	No.
I	We buy in the hardware, no patents necessary.
J	Yes.
K	No.

Q9. What advice would you give to first time business starters? (*Mandatory)*

E	Get good, solid advice from people with experience in the design sector. Keep it small to start with and use freelance help during busy times. At start-up, budget for a second workstation as part of the initial capital so you can employ freelance help. Get a good finance programme that can quote, book jobs, invoice etc.
F	Get as much advice from an Enterprise Board before you start up, get financial aid and be prepared for a long struggle; make as many contacts as you can. Project what your sales may be and see how viable your business is. Do market research in your locality.
G	Ignore all criticism. Focus on yourself and relentlessly follow what you want. Think as big as you can. Then revise it and think bigger. Hard work is the best way to success.
H	Go to your local Enterprise Board. Good business proposal.
J	Get a mentor.
K	Do your research: is there need for your product/services? What improvement does it offer in relation to what's already on the market? What impact does it have on society/environment? Make your plan: what is your aim? How are you going to achieve it? What resources do you need? How will you fund your business at the start? Can you get help (grants, mentorship, advice)? Be enthusiastic and persistent.

Appendix 9

Interview with Legal Professional

What are the Intellectual Property contractual arrangements between the student and their learning Institution?

If the project is done outside college then the college should not assert any ownership. If the student is getting paid by the college then the college will own it, but in most cases the college will sign ownership back to the student.

The colleges cannot lay claim to all students' intellectual property. You need to be able to prove that you own the IP. The big issue for students in terms of their designs is making sure that they are free to use them. You cannot contract someone out of their rights. Your rights include your intellectual property rights.

What are the Intellectual Property contractual arrangements for an undergraduate student?

The college have no rights over the undergraduate's work. If the student wants to use designs from their undergraduate work the best thing to do is write to the college asking them to assert over ownership of the IP to the student.

What are the Intellectual Property contractual arrangements for a Master's student?

Most Master's students are working for a paid project and will have signed a document which states what rights they have to their project. The student needs to look at the document that they signed, to see what applies to their situation. In most cases the student will have signed over their IP rights. All the student needs from the college is an assignment of those rights stating that the college has signed over all rights.

Appendix 10

Interview with the New Frontiers Enterprise Development Programme Manager

What is the New Frontiers Programme?

New Frontiers is Ireland's national entrepreneur development programme that is delivered at local level by the Institutes of Technology. It is designed to help people such as creative designers, who have an innovative business idea, to establish and run their own companies. It will provide the designer with a package of supports to help accelerate their business's development and to equip them with the skills and contacts that they need to be future business leaders.

What supports are offered to students to further explore the commercial realisation of their projects?

They will have access to expertise and contacts to commercialise their business idea fast and will learn the latest management and leadership techniques.

The programme consists of 3 phases:

The first phase (Testing the Business) will be part-time over an 8-10 week period and will help participants to validate the market potential of their business idea. These workshops will provide information and general start-up training, allowing participants to tease out their idea's feasibility and to see whether a viable proposition exists.

Following a competitive selection process, committed participants who have a strong value proposition and who can demonstrate that their business proposition has potential to grow and create jobs may be offered a place on Phase 2 (Planning the business).

If successful, students will receive intensive support for six months to develop both their own skills and to work up their business proposition. This will entail full-time participation in workshops, mentoring and regular reviews. Using these supports, they will fully detail and validate their business proposition and identify potential customers, sales channels and funding options.

Participants must be available for full-time participation. To facilitate this, they will receive up to €15,000 in scholarship funding subject to satisfactory development reviews. The aim of this phase is to support participants in their development of an investor-ready business proposition.

On the basis of their potential to develop sales and/or secure investment, business's emerging from Phase 2 will then be guided to the government supports that can best help them at their particular stage of development. Further incubation facilities and support may be available to participants for a limited period. (Phase 3- Developing the business)

Is there advice on how to set up your company/partnership?

The New Frontiers programme offers advice on new start-ups. Mentorship, funding and a hot desk is provided to applicants that make it to phase 2 of the programme.

Each person gets five sessions with mentors.

What advice would you give to first time business starters?

- Develop a well defined product
- Get a good business plan
- Have a good marketing strategy (good idea of route to market)
- Avail of the existing organisations that offer funding and support. Existing organisations are as follows:
    a) Enterprise Ireland – offer advice and funding
    b) Welfare fund – start your own enterprise, funding is provided for you up to two years
    c) Leader programme – development companies, rural development plan, business activities on the rural area. Funding is also provided.
    d) Feasibility fund – offers up to €13,000 - €14,000. The person must spend €7,000 first to claim the full €14,000 back.
    e) Innovation Centre provides Innovation Vouchers to be utilised by the college.
    f) NDRC (National Digital Repository Centre) offers advice and many funding opportunities.

Appendix 11

Interview with the ACE (Accelerating Campus Entrepreneurship) Programme Manager

What is the ACE Initiative?

The ACE Initiative involves a joint collaboration between IT Sligo, Blanchardstown Institute of Technology, Cork Institute of Technology, National University of Ireland Galway (NUIG) and Dundalk Institute of Technology.

What is the purpose of your organisation?

The purpose of the organisation is to instil a module of entrepreneurship in each course in the institute. The goal of the ACE is to bring the module to other colleges. To encourage and sustain a vibrant, successful knowledge economy, Ireland must increase the number and quality of indigenous companies and create graduates, irrespective of discipline, who are entrepreneurial thinkers and doers. The accelerating Campus Entrepreneurship (ACE) Initiative seeks to explore how the Higher Education Institutions in Ireland (HEIs) can develop and deliver a framework for embedding entrepreneurship education across all disciplines to fulfil the aim of '*Creating the Entrepreneurial Graduate'*

What process would they need to go through to when starting up companies?

They come up with a product or service and find their own investors.

What supports are offered to students to further explore the commercial realisation of their projects by your college or external bodies/institutions?

There is support in the form of mentorship. There is no funding or finance available.

What are the Intellectual Property contractual arrangements between the student and the institution?

IP belongs to the employer. If the students use the college hardware then the college owns the work done by the student.

Have any students ever patented/trademarked/registered their design output?

Not as of yet.

Do you see the company growing or shrinking in the future?

Growing if the funding is available.

Appendix 12

Interview with Dutch Design Student

(Industrial Design student from Eindhoven)

Q1. Institution attended

Eindhoven University of Technology (TU/e)

Q2. Is your major project issued by the college or self-selected?

It was self-selected.

Q3. What are the Intellectual Property contractual arrangements between you and your learning institution?

The university owns the rights to all we create at the TU/e. All our projects are thereby protected from our commercial clients and other third parties. When anything of a project is sold to a client the designer will get a third of the profit, a third will go to our faculty and a third to the university. This is mainly to protect IP and avoid having to draw up a single contract for each case.

The advantage for the students is that they will get professional support from IP consultant or people who can help them create and file patents. There are also quite generous start-up loans for students who want to take a design into production.

Q4. Who contributed to your project design criteria?

I interviewed many academics and business professionals.

Q5. Did your project conclusions have commercial potential?

Yes.

Q6. Did you subsequently explore the commercial realisation of your project?

I hope to pursue it further. I do not know the exact procedure for this process. It only happened a few times during my education and I was not closely related to these projects.

Q7. What supports were offered to you to further explore the commercial realisation of your project by your college or external bodies/institutions?

The institute have a model in place to help students commercialise their projects.

Q8. From your course of study do you clearly understand how to commercialise an innovative product or service?

Yes there is a focus on commercial viability in the course.