Entrepreneurship Education in Ireland

Towards Creating the Entrepreneurial Graduate

2009

itb Institute of Technology Blanchardstown

DUNDALK INSTITUTE of TECHNOLOGY

CIT Institiúid Teicneolaíochta Chorcaí Cork Institute of Technology

OÉ Gaillimh NUI Galway

RDC

NDP National Development Plan 2007 - 2013

An Roinn Oideachais agus Eolaíochta Department of Education and Science

HEA Higher Education Authority An tÚdarás um Ard-Oideachas

IT Sligo An Institiúid Teicneolaíochta, Shligeach

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Foreword

It is now recognised that the benefits of entrepreneurship education are not limited to the creation of new business ventures and subsequent new jobs but will develop key competencies of students, develop their mindsets and in turn enable them to be more creative and self-confident in whatever they undertake. By developing an entrepreneurial capacity among students, the economic and social well-being of a nation will be enhanced at a time when it is needed the most.

Currently entrepreneurship programmes are not available to students of all non-business disciplines across the third level sector in Ireland and in light of this report, developing such offerings would have far-reaching benefits on many levels from overall economic stimulation right through to individual personal growth and development.

This study was commissioned by the ACE (Accelerating Campus Entrepreneurship) Initiative Management Committee as a national research project to examine entrepreneurship education across the third level sector in Ireland, from both a 'demand side' and 'supply side' perspective. The findings presented in this report highlight the gaps which exist in the provision of entrepreneurship education and the challenges and issues which need to be addressed to ensure a level playing field is created giving students across all disciplines an opportunity to develop enterprise skills and an entrepreneurial mindset. The international best practice cases also provide an insight into how particular Institutions have developed effective models for the implementation of entrepreneurship across all disciplines and all levels.

I welcome this study as a valuable contribution to our understanding of the need for the development of a culture which appreciates the potential benefits of putting structures and resources in place which extends the provision of entrepreneurship education to all students across the third level sector.

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Director of Research and Education
National Council for Graduate Entrepreneurship

Acknowledgements

This research report is an output of the Accelerating Campus Entrepreneurship (ACE) Initiative which is part-funded under the Strategic Innovation Fund by the Higher Education Authority (HEA) in Ireland and co-funded by the Partner Institutions: Dundalk Institute of Technology (DkIT), Institute of Technology Sligo (ITS), Institute of Technology Blanchardstown (ITB), Cork Institute of Technology (CIT) and the National University of Ireland in Galway (NUIG). Sincerest thanks are offered to Minister Batt O'Keeffe and the HEA who have funded and supported this research and the ACE Initiative from its conception. The vision, commitment and support of Senior Management across all Partner Institutions to develop and deliver effective entrepreneurship education grounded in cutting-edge research must also be commended.

This report was compiled by representatives of the ACE Initiative Development Committee (See Appendix II) and also includes:

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The ACE Initiative Committee was facilitated by colleagues in Higher Education Institutions (HEIs), nationally and internationally. We sincerely thank the wide range of research participants for their input into the ACE Initiative.

The Ace Initiative

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".

For the purposes of the ACE Initiative, and indeed the research study reported in this document, entrepreneurship is viewed as a process which begins with opportunity recognition and then involves the acquisition of resources (technological, financial and human) to exploit that opportunity and produce a new or more valuable outcome. The basic assumption is that the knowledge and skills required to engage in this process can be taught and that the teaching of these skills has sound educational merit. However, it is recognised that whilst these skills have obvious applications in the new venture creation process, they are equally valuable within organisations ('intrapreneurship') across public, private and third sectors.

The ACE Initiative evolved from a growing perception that the traditional approaches to teaching entrepreneurship are not suited to the challenge of creating the entrepreneurial graduate for a number of reasons, including:

- Most entrepreneurship courses are underpinned by the 'business-plan'. Growing evidence suggests that successful entrepreneurs depend more on their ability to be able to adjust flexibly to the marketplace and less on formal business planning.
- Traditional faculty structures and programmes are at odds with the cross-faculty approach required to support entrepreneurship.
- Entrepreneurial learning is acquired on a 'how-to' basis through the processes of 'doing', 'problem-solving', 'learning from others', 'making mistakes', 'risk-taking' and 'pursuing opportunities'; real-world and problem-based learning needs to be incorporated into entrepreneurial education.

- The traditional pedagogical approach does not teach 'know-who', i.e. the management of relationships or gives the student a sense of what it 'feels' like to be an entrepreneur.

The ACE Initiative seeks to provide innovative approaches to entrepreneurship education by providing the opportunity for students from non-business programmes to take enterprise related modules. These provide the student with the simulated experience of running and operating a real business; thereby promoting self-employment as a real, attractive and viable career option. This process will be achieved through four inter-related targeted actions:

- Targeted Action 1: Pedagogies, Teaching and Curriculum Development.
- Targeted Action 2: Cross-Faculty Multi-disciplinary Approach.
- Targeted Action 3: Embedding Technology Entrepreneurship into Engineering Education, leveraging of non-curriculum activities from Incubation/Technology Transfer Offices.
- Targeted Action 4: Educational Organisation and Culture Change Towards the development of more 'Entre-' and 'Intra' -preneurial approaches.

The ACE Initiative involves a joint collaboration between Blanchardstown Institute of Technology (ITB), Cork Institute of Technology (CIT), Institute of Technology Sligo (ITS) and National University of Ireland Galway (NUIG) and is led by Dundalk Institute of Technology (DkIT). The project partners recognise that the process of embedding entrepreneurship education will require fundamental organisational and cultural change complemented by the use of new cross-Institutional and multi-disciplinary pedagogical methodologies. This process will require re-orientation of traditional models and the development of new staff skills and competencies and the active involvement of industry and entrepreneurs.

Further information about the ACE Initiative, and its outputs, can be accessed via: www.aceinitiative.ie

Glossary

ACE	Accelerating Campus Entrepreneurship
BBA	Bachelor of Business Administration
BERR	Business Enterprise and Regulatory Reform
CIT	Cork Institute of Technology
DIUS	Department of Innovation, Universities and Skills
DkIT	Dundalk Institute of Technology
EC	European Commission
EduPROF	An Education and Training Conference
Entrepreneurship	A process which begins with opportunity recognition and then involves the acquisition of resources (technological, financial and human) to exploit that opportunity and produce a new or more valuable outcome.
EU	European Union
FINPIN	Finnish Entrepreneurship and Innovation Network for Higher Education
HE	Higher Education
HEA	Higher Education Authority
HEI	Higher Education Institution
HEIF	Higher Education Innovation Fund (UK)
ILO	Industrial Liaison Officer
IoT	Institute of Technology
IP	Intellectual Property
ITB	Institute of Technology Blanchardstown

ITS	Institute of Technology Sligo
MA	Master of Arts
MBA	Masters of Business Administration
MNC	Multi National Company
NCGE	National Council for Graduate Entrepreneurship
NICENT	Northern Ireland Centre for Entrepreneurship
NUIG	National University of Ireland Galway
OECD	Organisation for Economic Co-operation and Development
PhD	Doctor of Philosophy
QUB	Queens University Belfast
RDA	Regional Development Agencies (UK)
SEC	Science Enterprise Challenge
SEDA	Staff and Educational Development Association (UK)
SME	Small and Medium Sized Enterprises
SOTEEKKI	Social Enterprise Education Initiative
TTO	Technology Transfer Officer
UU	University of Ulster

Executive Summary

Executive Summary

In the midst of the radically altered global economic climate, the Irish Government has reiterated its commitment to the higher education agenda. Just as increased participation in higher education underpinned the phenomenal economic growth and success previously enjoyed in Ireland, it is the Government's contention that the creation of an entrepreneurial and highly skilled workforce will not only support the continued attraction of foreign direct investment to our shores, but will also deliver graduates who can create indigenous employment and/or deliver benefit to employers aiding economic recovery. The Government's Framework for Sustainable Economic Renewal (2008) recognises the need to promote entrepreneurship education within the higher education sector and pledges to progress the provision of entrepreneurship and management training to students from non-business disciplines, especially postgraduate research students.

It is against this contextual backdrop that this research study was undertaken in 2008. Similar to previous studies it was found that entrepreneurship education in Ireland's tertiary education system remains fragmented, delivered mainly within business schools, as structured, academic business modules which take students through a linear process to produce a business plan. Whilst the old-fashioned, traditional theory-based lecture remains the most commonly employed teaching method in the Irish classroom, we learn from international research and good practice that it is experiential learning that will most benefit entrepreneurial students.

This study, therefore, calls for entrepreneurship education that is 'fit-for-purpose' today. That is, an entrepreneurship education (*for* and *about* entrepreneurship) for all students that will not only provide theoretical knowledge but ensure graduates develop an entrepreneurial mindset, through developing entrepreneurial skills, behaviours and attitudes and equipping them with the key competencies to enable them to enjoy an entrepreneurial /intrapreneurial career or engage in new venture creation. This can only be achieved through student-centred teaching and learning that employs innovative, experiential learning methodologies in conjunction with assessment mechanisms that award credit for extra-curricular and practical activities delivered by a coordinated, student-focused Institutional infrastructure. It is therefore essential that educators are recognised and encouraged to act as "entrepreneurial champions" and provided with the means to enhance their own teaching skills and to be entrepreneurial and innovative in developing new teaching methods and resources.

Seventy-eight percent (78%) of undergraduate students surveyed expressed an interest in starting their own business at some point in the future. These students reported that their entrepreneurial interest was most influenced by family members who had started a business (33%) followed by high-profile entrepreneurs (22%). It must be noted however, that this study was undertaken in late 2008, before the full ravages of the global recession upon the Irish economy were experienced. It is intended to survey this same student grouping in each year of their studies which will provide an opportunity to fully explore the potential impact of the recessionary experience on their entrepreneurial intent. This study also found that 39% of postgraduate students are interested in setting up their own business through their college infrastructure; despite this, there is a reported lack of student enquiries and start-ups within campus incubators. This is due to the culmination of various factors including: a lack of communication about, and visibility of, entrepreneurial supports and policies; a lack of coordination of the different but complementary entrepreneurship and enterprise support activities; and a lack of education and training *for* and *about* entrepreneurship. Additional resources and Senior Management commitment are required to ensure the co-ordinated and effective implementation of measures to address these issues.

Whilst 42% of Presidents reported that entrepreneurship was incorporated within their written Mission Statement, there appeared to be structural barriers to the practical implementation of policy. The barriers encountered in the process of translating policy into delivery related to: inflexibility in organisational structures; timetabling and education delivery formats; lack of development resources and limited multi-disciplinary working; and perhaps most significantly, a lack of awareness of the benefits to be derived, by students and Institutions, of embedding entrepreneurship education across curricula.

There is no national framework nor an articulated strategic policy for entrepreneurship education Institutionally, that would support education and practice among staff and students at all levels and across all disciplines. HEI Management respondents in this study have indicated that changing mindsets is a key challenge for improving entrepreneurship education at an Institutional level.

The current lack of evaluation of entrepreneurship education offerings within HEIs must also be addressed. Effective evaluation and a climate of continuous review and improvement can only serve to enhance student learning.

Therefore, the HEIs in Ireland face a steep learning curve in raising the standard of campus entrepreneurship education and activity. They also need to bridge the gap between academics and industry, which often results from practitioners not perceiving education provision as relevant and many time-constrained business people see limited payback for active participation in the education process. Industry engagement within HE is neither widespread nor intensive despite initiatives to mainstream such collaboration. While private funding and active engagement with entrepreneurs in the teaching process is common within the entrepreneurial University culture of the US, this is a challenge for the HEIs in Ireland.

This will require a cultural change and, in order to bridge the gap, industry must be informed, and consulted, about changes in the academic agenda. It is increasingly recognised amongst the third-level academic community that entrepreneurship education today cannot be solely theoretical in nature.

Based on the previous discussion, it would seem that the key success factors for 'fit-for-purpose' entrepreneurial education today relate to:

- Policy support to ensure a strategic, integrated approach is adopted for the long-term placement of entrepreneurship education on the educational agenda and to facilitate the adequate resourcing to develop the necessary infrastructures and cultural change.
- Senior Management leadership and support in resourcing entrepreneurship education across curricula within Institutions.
- Co-ordination and promotion of activities and collaborative working between academics, researchers, enterprise support staff and technology transfer functions within Institutions. In this way, programmes of enterprise support and commercialisation assistance will be highly visible and be offered, and accredited, as part of a wider programme of entrepreneurship and enterprise education.

- Entrepreneurial educators, entrepreneurs and business advisers providing real-world simulations and experiential learning to students to ensure that students possess the requisite theoretical and practical business knowledge, entrepreneurial skills and competencies to equip them for employment and enterprise creation.
- New assessment methods and greater flexibility within education design and delivery systems so that extra-curricular enterprise activities can be accredited within formal learning programmes.
- Effective measurement and continual improvement of offerings to ensure quality, relevance and effectiveness.

Forfás in their recent document, 'Sharing Our Future: Ireland 2025: Strategic Policy Requirements for Enterprise Development' (2009), called for a longer-term framework to underpin national prosperity taking into consideration that decisions made today, affect all our tomorrows. It seems fitting to echo this call within the education context. In order for the tertiary education tier in Ireland to fulfil its objectives of enabling students to fulfil their potential and of delivering graduates who can create indigenous employment or deliver benefit to employers, change must occur. Entrepreneurship education must be made available to all students in Ireland within the higher education sector. This will require strategic vision and leadership from Senior Management within Higher Education Institutions and the allocation of the necessary resources by Government to enable the conversion of policy into action.

Section 1
Introduction

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The Higher Education sector in Ireland comprises Universities and Institutes of Technology. There are thirteen Institutes of Technology (IoTs) located throughout the country, providing a comprehensive range of courses from craft/apprentice programmes to higher technical/technological education through two-year Higher Certificates, three-year Bachelor Degrees and three to five-year Honours Bachelor Degrees. The Institutes also provide a range of postgraduate programmes at Postgraduate Diploma, Masters and Doctoral level. In addition, Ireland has seven Universities: NUI Galway, NUI Maynooth, University College Cork, University College Dublin, Dublin City University, Trinity College Dublin and the University of Limerick.

The Department of Education and Science is the Government Department with overall responsibility for the administration of higher education. The Higher Education Authority (HEA) is the statutory planning and development body for higher education and research in Ireland. The HEA has wide advisory powers throughout the whole of the third-level education sector. In addition, it is the funding authority for the Universities, Institutes of Technology and a number of designated higher education Institutions.

Participation in third level education in Ireland has witnessed extraordinary growth in recent decades with statistics from the Department of Education and Science Ireland showing an increase from 11% (21,000 persons) in 1965 to an estimated 57% (137,000 persons) in 2003 (OECD, 2004). Ireland's recognition of the important contribution a skilled and educated workforce can make to the economy assisted the phenomenal economic growth of the Celtic Tiger era. The growth in tertiary education was accompanied by a 250% improvement in average material living standards (OECD, 2004).

The European Commission (2006) identified the encouragement of innovation and entrepreneurship as a micro-economic policy requirement for Ireland. In addition it was recommended (EC, 2004) that entrepreneurship education objectives should be incorporated within national curricula, accompanied by practical implementation guidelines, support mechanisms and teacher training, in order to facilitate its local implementation (Cooney and Murray, 2008).

The Irish Government, in line with European policy, has outlined its commitment to the inclusion of entrepreneurship education within curricula across all sectors. This emphasis on embedding entrepreneurship as a discipline area within second and third level educational curricula is most evident in the Enterprise Strategy Group's Report 'Ahead of the Curve'(2004), with the promotion of indigenous Entrepreneurship considered critical to continued economic success. This was further supported by the recent National Development Plan (2007-2013) which allocated a significant portion of its budget to improving Research and Development and commercialisation, as well as investing in start-ups and growth enterprises (Treanor, 2009). Since the introduction of the 'Small Business Act' for Europe in June 2008, individual EU member countries, including Ireland, have sought to strengthen their SME policy.

This policy trend, evident across all tiers of education systems throughout Europe and the US in recent years, undoubtedly emanates from international literature espousing the benefits to students, economic development and national competitiveness (Bennett, 2006). At the individual level, Henry, Hill and Leitch (2003) assert that students who have completed entrepreneurship programmes are more likely to:

- Create more businesses and employment.
- Generate more business contacts.
- Have a broader range of skills and knowledge.
- Possess greater self-confidence in their entrepreneurial abilities.
- Test the commercial viability of their idea.
- Improve their employability even if they do not start a business.

Arguably, the radically altered economic climate now lends greater urgency to the provision of education that will equip graduates with the innovative, problem-solving, entrepreneurial skill sets required to promote enterprise and economic recovery. Entrepreneurship education in Ireland however, was identified as being fragmented by Goodbody (2002) and in the GEM Ireland 2007 Report (Fitzsimons and O'Gorman, 2008), which highlighted the absence of a coherent entrepreneurship education strategy, despite evidence that Ireland's entrepreneurs are more likely to have a third level education as a minimum. In addition, the GEM Ireland 2008 report provides indicative evidence that the provision of entrepreneurship education and training 'does increase the intention to become an entrepreneur' (Fitzsimons and O'Gorman, 2009).

Jamieson (1984) distinguished between education and training; there is also an important distinction between educating *about* enterprise which is academic in nature, and educating *for* enterprise, which prepares aspiring entrepreneurs for the process of new venture creation. These are distinct from training *in* enterprise to established entrepreneurs. It appears that for national objectives pertaining to economic recovery and development to be fulfilled, Ireland must move away from typically educating *about* entrepreneurship to providing education *for* entrepreneurship.

Indeed, the comprehensive audit of entrepreneurship education in Ireland recently undertaken by Cooney and Murray (2008) casts doubt upon the potential for entrepreneurship education, as it is currently delivered in Ireland, to deliver on the objective of increasing indigenous entrepreneurs.

There is increasing consensus that effective entrepreneurship education is not book-based but should be more interactive and real-world based. Dana (1987) suggests that the entrepreneurial learning style requires active participation as opposed to 'chalk and talk' instruction. The difference in approach was succinctly summated by Gibb (1996), as follows:

Conventional Approach	Enterprising Approach
Major focus on content	Major focus on process delivery
Led by teacher	Ownership of learning by participant
Expert 'hands-down' knowledge	Teacher as fellow learner / facilitator
Emphasis on 'know-what'	Emphasis on 'know-how' and 'know-who'
Participants passively receive knowledge	Participants generate knowledge
Learning objectives imposed	Learning objectives negotiated
Emphasis on theory	Emphasis on practice
Subject / functional focus	Problem / multidisciplinary process
Sessions heavily programmed	Sessions flexible and responsive to needs

International research also highlights the benefits of providing entrepreneurship education to those students outside the business school (Hill, Ó'Cinnéide and Kiesner 2003; European Commision, 2008). There would appear to be an inherent logic in educating students for entrepreneurship through a multi-disciplinary approach, especially for graduates in technical disciplines where self-employment is a traditional outcome. Cooney and Murray (2008) suggest that internationally, entrepreneurship or enterprise based modules are increasingly being incorporated into non-business courses; more significantly, "interest and demand in these modules is growing among science, engineering, and arts faculties (Cooney and Murray 2008:28)."

Despite this reported demand for entrepreneurship education and training amongst science and technology students in Ireland, the number of student enterprise enquiries is low, with student start-ups remaining lower still. This is despite the Government's significant financial investment in campus incubation facilities in Ireland, via the 'Third Level Business Incubator Initiative' which commenced in 1997[1]; the aim of that programme was to support balanced regional development through incubating High Potential Start-Up enterprises which are typically high-technology enterprises with significant growth and export potential. There is anecdotal evidence from practitioners that the lack of entrepreneurial graduates may result from the interplay of several factors including:

- A lack of entrepreneurial training on most undergraduate and postgraduate programmes and, in particular, non-business based disciplines.
- The absence of tangible links between campus incubators/technology transfer offices and academic programmes.
- Little evidence of collaborations between Schools and a lack of focus on graduates as potential employers.

1 The total investment in campus business incubation activity stands at over €46 million; €38m in incubators in Institutes of Technology, which is part-financed by the European Regional Development Fund, a €4.2 million investment in University-based incubation centres, and a €4.1 million investment in University Bio-incubation facilities - According to Mr Micheál Martin T.D. at the Official Opening of the Tom Crean Business Centre in the Institute of Technology in Tralee on March 15th 2006. Last accessed: November 2009 via http://www.entemp.ie/press/2006/20060315a.htm.

The Irish Government has recently pledged to "progress the provision of entrepreneurship and management training skills on scientific and engineering doctoral programmes in universities" as part of its "Framework for Sustainable Economic Renewal" (Department of Taoiseach, 2008:16). In this document, the requirement to develop new approaches to entrepreneurship education within the Higher Education sector is highlighted, in order to secure an enterprise economy and an ideas economy, so that Ireland becomes not only an open economy suitable for Foreign Direct Investment, but an open entrepreneurial economy.

The existing literature, national policies and the good practice examples discussed in this document repeatedly discuss education *for* entrepreneurship as being an education that will ensure graduates develop an entrepreneurial mindset, through developing their entrepreneurial skills, behaviours and attitudes and equipping them with the key entrepreneurial competences. This in turn, is considered to motivate and equip graduates to enjoy an entrepreneurial (intrapreneurial) career or engage in new venture creation. The National Council for Graduate Entrepreneurship (NCGE) in the UK, published an outcomes framework (by Gibb, 1996) outlining the various stages and outcomes of entrepreneurship education [See Figure 1].

Desired Outcomes Category	Description of Desired Outcome
Entrepreneurial behaviours, attitudes and skills developed	• Opportunity seeking • Initiative taking • Ownership of a development • Commitment to see things through • Personal focus of control (autonomy) • Intuitive decision making with limited information • Networking capacity • Strategic thinking • Negotiation capacity • Selling/persuasive capacity • Achievement orientation • Calculated risk-taking
Motivated towards an entrepreneurial career	• Understand the benefits • Can compare with employee career • Have some "heroes" as friends, acquaintances • Have images of entrepreneurial people "just like them"
Understanding processes of venture creation	• Can go through the total process, know what challenges at each stage • Know roughly how to handle them
Generic entrepreneurship competencies developed	• How to find an idea • How to appraise an idea • How to see problems as opportunities • To identify the key people to be influenced in any development • Know how to build the know who • Know how to learn from relationships • Know how to assess business development needs • Know where to look for answers • Emotional self awareness, manage, read emotions, handle relationships • To constantly see yourself and the business through the eyes of stakeholders and particularly customers

Figure 1 NCGE Outcomes Framework for Entrepreneurship Education (by Gibb, 1996)

In summary, there is a growing acceptance of the need to provide entrepreneurship education within the HEIs in Ireland; that there is increasing demand for entrepreneurship education within non-business disciplines within the HEIs in Ireland; and that a framework for delivering excellence in entrepreneurship education within the HEIs in Ireland is vital for the future.

The following section, Section 2, outlines the methodology used to conduct this research. In Section 3, the findings of in-depth investigations into the different viewpoints on the provision of entrepreneurship education within the HEIs in Ireland are reported. The infrastructure, strategy and culture at Institutional level are described where the opinions of Presidents of Institutions, Heads of non-business Departments, Business School academics and Industrial Liaison Managers are presented. Current provision is examined and includes the provision of entrepreneurship education within non-business disciplines. Undergraduate and postgraduate views are taken into consideration to highlight the demand and perception of the current provision of entrepreneurship education within HE in Ireland. A significant added value component of this research is the enterprise

perspective of entrepreneurship education. The findings from surveys conducted with these enterprises conclude the findings section. In Section 4, some reflections are presented on the international good practice exemplars studied as part of this research. These case examples explored the cultural environment, Institutional support for, and change required to enable good practice in entrepreneurship education. Section 4 also contains a general discussion on the appropriate delivery models for entrepreneurship education. In the concluding sections (5-6) conclusions are drawn from the research study (Section 5) and recommendations (Section 6) are made on embedding entrepreneurship education within the HEIs in Ireland. In Section 7 there is guidance on future research directions in the area of entrepreneurship education, herein the implications for future research might provide useful insights for enterprise educators in working collaboratively within HE.

Section 2
Methodology

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Methodology

2.1 Aims and Objectives

The aim of the ACE Initiative is to 'Create the Entrepreneurial Graduate'. This Initiative recognises that all students should be given the opportunity to engage in entrepreneurial learning within HE. The ACE Initiative therefore seeks to explore and provide innovative approaches to entrepreneurship education that can be applied in diverse disciplines within the HEIs in Ireland.

The objectives of the ACE Research project are:

- To examine current provision of entrepreneurship education within the HEIs in Ireland.
- To assess the needs of entrepreneurship education from the various stakeholder perspectives.
- To assess the effectiveness of support infrastructures within the HEIs in facilitating the exploitation of commercialisation opportunities by postgraduate students.
- To explore international models of good practice that could inform practice within the HEIs in Ireland.
- To develop an understanding of the culture within the HEIs and its impact on entrepreneurship education.

The key questions addressed within this report include:

- Are the HEIs in Ireland currently providing entrepreneurship education that not only informs students *about* enterprise but equips them *for* enterprise?
- What is required from entrepreneurship education today and how can this be delivered?

- What infrastructural, organisational and cultural changes may be required to facilitate embedding new approaches to entrepreneurship education within HEIs across all departments?

2.2 Methodological Approach

There are three broad steps in this research investigation:

- Research at Institutional level
- Evidence from practitioners, the business perspective
- Case-based evidence from international good practice exemplars

The research began by developing an in-depth picture or case-study of entrepreneurship education delivery, demand and prioritisation within each Partner Institution. Analyses across the supply and demand sides of entrepreneurship education facilitated robust within case and across case analysis (Eisenhardt, 1989), which will continue throughout the pilot-testing phase to facilitate theory development. This method was adopted as it provided Partner Institutions with a more complete understanding of the dynamics present within their own Institutional settings to enable benchmarking against peers and international best practice and, ultimately, in an action research methodology to be employed in the second phase of the ACE Initiative, to enable the development of pilot initiatives tailored for the particular cultural context of each Institution so as to maximise effectiveness and likelihood of success. Different levels of analysis were employed within and across studies (Yin, 1984) using the combination of qualitative and quantitative data collated (Eisenhardt and Bourgeois, 1988).

The partner organisations represent HEIs of both Institutes of Technology and University status. They were not randomly sampled but were selected for participation in the ACE Initiative due to their desire to widen current entrepreneurship education offerings outside the business school, with the ultimate aims of developing entrepreneurial mindsets, skills and behaviours amongst students and increasing the likelihood of student start-ups by entrepreneurial graduates.

Multiple researchers at each Institution were involved in conducting, analysing and presenting this research. The use of multiple researchers ensured greater objectivity. This assisted (a) in avoiding theoretical bias and (b) in converging towards novel observations thereby allowing for new interpretations and for richness of the data (see Glaser and Strauss, 1967). Note the primary research at Institutional level involved qualitative interviews with a range of HEI staff from the Institutions (see Appendix III) and quantitative and qualitative surveys of undergraduate and postgraduate cohorts.

Whilst the individual case-study analysis undertaken for each partner Institution is valuable in its own right, it is the collation and cross-referencing of this data that insights into the provision of entrepreneurship education within non-business in Ireland. With these results from an exploratory study into student and staff supports, organisational culture and the potential methods for implementing entrepreneurship education as derived from international good practice becoming evident. This report therefore, mainly outlines the collated research findings to provide the reader with an overview of current entrepreneurship education practice in the higher education in Ireland, examples of international good practice, and recommendations as to the way forward in creating entrepreneurial graduates, regardless of their discipline of study.

Enterprises were surveyed to take into consideration the needs of 'the entrepreneurial graduate' from the perspective of the prospective employer, businessperson or social entrepreneur. These enterprises were located in the regions where the five ACE partner HEIs were located. The research subjects were derived from a range of organisational types and were not necessarily involved with the curriculum development efforts of the HEIs or with entrepreneurship education.

The research compared what was considered as three international good practice exemplars of entrepreneurship education – one in Northern Ireland, one in Europe and one in the UK. The evidence for the three cases was collated from a qualitative, semi-structured interviewing document designed for this research study and used during the site visits to the three good practice exemplars.

The following methodological framework was employed for this study:

Step One

- Interviews with four distinct groups from each of the participating HEIs including:
    - President or nominee
    - Head of Department (non-business)
    - Business School academic
    - Industrial Liaison Manager or Technology Transfer Officer

Interviewers were selected from each of the ACE Initiative Partner Institutions. A comprehensive interview schedule, based on surveys used in the HE in a European research study, (European Commission 2008*b*) was designed to collect quantitative and qualitative data on the following key areas:

- Teaching and Learning
- Resources
- Strategy, Policies, Culture
- Infrastructure
- Multi-disciplinary Approaches
- Development
- Design and Co-ordination of Entrepreneurship Education for Non-Business Disciplines
- Innovation, Technology, Entrepreneurship and Commercialisation

The surveys differed slightly for each group but, by using the same core questions, offered comparative analysis and triangulation opportunities. Business school academics were asked most questions (58) with a focus on current delivery, development, the existence of a multi-disciplinary approach for delivery to non-business students and the inclusion of technology entrepreneurship and commercialisation. Heads of Department of non-business schools, corresponding to the discipline in which undergraduate students were surveyed at the same Institution, were also interviewed. Their responses to thirty questions were cross-referenced with responses of business academics in relation to teaching, and with those of Presidents and Industrial Liaison/Technology Transfer Officers (ILO/TTOs) in relation to policy and management issues.

Presidents were asked thirty questions focusing on infrastructure, strategy, culture and development; whilst, TTO/ILOs were asked thirty-eight questions with a heavier weighting on the Innovation, Technology, Entrepreneurship and Commercialisation section. Whilst comparative analysis was undertaken by sub-group, findings are primarily reported within this document by key findings topic in order to address the research questions outlined in Section 2.1 i.e. Teaching and Learning, Institutional Infrastructure, Strategy and Culture.

- First Year, non-business undergraduate student survey – a paper based questionnaire administered to students within the classroom environment by a project researcher.

Within each Partner Institution, certain non-business subjects/disciplines were targeted as a means of providing an exploratory insight into the attitudes towards entrepreneurship education amongst non-business students, and also, to provide an indication as to the level of their entrepreneurial interest. The subject areas were surveyed as shown in Table 1.

The survey contained fourteen questions categorised under entrepreneurial aptitude; interest in self-employment; influences on entrepreneurial interest; motivations for wanting to start a business; opinion on embedding entrepreneurship in non-business discipline; entrepreneurship skills development and current provision within the HEIs.

Table 1 Undergraduate Survey Response Rates

Institution	Subject/Discipline	Number of Undergraduate Responses
Dundalk Institute of Technology	Engineering	147
Institute of Technology Sligo	Early Childhood Care and Education	53
Institute of Technology Blanchardstown	Computing/Computer Engineering	48
Cork Institute of Technology	Biomedical Engineering	15
NUI Galway	Various Engineering	35
Total		298

Note that as part of the longitudinal studies associated with the ACE Initiative this same cohort will be surveyed during each subsequent year of study to map attitudinal change towards entrepreneurship.

- Postgraduate Survey – administered in paper-based format and electronic format.

Forty-four postgraduate students enrolled on taught Masters and higher research degrees across all subject disciplines in Partner Institutions were surveyed. Whilst this represents less than one percent of the postgraduate student population across Partner Institutions, this exploratory qualitative study sought to identify postgraduate experiences and issues.

The postgraduate surveys contained twenty seven questions across various topics including the nature of research being undertaken; the potential for exploitation/ commercialisation; awareness and understanding of IP and technology transfer policies within their Institution; awareness and understanding of commercialisation supports within their Institution (e.g. campus-incubation facilities); their experience, if any, of enterprise development/entrepreneurship education and training delivery; Institutional recognition of entrepreneurial endeavour and their interest in commercialisation.

Step Two

- Enterprise Survey – administered electronically to a convenience sample of key personnel across a range of organisational types – as defined by employee numbers, turnover, budget and industry sector.

The enterprise surveys sought to explore the entrepreneurial skills, knowledge and capabilities required of graduates in the labour market. The surveys were administered to 33 enterprises/organisations in electronic format to enhance response rates. The surveys contained 19 open and closed questions pertaining to the profile of the organisation; opinion on the key entrepreneurial skills, knowledge and competencies required of graduates in marketplace; the anticipated benefits of entrepreneurial employees; the methods for fostering entrepreneurial skills; and the importance of enterprise linkages in delivering entrepreneurship education.

Step Three

- International exemplar survey – site visits and semi-structured interviewing.

The 'Survey of Entrepreneurship in Higher Education in Europe' (European Commission 2008*b*) identified 45 exemplars. For the purposes of this investigation, this survey was adopted and the exemplars were shortlisted on the basis of the extent of entrepreneurial activity at different levels and across different disciplines and willingness to support the ACE Initiative. The three good practice exemplars include the Northern Ireland Centre for Entrepreneurship (NICENT) a joint partnership between the University of Ulster and Queen's University Belfast in Northern Ireland; the University of Satakunta, Finland (a member of the FINPIN – network of polytechnics and universities of applied science) and the National Council for Graduate Entrepreneurship (NCGE) in the UK.

To inform this research, a standard analytical framework was employed during each site visit to establish:

- The nature, extent and development of enterprise education and activity within the Institute. While this sets the context, it also helps to give an understanding of the mechanisms used to introduce entrepreneurship education to non-business disciplines.
- The nature and level of academic engagement.
- Their methods of measuring success of their entrepreneurship education programmes.
- Their approaches to delivering entrepreneurship education and the extra-curricular activities which support academic learning on entrepreneurship programmes.
- The organisational and cultural influences and how they embed entrepreneurship in the curriculum elements.

In addition, US models of entrepreneurship education delivery were conceptually examined to identify the key delivery models employed in delivering entrepreneurship education across curricula. Different approaches and the implementation of these different models within the UK context were then explored to aid an assessment of the transferability of different approaches and models within the Irish context.

Expert Focus Groups

When the fieldwork was completed, indicative results were presented to experts at two fora as follows:

- EduPROF Conference, 4-5th February 2009, The Hague.
- Entrepreneurship Education Conference, 17th February, 2009, Dublin Castle.

Note the research findings were also presented to the Advisory Committee to the ACE Initiative (see Appendix I). These fora encouraged academics, researchers, policy makers and the business community to (a) provide constructive feedback on the research findings and (b) to inform the development phase of the ACE Initiative which, on the basis of the research, aims to develop and pilot test entrepreneurship education programmes in non-business disciplines within the five Partner Institutions at both undergraduate and postgraduate level.

Section 3
Findings

Section 3
Findings

This research study explored the demand-side perspective in relation to entrepreneurship education for students in higher education in Ireland. This involved an exploration of demand for entrepreneurship education from non-business undergraduates and postgraduates and an analysis of the requirements of entrepreneurship education from the perspectives of both students and industry. The supply-side of entrepreneurship education was also examined to explore current delivery and approaches, the commitment to entrepreneurship within Institutions, and an evaluation of the organisational structures and cultures at interplay that would promote or hamper progress. This section of the report sets out the findings from each aspect of the primary research undertaken, beginning with the supply-side:

3.1 Institutional Infrastructure, Strategy and Culture Supply-side Analysis

3.2 Entrepreneurship Education Survey[2]

3.3 Undergraduate survey

3.4 Postgraduate survey Demand-Side Analysis

3.5 Enterprise Survey

3.1 Institutional Infrastructure, Strategy and Culture

The European Commission for Enterprise and Industry Directorate General produced a report entitled 'Entrepreneurship in Higher Education, especially in non-business studies' in 2008. This report highlights key issues, identifies existing challenges and proposes recommendations to multiple stakeholders including policymakers, senior management within Institutions, educators and staff responsible for enterprise promotion within

2 Includes Business School academic and Non-Business Head of Department responses in relation to current practices and planned provision to provide data on practices across disciplines.

the higher education system. This report outlines research undertaken to inform the Irish context in relation to how these recommendations could be implemented and the necessary changes and requirements to facilitate effective action. Therefore, the Presidents of each Institution (or their nominated representatives) were interviewed, in addition to Heads of Department (non-Business) and the Technology Transfer/ Industrial Liaison Officers within each organisation who are responsible for the enterprise creation and economic development remit of the organisations. In addition, business school academics were surveyed to ascertain delivery practices and perceptions at the staff-student, teaching and learning interface.

To ascertain the significance attributed to entrepreneurship within each individual HEI policy environment, Presidents were asked if entrepreneurship was embedded in the Institution's written Mission Statement. Whilst only 42% of Presidents stated that their Institutional Mission Statements incorporated entrepreneurship, 58% highlighted that they had in place Institute-wide policies and plans to assist in the development of entrepreneurial behaviours, skills, mindsets and experiences. Presidents identified the main overarching goals for entrepreneurship education in the HEIs in Ireland as being:

- To foster entrepreneurial behaviours, skills and mindsets.
- To increase the number of graduate start-ups.
- To seek opportunities for commercially exploiting knowledge present at the Institution.
- To inspire students towards an entrepreneurial career or life.

The survey provided an insight into the typical Institutional infrastructure in place in relation to delivering entrepreneurship education and entrepreneurial activities within the HEIs in Ireland. It was found that:

- The majority of Institutions do not have a centre or a department for research in entrepreneurship (67%) and, of those that do, 75% have less than five full-time equivalent academic staff.
- Sixty percent (60%) of Universities surveyed did not have a Professor of Entrepreneurship on their academic staff. It should be noted that Institutes of Technology cannot appoint Professors as there are no Chairs within the IoT system.
- Sixty-nine percent (69%) of the HEIs have business incubation facilities for more than 10 start-ups or spin-outs, with 50% having a Technology Transfer or Industry Liaison Office employing more than one person.
- Only 6.3% reported having no infrastructure for incubation, technology transfer or industry liaison available.
- Sixty-six percent (66%) of the HEIs generate income from entrepreneurial activities, mainly the generation of fees from seminars, training workshops and advisory services.

While facilities evidently exist for incubation and technology transfer alongside the research that is conducted in the area, there was no consistent academic focus for entrepreneurship evident across Institutions.

This issue re-surfaced when Presidents were asked to outline the main barriers to entrepreneurship education within their own Institutions. The key barriers reported, ranked according to frequency, were considered to be:

- No support from the Government/policy environment for entrepreneurship education improvement.
- Entrepreneurship education is dependent upon the efforts of a single person or a few people.
- Entrepreneurship education lacks strategic integration at Institutional level.
- At Institutional level, no recognition is given for excellence in entrepreneurship education.
- Academics do not have time to engage in entrepreneurship education.

Heads of Department of a non-business discipline also considered the main barrier to entrepreneurship education delivery at their Institution resulted from the lack of a policy drive; with similar frequency, they also indicated that the reliance on one, or a small number of people, to deliver entrepreneurship education within the Institution was a barrier. This was followed by a consensus that their academic staff did not have time to engage in entrepreneurship education and an acknowledgement that they had limited expertise in the area.

Those staff with a remit for enterprise, commercialisation and technology transfer within the HE sector i.e. Industrial Liaison or Technology Transfer Managers/Officers, did not consider a lack of policy to be a key factor. This group considered the limited expertise among academic staff to be the key barrier; this group also indicated that entrepreneurship education tended to depend on the efforts of one or a small number of individuals within Institutions; and more widely, staff did not have enough time to engage in entrepreneurship education. This was compounded by the lack of recognition given for excellence in entrepreneurship education at Institutional level.

Similarly business school academics perceived the key barrier identified being the small number of academics delivering and championing entrepreneurship education within Institutions. Academics also highlighted the lack of strategic integration raised by Presidents. This group also considered entrepreneurship education to have a lack of academic credibility, which may explain the low numbers of staff involved or required to teach in this area.

Whilst 67% of Institutions were reported by Presidents to be engaged in entrepreneurship research, many did not engage in research in the field of entrepreneurship education. The purpose of the research being undertaken was varied; Presidents equally prioritised two objectives: the desire to understand market trends and needs within the area of entrepreneurship education and to further advance the field through 'high-end', academic research in the field of entrepreneurship education. Other responses included the development of an entrepreneurial culture on campus, identifying best practice models to deliver entrepreneurship education across all courses and for benchmarking purposes.

Institutions generally do not require staff to have actual entrepreneurial experience prior to teaching entrepreneurship and there was no formal requirement on staff to engage in training or coaching to improve their entrepreneurship teaching skills. When asked to outline the key organisational and infrastructural changes required to facilitate the implementation of entrepreneurship education across disciplines, Senior Management considered the implementation of modularisation and semesterisation, in conjunction with optional electives, as a potential means for progress. Some respondents recognised a need to plan for the inclusion of entrepreneurship education within programmes at an earlier stage.

A cause for concern is the disparity in findings relating to the evaluation of entrepreneurship education delivered within the sector. Whilst eighty-two percent (82%) of business academics indicate that student evaluations of modules occur, 56% of non-business Heads of Department report that student evaluation does not occur. Of greater concern is the fact that no organisational procedures or evaluation mechanisms are in place to assess if the entrepreneurial education offerings are meeting the medium to long-term goals according to 91% of business school academics and 89% of Heads of Department.

The main challenges inherent in the current system relate to the difficulties in persuading all Departments of the relevance of entrepreneurship across disciplines; this may necessitate discussions to achieve consensus on the purpose and aims of entrepreneurship education, which is perhaps why respondents widely acknowledged that a mindset and cultural change would be required to effect change. In addition, there are resource constraints. Within the University sector, it was acknowledged that greater value is placed on academic research than academic entrepreneurship and that it may be more difficult to persuade faculty to engage in embedding entrepreneurship education rather than concentrating on academic research which has typically provided a route to promotion.

When asked about the challenges facing entrepreneurial graduates, Presidents outlined the current economic climate, access to finance, access to business networks and relevant contacts and confidence as key difficulties likely to be encountered. However, most respondents were able to identify some successful role models from their Institutions who had started new businesses and had been successful.

It became evident throughout the research process that an inherent tension often exists within Institutions as business schools consider entrepreneurship education to fall within their remit. This has, on occasion, led to a perception amongst some academics from non-business backgrounds that they are not considered to possess similar or relevant expertise. A key requirement identified by various respondent groups, was the requirement for Heads of Department to collaborate locally to facilitate widespread implementation of high quality entrepreneurship education delivery. In addition, the importance of actively engaging the commercialisation and enterprise support functions within Institutions was acknowledged in order to ensure relevant, real-world linkages within the teaching process. A smaller number of respondents identified the need to involve researchers

within the process which would ensure that current good practice consistently informed delivery and assisted students in preparing for the entrepreneurship process.

At 75% of Institutions surveyed, all students could not access entrepreneurship education as part of their course according to non-business Heads of Department. It would appear that despite a reportedly high level of support at Senior Management level for entrepreneurship, difficulties remain in translating policies into deliverable actions due to barriers operating at different levels including organisational structures, timetabling and education delivery formats, lack of developmental resources and limited use of multi-disciplinary approaches.

3.2 Entrepreneurship Education Survey

3.2.1 Current Provision

Thirteen Heads of (non-business) Departments and twelve business school academics participated in this research, outlining current entrepreneurship education delivery and the level of integration (or not) across curricula. For the most part, entrepreneurship modules tend to be taught as specialised courses and are not integrated across curriculum in non-business disciplines. Within business schools, whilst many have modules and programmes available to students, only two Institutions report integrating entrepreneurship across the entire business school.

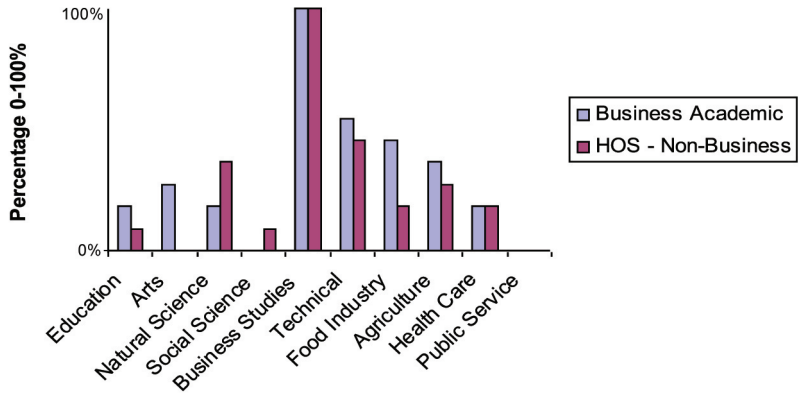

Figure 2 Overall disciplines which offer In-Curricular Entrepreneurship Courses

As shown in Figure 2, the business studies discipline is the largest cohort exposed to entrepreneurship education within the curriculum, followed by science and technology disciplines. Most notably, Public Services programmes do not have access to entrepreneurship education at all.

As outlined earlier in this document there is a difference between educating about entrepreneurship and educating for entrepreneurship. Sixty-seven percent (67%) of business academics in this survey considered the entrepreneurship education offerings within their Institution offered a combination of both. Entrepreneurship courses can also have different focal points with respect to the entrepreneurial process. Seventy-five (75%) of respondents however, reported that current offerings provide students with a broad view of the entire entrepreneurial process from the Pre-start (idea generation, assessment and experimentation) phase, through the start-up phase (assembling resources, identification of customers, problem solving) to the growth phase (formalising procedures, structures, acquiring resources to sustain and promote growth, enlarge market opportunity). However 50% of respondents acknowledged a slightly greater emphasis on the start-up phase.

Respondents were then asked to outline the main methods and approaches employed in delivering entrepreneurship education; the results show that lecturing is still the dominant method.

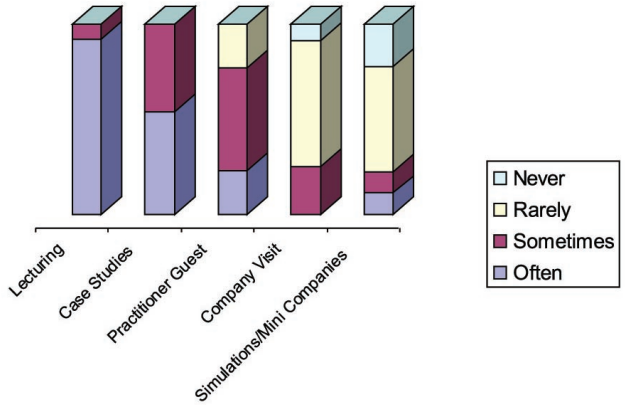

Figure 3 Main Teaching Methodologies Used

Whilst there is a variety of activity currently undertaken nationally, as illustrated in Table 2, there is unfortunately no overall standard or mechanism where the learning outcomes of each type of activity can be captured, adapted at an Institutional level and freely disseminated throughout the sector.

Table 2 Types and Examples of Supporting Activities

Type of Activity	Example of Activities
In-Curricular	• Guest speakers and lecturers • Academic modules or partial modules • In-curricular project work with or without a multidisciplinary focus • Industry placement • Business game (i.e. new venture simulation)
Extra Curricular	• Entrepreneurs Society or Forum • Commercialisation and Mentoring Programmes • Enterprise Week and Business Week • Sabbatical exchange for academics • Workshops and Blue Sky Days
Business Plan and Competition Based	• Enterprise Ireland Competition • Newstalk Student Competition • Involvement of Irish Marketing Institute • AIB Innovation Fund • General exhibitions, and local initiatives

The majority of Institutions, according to 60% of business school academics, undertake in-house development of the entrepreneurship curriculum and teaching methods with 64% reporting that there is no importation of teaching methods from other HEIs and 73% report no formalised exchange in good practice of entrepreneurship education at a national level. Eighty-two percent (82%) of business school academics reported that their HEI did not currently engage in international good practice exchanges of entrepreneurship education.

This study also highlighted a poor funding environment for curriculum development within the HEIs in the area of entrepreneurship education. Ninety-one percent (91%) of non-business Heads of Department surveyed do not have access to a dedicated fund for delivering entrepreneurship curricula. Forty-six percent (46%) of business academics and Heads of non-business departments however, reported that their Institution did have formalised cross-disciplinary structures in place to enable collaboration to develop new entrepreneurship education offerings. This will hopefully go some way to overcoming the lack of dedicated Technology Entrepreneurship programmes available in HEIs, as reported by 82% of respondents.

3.2.2 Entrepreneurship Education for Non-Business Disciplines

Respondents indicated that approximately half of all entrepreneurship education is delivered directly from, or within, the business school; the remainder is delivered by both business and non-business schools. When developing entrepreneurship education offerings for non-business students, 70% of business school academics said this was done in conjunction with academics from the relevant discipline, indicating informal cross-disciplinary liaison. It must be remembered however that entrepreneurship education is only being offered to non-business students in 25% of the HEIs surveyed. These findings tend to suggest that the incorporation of entrepreneurship education into non-business programmes is still in its infancy in Ireland.

The business school academics responsible for delivering entrepreneurship education and the Head of a non-Business Department were then asked what they considered to be the main organisational and structural barriers to be overcome and changes required, to facilitate the implementation of entrepreneurship education across disciplines. They highlighted:

- The rigidity of programmatic structures.
- Lack of co-ordination of such programmes for academic centres.
- Need to change the mindset of academics.
- Need to communicate with potential students.
- Lack of staff incentives.
- The impact of modularisation and semesterisation.

Business School academics and Heads of non-business Departments, in contrast to Presidents, considered modularisation and semesterisation as potential challenges to the success of implementing entrepreneurship education.

3.3 Undergraduate Survey

In total, 298 students completed the undergraduate survey, administered by project team members within Partner Institutions. Higher Education Authority statistics indicate that approximately 70% of students enrol on non-Business school courses in the HEIs in Ireland. Based on the most recently available statistics for 2007/08, we estimate that this student survey sampled less than 1% of the total population of non-business undergraduates. However, as outlined in the methodology section, this survey was undertaken as part of the process of developing case-studies of each participating Institution to facilitate within case, and across case, data comparison. The 298 responses are disaggregated by Partner Institution in Figure 4.

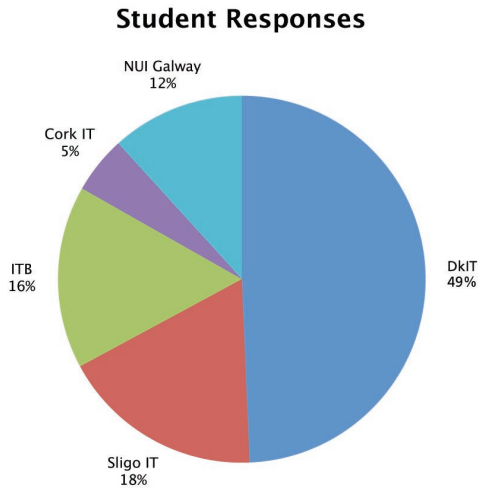

Figure 4 Breakdown of Undergraduate Student responses by Partner Institution

Data analysis was undertaken on an Institutional level and collated to provide an overall indication for the first year undergraduate students surveyed. As can be appreciated throughout the remainder of this section, the collated responses provide a good indication of responses within each Partner Institution. The high proportion of respondents within one Institution did not therefore skew overall results, and the summary findings contained herein, are therefore considered representative. Interesting findings at an Institutional level are highlighted within the overall data set throughout.

3.3.1 Findings

Students were asked to rank a number of attitudinal statements on a Likert scale ranging from 1 to 5 where 1 was most significant. The collated responses are displayed in Table 3 following.

Table 3 Ranked Preferences of Entire Student Sample

Statement	Average Rating
I prefer a steady income stream	1.79
I want to be my own boss	1.81
I like to take risks	2.00
I continually come up with new ideas	2.13
I prefer to follow others lead	2.85

There was some variation amongst these results across Partner Institutions. Students in DkIT, CIT, and ITB were keen to be their own boss, and this desire slightly outranked their secondary desire for a steady income stream. The ITS student sample indicated a stronger preference for a steady income stream, with their secondary preference being the desire to be their own boss. Interestingly students at NUI Galway most agreed with the statement that they continually came up with new ideas; their secondary preference was the desire to have a steady income stream. Hence, the desire for a steady income stream, which was ranked highly across all student groups in Partner Institutions, was ranked first in the total sample.

Table 3a Dundalk Institute of Technology

Statement	Average Rating
I want to be my own boss	1.71
I prefer a steady income stream	1.83
I like to take risks	1.92
I continually come up with new ideas	2.15
I prefer to follow others lead	2.87

Table 3b IT Sligo **IT Cork**

Statement	Average Rating	Statement	Average Rating
I prefer a steady income stream	1.69	I want to be my own boss	1.80
I want to be my own boss	2.00	I prefer a steady income stream	1.86
I like to take risks	2.18	I continually come up with new ideas	1.93
I continually come up with new ideas	2.39	I like to take risks	2.00
I prefer to follow others lead	2.54	I prefer to follow others lead	3.07

Table 3c IT Blanchardstown NUI Galway

Statement	Average Rating	Statement	Average Rating
I want to be my own boss	1.71	I continually come up with new ideas	1.79
I prefer a steady income stream	1.83	I prefer a steady income stream	1.81
I continually come up with new ideas	2.02	I like to take risks	1.87
I like to take risks	2.07	I want to be my own boss	1.9
I prefer to follow others lead	2.93	I prefer to follow others lead	2.97

Students were then asked to indicate their interest in starting their own business at some point in the future. On average, seventy-eight percent (78%) of students surveyed expressed an interest in starting their own business in the future. Figure 5 provides a breakdown of responses across Partner Institutions and shows the 'fit' of the collated result.

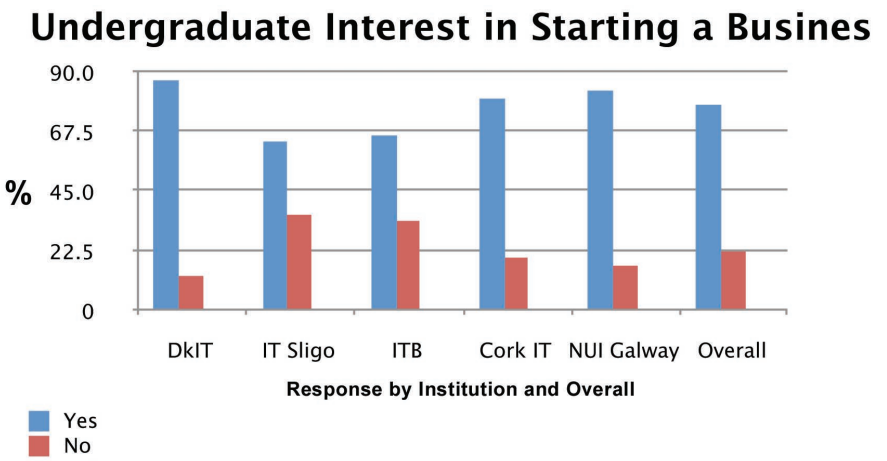

Figure 5 Undergraduate Interest in Starting a business by Partner Institution

Analysis of the data by Partner Institution shows that DkIT students were most interested in starting their own business at some point in the future, with students in IT Sligo being least interested in new venture creation at the time of the survey.

It must be noted however that the DKIT students were predominantly male (99.98%) engineering students whereas the IT Sligo students surveyed were entirely female undertaking Early Childhood Care and Education. The extant literature outlines a gender differential in relation to entrepreneurial activity and approach to risk which may explain this difference (Allen et al., 2008; Carter, Anderson and Shaw, 2001), however, it could also stem from a combination of gender and the entrepreneurial opportunities perceived in their field of study. It would seem from the survey findings that there is certainly a gender differential in relation to desire to secure a steady income stream and the willingness to become self-employed. There does not however appear to be a strong geographical influence on entrepreneurial interest.

The data would suggest that the collated responses represent a good fit for responses obtained from each individual site and may, therefore, be considered to be suitably representative of the first-year undergraduate population in non-business disciplines across the HEIs.

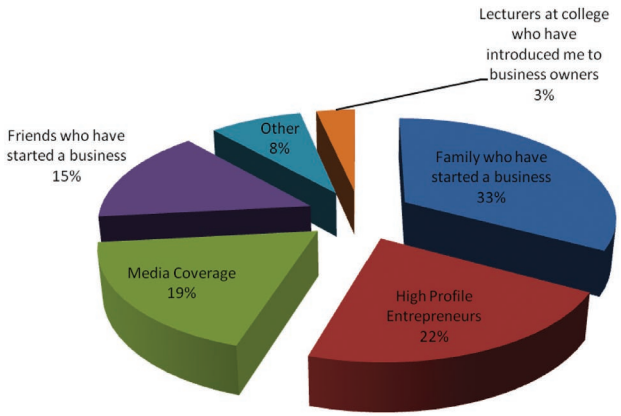

Figure 6 Influences on Students' Entrepreneurial Interest

It is apparent from the undergraduate survey that those students interested in starting their own business at some point the future, are most significantly influenced by family members who have started a business and high profile entrepreneurs, covered predominantly in the media and educational case studies. Figure 7 provides a breakdown of responses across Partner Institutions.

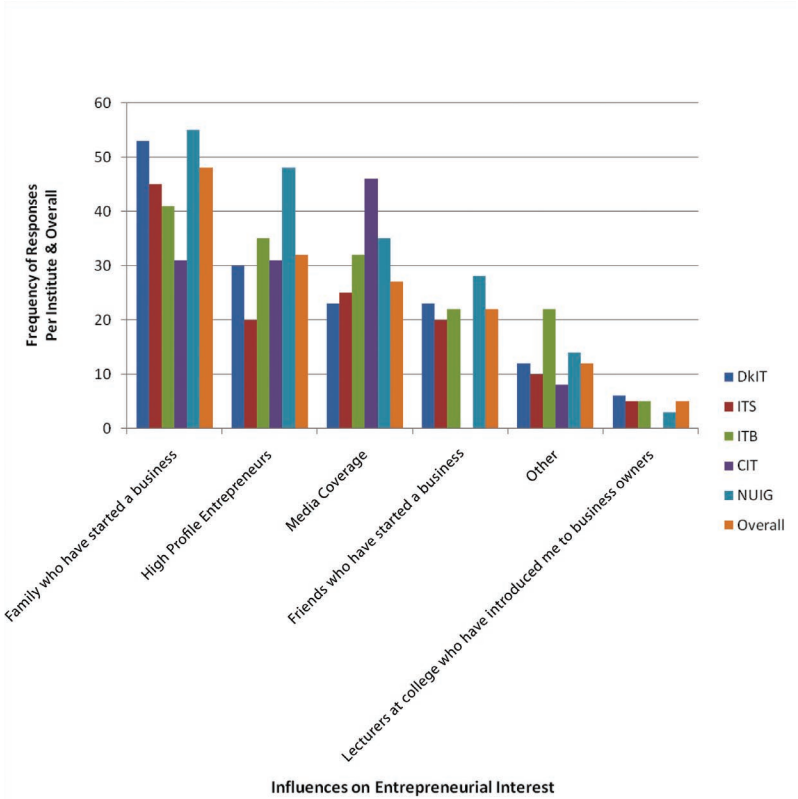

Figure 7 Key Influences on Undergraduates' Entrepreneurial Interest by Partner Institution

Respondents were then asked to identify their motivations, for wanting to start their own business in the future. In order to identify the range of motivating factors at interplay, respondents were not asked to rank their responses but could freely identify as many motivational factors as applied. The following pie-chart highlights responses from the entire student sample.

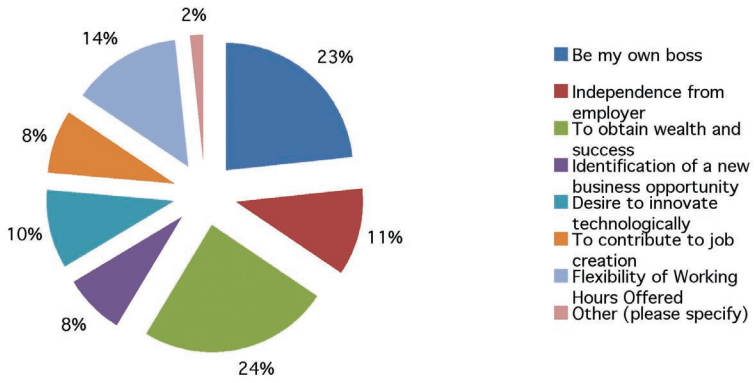

Figure 8 Undergraduate Students' Entrepreneurial Motivation

There was some slight variation within Partner Institutions to this question; for example, students in IT Blanchardstown were most motivated by being their own boss, whilst Cork IT students sought the flexibility of working hours offered. However, students in these Institutions responded in similar proportions to the majority of students across the remaining Partner sites, that a key motivational factor was to obtain wealth and success (see Table 4 below). Given the reported influence of high-profile entrepreneurs (who tend to be the most successful entrepreneurs in terms of wealth creation e.g. Richard Branson, Bill Gates), it would seem that the media has created a positive image of entrepreneurs but, on a cautionary note, may also have created unrealistic expectations of new venture creation amongst young people.

Table 4 Entrepreneurial Motivations

Motivation for wanting to be an Entrepreneur	DkIT	ITS	ITB	CIT	NUIG	Overall
Be my own boss	55	46	**61**	46	52	54
Independence from employer	18	23	37	23	48	26
To obtain wealth and success	57	55	55	54	**59**	56
Identification of a new business opportunity	17	9	29	0	24	18
Desire to innovate technologically	18	0	40	31	52	23
To contribute to job creation	15	32	26	15	24	19
Flexibility of Working Hours Offered	26	46	34	**62**	41	32
Other (please specify)	4	9	5	0	3	4

Students were asked to rank in order the characteristics they considered most important for an entrepreneur to possess. The consensus was that an entrepreneur needed to be:

- Self-confident
- Determined
- Hard working/energetic
- A good communicator
- Creative/Innovative

Students were asked if they thought entrepreneurship/enterprise development education should be an important element of their course. Overall 72% of first-year, non-business undergraduate students considered that entrepreneurship education should be incorporated within their programme of study.

Table 5 Undergraduate Opinion on Inclusion of Entrepreneurship Education within Curriculum

Should entrepreneurship/ enterprise development be an important part of your course?	DkIT	ITS	ITB	CIT	NUIG	Overall
Yes	81	75	54	71	71	**72**
No	19	25	46	29	29	**28**

Undergraduate students were then asked to identify the skills and knowledge areas they considered important to be included in an entrepreneurship education programme. The key skills and areas identified were, in rank order:

- Creativity and Innovation
- Communication Skills
- Opportunity Identification
- Developing a Business plan
- Assessing the risks/benefits of self-employment
- Selling an Idea and Finding Customers

The skills and knowledge valued least by first-year undergraduates were:

- Human Resource Management
- Dealing with Business Failure
- Personal development
- The role of Intrapreneurship
- Regulatory/Legal requirements.

The responses would tend to suggest a high degree of optimism amongst the student grouping in relation to the potential success of a new venture. The survey also sought to assess student awareness of current networking supports and initiatives, on campus, for students interested in entrepreneurship. The responses reflected a low level of awareness of such initiatives and supports as evidenced in Table 6.

Table 6 Undergraduate Awareness of On-Campus Networking Supports

Are there any Networking opportunities provided on campus for students interested in starting a business?	DkIT	ITS	ITB	CIT	NUIG	Overall %
Yes	10	4	6	0	3	7
No	15	7	6	14	18	13
Unsure	75	89	88	86	79	80

Students were then asked if, in their opinion, their Institution was sufficiently engaged in raising student awareness of entrepreneurship as a potential career option. There was some variation in the extent of responses across different Institutions (see Table 7), which is perhaps to be expected given different levels of activity undertaken at each site, however, the majority of students in all sites did not think their Institution sufficiently promoted entrepreneurship as a career option.

Table 7 Promoting Entrepreneurship as a Career Option

Does your College do enough to create awareness of entrepreneurship as a potential career option?	DkIT	ITS	ITB	CIT	NUIG	Overall %
Yes	44	28	35	14	18	36
No	56	72	65	86	82	64

These findings suggest that, in the main, the HEIs in Ireland must promote entrepreneurship as a career option and provide entrepreneurship experiences to undergraduates, if the goal of creating the entrepreneurial graduate is to be achieved.

3.4 Postgraduate Survey Findings

As early as 2003, Forfás, advocated that postgraduate and doctoral training programmes in Ireland should include courses on research management/administration, technology transfer and entrepreneurship, as well as exposure to the processes involved in making "mind-shift" required in the transition from laboratory research to commercial developments that take advantage of market opportunities (Downey, 2003). This research study surveyed 44 postgraduate students, 34 of which were from non-business disciplines. The postgraduates were asked 27 questions to ascertain general interest surrounding, and potential for, knowledge transfer from their research. More specifically, non-business students were questioned about the likelihood that they would engage in either commercialisation of research or new venture creation within campus-incubation facilities, to explore the entrepreneurship education and training they received and to establish the interplay of incentives, supports and/or barriers to commercialisation and entrepreneurship under current HEI structures.

The postgraduate students were surveyed across the five HEI partners in the ACE Initiative, with students undertaking both taught and research programmes, as listed in Table 8.

Table 8 Participating HEIs for Postgraduate Survey

Participating Institution	Response Frequency (%)
Dundalk IT	23%
IT Sligo	14%
Blanchardstown IT	25%
Cork IT	20%
NUI Galway	18%

Forty-seven percent (47%) of the entire group of students reported a strong desire to engage in knowledge transfer and find an application for their work in society generally; a similar proportion (46%) of the overall group of respondents indicated they were actively developing ideas for commercialisation.

When the subsample of non-business postgraduates was analysed, it was apparent that non-business, postgraduate students comprised the majority of students with a strong interest in engaging in knowledge transfer and commercialisation. Given however, that 68% of postgraduate students from non-business disciplines saw opportunities for the commercial exploitation of their research, it is perhaps a cause for concern that only 42% of this group have a strong desire to actually commercialise their work.

This survey revealed that 59% of postgraduates had no knowledge of their Institution's IP policy. It was reported that 79% of respondents either had no knowledge (50%) or were only vaguely familiar (29%) with enterprise development and commercialisation supports within their Institution. Seventy-three percent of this group had received no training or advice in relation to intellectual property or its implications for their research; a further 9% identified training provision in relation to copyright infringement and plagiarism only.

Sixty-four percent (64%) of the group of non-business postgraduate students had received no training in relation to developing a business plan or preparing a funding application. Only two students had received any information in relation to the technology transfer process within their Institution. The issue of lack of student awareness must be overcome, possibly through communication to students about the supports available and their potential applicability to their own research via a formal induction programme.

The academic literature highlights the importance and benefits of networking throughout the entrepreneurial process (Chell and Baines, 2000); postgraduate students were therefore questioned about their interest in networking with different groups and the extent to which their HEI facilitated such networking. This revealed that:

- Only 14% of Institutions offer postgraduate students formal engagement opportunities with Enterprise Ireland.

- The HEIs do not tend to seek to facilitate linkages between postgraduate students and potential customers for their research outputs but were more likely to facilitate linkages with potential suppliers (4% as opposed to 12%).
- Legal advice is rarely provided to students (only in 2 reported cases).
- Whilst it might be expected that the HEIs would provide linkages between postgraduate students and other researchers in their field, this was only reported in 19% of cases.

In addition, 34% of non-business, postgraduate students indicated a strong interest in working within multidisciplinary teams to assist them with commercialising their research e.g. working with MBA or other business school students. This would not appear to be a common feature within the HEIs in Ireland; however, some enterprise competitions and activities within some Institutions do facilitate multi-disciplinary teams for the purposes of the competitions or activities which may facilitate this assistance on an informal basis.

A key barrier to successful commercialisation identified by eighty-two percent of students (82%) was lack of finance. Given the current recessionary climate, it is likely that access to finance will be a more significant barrier than for previous cadres of students.

It would appear that currently the HEIs in Ireland are not encouraging the exploitation of research with commercial potential, nor are they equipping postgraduates with the skills, knowledge, capabilities and contacts to facilitate entrepreneurial graduates in commercialising their work or engage in the new venture creation process. The findings of this study support existing research findings that poor dissemination and understanding of IP policy by postgraduate student researchers is a barrier to commercialisation (Freeman and Barron, 2007); however access to finance may prove a greater challenge in the current climate.

Thirty percent (30%) of non-business, postgraduates surveyed in this study reported being interested in starting their own business at some point later in their career, whilst 39% are interested in setting up their own business through their college infrastructure. Given the reported lack of student enquiries and start-ups within campus incubators, it would appear that lack of communication and visibility of entrepreneurial supports, compounded by a lack of entrepreneurial education and training, is stifling potentially entrepreneurial graduates in Ireland.

3.5 The Enterprise Survey

As part of the study, 33 enterprises were surveyed to provide indicative data as to expectations of graduates and how academic-enterprise linkages could be beneficially developed. The enterprises surveyed came from the following broad industry areas:

Manufacturing	24%
Service	42%
Knowledge-intensive industries (e.g. high-tech)	28%
Social enterprises	6%

The enterprises ranged in size from one-person through to organisations with 5,000 employees. Respondents were asked to rank the skills required by graduates in order to develop their business; the three highest ranked skills were:

- Communication skills
- Innovative and creative thinking
- Problem solving skills

Interestingly, comparing these responses with the undergraduate survey findings (section 3.3.1) shows that students seem to be quite aware of the skills required and valued in the marketplace; both students and entrepreneurs considered communication skills and innovation and creativity as being the two most significant skills and abilities.

The skills and attributes ranked most lowly by respondents were team-working and risk-taking. Respondents were also asked to evaluate ways in which they considered that enterprise could engage with HE providers in order to promote the entrepreneurial development of students. The most highly ranked responses were:

- Real-life projects
- Venture simulation/mini-company experiences

- Student work placements
- Guest lectures
- Company visits.

This tends to suggest that current entrepreneurs value experiential learning that would enable the student to experience the entrepreneurial process; respondents were least inclined to get involved to provide case-study material. Whilst this may be due to concerns surrounding the release of sensitive information, this is a response which should be further explored as it may reflect a lower regard for case-study teaching, which has been shown to be the second most widely-used approach in entrepreneurship teaching in Ireland. It must be remembered however, that case studies can also serve the purpose of providing identifiable role-models to students.

Section 4
International Good Practice Exemplars

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International Good Practice Exemplars

The recent 'Survey of Entrepreneurship in Higher Education in Europe' by the European Commission 2008*b* identified forty–five examples of good practice in entrepreneurship education within Europe. These 'good practice' cases were examined and a shortlist compiled, based on factors such as: extent of entrepreneurial activity at different levels and across different disciplines; willingness of exemplars to host a site visit by members of the research team and associated financial costs. Site visits were then undertaken to three of these European good practice programmes; those being:

4.1 Northern Ireland Centre for Entrepreneurship (NICENT)

4.2 University of Satakunta, Finland (Member of the FINPIN Network)

4.3 National Council for Graduate Entrepreneurship, UK (NCGE)

To inform this research, a standard analytical framework was employed during each site visit, to establish:

- The nature, extent and development of enterprise education and activity within the institute.
- The approaches and models employed to embed entrepreneurship education within non-business disciplines and identification of the organisational and cultural influencing factors.
- The nature and level of academic engagement.
- The methods and resources used to deliver entrepreneurship education within these entrepreneurship programmes.
- Monitoring and evaluation of their entrepreneurship education programmes to 'measure success'.

This section of the report outlines the activities undertaken at each good practice site. In addition, Section 4.4 explores 'Entrepreneurship Education Delivery Models' from a conceptual and implementation perspective. US models of entrepreneurship education delivery are explored as are findings from a UK study exploring the implementation approaches employed within the HEIs. Given the analysis undertaken at an Institutional level by the HEIs participating in this project, this research facilitates local benchmarking and strategy development; in addition, this activity has informed evaluation of the transferability of differing approaches within the HEIs in Ireland.

4.1 Northern Ireland Centre for Entrepreneurship (NICENT)

NICENT was established as a result of a competitive bid made to the Science Enterprise Challenge (SEC) initiative in 1999. It is a partnership between the University of Ulster (UU) and Queen's University Belfast (QUB), Northern Ireland's two Universities. The primary aim of NICENT is to drive, promote and support entrepreneurship in Higher Education in Northern Ireland. Two delegates from the Research Committee undertook site visits to NICENT and met key NICENT staff at both Universities.

The NICENT Initiative was influenced by the US model of entrepreneurship education which has generated many spin-outs. At both UU and QUB entrepreneurship teaching is delivered at undergraduate and postgraduate levels.

4.1.1 Approaches to Delivering Entrepreneurship Education

The Partner Institutions agreed that entrepreneurship had to be migrated out of the business school if entrepreneurship education was to be truly integrated and embedded within course design in the various non-business disciplines. The NICENT Partner Institutions adopted an appropriate institutional approach to embedding entrepreneurship education which was somewhat dictated by organisational culture and structure. At QUB and UU the focus has been one of engaging within the current curriculum and where possible entrepreneurship was extended beyond a few timetabled sessions and offered the students the opportunity to study full modules in entrepreneurship. At UU (the lead partner), full online modules in entrepreneurship were also developed to cope with demand across four geographically dispersed campuses.

At QUB, entrepreneurship is embedded within many undergraduate degree pathways but usually not until the second year of study. Typically, one third of a module in a programme is given over to entrepreneurship content or activities within the science, engineering and technology disciplines. The focus has been to integrate entrepreneurship into existing modules and to enhance staff capability for delivering entrepreneurship education – as a means of ensuring multi-disciplinary staff are involved which should ensure longer term sustainability for the entrepreneurship agenda. There is a need therefore to source staff from non-business disciplines in delivering entrepreneurship within their discipline. The NICENT Teaching Fellow at QUB initially delivers this part of the module for one year, as a way of internally 'training the trainer', with the objective of handing over complete control to the module lecturer in year two. The Centre, over time, sought to create a critical mass of academics skilled in the delivery of entrepreneurship education which reduces dependency on the NICENT resources.

Reducing dependency on NICENT resources was a key objective of the roll out of the work of the Centre because the Centre received external funding (also from Invest Northern Ireland) and staffing resources were limited. At QUB the agenda was driven by three full-time academics and one extra-curricular officer, supported by a student intern.

According to the information given as part of this research the key factors to embedding entrepreneurship education at QUB were identified as:

- Entrepreneurship education needs to be customised and meaningful to the cohort/discipline (for example biomedical, nursing and computer science) and it needs to be practical or action-oriented where students engage in credit-bearing activities.
- From an academic perspective, appropriate pedagogies are essential to delivering entrepreneurship education. There is an emphasis on the importance of reflective assignments, rather than creating a 'business plan competition' scenario, a reflective business plan can form part of the student's application. For example students are assessed on their undertaking of a networking event (how they perform in relation to preparation, delivery and follow up after the event), where they maintain a reflective diary which captures learning activity.

At UU (the lead partner), entrepreneurship education is also embedded in a wide spread of undergraduate degree pathways within the science, technology and engineering disciplines; entrepreneurship is a core module of study in over 200 programmes offered in each academic year. In addition entrepreneurship is also embedded in postgraduate taught programmes and in research training for all those studying for the Masters by research and for all doctoral students.

At undergraduate level, given the high demand for entrepreneurship education at all four campuses, NICENT at UU has relied on innovative delivery methods and the use of new interactive learning technologies to deliver entrepreneurship materials. The centre at UU has heavily invested in the development of three online modules for entrepreneurship – two at undergraduate level in Entrepreneurship Awareness and Entrepreneurship Applied and one at postgraduate level Entrepreneurship Theory and Practice. Whilst expertise for online module development was available from within UU (in the top five for global lighthouses for online education) it was more time and cost- effective for NICENT to secure external expertise in developing online materials for entrepreneurship education.

Similar to QUB, NICENT at UU has only three academic staff members across four geographically dispersed campuses and two administrative staff at headquarters; therefore there is an onus on encouraging champion for enterprise within the particular faculties. The Centre at UU offers train the trainer programmes for delivering entrepreneurship and for e-tutoring (in conjunction with its virtual campus staff). Academics within the various disciplines become the e-tutors of the online modules where they are initially supported by both NICENT academic staff and the virtual campus at the university – technical support. The interviewees were keen to point out that the role of lecturer greatly differs from that of the e-tutor. The e-tutor is more likely to act as a facilitator, managing the student experience in terms of access to the module, interpreting of the e-content and interaction within the e-learning environment. In the e-module set-up there is a provision for face-to-face tutorials to further enhance the e-learning experience. E-tutors are also given ownership of the e-content and can upload additional discipline-specific materials (e.g. relevant case studies) and manage the course as they see fit in terms of assessment strategies. The e-module is designed to be assessed fully online thereby encouraging self-directed learning, peer learning and reflective learning.

For UU, the success of piloting entrepreneurship education through online interactive technologies has been rewarded. For instance there has been increased uptake of entrepreneurship modules of study and NICENT at UU has been named as an exemplar by Higher Level Learning for its e-learning activity. However, the process of engaging staff has not been straight forward. The interviewees indicated that the main challenges were:

- Engaging appropriate key champions in each faculty.
- Encouraging staff to undertake the mandatory module as part of their programme.
- Encouraging staff to undertake the elective modules as part of their programme.
- Scheduling 'train the trainer' programmes at the various campuses.
- Financial resourcing for sustaining entrepreneurship activity given increased demand and turnover in staff champions.

At UU, NICENT also sought funding from the Higher Education Innovation Fund (HEIF) in the UK, to be able to offer academics the opportunity to travel to the US for one week of intensive training at Babson College, the recognised global leader in entrepreneurship education. In addition, NICENT at UU also appointed a number of visiting/adjunct professors to further enhance the practical-oriented offering for students and enhance linkages with industry. Involvement of industry in entrepreneurship education was thought to be valuable in changing organisational and cultural change for entrepreneurship at institutional level. QUB are currently developing a full programme in Enterprise at postgraduate level (MSc Enterprise). It is aimed at graduates who are ready to implement and commercialise a viable business idea and wish to obtain a Masters. Mentoring from successful high-growth entrepreneurs and university expertise in the commercialisation of academic research will be a vital component to the work-based learning approach in this programme.

Across the NICENT Partner Institutions, entrepreneurship teaching relies on creating awareness initially followed by application. The NICENT model relies on a wide range of teaching tools. The interviewees cited, for example, interactive learning, active learning, experiential learning, peer learning, reflective learning and project-based learning. The learning activities were dependent upon the discipline. The use of multimedia has

expanded to include podcasts and online, simulation business games. Links have been established between curricular study, extra-curricular activity and other internal and external enterprise and career development support systems. Alumni links have also given students the opportunity to learn from the enterprise experiences of recent graduates. The NICENT model rewards entrepreneurial learning with credit-bearing programmes and students who have successfully completed modules in entrepreneurship (and are eligible for graduation) will receive a Certificate in Entrepreneurship Studies from their university upon graduation as noted on the student transcript from the university examinations office.

4.1.2 Evaluating the Provision of Entrepreneurship Education

The interviewees emphasised the importance of ongoing feedback and monitoring of the provision of entrepreneurship education within their Institution. Note evaluation was necessary for the purposes of satisfying external funder requirements but it also became part of internal monitoring activity and according to the interviewees assisted in improving course content. Both staff and students were involved in evaluating the entrepreneurship modules of study at both institutions. To illustrate, the data mined from student feedback assists in course evaluations and (re)validations where the programmes are externally reviewed and examined. This also ensured entrepreneurship education (learning outcomes) was explicit within course programmes and was therefore truly embedded rather than a 'bolt-on' activity within courses. At UU data mining also provided the lead partner in NICENT with information to inform future practice of the Centre.

Regarding the impact of entrepreneurship education, the student data captures attitudinal change (self-assessed) in entrepreneurial competency before and after completion of their entrepreneurship programme. To illustrate from the NICENT tracking mechanisms at UU a recent follow-up survey of 50 postgraduates revealed that exposure to entrepreneurship education and in particular a business plan competition encouraged entrepreneurial behaviours. Over 30% of graduates (postgraduate level) had sold their ideas or licensed their IP. Conversion rates have increased over time; 2006/07 data shows five start-ups had licensing agreements in place but the 2008 cohort had all started their own business.

4.2 University of Satakunta, Finland (FINPIN Member)

The Finnish Entrepreneurship and Innovation Network for Higher Education (FINPIN), is a network of Polytechnics or Universities of Applied Science. It has been recognised by the European Commission as an example of good practice in entrepreneurship education and was deemed a Centre of Excellence by the Finnish Ministry of Education in 2006. A site visit was undertaken to the University of Satakunta, a FINPIN member to explore their twin approach which involves entrepreneurship education and an enterprise support programme called 'Enterprise Accelerator.'

Satakunta University of Applied Sciences has similar structures to those of HEIs in Ireland, providing incubation facilities and having Technology Transfer/Industrial Liaison functions to promote information and technology transfer.

4.2.1 Enterprise Accelerator programme

The Enterprise Accelerator programme has created over 150 knowledge-intensive entrepreneurs from various academic disciplines since 1996. The programme was originally designed for engineering students but has since been extended to include other disciplines such as: social and health care, business administration, communication, tourism and fine arts. To facilitate the establishment of cross-disciplinary participation, long-term commitment and ownership within the University, the management and delivery of the Enterprise Accelerator programme is rotated annually across different faculties. In addition to promoting collaboration and active participation within the organisation, the programme encourages collaboration on a regional, national and international level.

However, whilst management responsibility is compulsory within the annual rotation scheme, a passive approach has been adopted in the recruitment of multi-disciplinary academics for this initiative. Faculty members are advised of the opportunity to participate as a mentor on the programme irrespective of background and interested staff must complete a mandatory module in entrepreneurship education training. This approach was preferred as it ensured participation from those academics with a genuine interest in, and commitment to, entrepreneurial activity and the promotion of enterprise development initiatives amongst students. Two-thirds of the mentors have been recruited from the business school.

The mentors are teachers and researchers within the University. The mentor's role will vary according to the needs and requirements of the particular student; they might mentor a student through the process of developing their business idea or devising their personal study plan for professional and entrepreneurship studies. The mentoring system matches the student with the mentor on the basis of the proposed enterprise idea, with the mentor selected from the relevant discipline. The rationale being that the fundamental tools of enterprise creation are provided within the relevant technical context.

The University has an annual budget of €34 million. They have been awarded €700K for their Enterprise Accelerator Programme from the Ministry of Education. Since 1996, they have self-funded their E-Learning programme and have paid for 1500 mentor hours from 15 mentors, selected on a cross-disciplinary basis.

The practical process of embedding entrepreneurship education within all courses on the curricula was not problematic. Non-business schools could easily replace non-business modules with enterprise modules due to the structure of courses within the University.

Table 9 University of Satakunta E-Learning Programme

Stage of Programme	Credits Awarded	Detail of Content
1	3	Business Idea Development Evaluation of Business Environment Development of Business Proposal Commitment made by student and University
2	3	Development of Business Plan
3	3	Start-up Phase (student is given advice from local enterprises and information on the business start-up process.
4	3	Post Start-up Stage (After 1 Year) Evaluate Performance Build Marketing Strategy Develop a Growth and Sustainability Plan
5	3	Continuation of Stage 4

Note: *Each stage involves support from the mentor.*

Guest lectures and special entrepreneurship seminars are routine within the University of Satakunta. Efforts are also made to include alumni but no formal, structured programme of involvement or alumni tracking are in place. An e-learning programme is available to all interested students regardless of discipline; this is currently being implemented within two partner Universities in the region.

The e-learning module encourages students to generate a business idea, map out a business plan, a start-up strategy and consequently, evaluate their first year's performance before developing a plan for growth and sustainability. At this point the student must make a commitment to the University and in turn, the University commits to support the student. The details of University supports, in particular IP rights, were not fully finalised at the time of writing. Throughout this process, mentor support is available to the student as required.

4.2.2 SOTEEKKI - A Social Enterprise Education Initiative

Within the faculty of Social Services and Health Care, they tailored the Enterprise Accelerator programme to suit the needs of their students and the local community. Soteekki, is an enterprise education initiative funded on a partnership basis between the Ministry of Education in Finland (60%) and Satakunta University of Applied Sciences (40%). The primary aim is to increase the number of welfare enterprises in the University, to meet the demand for services which currently exceeds public sector delivery and private enterprise provision. A secondary aim is to provide all Social Services and Health Care students with experience in entrepreneurial activities in the hope that some may become involved in enterprise development during their studies. It proved more difficult to get students interested in this social enterprise initiative, and so, the University made participation a mandatory part of programmes for students undertaking healthcare degrees.

Mentors frequently participate in contract negotiations within the SOTEEKKI initiative, in addition to providing follow-up support throughout the development of the enterprise. One such project is a Home Help scheme which addresses a gap in provision in this area. The centre is currently developing a contact network to facilitate the identification of gaps, and therefore opportunities, for other services which can be offered by the centre.

Student Engagement

The entire student population, across all years, is surveyed at the beginning of each academic year to evaluate their interest in entrepreneurship. These studies have typically found that forty-seven percent (47%) of students are interested in entrepreneurship, with approximately forty percent (40%) of these students being from the Business faculty, a similar proportion (40%) from Engineering and the remainder (20%) being Arts or Social and Healthcare students. A passive approach is also taken to student recruitment and participation within the scheme; students are made aware of the availability of entrepreneurship education and enterprise support and they decide if they wish to actively participate.

Measuring Success

Whilst generating and supporting graduate start-ups is the primary focus (the Accelerator programme sets annual targets for new graduate start-ups), there is also an emphasis on graduates having developed an entrepreneurial mindset to ensure that those students not engaging in enterprise creation, are intrapreneurial within industry.

Senior Management Support

Winning the commitment of Senior Management for the programme has been a slow process and is an ongoing challenge. However, the recognition gained and awards from the Ministry of Education since 2004 have assisted in raising awareness amongst management of the significance of entrepreneurship education and have slowly helped to change attitudes and generate support.

4.3 National Council for Graduate Entrepreneurship (NCGE), UK.

During the 1990s, the British Government sought to increase the employability of graduates by ensuring that they left HEIs with a range of skills to enhance their employability. Within the initiatives introduced, was an aim to promote entrepreneurship as an alternative career option for graduates. As it evolved however, there was an increasing recognition that entrepreneurship did not merely equate to self-employment, but was reflective of a mindset involving individuals being creative, innovative, committed and flexible amongst other attributes and skills. As a result, the British Government has, at a strategic level, sought to foster entrepreneurship education and enterprise learning throughout the entire education system, from primary school through to higher education.

In 2004, following a review of graduate entrepreneurship in the UK which highlighted significant inadequacies in comparison to the US model (most significantly, limited and piecemeal evidence of entrepreneurship education being embedded into the curricula outside the business school and lower rates of graduate start-up), Gordon Brown founded the National Council for Graduate Entrepreneurship (NCGE). Two government departments: the Department of Innovation Universities and Skills (DIUS) and the Department for Business, Enterprise and Regulatory Reform (BERR) were responsible for the NCGE, the two main objectives of which were, to develop more graduate entrepreneurs and to produce graduates with the entrepreneurial mindset, values and skills. To fulfil these objectives, NCGE identified four target areas:

- Long-term cultural change within the Universities.
- Shape the Institutional environment for enterprise and entrepreneurship and embed good practice.
- Increase the number of businesses from graduates.
- Inform national and regional policy that affects entrepreneurship in universities.

The NCGE undertakes the following activities to fulfil objectives:

4.3.1 Targeting Student Engagement

In conjunction with Regional Development Agencies (RDAs), NCGE introduced a 'Flying Start' programme which works directly with students and graduates. The Flying Start programme comprised awareness events, called 'rallies', that seek to inspire students to give serious consideration to starting their own business. Subsequently, potential graduate entrepreneurs could participate in a twelve-month long programme focused on the practical aspects of creating and establishing a new business. These programmes enable students to access experienced support to develop their business idea and to access assistance from accountants, lawyers, enterprise support agencies, business mentors and business networks. There is also an online resource offering support and mentoring to participants, peer networking and an online marketplace to facilitate the buying and selling of products.

Since 2005, 5,500 and graduates attended the Flying Start Rallies, with a programme evaluation from 2005 reporting that approximately 50% of graduate start-ups from the programme had begun trading. To date, Flying Start has resulted in:

- 592 businesses launches
- £815,000 in seed-capital secured
- 12,000 online graduate registrations.

The Flying Start programme has also been tailored to target specific groups or sectors as required, for example, graduate engineers, social enterprises, creative industry entrepreneurs and so on. Microsoft co-sponsors a software graduate programme, whilst the Royal Society of Arts co-sponsors a programme for arts graduates. Additionally, a joint International Entrepreneurship programme is delivered in conjunction with the Kauffman Foundation for the UK's top-performing graduate entrepreneurs in science, technology, engineering and mathematics. The programme runs for six months in the UK and six months in the US and focuses on developing the students own innovative product idea and entrepreneurial internships.

4.3.2 Targeting Educators and Campus Entrepreneurship Agents

The UK review of entrepreneurship education across the University sector also highlighted the overriding focus of the "business-school" model as the primary vehicle for entrepreneurship education (Hannon, 2005). The review identified a gap between the traditional competencies and approach of UK Universities (typically, classroom pedagogies underpinned by a "business-plan" project) and the training requirements for entrepreneurs. Consequently, NCGE developed the "International Entrepreneurship Educators Programme", which aims to build the professional capability of entrepreneurship educators within the HE environment. The programme adopts an entrepreneurial ethos and participants are expected to be active co-learners along with the international faculty of experts, over the eighteen-month duration of the programme. Underpinning the programme is a wide array of well developed pedagogies based on action and experiential learning. Completion of the course can lead to an MA Entrepreneurship Education award from Coventry University and a professional qualification from the Staff and Educational Development Association (SEDA).

4.3.3 Leadership Development Programme

This programme targets senior University management staff. It raises awareness of the philosophical, strategic and practical issues surrounding best practice in bringing about the Institutional change required for entrepreneurship education. Participants' skills are developed to facilitate their ability to persuade key stakeholders in their contexts, to support enterprise education. It looks specifically at how to make Universities and Colleges more entrepreneurial as organisations and explores the environmental forces driving that change.

NCGE has defined the key characteristics of an entrepreneurial University (HEI) as:

- Strong leadership that develops entrepreneurial capacities for staff and students.
- Strong ties with the business community as stakeholders.
- The delivery of entrepreneurial outcomes that make an impact on people and organisations.
- Innovative pedagogies that inspire entrepreneurial action.
- Multidisciplinary approaches to education that mimic real-world experiences and focus on solving complex world challenges.
- A drive to promote the application of the entrepreneurial mindset.

Additionally, they have proffered an evaluation framework for programmes (Robertson 2007) which identifies learning outcome categories, such as:

- Entrepreneurial behaviour, attitude and skill development.
- Creating empathy with the entrepreneurial life-world.
- Key entrepreneurial values.
- Motivation to entrepreneurship career.
- Understanding the process and tasks of business entry.
- Generic entrepreneurship competencies.

- Key business 'how-to's'.
- Managing relationships.

The importance of Senior Management buy-in and support in embedding and delivering high quality entrepreneurship education to all graduates is apparent.

4.4 Entrepreneurship Education Delivery Models

The European Foundation for Entrepreneurship Research and Harvard Business School contend that the US model of entrepreneurship education is much more evolved than its European counterpart in every measurable metric from course availability, average funding per school for entrepreneurship activities, to the number of Chairs and research centres available (Twaalfhoven, 2000). It is understandable then perhaps, that so many of the European good practice exemplars have been informed by the US model.

There are two key structural models of entrepreneurship education identified in the literature: the magnet model and the radiant model, often referred to as the centralised or de-centralised models (Streeter et al., 2002; Streeter 2004) as outlined in Figure 9.

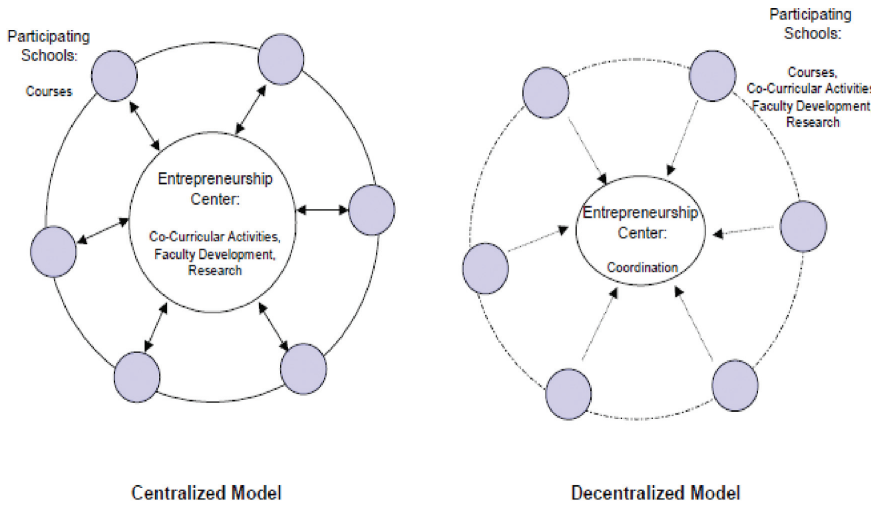

Figure 9 Structural Models for Entrepreneurship Programmes in the US

The centralised or magnet model is employed by the majority of American Universities including MIT, Babson, and Case Western. The magnet model utilises the opening up of courses to non-business students through the creation of minors or specialisations and/or the creation of joint degree programmes where entrepreneurship is taught to students through the business school.

Conversely, the decentralised or radiant model diffuses entrepreneurship education across schools and faculties. This model is employed by Cornell University and facilitates student access to entrepreneurship modules at school level.

The adoption of the radiant model approach may introduce difficulties in securing the long-term position of entrepreneurship education within the non-business curricula, in addition to co-ordination difficulties reported in the American context. The implementation of a centralised model may be more easily facilitated within the Irish context given that semesterisation and modularisation are ubiquitous in the Republic of Ireland, and that most HEIs have a central business school. However, this would also necessitate the education of Management and staff in all departments as to the benefits of entrepreneurship education, to foster management support and strategic integration. This would require the negotiation of entrepreneurship education inclusion within the curriculum on a discipline by discipline, programme-by-programme basis, should a bottom-up approach to embedding entrepreneurship education be necessary. Moreover, staff from non-business disciplines may not feel that the particular requirements of their discipline are adequately appreciated or reflected in offerings from the business school. Therefore, to maximise relevance and success, greater cross-disciplinary working would be required.

The cultural contexts are markedly different between Ireland and the US. In the US, there is a culture which celebrates and champions entrepreneurship and successful entrepreneurs; failure is socially acceptable and not stigmatised.

However, the Institutional commitment to entrepreneurship education has only been made possible in the US through the commitment and involvement of senior University leaders (President, Chancellor, Provost etc), this Senior Management engagement has been a major catalyst for success within Institutions and also, for raising significant external funding to support continued programme delivery through endowed Chairs in Entrepreneurship, for example. The necessity of Senior Management support is a recurring theme across good practice exemplars.

In the UK, enterprise within HEIs has been introduced by virtue of two distinct approaches: the bottom-up and top-down approaches (Botham and Mason, 2007:23). Their study found that several UK HEIs introduced accredited course modules or components within existing programmes as a result of individual initiatives for example, University of Nottingham and University of Sheffield. Interestingly, these initiatives were often instigated by individuals with industry, as opposed to academic, backgrounds. A top-down, strategic approach was employed at other HEIs including Coventry, Strathclyde, Sunderland and Staffordshire, that tended to have a greater tradition of 'vocational education' which is reported to have proved a 'less daunting' challenge in terms of implementation.

Regardless of the approach taken, the same two delivery models (centralised and diffused/radiant delivery mechanisms) were employed in the UK context. Centralised delivery was undertaken in either one of two ways; either being centralised within the business school or centralised within a new independent unit, such as the Hunter Centre at the University of Strathclyde in Scotland. Botham and Mason (2007: 30) outline similar centres in Leeds, Dundee, Nottingham, Portsmouth and University College London; however, they highlight that such units have tended to be self-financing and have experienced difficulty in achieving sustainability. This often resulted in either a focus on extra-curricular delivery or engagement in external, income-generating activities which sometimes led to 'less entrepreneurship-related activity'.

Decentralised delivery has also been adopted at various UK Institutions including the University of Sheffield, where a top-down approach was employed encouraging individual Departments to devise and deliver education for entrepreneurship, according to their own specific requirements. To support this, funds were made available to enable Departments to develop their own modules for inclusion within existing programmes. At Leeds Metropolitan University however, a slightly different approach was adopted with Faculty Pioneers being used to help staff from other disciplines, with typically no previous enterprise education or training, to design the courses.

In consideration of approaches and methods of implementation, Botham and Mason (2007) suggest that experimentation should continue in order to truly identify best practices, as opposed to Institutions prematurely selecting a good practice model.

Section 5
Conclusions

Section 5
Conclusions

This study, therefore, calls for entrepreneurship education that is 'fit-for-purpose' today. That is, an entrepreneurship education (*for* and *about* entrepreneurship) for all students that will not only provide theoretical knowledge but ensure graduates develop an entrepreneurial mindset, through developing entrepreneurial skills, behaviours and attitudes and equipping them with the key entrepreneurial competences to enable them to enjoy an entrepreneurial (intrapreneurial) career or engage in new venture creation. This can only be achieved through student-centred teaching and learning that employs innovative, experiential learning methodologies in conjunction with assessment mechanisms that award credit for extra-curricular and practical activities delivered by a coordinated, student-focused Institutional infrastructure.

Forty-two percent (42%) of Presidents of Irish Universities and Institutes of Technology surveyed, reported that entrepreneurship was incorporated within their written Mission Statement. A greater proportion however, 58%, report that their own Institutions have Institute-wide policies and plans in place, to assist with the development of entrepreneurial behaviours, skills, experiences and mindsets.

According to the Senior Management within the HEIs in Ireland, the main goals relating to entrepreneurship education within their Institutions was, apart from creating entrepreneurial graduates, to promote graduate start-up enterprises and to support the commercialisation of existing knowledge. Despite this finding however, our study highlighted that in seventy-five percent (75%) of Institutions surveyed, all students cannot undertake entrepreneurship education, even in cases where they may wish to do so. The perception of a widespread lack of entrepreneurship education for non-business students within the third level education sector in Ireland would seem to be well founded.

The challenges encountered in the process of translating policy into delivery related to: inflexibility in organisational structures, timetabling and education delivery formats; a lack of development resources; and limited multi-disciplinary approaches. These difficulties must be overcome however, as, in an exploratory survey of almost 300 first-year, non-business undergraduates, 72% reported that in their opinion, entrepreneurship education should be incorporated within their programme of study.

Seventy-eight percent (78%) of undergraduate students surveyed expressed an interest in starting their own business at some point in the future. These students reported that their entrepreneurial interest was most influenced by family members who had started a business (33%) followed by high-profile entrepreneurs (22%). It must be noted however, that this study was undertaken in late 2008, before the full ravages of the global recession upon the Irish economy were experienced. It is intended to survey this same student grouping in each year of their studies which will provide an opportunity to fully explore the potential impact of the recessionary experience on their entrepreneurial intent.

Undergraduate students indicated that their key motivations for new venture creation would be: obtaining wealth and success (24%) and being their own boss (23%). Students' entrepreneurial intent is reported to be most influenced by family members who have started their own business; this was closely followed by high-profile entrepreneurs and thirdly, by media coverage. The importance of ensuring that 'entrepreneurial heroes', such as Richard Branson and Bill Gates, are not the only role-models that our students are exposed to cannot be over-stated. The reasons are twofold: firstly, there is an issue of expectation management and secondly, providing role-models that students can relate to and identify with, is more likely to assist them in overcoming potential barriers surrounding self-efficacy.

Whilst there is richness of entrepreneurship and enterprise support activity at local level, there is no national framework to support the development of such activities, capture lessons from them and freely disseminate those to other HEIs. This militates against the realisation of the full potential for entrepreneurship education within the HEIs in Ireland. The predominant pedagogical tool for the provision of entrepreneurship education in continues to centre around the development of a business plan; however, it is evident from examples of international best-practice that there is significant scope for the development of innovative methodologies that incorporate extra-curricular activities.

The current lack of evaluation of entrepreneurship education offerings within the HEIs must be addressed. Effective evaluation and a climate of continuous review and improvement can only serve to enhance student learning. The challenge to extend current education about enterprise to incorporate elements of education for entrepreneurship would not be as daunting if such educational good practices were standard across all courses, programmes and Institutions. This would also facilitate the incorporation of education for entrepreneurship across curricula ensuring horizontal delivery.

Students were also highly optimistic about the success of any venture they would create and reported, overall, that their main motivation for engaging in entrepreneurship would be to obtain wealth and success. Whilst an aim of any entrepreneurial education programme is likely to be the instillation of the necessary confidence within students to engage in new venture creation, it is also important to ensure that their expectations are realistic. In this regard, it is important to ensure that high level success stories are not the only entrepreneurial role models to which students are exposed.

The staff surveyed in this research were positive about working with others in diverse disciplines to progress the entrepreneurship agenda on campus. Lessons from international good practice examples would highlight that educate within HEIs in Ireland should be provided with:

- Training in good practice teaching and assessment methods.
- Simulated, experiential learning to develop entrepreneurial skills and behaviours amongst educators, especially when there is no requirement for previous entrepreneurial experience.
- Ongoing training with the necessary supports in place to facilitate engagement in regular good practice exchange activities with colleagues nationally and internationally.

The current lack of integration of good practice entrepreneurship education across curricula militates against the HEIs in Ireland delivering on their Government defined agenda of creating the entrepreneurial graduate. This was echoed by 64% of undergraduate students who did not consider their Institution to sufficiently promote entrepreneurship as a career option.

The use of experience-based teaching methods is critical to developing these entrepreneurial skills and abilities amongst graduates. This will require entrepreneurial educators who may have had real-world or simulated experience of starting and/or operating their own business and will require the training of lecturers in new teaching methods. It is essential that educators are recognised and encouraged, and provided with the means to enhance their own teaching skills and to be entrepreneurial and innovative in developing new teaching methods and resources.

Having explored how the HEIs in Ireland could assist in creating a greater number of more highly skilled, entrepreneurial graduates; this study then sought to explore the supports provided to those graduates with entrepreneurial potential currently within the system. Unfortunately, this study highlighted that existing support infrastructures to assist entrepreneurial graduates in converting their aspirations and ideas into enterprises or commercialised knowledge, are not being sufficiently promoted in order to encourage uptake. Whilst 47% of postgraduate students are keenly interested in engaging in knowledge transfer and commercialisation:

- 59% of non-business postgraduates had no knowledge of their Institutional IP policy.
- 79% either had no knowledge or were only vaguely aware of enterprise development and commercialisation supports available.
- 73% had received no advice or training relating to IP.
- 64% had received no training assistance in developing a business plan or funding application.

It would appear that currently the HEIs are not encouraging the exploitation of research with commercial potential; nor are they equipping postgraduates with the skills, knowledge, capabilities and contacts to facilitate entrepreneurial graduates in commercialising their work or engage in the new venture creation process.

This study found that 39% of postgraduate students are interested in setting up their own business through their college infrastructure; despite this, there is a reported lack of student enquiries and start-ups within campus incubators. It would appear that our higher education Institutions are currently stifling potentially entrepreneurial graduates in Ireland due to the culmination of various factors, including: a lack of communication about, and visibility of, entrepreneurial supports and policies; a lack of coordination of the different but complementary entrepreneurship and enterprise support activities; and a lack of education and training *for* and *about* entrepreneurship. Additional resources and Senior Management commitment are required to ensure the co-ordinated and effective implementation of measures to address this scenario.

Although there are some examples where there is sufficient provision of entrepreneurial supports and training for postgraduate students, a significant gap remains nationally in the provision of access to financial information, training, information on intellectual property and the opportunity for commercialisation. While enterprise and industry are interested in engaging with academia in terms of research and practical outputs, there is a clear need for structured support and interventions that would ensure the provision of an effective collaborative model that is mutually beneficial.

There currently exists an absence of an articulated, integrated, strategic policy for entrepreneurship education, both Institutionally and nationally, that would support good practice in entrepreneurship education amongst staff and students at all levels and across all disciplines. The HEI Service Management respondents in this study have indicated that changing mindsets is a key challenge for improving entrepreneurship education at an Institutional level.

It is apparent that, in Ireland, the ability to develop and deliver high-quality, good practice education for and about entrepreneurship is significantly affected by the internal organisational structure of an Institution. In 64% of Institutions, no one person had the primary responsibility for entrepreneurship at a strategic level with entrepreneurship education relying on one, or a small number of people, within their Institution. Furthermore, the efforts of entrepreneurship champions are being eroded because of structural issues.

The need for integrating relevant enterprise activities into programmes that traditionally have had no enterprise dimension will require resources and close collaboration with existing enterprise educators, campus incubation centres and Technology Transfer officers (to share case studies and provide access to guest speakers).

Approximately two-thirds of the HEIs in Ireland do not import teaching methods with even fewer availing of a formalised national exchange of good practice in entrepreneurship education. A major challenge is to create a network and networking opportunities for academics to develop and enhance good practices based on the experiences of others.

The HEIs in Ireland face a steep learning curve in raising the standard of campus entrepreneurship education and activity. They also need to bridge the gap between academics and industry, which often results from practitioners not seeing education

provision as relevant and many time-constrained business people see limited payback for active participation in the education process. Industry engagement with tertiary education sector is neither widespread nor intensive despite initiatives to mainstream such collaboration. While private funding and active engagement with entrepreneurs in the teaching process is common within the entrepreneurial University culture of the US, this is a challenge for the HEIs in Ireland.

This will require a cultural change and, in order to bridge the gap, industry must be informed, and consulted, about changes in the academic agenda. It is increasingly recognised amongst the third-level academic community that entrepreneurship education today cannot be solely academic in nature. Entrepreneurship education today must also incorporate experiential learning, training and mentoring opportunities to ensure a student-focused education system that offers knowledge, skills and competence-building to equip graduates for entrepreneurial careers in industry as employees or business owners. This focal shift must be communicated to industry.

It would seem therefore that the key success factors for 'fit-for-purpose' entrepreneurial education today relate to:

- Policy support to ensure a strategic, integrated approach is adopted for the long-term placement of entrepreneurship education on the educational agenda and to facilitate the adequate resourcing to develop the necessary infrastructures and cultural change.
- Senior Management leadership and support in resourcing entrepreneurship education across curricula within Institutions.
- Co-ordination and promotion of activities and collaborative working between academics, researchers, enterprise support staff and technology transfer functions within Institutions. In this way, programmes of enterprise support and commercialisation assistance will be highly visible and be offered, and accredited, as part of a wider programme of entrepreneurship and enterprise education.
- Entrepreneurial Educators, entrepreneurs and business advisers providing real-world simulations and experiential learning to students to ensure that students possess the requisite theoretical and practical business knowledge, entrepreneurial skills and competences to equip them for employment and enterprise creation. This will require new methods, approaches and educational offerings for delivery to students in addition to tailored training for educators.
- New assessment methods and greater flexibility within education design and delivery systems so that extra-curricular enterprise activities can be accredited within formal learning programmes.
- Effective measurement and continual improvement of offerings to ensure quality, relevance and effectiveness.

International experience has shown that resource allocation and policy support tends to follow on from the establishment of a robust evidence base. Whilst the success of entrepreneurship education initiatives in the US and throughout Europe are proven, to date such an evidence base has not been established within the Irish context, which would, arguably, be more persuasive to national audiences. It is therefore of fundamental importance that any initiatives include effective and robust evaluation mechanisms to establish success.

In order to facilitate such effective evaluation, it is necessary to identify shared goals, aims and expectations for entrepreneurship education in order to facilitate measurement of related indices. Presidents of the HEIs in Ireland identified the goals of entrepreneurship education as being: the creation of entrepreneurial mindsets and skills amongst students, increased numbers of graduate start-ups and increased rates of commercialisation of existing knowledge. This, in turn, would suggest that an effective evaluation framework to measure success should incorporate a range of metrics, which may include:

- Visibility of entrepreneurship education within Mission Statement, policy documents and priorities of Institutions.
- Numbers of students accessing entrepreneurial education and enterprise support programmes per Institution annually.

- Numbers of courses and disciplines which incorporate entrepreneurship education within Institutional portfolio of programme offerings.
- Levels of engagement with industry; number of student placements, student projects, guest lectures.
- Training provision to entrepreneurship educators.
- Longitudinal assessments of students' entrepreneurial skills, behaviours and attitudes (this could include a combination of self-assessment and formal evaluation).
- Students' understanding of the business start-up process, an appreciation of the real-world difficulties and barriers likely to be encountered and knowledge of the supports available from various internal and external sources.
- Development of entrepreneurial competencies and business acumen and skills amongst student cohorts.
- Recording of student enquiries re: commercialisation or new venture creation by lecturers, incubation centre managers and TTO/ILOs as appropriate.
- Alumni tracking to ascertain the number of businesses established or commercialisation opportunities exploited in the longer-term.
- Economic benefits delivered to local/regional economy re: job creation, job protection, wealth creation and investment from graduate enterprises or commercialised knowledge.
- Societal benefits i.e. target groups or communities assisted through social enterprise schemes.
- Research outputs: peer reviewed journal articles, conference papers, case studies and ongoing action research and reporting.
- Teaching material development, for example case-studies, online games, e-learning lectures.
- Awards: for example, attraction of funding, increased student enrolments in more 'entrepreneurial' organisations, national/international recognition for good practice in entrepreneurship education, quality of teaching, research and/or supports.

Establishing an evidence base of the benefits of education for entrepreneurship, for both students and Institutions within the third sector in Ireland, should enhance support from Senior Management and policy makers. In the current economic climate, however, establishing entrepreneurship education on the educational and Institutional landscape is arguably more difficult than ever before; it is therefore important to assess success in a holistic manner for example also measuring impacts and outcomes for regional economies, communities and groups, in order to maximise potential funding streams.

Section 6
Recommendations

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Recommendations

The European Organisation for Economic Co-operation and Development (OECD) regards entrepreneurship education as being of fundamental importance for Ireland's economic growth. This is a view reflected by the Irish Government and the Higher Education Authority in various strategy and policy documents and funding initiatives, as discussed in Section 1 of this report. Indeed, the Expert Group on Future Skills Needs, in devising a National Skills Strategy to support the country's development to 2020, identified the need for generic skills to drive entrepreneurship and enterprise in Ireland. The skills identified map closely to the entrepreneurial skills, capabilities and competences discussed in this document.

Whilst the global recession has necessitated swift fiscal action by the Government to restore public finances, underpin the banking sector and safeguard our competitiveness in the short-term, the requirement for longer-term vision, strategy and investment to consolidate and re-build our economy is acknowledged. Indeed, this rationale underpins the Forfás, 'Sharing Our Future: Ireland 2025' review of strategic policy requirements. This document highlights the need for a longer-term framework to underpin national prosperity, reminding the reader that decisions made today, affect all our tomorrows.

Forfás contend that innovation will remain a key driver of wealth creation and economic development over the next two decades; however they assert that the term 'innovation' will not merely relate to technology but will, by necessity, include organisational and business model innovation. Fundamental to achieving this economic progress is the ability of enterprises to 'access an entrepreneurial skills base' which will only be achieved via a 'world-class education system.' (Forfás, 2009). Indeed, it is envisioned that Ireland's enterprise structure will continue to evolve with a greater mix of large and small innovation-intensive enterprises, increased lifestyle entrepreneurship and self-employment (Forfás, 2009).

It is against this backdrop that Forfás predict that higher education Institutions will compete internationally for students, with a requirement for education provision to be more responsive to the needs of individuals and the market. This will necessitate structural change, greater internal coordination and greater engagement with industry:

'Partnership between education and enterprise will also be a crucial element to ensure we continue to provide the skills needed to build a sustainable indigenous enterprise base and continue to attract and retain foreign direct investment.'

(Forfás, 2009)

The lack of a strategic, coordinated national approach to campus entrepreneurship in Ireland suggests the need for a supporting government body, similar to the National Council for Graduate Entrepreneurship (NCGE) which informs and trains educators, supports researchers, educates executive management, advises policymakers and facilitates good practice exchange and networking.

In order for the HEIs in Ireland to fulfil its objectives of delivering graduates who can create indigenous employment or deliver benefit to employers, be they indigenous or multi-national companies attracted by a highly skilled and creative labour market, change must occur. Entrepreneurship education must be made available to all students in Ireland within the higher education sector. This will require strategic vision and leadership from Senior Management within the HEIs.

In addition, entrepreneurship education should similarly be incorporated within existing courses offered on part-time, evening study basis through lifelong learning centres. In this way, Irish citizens currently within the workforce can enhance their entrepreneurial skill sets and deliver benefit to their employers in the current challenging economic climate.

This research has highlighted a number of key areas in which the higher education system can improve on current performance and exploit latent potential. Those include:

- A focus on educating *for* entrepreneurship and not solely *about* entrepreneurship; in line with the Bologna Process, teaching and learning should focus, not only on imparting knowledge but also, on assisting students to develop the necessary competences. This will necessitate a paradigmatic shift for business school academics who typically, according to Botham and Mason, (2007:13), avoided education for entrepreneurship because it is perceived to be too vocational.

- All third-level education Institutions should examine their structures and processes to examine how functions (e.g. teaching, research, enterprise support, technology transfer) can be re-engineered and better coordinated to ensure student-focused teaching and support provision. This may involve the allocation of strategic responsibility for entrepreneurship to ensure the effective co-ordination of educational development and training, research, enterprise support and knowledge transfer functions. In so doing, this could facilitate regular networking and communication between key players within Institutions.

- It is also imperative that such networking and best practice sharing occurs across Institutions in Ireland. In addition, the HEIs in Ireland must become more outward-looking and entrepreneurial in their own right, looking internationally to keep abreast of developments in the field, with the longer-term vision of establishing Ireland as a leader in the field.

- During a period of state withdrawal and restricted access to finance for the private sector, it is imperative that social entrepreneurship is incorporated within both teaching, experiential learning and enterprise support initiatives to ensure that the HEIs contribute to their social objectives.

- Commercialisation: The issue of lack of student awareness must be overcome, through communication to students about the supports available and their potential applicability to their own research via a formal induction programme. At the minimum, structured training and information sessions should be held for students annually within Institutions. In addition, greater collaboration should be undertaken between the HEIs to host on a biennial basis an event to facilitate inter-Institutional networking amongst postgraduates, industry, agencies and existing researchers. These events could be addressed by individuals from successful spin-out companies and graduate enterprises.

- A series of short graduate enterprise and commercialisation case studies highlighting small scale and large scale successes, and importantly failures, should be developed for use in HE. This would assist in enabling less confident students to identify with successful graduates and raise awareness of support mechanisms informally. In addition, it could foster greater realism and realistic goal-setting amongst over-optimistic students who may equate entrepreneurship with "high-profile" entrepreneurs.

- A standardised system of measuring the 'entrepreneurial' fitness of a HEIs would encourage Institutions to support the work of individual academics, promote multi- and inter- disciplinary efforts and inform the change and/or development of Institutional policy, culture and strategy through individualised metrics and the ability to benchmark against national and international good practice and performance.
- A 'Train the trainer' programme for entrepreneurship education should be devised to support experiential learning and teaching approaches amongst academics from all disciplines in Ireland.
- Entrepreneurship education should be incorporated within third-level teacher training programmes to ensure that future generations of teachers can incorporate entrepreneurship education within all subject areas.
- National awards for Entrepreneurship Education Excellence should be established and publicised to assist in ensuring that this is an area that is valued, to overcome the current lack of recognition and to assist in maintaining the profile of entrepreneurship education on the Institutional policy landscape.

Section 7
Implications for Future Research

Section 7
Implications for Further Research

This study has drawn attention to a variety of entrepreneurship education research areas including: the nature of entrepreneurship education, including the distinction between educating *for* and *about* entrepreneurship and the distinction between education and training; national policy and its effective implementation; Institutional models for delivery and management; entrepreneurship teaching pedagogies and methods; evaluation of effectiveness, impacts and outcomes; measurement of entrepreneurial propensity, intent and self-efficacy; and, the impact of the media on entrepreneurial activity. There is a wealth of research avenues to be explored and further developed. Within the confines of this study however, research undertaken to date has highlighted further research of benefit to this project and the HEIs in Ireland.

Further research needs to be undertaken to refine the evaluation framework set out in Section 5, it is considered that this could form the basis of an 'Entrepreneurial Fitness Check' for the HEIs that will provide a pathway for Institutional progress across a range of metrics. In order to develop this framework, various research studies could be undertaken to assist with the refinement of indicators, including:

- A longitudinal assessment of the entrepreneurial interest of the undergraduates surveyed as part of this study. This will also offer an opportunity to assess the impact of the economic downturn, and its media coverage, on entrepreneurial interest amongst this grouping in addition to refining measurement methods.
- A longitudinal, tracking study of this undergraduate group to explore how many actually start a venture or engage in self-employment or IP commercialisation or licensing activity of potential postgraduate research. This would be outside the lifetime and funding lifespan of this study. However, follow-up activity after one year, five years and so on, would provide useful data on the impacts and outcomes of the tertiary education system in relation to enterprise creation and entrepreneurial skills development. This could highlight unexpected outcomes and impacts not currently captured in the framework outlined.

- This research raises interesting questions, concepts and challenges for stakeholders in the HEIs in Ireland. In order to garner support and generate an evidence base to facilitate progress, a retrospective study is also recommended to ascertain the career destinations of students graduating in the formerly favourable economic climate without the benefit of co-ordinated or embedded entrepreneurship education.

- It is recommended that research is undertaken to establish the baseline entrepreneurial skills, competences, attitudes and aptitudes of a future group of students who will experience a greater co-ordination of entrepreneurship education and enterprise support within the third level sector. It is recognised that this educational environment may not yet exist within the HEIs in Ireland. If this study were undertaken three or five years from now however, it would provide useful comparative data across Institutions with different ranges of activities and different organisational cultures and could also be compared against findings for the other groups from each Institution i.e. graduates from three or five years ago who entered a more positive economic environment with less coordinated entrepreneurship education and the group currently under investigation. These three sets of data would not only enable an analysis of the impact of entrepreneurship education controlling for different economic climates but also, would provide longitudinal case studies regarding the embedding of entrepreneurship education within different organisational contexts and within the Irish context overall, that could benefit other organisations and countries.

- The impact of 'Train the trainer' provision to educators should be explored, not only from the perspective of the educators but also, through comparative analysis of student feedback and assessments.

- Teaching materials developed within the context of the ACE Initiative should be assessed by educators and students to enable refinement and development. This would also serve as a critical learning exercise for educators and students.

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Appendices

Appendix I: ACE Initiative

International Advisory Committee

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Dr. Matti Lahdeniemi	Vice President, Dean of Technology and Maritime Management, Satakunta University of Applied Sciences
Prof. Pauric McGowan	Director, NICENT, University of Ulster
Paula Fitzsimons	Strategy and Management Consultant, National GEM Co-Coordinator
Wendy Kennedy	President, wendykennedy.com.inc
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Tom Carson	Managing Director, Corporate and Government Solutions, BT Ireland Ltd.
Colm Piercy	CEO Digiweb Limited
Gerry Bedford	Managing Director, IOMPAR BBA Europe
Martin Cronin	CEO, Forfás
Brendan Flood	Director of Regions, Enterprise Ireland
Patrick Doherty	Regional Manager-North East, IDA Ireland
Gerry Finn	Director, Border, Midland & Western Regional Assembly
Michael Curran	Director of Service - Economic Development, Community, Enterprise and Recreation, Louth County Council
Ronan Dennedy	Chief Executive, Louth County Enterprise Board
John Reilly	CEO, Sligo County Enterprise Board
Oisin Geoghegan	CEO, Fingal County Enterprise Board
Sean O'Sullivan	CEO, South Cork County Enterprise Board
Prof. Barra O'Cinneide	Irish Australian Innovation Network

Appendix II: ACE Initiative Management and Development Committees

Management Committee Members

Irene McCausland	Project Director, Dundalk Institute of Technology
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Assumpta Harvey	Institute of Technology Blanchardstown
Doireann O'Connor	Institute of Technology Sligo
Fiona Neary	National University of Ireland
Sean MacEntee	Dundalk Institute of Technology
Colman Ledwith	Dundalk Institute of Technology
Cormac McMahon	Institute of Technology Blanchardstown
Daithi Fallon	Cork Institute of Technology
Dr. John Kane	Institute of Technology Sligo

Development Committee Members

Angela Hamouda	Lecturer, School of Business Studies, Dundalk Institute of Technology
Colman Ledwith	Lecturer, School of Engineering, Dundalk Institute of Technology
Dr Cecilia Hegarty	Regional Development Centre, Dundalk Institute of Technology
Caroline O'Reilly	Lecturer, Department of Accounting and Information Systems, Cork Institute of Technology
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Claire Quigley	Lecturer, Learning and Innovation Centre, Institute of Technology Blanchardstown
Cormac McMahon	Lecturer, Learning and Innovation Centre, Institute of Technology Blanchardstown
Maebh Coleman	National University of Ireland
Roisin McGlone	Lecturer, Institute of Technology Sligo
Cathy O'Kelly	Lecturer, Institute of Technology Sligo
Michael Walsh	Lecturer, Cork Institute of Technology
Brian Cliffe	Cork Institute of Technology

Appendix III - Participating HEIs

University College Dublin

University College Cork

Trinity College

National University of Ireland (Galway)

National University of Ireland (Maynooth)

Dublin City University

Carlow Institute of Technology

Dublin Institute of Technology

Waterford Institute of Technology

Dundalk Institute of Technology

Tallaght Institute of Technology

Blanchardstown Institute of Technology

Cork Institute of Technology

Dun Laoghaire Institute of Art, Technology and Design

Tralee Institute of Technology

Limerick Institute of Technology

Athlone Institute of Technology

Galway/Mayo Institute of Technology

Sligo Institute of Technology

Letterkenny Institute of Technology

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itb Institute of Technology Blanchardstown
Dundalk Institute of Technology
CIT Institiúid Teicneolaíochta Chorcaí Cork Institute of Technology
OÉ Gaillimh NUI Galway
NDP National Development Plan 2007 - 2013
An Roinn Oideachais agus Eolaíochta Department of Education and Science
HEA Higher Education Authority An tÚdarás um Ard-Oideachas
IT Sligo