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Entrepreneurship Education: A Systematic Review of the Evidence

Dr. Luke Pittaway and Dr. Jason Cope

Enterprise and Regional Development Unit,
Sheffield University Management School
9 Mappin Street, Sheffield, S1 4DT
Tel: 0114 222 3486
E-mail: luke.pittaway@shef.ac.uk

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ABSTRACT

The purpose of this paper is to explore different themes within entrepreneurship education via the use of a systematic literature review (SLR). Systematic literature reviews are recognised methods for conducting evidence-based policy (Tranfield et al., 2003). The particular approach to the SLR used in this study is explained and the paper explores the findings outlining a thematic framework drawn from narrative coding. The findings support the conclusion that entrepreneurship education has had an impact on student propensity and intentionality. What is unclear is the extent to which such education impacts on the level of graduate entrepreneurship or whether it enables graduates to become more effective entrepreneurs. The findings also highlight a lack of consensus on what entrepreneurship or enterprise education actually 'is' when implemented in practice. There are also many pedagogic contradictions highlighted within the review and the evidence is introduced to explore these in more depth. The study highlights major implications for policy groups interested in entrepreneurship education, such as, the National Council for Graduate Entrepreneurship and the Kaufmann Foundation. There are a number of major issues and research requirements identified in the study. These include a need to begin tracking graduate careers, a need to explore employer demand for 'enterprise' skills and to begin to understand how different models of entrepreneurship education achieve different things. The paper, therefore, makes a contribution to knowledge by reflecting on the existing evidence base in the subject and is valuable because it allows for the development of a thematic framework within the subject and helps to identify where the current evidence is lacking.

Key Words:

*education systematic literature review entrepreneurial learning
entrepreneurship education higher education*

INTRODUCTION

On the 13th September 2004 the National Council for Graduate Entrepreneurship (NCGE) was launched in the United Kingdom (UK). The NCGE was designed to develop the link between industry, students and Higher Education Institutes (HEIs) seeking to facilitate improvements in the 'enterprise culture' within UK Universities. The NCGE follows a series of initiatives in the UK that date back to the early 1980s. These initiatives have been seeking to have an impact on Higher Education in the UK and the NCGE (2004a) report which mapped graduate enterprise provision showed that in 2004:

- i) There was a strong base of graduate entrepreneurial capability in the UK with increasing resources flowing into HEIs for the purpose of promoting such education.
- ii) Although this 'landscape' was vibrant at an operational level the report concluded that HEIs could do more to develop strategic approaches for institutions as a whole.
- iii) The Department of Trade and Industry (DTI) Science Enterprise Programme (SEC) was considered to have made a major contribution to the promotion of enterprise education in HEIs. Including, having an impact on institutions that are not a part of the SEC Programme.
- iv) Awareness of existing activity within HEIs was not as high as perhaps it should be amongst key stakeholders.

The NCGE (2004a) report consequently concluded that enterprise education had made a profound impact on HEIs and that the initiatives so far had begun a 'vibrant' cultural shift. Despite the conclusions of the report many questions remained. For example, what is considered 'enterprise' or 'entrepreneurship' in the context of these initiatives? There are many educational aspects covered within the domain including: employability skills; social enterprise; self-employment; venture creation; employment in small businesses; small business management; and, the management of high-growth ventures. Inevitably, the skills and theoretical knowledge required in each domain is inter-related but exclusive and each domain may be more relevant to certain students and graduates than others. Likewise questions can be asked about 'pedagogy'. The underpinning pedagogy that constitutes 'enterprise' or 'entrepreneurship' education constitutes a range of forms (Gibb, 1996) and institutional approaches to implementation have varied considerably.

What this vibrancy and diversity in enterprise and entrepreneurship education illustrates is a requirement to move from a period of growth into a period of reflection. There is a need to begin to assess and understand more carefully what has worked and why and to begin to move from an operational implementation to a strategic one. With this in mind the second NCGE study commissioned in 2004 (2004b) aimed to explore in detail current research in entrepreneurship education to investigate the research base in order to understand the nature, forms and processes involved in graduate entrepreneurship. An extensive study (NCGE, 2004b) of prior research was carried out and it concluded that:

- i) There remains definitional and conceptual uncertainty
- ii) The evidence does not provide an indicative evidence base because it is fragmented and emergent lacking a developmental nature.

- iii) There is an improvement in the quantity of empirical research in peer reviewed journals but many of these lack clear theoretical foundations related to learning or education.
- iv) Research needs to be more evaluative and longitudinal in nature
- v) There are many unanswered questions and an inevitable time lag between the growth of entrepreneurship education in practice and the collection of robust data enabling evaluation of practice to occur.

These two NCGE studies (NCGE 2004a; NCGE 2004b) show that, on the one hand, the practice of 'enterprise' and 'entrepreneurship' education in the UK has grown considerably over the previous two decades, while on the other hand, illustrating that the extent to which it has been evaluated, and consequently the evidence-base on which policy is drawn, has been rather limited.

The rationale for this paper is set in the context of the two NCGE studies. It is designed to explore systematically the evidence base and will map out the field of entrepreneurship education thematically. The objective is designed to help provide a map and to assess in more detail current evidence in the subject area to show where further empirical evidence is needed. In the following part of the paper the systematic review methodology used for this study will be briefly explained. The paper will continue by exploring the results and explaining the thematic aspects of the review.

METHODOLOGY

The systematic literature review (SLR) methodology has been discussed in detail elsewhere (Tranfield et al., 2003; Pittaway et al., 2004; Denyer and Neely, 2004). This paper will, therefore, only briefly explain how the methodology was used in the context of this study. The basic principles of SLRs, as applied in management research, are transparency, clarity, equality and accessibility and that it is focused and unified (Thorpe et al., 2006). In this sense systematic reviews differ from traditional 'narrative' reviews. They are different because the process is reported openly in the same way that empirical research would be. They use methods for assessing the quality of the empirical evidence used and are thematic drawing from a range of disciplines via detailed search criteria within citation indexes. In this study the original methodology proposed within management research by Tranfield et al. (2003) has been changed considerably, however, the basic principles have been maintained and some 'narrative' cross-referencing has been introduced.

There were 12 stages within the review methodology and these are outlined in Table 1. In this study the review methodology began from a disciplinary stance by exploring journals listed within 'entrepreneurship' journal rankings. These journals citation indexes were searched systematically for

articles that had 'education' in the citation information, keywords and abstracts. These citations were reviewed and download into bibliographical software where they dealt with 'entrepreneurship education'.

**Table 1:
Stages of the SLR Process**

Stage	Description
Stage 1	The researchers used entrepreneurship journal rankings ^a to identify key journals in the field in rank one there were four journals ^b , in rank two there were 10 journals, in rank three there were 47 journals.
Stage 2	The citation indexes of all 61 journals from 1980-2004 were systematically searched using the root term 'education'. Relevant article citations and abstracts were downloaded into bibliographical software (Procite). At this stage there were 48 citations.
Stage 3	The bibliographical software was used to identify keywords used in the 48 citations that could be developed in search strings to conduct a wider search of citation indexes. There were 27 keywords.
Stage 4	The keywords were constructed into search strings (e.g. Entre* OR enter* AND business education OR business schools OR colleges OR Higher Education OR Universit* AND NOT information systems). There were 10 search strings identified.
Stage 5	The search strings were used to search ABI Proquest 116 further citations were found with 18 duplicates from stage 2. At the end of stage 5 there were 146 relevant papers identified.
Stage 6	The researchers took a selection of key journals from rank 1 and 2 (ERD; JBV; JSBM; SBE; ETP; ISBJ; EIMS) ^c and used a narrative approach to explore the bibliographies and each article for further relevant citations. 34 articles were reviewed, there were 60 citations identified of which 13 had not been identified in Stage 5. The narrative cross-referencing confirmed a systematic review success rate of 78.3%. At the end of this stage there were 159 citations.
Stage 7	Using the bibliographical software key authors in the field were identified ^d according to the number of relevant publications in the existing citation database. A citation search was carried out for each author cross-referencing the systematic element of the review. A further 26 citations were found indicating a systematic review success rate of 60.6%. At the end of this stage there were 185 citations.
Stage 8	The citation data from the bibliographical software was exported into narrative coding software (NVIVO). A first level thematic analysis was conducted by coding article abstracts.
Stage 9	A secondary thematic analysis was conducted by coding the output from the first order coding and more detailed themes were identified.
Stage 10	A thematic framework was developed to describe the inter-relationships between the themes.
Stage 11	Articles were ranked for quality using impact criteria
Stage 12	Articles were reviewed according to thematic focus and level of impact

a) Journals were ranked initially using the Katz and Boal Entrepreneurship Journal Rankings the initial articles were used only to develop keywords and search strings. During the wider search all journals listed in ABI Proquest were included

b) Rank 1 included Journal of Business Venturing; Entrepreneurship Theory and Practice, Small Business Economics and Entrepreneurship and Regional Development.

c) These journals were selected only to ensure a manageable workload, in this stage the citations found are being used to ensure narrative cross-referencing of the systematic element of the review.

d) Sue Birley; Amanda Collins; William Gartner; Allan Gibb; Kevin Hindle; Jerome Katz; Vanessa Knowles; Wayne Long; Harry Matlay; Ed McMullan; Martyn Robertson; Scott Shane; George Solomon; Jim Stewart; Karl Vesper.

Within the definition of entrepreneurship education the focus was principally on Higher Education rather than on educating entrepreneurs. Consequently, articles on the education of entrepreneurs were only relevant to this review where they actively discussed the role of Higher Education (see Appendices 1 and 2 for the keywords and search strings used). Once the initial citation database was developed it was further expanded via a number of systematic review stages, as outlined in Table 1 (stages 3-7). These stages also included two narrative methods for cross-referencing the systematic part of the review (as outlined in stage 6 and 7). The final database included a broad section of literature both inside and outside of the entrepreneurship discipline, including 185 academic papers from 1970-2004. The citation data and abstracts of each paper were coded twice within NVIVO, once directly via the coding of abstracts and the second time exploring 'second order' themes.

The papers were also separated into three categories (A, B, C) according to their likely impact on the specific subject, with for example the Academy of Management Journal being ranked A, the American Journal of Small Business being ranked B and the Journal of Managerial Psychology being ranked C. The three categories A, B, C were identified by using impact criteria. The impact criteria included whether the journal was listed in the Social Science Citation Index; the FT rankings; the number of subject specific articles found in the journal; the rank in the Katz and Boal ranking of entrepreneurship journals; the ranking in the JCU classification of entrepreneurship journals; and, whether or not the key recognised authors in the field had published in the journal.

In the next part of the paper we explore the thematic coding and introduce the thematic framework. In the section that follows we explain some of the detailed findings of the review.

THEMATIC ANALYSIS

The thematic analysis was carried out using NVIVO; abstracts were reviewed for each citation in detail using narrative coding. In this sense the themes emerge in a 'grounded way' from the abstracts being reviewed. This method has some recognised weaknesses (Pittaway et al., 2004), for example it is rather dependent on the quality of the written abstract, but is also useful for creating a thematic structure around which more detailed reviewing can take place. In this study there were two levels to the thematic analysis. In level one the abstracts were reviewed in detail for general themes, of which there were nine. In level two the existing coded data was reviewed for a second time drawing out secondary themes, of which there were 30. The coding of the data in each stage is highlighted in Tables 2 and 3.

**Table 2:
First Level of Thematic Coding**

Theme	Character Count	Passages Coded	% of Coded Data
Teaching Entrepreneurship (TE)	51,218	123	35.2
Management Training (MT)	26,713	56	18.4
Enterprising University (EU)	25,502	47	17.6
Student Entrepreneurship (SE)	18,595	37	12.8
Graduate Enterprise (GE)	7,812	16	5.4
Student-Entrepreneur Interactions (SEI)	5,924	16	4.1
Employment of Graduates (EG)	3,694	9	2.5
Doctoral Education (DE)	2,923	6	2.0
Analysis of Policy (AP)	2,946	10	2.0
TOTAL	145,327	320	100%

In the first level themes, as outlined in Table 2, there are four major themes that constitute 84% of the coded data. In order of importance these are articles exploring the teaching of entrepreneurship, the role of management training for entrepreneurs, the role of the enterprising university and student entrepreneurship. Themes that would appear to be surprisingly under-represented in the data, one could argue under-researched, include the employment of graduates in entrepreneurial or small businesses, graduate entrepreneurship (in the sense of actual venture creation by graduates) and the analysis of general policies promoting entrepreneurship education. Although the nature of the systematic review process may skew these results the data may indicate that some important subject areas are currently under-represented in the evidence base on entrepreneurship education.

When moving to the second level of the thematic analysis other interesting points can be highlighted (see Table 3). Areas that appear to have received some detailed attention by researchers include: management development (pedagogy); the factors affecting student's propensity to become entrepreneurs; teaching and learning pedagogy; institutional policies towards entrepreneurship education and the mapping of provision of teaching programmes in the subject. One can also highlight some areas where one would have expected more detailed research to have been carried out, which appear to have lacked the benefit of systematic study. For example, from Table 3 one might have expected more research to have focused on: the role of extra-curricula activities; the perceptions of graduates towards entrepreneurship (rather than their propensity or capability); analysis of graduate careers; employer demand for graduates with entrepreneurship education; the impact of courses on actual behaviour and future performance; and, start-up support for graduate entrepreneurs. In certain respects then the thematic output from this systematic review, exploring the evidence base, concurs with both the NCGE (2004b) study and the recent Academy of Management Learning and Education special issue on entrepreneurship education (Greene, Katz and Johannisson, 2004). There is substantial and growing study in the subject that

has started to provide a reasonable evidence base in certain areas, most typically surrounding pedagogy, but that there remain significant gaps in our understanding that need to be addressed (NCGE, 2004b).

**Table 3:
Second Level of Thematic Coding**

Theme 1 st Level	Theme 2 nd Level	Character Count	% of Coded Data
MT	Management Development	11,139	8.5
MT	Business Support	6,495	4.9
MT	Mapping Demand	3,895	3.0
MT	Career Development	859	0.7
MT	Mapping Provision	478	0.4
SE	Factors Affecting Propensity	13,802	10.5
SE	Factors Impacting Capacity	2,108	1.6
SE	Extra-curricula	2,413	1.8
SE	Raising Awareness	215	0.2
SEI	Value for the Student	2,026	1.5
SEI	Value for the Firm	1,890	1.4
SEI	Coaching	181	0.1
EG	Demand for Graduates	2,036	1.6
EG	Graduate Perceptions	696	0.5
EG	Working Conditions	714	0.5
EG	Graduate Careers	158	0.1
TE	Pedagogy	28,173	21.5
TE	Mapping Provision	7,414	5.6
TE	Role of Business Schools	5,408	4.1
TE	Role in the University	4,857	3.7
TE	Impact of Courses	1,828	1.4
TE	Impact of Different Cultures	1,581	1.2
GE	Assessing Success Factors	6,005	4.6
GE	Start-up Support for Graduates	1,171	0.9
DE	Practices	2,031	1.5
DE	Supply of Faculty	142	0.1
AP	<i>No sub-themes</i>		
EU	Institutional Policy	13,079	9.9
EU	Commercialisation	5,977	4.5
EU	Outreach Activity	3,671	2.8
EU	Academic Entrepreneurship	1,196	0.9
TOTAL		131,638	100%

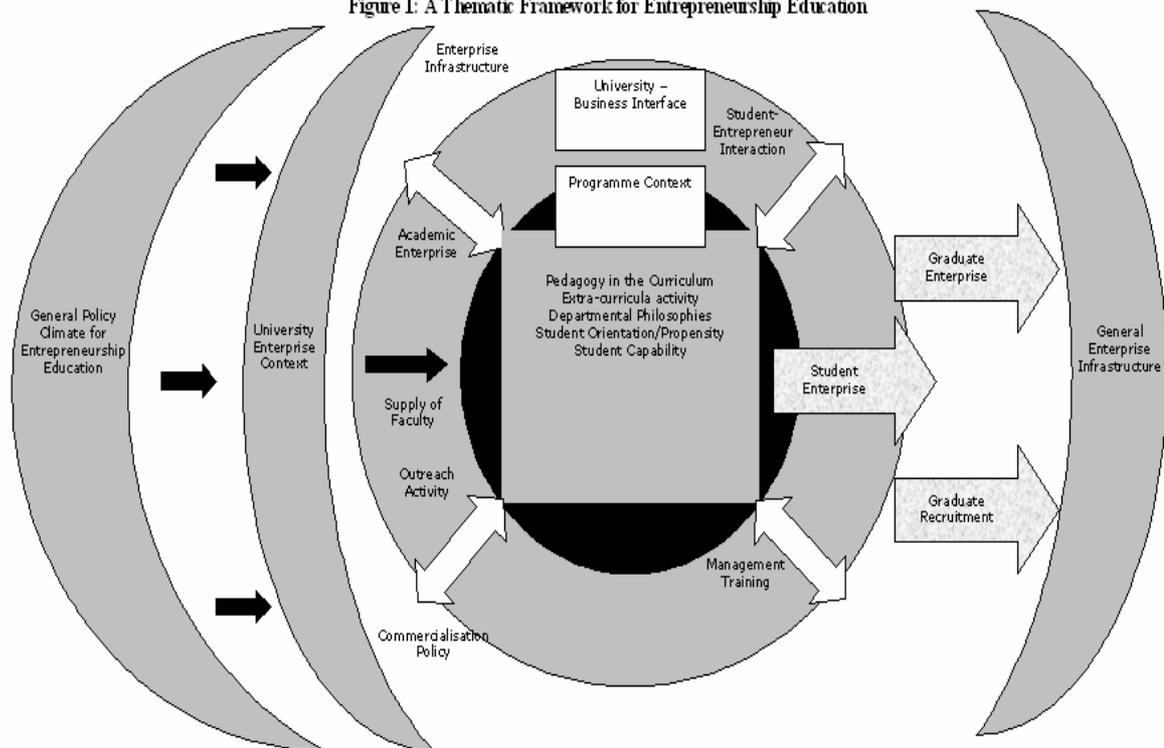
In order to highlight the inter-relationships between the themes and gaps in knowledge, highlighting an overall view of entrepreneurship education', a thematic framework was developed. The thematic framework was developed from the analysis of abstracts highlighted in Stages 8 and 9 of the review process (Table 1). The analysis conducted used NVIVO to code abstract and citation data, the categories of coded data were then linked using NVIVO's model building tool, which enabled the researcher to draw links between themes. The thematic framework presented in Figure 1 highlights conceptually key areas for empirical research in entrepreneurship education, some of these have received more attention historically than others, but all of them can be considered to have equal value in terms of providing a holistic understanding of the role of entrepreneurship education.

There are two areas which are typically the focus of policy-based research using a supra-national, national or regional (or state) level of analysis.

The first is the general policy climate for entrepreneurship education, the role of government or other quasi-government policies in promoting such education, its intended outputs when designing policies, the measures used to assess outputs and the funding mechanisms employed. This first macro-level theme can be considered a systemic input into the environment or context within which such education occurs. The second macro-level area of research is the general enterprise infrastructure and specifically its role in promoting and supporting graduate led new ventures but also its support for graduate employment, particularly in high technology firms and small and medium enterprises (SMEs). This theme within the entrepreneurship education domain can be considered a systemic output. In the sense that it provides the infrastructure and support for the occurrence of graduate enterprise and employment once 'education' is turned into 'practice'.

The thematic framework presented in Figure 1 also highlights a number of factors and themes within the institutional environment that will influence individual institution's capabilities and approaches toward entrepreneurship education. These factors have been described as the 'university enterprise context'. They include the enterprise infrastructure, the supply of faculty and the institution's commercialisation policies. These contextual factors may have an indirect bearing on the form, nature and efficacy of an individual institution's approach to entrepreneurship education. Other contextual factors, which are viewed as important in this thematic framework, are those that can be considered to exist at the interface between an institution and other organisations (particularly businesses). These themes include: academic enterprise; outreach activities; student-entrepreneur interactions; and, management development activities (especially those that bring entrepreneurs and business people into the HEI). These contextual factors can be described as the indirect inputs into entrepreneurship education.

Figure 1: A Thematic Framework for Entrepreneurship Education



The next major level of analysis identified by the thematic framework is the programme context. These themes typically explore issues and develop empirical evidence which is focused on the development of specific forms of entrepreneurship education. Several major themes exist within this level of analysis: discussions and debates over appropriate pedagogy; the role of extra-curricula activities; the extent to which departmental philosophies and student vocations influence the form and nature of entrepreneurship education; the level of student orientation and the extent to which it can be changed; and, the level of capability that students exhibit. Research within the level of the programme context can best be described as analysing the direct inputs into entrepreneurship education.

The final category of themes are those focused on 'activity' highlighted here as student enterprise, graduate enterprise and graduate employment. Although the level of analysis can come in a range of forms, for example the individual, the firms created and the activity, they have in common a focus on the direct outputs from the HEI. This category of themes, therefore, includes studies of demand for graduates, and demand for graduate skills, research on the employment of graduates by SMEs, studies exploring graduate careers, and research on the formation of graduate-led ventures. What these themes highlight is a need to understand what entrepreneurship education is trying to achieve. There are two distinct forms of output, firstly, to enhance graduate employability and secondly, to encourage graduate enterprise (which itself can be broken down into several forms e.g. self-employment, small business

management and high-technology new venture creation). As well as these specific outputs there are some more general aspirations, which link into debates about the role of Higher Education in general. For example: to develop 'better' societies; to enhance understanding; or, to facilitate innovation and new technology.

Based on these categories the thematic framework illustrates a number of pertinent points which have been used in this paper to guide the explanation of the evidence-base that follows:

- i) A holistic approach to entrepreneurship education may need to be developed that can represent to some extent multiple levels of analysis. For example, this thematic model suggests that study on pedagogy at the level of individual programmes is inherently embedded in a wider context of the institution and government policy on entrepreneurship education. Inevitably, therefore, debates about appropriate pedagogy sit within the context of what entrepreneurship education is understood to 'mean' or what entrepreneurship education 'is' or what it is trying to 'do', axioms which are themselves guided by contextual factors. It is also inevitable that these contextual factors are further influenced by the wider society and particularly its culture.
- ii) It is possible to understand entrepreneurship education systemically; in the sense of being able to identify contextual factors; inputs into a system; educational processes; and, outputs. The systemic nature of entrepreneurship education is, however, complicated by the fact that there is little clarity about what the outputs are designed to 'be' (e.g. graduate ventures; general education; business education; improved employability; enterprise skills). This lack of clarity about the intended outputs leads to significant diversity surrounding the inputs (e.g. contradictory policies; major differences over pedagogy; and, differences in institutional implementation). In this sense the idea of 'entrepreneurship education' as one thing would appear to be rather problematic suggesting further effort is required to begin the development of detailed taxonomies and typologies based on current international practice.

From this thematic analysis then it can be concluded that entrepreneurship education, as a research domain, while gathering some momentum has a great deal more to do to integrate understanding across the different levels of research endeavour and needs to be better linked into general debates on adult learning, management learning and role of Higher Education in general. In the next part of the paper the detailed evidence-base that arises from the SLR will be explored to further expand and reflect on the current status of knowledge in the subject.

RESULTS OF THE REVIEW

Following on from the thematic analysis the results of the review were broken down into the key themes outlined in the thematic framework. This part of the paper will explore the general evidence relating to these themes. The paper is developed according to the thematic structure outlined in Figure 1. Consequently, the paper will explore research on the general policy climate for entrepreneurship education; the university enterprise context including the interface between the HEI and business; the programme context; and finally the activity of graduate entrepreneurship and employability. The first part of the review will explore the general evidence in relation to the policy context.

The General Policy Context for Entrepreneurship Education:

Despite its obvious importance in terms of a country's approach to entrepreneurship (NCGE, 2004b) the role of policy and particularly policy initiatives designed to promote entrepreneurship education have not featured strongly in this SLR. This lack of representation can be interpreted in a number of ways. Firstly, the nature of the review focusing on 'education', rather than on 'policy', may well have excluded important studies. Secondly, it is possible that research exploring policy initiatives has tended to reside in evaluative reports for Government agencies rather than within academic journals. Finally, it may also be the case that there is a lack of research evaluating policies designed to promote entrepreneurship education. Either of these alternatives, or all of them, could explain the lack of representation. It can be concluded, however, that this subject is an important area of focus for a future SLR.

The studies identified in the review explore a number of US and UK policies and their impact, either directly or indirectly, on entrepreneurship education. The only study identified outside this 'Anglo-Saxon' perspective is a study undertaken by Carayannis, Evans and Hanson (2003), which focuses on the environment and cultural context for entrepreneurship education in France. Rather than exploring specific policies this study explores the general climate within which entrepreneurship education operates in France. Policy initiatives that have been explored and reviewed include: the US Perkins Vocational and Technical Act (Lewis, 2002); the US Small Business Institute programme (Solomon, 1975; Burr and Solomon, 1977); the US Bayh-Dole Act (Mowery and Sampat, 2005); the role of UK Regional Development Agencies (Robertson and Collins, 2003a); the UK Enterprise in Higher Education programme (Mortimer, 1995; Whiteley, 1995; Newby, 1998).

General conclusions from these studies illustrate a number of points about the role of policy in promoting and influencing entrepreneurship education. It is worth noting, for example, that policies that are designed for one purpose (e.g. the Bayh-Dole Act) can have an impact on entrepreneurship education indirectly, either positively or negatively (Mowery and Sampat, 2005). Studies of this nature illustrate that future reviews and empirical studies need to focus on Higher Education policies in general. Specifically, it is worth exploring how these

policies create a climate within which entrepreneurship education must operate.

Where research has examined specific policy initiatives there are a few conclusions worth highlighting. Many of the US initiatives, for example the proposed Technical Entrepreneurship Development Act (Lewis, 2002) and the Small Business Initiative programme (Solomon, 1975); have focused on the development of specialist centres in Universities. These forms of initiative have been mirrored in the UK with similar programmes, for example, the Science Enterprise Challenge programme. Many of these initiatives have been viewed to have been broadly successful, although more empirical data is required on many of them. Underpinning this success has been the value of creating institutions that can survive and prosper after funding has stopped, acting as a focal point for 'entrepreneurship education', however it is conceived by the particular programme (Lewis, 2002).

Although assessments of specific programmes do appear to have occurred (Solomon, 1975; Newby, 1998) there appears to be only limited empirical evidence. One programme that has been reviewed in some detail is the UK's Enterprise in Higher Education programme. Conclusions from the review of this programme are in some respects contradictory. The studies do show that variations in successful implementation of the programme between institutions in the UK occurred as a consequence of varied factors including: the choice of director; the university infrastructure; the support of university senior management; input from the programme's staff and the existing level of student enterprise in the institution prior to the programme (Mortimer, 1995). Whiteley's (1995) study of the programme also indicated the role of employer partnerships and self-evaluation in levels of success. Assessments of policy initiatives that do exist, although in many ways insufficient, do illustrate the role of institutional strategies, infrastructure, people and relationships, as essential factors in the diversity of implementation and levels of 'success' when introducing entrepreneurship education. It is fair to say, however, that these assessments are somewhat simplistic when analysing 'success' as this is usually understood in terms of 'success of the programme' and its objectives. Inevitably, 'success' as defined by the individual HEI may be different, for example, by using policy-led initiatives to further develop core activities of teaching and research rather than introducing 'entrepreneurship education' as a discrete activity. Consequently, the general evidence on institutional contexts will be explored next.

The University Enterprise Context:

The University Enterprise Context as conceived via this thematic framework comprises of a number of inter-related parts, which may not make a direct contribution to entrepreneurship education as an activity but which create the context within which such education is applied. The first major element is the context itself which includes; university governance and leadership (Sotirakou, 2004); its organisational culture, infrastructure, purpose

and strategy (Poole and Robertson, 2003); the specific enterprise infrastructure (Grigg, 1994); and, its approach to commercialisation of research and technology (Etzkowitz, 2003). These factors have a bearing on the nature and supply of people engaged in 'entrepreneurship education'; however it is conceived by the institution, and on the form and nature of such education. The second major element is the existing university-business interface, which includes: the level of activity and culture supporting academic entrepreneurship; existing relationships between the HEI and businesses; the interaction between students and businesses; and, the role and nature of management development, or enterprise development, education within the institution.

There is a range of study exploring how HEIs can themselves act in 'entrepreneurial' ways (Grigg, 1994; Poole and Robertson, 2003) others argue that universities are already entrepreneurial institutions (Conceicao and Heitor, 2002). Such discussions link into more general discussions about the nature of Higher Education and tend to explore issues of university governance, leadership and administration. There are also studies that liken the academic endeavour to 'entrepreneurship' (Krebs, 1985; Chia, 1996; Etzkowitz, 2003), which argue that HEIs are at the forefront of innovation and, therefore, should both act 'entrepreneurially' and encourage others to do so. Such studies tend to be argumentative in nature, while valuable in their own right; in most cases they do not provide any empirical justification for the particular viewpoint. As Jacob, Lundqvist and Hellsmark (2003) point out when they explored changes within Chalmers University of Technology, policies designed at transforming universities into 'entrepreneurial institutions' can take a long time to implement and can create uncertainty around the role of HEIs in society. Despite the detailed debates that are illustrated above most empirical studies are focused on individual institutions (McBrierty and O'Neill, 1991; Tate, 1993; Jacob et al., 2003; Jackson and Audretsch, 2004). While this is not a criticism by itself, there does appear to be a need for more cross-institutional studies and for a SLR which draws together conclusions from studies of individual institutions.

When exploring commercialisation strategies, outreach and academic entrepreneurship there is inevitably significant existing research and a good evidence base (McMullan, Long and Graham, 1986; Zhao, 1994; Grady and Pratt, 2000; Smailes, Cooper and Keogh, 2002; Menzies, 2004; Shane, 2004). What is evident from this SLR, however, is that this evidence tends to sit in isolation of the role of these factors in promoting and creating a context within which 'entrepreneurship education' occurs. One can conclude from the thematic framework outlined that these are important contextual factors. It is also worth noting, however, that 'entrepreneurship education' provides a means through which institutional culture can shift, enabling a more appropriate environment within which commercialisation and academic entrepreneurship can occur (Jacob et al., 2003). The relationship is two-way, and therefore, more empirical research is required that explores the link between the two. One study

that does explore this link is Stephan's (2001) study of the educational implications of technology transfer, unfortunately this focuses on the impact on general education rather than entrepreneurship education. Consequently, it does not provide empirical evidence that is specifically relevant to this SLR.

Like the extensive empirical base on university commercialisation there is a considerable body of work on 'the education of entrepreneurs' or 'management training' as it relates to SME owner-managers (Larson, 1974; Birley and Gibb, 1984; Dyer, 1994; Raffo et al., 2000; Ibrahaim and Soufani, 2002). Although this body of work is not directly relevant to 'entrepreneurship education' as defined in this paper, activities of this nature within HEIs do provide an environmental context within which 'student entrepreneurship education' occurs. Likewise concepts of learning and training derived from these sources and consequent pedagogic developments can flow between the two forms of entrepreneurship education (Gorman, Hanlon and King, 1997). Study in this area has a number of types including: work on career development and enhancement (Dyer, 1994); the mapping of demand for training (Matlay, 1999); the role of business support (Gibb, 1983; 1984; Carson, 1985; Gibb, 1990; Gibb, 2002); the mapping of provision (Birley and Gibb, 1984); and, pedagogy in management development education (Parsons and Kurtz, 1970; Solomon and Carhart, 1982; Dart and Pendleton, 1984; Gibb, 1987; Chan and Anderson, 1994; Gibb, 1999; Jack and Anderson, 1999; Thornberry, 2003).

Career development theory, as outlined in a number of studies, has the potential to be useful in both tracking the impact of 'management development education' on entrepreneurs and for tracking and understanding graduate entrepreneurship over time (Dyer, 1994; Katz, 1994; NCGE 2004b). The theoretical contributions made by Dyer (1994) and Katz (1994) have received relatively little attention empirically in the field and there is little doubt that wider studies on graduate careers generally would contribute to conceptual and empirical studies in this area. Analysing career development of graduate entrepreneurship both historically and longitudinally would, therefore, present itself as a relatively productive area for future research endeavour.

The mapping of demand and provision of training programmes, due to its specific focus on 'management training', offers little to assist understanding in student entrepreneurship education. There are, however, some interesting methodological developments in this form of study that may be useful when tracking the supply and demand of student entrepreneurship education across HEIs in particular national contexts (Birley and Gibb, 1984; Matlay, 2001). Likewise there is potential for cross-fertilization of methodologies from the student entrepreneurship education domain into the management training domain (Katz, 1991; Solomon and Fernald, 1991; Dana, 1992; Solomon and Weaver, 1994; Vesper and Gartner, 1997; Katz, 2003).

The final contextual factors which impact on entrepreneurship education are relationships, specifically interactions between students and entrepreneurs. These can be viewed as both a direct and indirect contributor to education

depending on their form and nature within an institutional context (Brindley and Ritchie, 2000). The evidence base in this area tends to focus on specific activities, for example: e-mentoring (Ridder and Van der Sijde, 2003); student consulting projects with small firms (Hollingsworth, Klatt and Zimmerer, 1974; Sonfield, 1981; Holoviak and Ackelsberg, 1983; Chan and Anderson, 1994; Brindley and Ritchie, 2000); and, internships and placements (Kirby, 1998; Westhead, Storey and Martin, 2000). The evidence base shows a number of benefits of these forms of activity.

- i) They provide a mechanism through which student awareness of entrepreneurship can be raised (Ridder and Van der Sijde, 2003).
- ii) Students can provide an important resource-base for local firms, enabling growth and improved business performance (Hollingsworth, Klatt and Zimmerer, 1974; Sonfield, 1981; Wayne and Ohtani, 1988).
- iii) These forms of activity allow both participants to benefit via engagement in problems, enabling experiential learning to occur (Carson, 1985; Chan and Anderson, 1994; Wani, Garg and Sharma, 2004).
- iv) Changes of perception for both students, in terms of working in small firms or graduate entrepreneurship, and for business owners, in terms of employing graduates (Brindley and Ritchie, 2000; Westhead et al., 2000).

This area of empirical research begins to show that entrepreneurship education can have an impact on the awareness and perceptions of students, where it engages them with 'real-life' opportunities to learn and involves them in experiential forms of learning. While the evidence supports the idea of raised awareness and changed perceptions it does not show that these changes lead to 'action' nor does it explore future decisions to pursue an entrepreneurial career. This stream of research, therefore, does not provide conclusive evidence that 'success' in being entrepreneurial increases as a consequence of engagement with practice. For example, Westhead et al. (2000) found no evidence that the Shell Technology Enterprise Programme (STEP) led to better employment prospects (between an involved group of students and a control group). The only shift in any of the studies was focused on 'perception toward' rather 'ability in' and this aspect of the evidence base will be explored in more detail in the next part of the paper.

The Programme Context:

The previous areas of research have typically focused on contextual factors within which student entrepreneurship education occurs. In this part of the paper the review is expanded to cover the general evidence within the programme context.

Table 4
Sample of the Evidence on Student Intentionality and Propensity

Authors	Data used in the study	Date	Location of Study	Summary
Wang and Wong	Survey covering undergraduate technical fields from the National University of Singapore – sample of 5326 students	2004	Singapore	Paper examines what determines the attitudes of undergraduate students to entrepreneurship. Three background factors were found to have an impact, gender, family experience with business and educational level. Inadequate business knowledge was found to present a key barrier to students in engineering and science who were interested in entrepreneurial activity. Used a multivariate regression model to explore seven hypotheses using hierarchical regression. The paper found that undergraduate entrepreneurial interests are high mirroring Western countries but preparedness to take risk and lack of business knowledge were found to be key barriers.
Luthje and Franke	Survey of 512 students of MIT School of Engineering	2003	United States	The study uses a covariance structure model to test and identify the causes of entrepreneurial intent among engineering students. The study shows that personality traits have a strong impact on the attitude to self-employment and are linked to intentions to start a new venture. Entrepreneurial intent was also viewed to be directly affected by perceived barriers and support factors.
DeMartino and Barbato	Survey of 1763 alumni graduating from a US Business School (after 1978)	2003	United States	The paper explores motivational differences between female and male MBA entrepreneurs. Logistic regression is used to measure the relationship between career motivators and gender. Several differences were found, women entrepreneurs preferred a career that gave them flexibility and allowed them to balance their career and family obligations. Male entrepreneurs on the other hand were most motivated by careers that would allow them to create wealth. These differences became larger when comparisons were made between married women and men entrepreneurs with dependent children.
Peterman and Kennedy	Survey of 117 students undertaking Young Achievement Australia using a control group.	2003	Australia	This article examines the effect of participation in an enterprise education program on perceptions about the desire and possible feasibility of starting a business. It measured changes in perceptions of students enrolled in the Young Achievement Australia enterprise program using a pre-test and post-test control group. After being involved in the program students reported significantly higher perceptions (desirability and feasibility) when compared to the control group.
Carayannis, Evans and Hanson	Multi-part survey with pre-test and post-test elements.	2003	United States and France	Survey of entrepreneurship students at the undergraduate, graduate and continuing education levels in France and the US. On the French side there were attitudes and perceptions that were less positive towards entrepreneurship and its impact and more cynicism with regard to institutional impediments to venture creation when compared to US students. The paper highlights the cultural sensitivity of entrepreneurship education.

This is by far the largest body of literature in the SLR and covers a number of themes and sub-themes. These include two substantial bodies of research on student propensity toward entrepreneurship and pedagogy in the curriculum.

There are also a number of other themes which include: the mapping of supply of entrepreneurship education; extra-curricula activities; the role of entrepreneurship education in universities, and, the impact of departmental philosophies (typically Business Schools). The first area to be examined in detail will be the evidence on student propensity as the outcomes of research in this area typically helps provide a more sophisticated understanding of the factors influencing student 'perceptions toward' entrepreneurship.

Studies in the area of student propensity have ranged considerably between narrow personality trait perspectives to broader perspectives taking into consideration social and environmental influences informing views about entrepreneurship (Luthje and Franke, 2003). Study has so far found a variety of influences on student propensity (or intentionality) towards entrepreneurship; these include:

- i) Personality traits are found to be linked to attitudes to self-employment and, therefore, indirectly to intentions to form a venture (Hatten and Ruhland, 1995; Koh, 1996; Luthje and Franke, 2003).
- ii) Entrepreneurial intent is directly linked to perceived barriers and support factors in the specific context within which the activity would occur (Luthje and Franke, 2003). This finding has implications for both the wider enterprise infrastructure and the HEIs' environment.
- iii) Inadequate business knowledge and perceived risks have been found to be significant deterrents for students, which illustrates a need for business programmes across many faculties within HEIs (Oakey, Mukhtar and Kipling, 2002; Wang and Wong, 2004).
- iv) Gender, family experience of entrepreneurship, educational level and age have been found to have a direct impact on intentionality (Hatten and Ruhland, 1995; Wang and Wong, 2004). In particular male and younger students with family experience of business appear to have greater intentionality (Scott and Twomey, 1988; Hatten and Ruhland, 1995; DeMartino and Robert Barbato, 2003).
- v) Programmes of entrepreneurship education can shift intentionality and perceptions regarding the desirability and feasibility of starting a venture (Hansemark, 1998; Peterman and Kennedy, 2003).
- vi) Wider cultural, political and macro-economic factors, including business support infrastructures, can have a profound impact on the level of student intentionality in different countries (Carayannis et al., 2003; Klapper, 2004).

From the evidence assessed by the SLR it is possible to conclude that 'entrepreneurship education' does have a positive impact on student intentionality. Unfortunately, however, this remains a rather simplistic picture. Such studies do not follow intentionality into 'activity' and, therefore, currently cannot tell us if improved intentionality leads to more graduate entrepreneurship or whether such education has an impact on 'success' when students do choose to create ventures. Likewise the picture remains simplistic because studies typically examine student intentionality without reference to general intentionality in a society more widely (Klapper, 2004). As Carayannis et al (2003) point out intentionality is embedded in cultural expectations; intentionality itself will be influenced by perceived and real barriers to action and will be affected by the general enterprise infrastructure. Entrepreneurship education may go part of the way in shifting cultural perceptions but it will not remove legal and economic impediments making venture creation more difficult. In this sense, studies on student intentionality may well benefit from a more sociological perspective linking intentionality to both contextual factors and actual 'activity', in the sense of examining what students eventually 'do'.

The next major theme of research endeavour, within the programme context, are studies examining pedagogy in entrepreneurship education. Like work on student intentionality and the education of entrepreneurs, debate and research on pedagogy has been wide-reaching and extensive. Some of the debates and key findings within the SLR are highlighted below:

- i) Methods for teaching 'entrepreneurship' have varied extensively (Porter, 1994); often they are linked to assumptions about what entrepreneurship education 'is' (Gartner and Vesper, 1994). Methods argued for include: the use of the classics (Benson, 1992); action learning (Leitch and Harrison, 1999); new venture simulations (Clouse, 1990; Kelmar, 1992); technology based simulations (Low, Venkataraman and Srivatsan, 1994; Hindle, 2002); the development of actual ventures (Haines, 1988); skills based courses (Ulijn, Duill and Robertson, 2004); video role plays (Robertson and Collins, 2003b); experiential learning (Sexton and Upton, 1987; Daly, 2001); and, mentoring (Stewart and Knowles, 2003)
- ii) There are also many debates including: whether entrepreneurship can be taught (Ronstadt, 1987; Ivancevich, 1991); the role of theory versus practice (Fiet, 2001); the place of entrepreneurship education in the university (McMullan and Long, 1987); and, the role of business schools (Miller, 1987).

The evidence presented in these studies can lead to a number of conclusions, some of which agree with the conclusions of the NCGE (2004b) study. Firstly, research has mapped and tracked provision of entrepreneurship education illustrating its growth across the US and its internationalisation (Gartner and Vesper, 1994; Solomon and Weaver, 1994; Katz, 2003). These studies show a

rapid increase in the demand for entrepreneurship education both within the US and globally, while continuing to show constraints in supply of qualified faculty (Katz, 2003). Major public and institutional policy issues arise as a consequence of these developments and there are many questions surrounding 'who' should teach the subject, whether it can be taught and where it should be 'taught' from. If governments continue to promote and develop entrepreneurship education, as many have, it is evident that policies will be required to address some of the supply side issues highlighted by these studies. Policies may be required to help address the supply of faculty, evaluative research may be required to explore existing practice more widely, in order to understand what is working educationally and institutionally. Policy may also need to have a better understanding of the desired ends; including evidence to support these ends.

When reviewing the various methods and pedagogic arguments highlighted above, two reflections seem appropriate. Firstly, many of the studies reviewed tend to promote or argue for one method or approach and focus principally on a case study of that approach. Very few studies examine programmes holistically, in the sense of recognising links between methods and approaches. Consequently, there does appear to be a need for more comparative studies (over time) which evaluate pedagogies in relation to alternatives. This point confirms the conclusions of the NCGE study (2004b). Secondly, due to the focus on case studies and particular programmes these studies have not generally been considered in relation to the Higher Education system within which they operate. In some cases conclusions are drawn for 'entrepreneurship education' as whole, while in reality such education can differ considerably within different countries (and, indeed regions) as a consequence of different Higher Education systems. Such studies, therefore, could be considered more carefully in relation to the HE context from which they are derived. A further consequence of this 'programme centred' view has been a lack of study which explores the inter-relationships between educational activity and actual outputs (graduate entrepreneurship; employment etc). This would seem rather unfortunate given that the explicit, although debateable goal, of such education is to make changes in society via changes in individual behaviour. If research is not conducted on the inter-relationship between the educational processes and the outputs of these processes then educational practitioners are unlikely to ever know what forms of activity work, for what purpose, leading to what changes in student behaviour, activity and choice. It seems evident from this SLR, therefore, that more research is required in this area but this may need to use a different design and frame of reference. Such work should be designed to link an understanding of the HE context, with specific case studies and programmes and be linked to the intended outputs of the programme.

In the next part we, therefore, expand our discussion by exploring studies that have specifically focused on the outputs of 'entrepreneurship education' namely, graduate entrepreneurship and graduate employability.

Graduate Entrepreneurship and Employability

Although studies of pedagogy can be criticised for not linking closely enough to the outputs of education there is research which specifically explores these outputs. In this section we outline these studies within the SLR in relation to graduate entrepreneurship. Research in this area has typically:

- i) Examined the role of business support and other structured interventions in supporting graduate entrepreneurship (Blizzard, 1996; Fleming, 1994).
- ii) Assessed mechanisms for promoting graduate entrepreneurship as a career option (Fletcher, 1999).
- iii) Explored the factors that influence the start-up process and found that teamwork and mentors are important (Macfarlane and Tomlinson, 1993).
- iv) Developed model processes for taking internal entrepreneurial projects into real businesses (Klofsten, 2000; Robertson and Collins, 2003a).
- v) Tracked the performance of graduate-led enterprises (McMullan and Gillin, 1998; McLarty, 2003; Rosa, 2003).

Table 5
Sample of the Evidence on Graduate Entrepreneurship

Authors	Data used in the study	Date	Location of the study	Summary
Rosa	Two surveys of graduate career aspirations of 5375 students drawn from 10 universities and 594 students drawn from Scottish institutions.	2003	England and Scotland	This article re-examines and compares data from surveys conducted in the 1980s on the entrepreneurial career aspirations of graduates. The data show that graduates when left to their own devices tend to develop small and unimaginative businesses. The study shows that the type of business started is significantly determined by the nature of the course taken.
McLarty	Interviews with 39 graduate business owners within five years of start-up.	2003	England (East Anglia)	The paper focuses on a detailed study into the entrepreneurial activities of graduates and examines issues impacting on their business development. Seven main issues were investigated; business establishment; location, premises, concerns, advice utilisation, education and training and support requirements. The graduates were poorly prepared for business activity, specifically in marketing and finance. The paper concludes through the introduction of three categories of competency.
McMullan and Gillin	Industrial case study of Swinburne University.	1998	Australia	The paper discusses a case study of Swinburne University of Technology in Melbourne, Australia who introduced architecture for a graduate degree programme in entrepreneurship which was adopted in 1988. The paper covers the development of the programme over eight years and discusses the results from two surveys tracking the activities and performance of graduates. 87% of those surveyed had started ventures.

The research in this area, therefore, has typically sought to identify mechanisms that can help graduate entrepreneurship occur, has begun to explore what influences the success of these businesses and whether graduate led enterprises are more successful than other non-graduate led ventures. Findings from this work are relatively inconclusive. Certainly, there is evidence supporting the view that graduate entrepreneurship can be effectively promoted. From the evidence reviewed it is possible to highlight that certain factors like access to early stage finance, mentoring and business support, have some impact on chances of successful venture creation but it is difficult to conclude to what degree these influence the process and whether or not other factors (e.g. proactive behaviour) actually sit behind the variables so far investigated. These variables also, in many respects, mirror those that are seen to influence venture creation in general and, therefore, the data do not often provide conclusive evidence that there is anything inherently different about graduate start-ups. It is rather essential, therefore, that the empirical evidence on support mechanisms for graduate entrepreneurship, particularly those within HEIs, is expanded. It is evident that such studies should be multi-institutional and have more sophisticated models that are measuring factors specific to the graduate context. The final stream of work in this area, exploring the performance of graduate enterprises over-time (McMullan and Gillin, 1998; McLarty, 2003; Rosa, 2003), appears to be adding some value. This could be further expanded and developed via the work that examines 'careers', drawing from career development literature.

Another major output identified that can be linked to entrepreneurship education is graduate employability and specifically the employment of graduates in SMEs. Much of the literature has not yet directly linked work on entrepreneurship education pedagogy and the employment of graduates, in the past research has typically focused on its link with venture creation. Examining the thematic framework developed by this SLR does illustrate, however, that there is a need to examine in more detail links between entrepreneurship education and employability. The research that has been conducted in this area at the moment tends to focus on the following areas:

- i) Evaluating the perceptions of graduates with regard to working in SMEs (Belfield, 1999; Brindley and Ritchie, 2000; McLarty, 2003).
- ii) Evaluating the perceptions that SME owner-managers have of graduates (Brindley and Ritchie, 2000; Stewart and Knowles, 2000; Pittaway and Thedham, 2005).
- iii) Exploring the graduate labour market in relation to 'enterprise' (Binks, 1996).

Studies in this area then, rather than linking employment outputs to educational processes, tend to focus on economic factors. For example,

studies have explored variables related to the supply and demand of graduates and examined the graduate labour market. The evidence in this SLR is too limited to draw any general conclusions and there are many relevant studies not included because this study was principally exploring 'education' and not 'employability'. Like the policy area previously highlighted, this is an area that could benefit from a SLR in its own right. Especially where such a review focuses on the link between empirical research and what it suggests about the role of entrepreneurship education in assisting employment and self-employment, as well as, venture creation. The studies that have been reviewed indicate that there are many aspects to consider which affect the employment of graduates in SMEs including the perceptions of graduates, the perceptions of owner-managers and the many different forms of SME (Pittaway and Thedham, 2005). Likewise, there are many economic studies of graduate employment outside of entrepreneurship as a subject, which could shed further light on these areas (Hesketh, 2000).

The final part of this paper will proceed by drawing together conclusions from the thematic sections of the SLR and by linking these to the NCGE (2004b) study.

CONCLUSIONS

This SLR has provided an effective method for mapping out thematically the field of entrepreneurship education and for allowing this field to be viewed holistically; linking forms of research together that have not been linked previously. The review highlights a number of areas of evidence that are making significant contributions to our understanding of entrepreneurship education, however, there are also areas for development, gaps in the knowledge base and research themes where one would have expected more cross-fertilization of knowledge. The thematic framework presented in this paper confirms much of the conclusions made by the NCGE (2004b) study, which used a narrative method.

The evidence is fragmented, although there are areas of critical mass, notably in student propensity; pedagogy; management development education and work on the enterprising university. There is clearly a reasonable quantity of empirical evidence but there is little 'piggy-backing' of studies leading to limited potential for meta-analysis across space and time. In some areas there are only a few empirical studies (e.g. when examining the role of business schools) and in other areas the theoretical foundation of the studies is limited. This highlights two concerns for policy makers, firstly, in general the evidence on which policy is being made is unsubstantial and secondly, the work that has been carried out tends to be conducted in isolation of other important work: in adult learning; management learning; Higher Education policy; graduate employment; and, labour markets. As the NCGE (2004b) study points out research needs to be more evaluative and longitudinal. Based on this study it also needs to be more contextual, in other words, better at recognising the

specific Higher Education and institutional context and acknowledging how this influences what is meant by 'entrepreneurship', or indeed, 'enterprise' education within the context studied. More clarity here through typologies and taxonomies would allow policy makers to be clearer about what outputs they mean to create when institutionalising particular educational programmes within this arena. Such work would require more detailed empirical but comparative studies of practice in different institutions and across different HE contexts.

As well as agreeing, confirming and expanding the findings of the NCGE (2004b) study this SLR has identified a number of gaps in the evidence-base and has highlighted a number of areas that need to be expanded in future systematic literature reviews. The most significant gaps appear to be the following:

- i) There is a sound evidence base on student propensity for 'entrepreneurship' exploring both facilitators and barriers to decision-making. This evidence is supported by study on the role of entrepreneurship education in enhancing propensity. What is not known, however, is whether this propensity or intentionality is turned into 'entrepreneurial behaviour' either in its broader sense or when focused narrowly on venture creation. There is, therefore, a need for research to examine in more detail and longitudinally graduate careers. Others would also advocate that this needs to be linked to a better understanding of education's impact on 'performance' when graduates pursue an entrepreneurial career (NCGE, 2004b).
- ii) While there has been significant study examining different forms of pedagogy and their value within entrepreneurship education much of this study has not been directly linked to graduate entrepreneurship, recruitment or demand from employers. In this sense discussions on pedagogy have occurred (but not always) in isolation of other wider debates on learning theory, graduate employment and the link between entrepreneurship education and graduate entrepreneurship.
- iii) Although there is study that has linked 'entrepreneurship education' to outcomes like graduate venture creation the area has been under-researched overall. A particular weakness is the lack of study linking entrepreneurship education to factors relevant to 'employability' in SMEs or other organisations. Other outputs of education which are less policy-driven and instrumentalist (for example, to create a better society), which tend to be important in the main HE literature, are almost absent from the debates and evidence on entrepreneurship education. These should be included in the debates if entrepreneurship education is to provide a wider justification for its existence outside of one based merely on economic utility.

- iv) The final gap that appears to exist that can be drawn from this thematic analysis is the role of policy based research in this subject area. While significant work has been carried out on institutional policies and strategies towards entrepreneurship education not enough of the studies highlighted in this systematic review focused on the role of regional, national or supra-national education policy. Importantly, the link between wider national policies and institutional strategies did not appear to be particularly well developed in the empirical base.

As well as these gaps in our knowledge there were some areas where knowledge that fell outside of this SLR could provide important contributions to understanding in entrepreneurship education. Further systematic literature reviews are, therefore, recommended in the following areas:

- i) Due to the nature of the methods used to conduct this study it is considered that the role of HE policies and specific HE programmes in entrepreneurship and enterprise education were somewhat underrepresented. It is recommended that a further review be carried out on the role of HE policy and its impact on the creation and support of entrepreneurship education. Such a study would benefit from focusing on different countries and perhaps examine 'grey' policy reports and literature, as well as, academic articles.
- ii) A review is also required to examine in more detail institutional strategies and activities toward entrepreneurship education, such a review could provide the foundation for an empirical study examining existing practice across countries.
- iii) Likewise, while pedagogy has been well reviewed in this SLR and within the NCGE (2004b) study this has typically focused on studies that are drawn from entrepreneurship journals. A further review could expand on this area by undertaking an SLR that was conceived more broadly to examine similar themes in other areas that have a stronger theoretical base (for example, adult learning theory and management learning).
- iv) Finally, a further SLR could be carried out on the key outputs of graduate employability and graduate entrepreneurship to further investigate the data in these areas before the development of more detailed empirical studies.

Based on these conclusions and recommendations for future research there are clearly some policy considerations which should be highlighted. Firstly, it seems clear that significant funds are flowing into promoting and developing entrepreneurship education but that much of the investment is founded on rather limited evidence. We do not really know what 'entrepreneurship

education' actually 'is'; policy is generally unclear about what outputs are to be created when such education is promoted; and, even if these policy questions were resolved we do not know what works and to what end. Consequently, Governments investing in this area need also to invest in research examining entrepreneurship education in order to improve the evidence base, to evaluate the impact of interventions and thereby have a clearer idea of what policies might work more effectively in which contexts.

REFERENCES

- Belfield, C.R. (1999), The behaviour of graduates in the SME labour market: Evidence and perceptions, *Small Business Economics*, 12(3), 249.
- Benson, G.L. (1992), Teaching entrepreneurship through the classics, *Journal of Applied Business Research*, 8(4), 135.
- Binks, M., (1996), Enterprise in higher education and the graduate labour market, *Education & Training*, 38(2), 26.
- Birley, S. and Gibb, A. (1984), Teaching small business management in the UK part I, *Journal of European Industrial Training*, 8(4), 17.
- Blizzard, D. (1996), Promoting entrepreneurship as a career option and providing business start-up support for students and graduates--experiences of graduate enterprise, *International Small Business Journal*, 14(3), 104.
- Brindley, C. and Ritchie, B. (2000), Undergraduates and small and medium-sized enterprises: Opportunities for a symbiotic partnership? *Education & Training*, 42 (8/9).
- Burr, P. L. and Solomon, G. T. (1977), The SBI Program: four years down the academic road, *Journal of Small Business Management*, 15(2), 1.
- Carayannis, E., Evans, D. and Hanson, M. (2003), A cross-cultural learning strategy for entrepreneurship education: outline of key concepts and lessons learned from a comparative study of entrepreneurship students in France and the US, *Technovation*, 23 (9), 757.
- Carson, D.J. (1985), The challenge of teaching marketing to small businesses, *European Journal of Marketing*, 19(5), 42.
- Chan, K.C. and Anderson, G.C. (1994), Academia - industry fusion: action learning for teaching enterprise, *Industrial and Commercial Training*, 26(4), 28.
- Chia, R. (1996), Teaching paradigm shifting in management education: University business schools and the entrepreneurial imagination, *The Journal of Management Studies*, 33 (4):409.
- Clouse, V.G.H. (1990), A controlled experiment relating entrepreneurial education to students' start-up decisions, *Journal of Small Business Management*, 28(2), 45.
- Conceicao, P., and Heitor, M. V., (2002), University-based entrepreneurship and economic development: A learning-centred model. *International Journal of Technology Policy and Management*, 2 (3), 220.

- Daly, S., (2001), Student-operated Internet businesses: true experiential learning in entrepreneurship and retail management, *Journal of Marketing Education*, 23(3), 204.
- Dana, L.P. (1992), Entrepreneurial education in Europe, *Journal of Education for Business* 68(2), 74.
- Dart, J. and Pendleton, L.L. (1984), The Role of advertising agencies in entrepreneurial education, *Journal of Small Business Management*, 22(2), 38.
- DeMartino, R., and Barbato, R., (2003), Differences between women and men MBA entrepreneurs: Exploring family flexibility and wealth creation as career motivators, *Journal of Business Venturing*, 18(6), 815.
- Dyer, G. (1994), Toward a theory of entrepreneurial careers, *Entrepreneurship: Theory & Practice*, 19(2), 7.
- Etzkowitz, H., (2003), Research groups as 'quasi-firms': The invention of the entrepreneurial university, *Research Policy*, 32 (1), 109.
- Fiet, J., (2001), The theoretical side of teaching entrepreneurship, *Journal of Business Venturing*, 16(1), 1.
- Fleming, P. (1994), The role of structured interventions in shaping graduate entrepreneurship, *IBAR*, 15, 146.
- Fletcher, M., (1999), Promoting entrepreneurship as a career option - the graduate enterprise programme, *Journal of European Industrial Training*, 23(3), 127.
- Gartner, W.B. and Vesper, K.H. (1994), Experiments in entrepreneurship education: successes and failures, *Journal of Business Venturing*, 9(3), 179.
- Gibb, A., (1983), Marketing small business programmes: the supply sector and its problems-conclusions: The Way Ahead, *Journal of European Industrial Training*, 7(5), 28.
- Gibb, A., (1984), Developing the role and capability of the small business adviser, *Leadership & Organization Development Journal*, 5(2), 19.
- Gibb, A., (1987), Designing effective programmes for encouraging the business start-up process: lessons from UK experience, *Journal of European Industrial Training*, 11 (4), 24.
- Gibb, A., (1990), Training the trainers for small business, *Journal of European Industrial Training*, 14(1), 17.
- Gibb, A., (1996), Entrepreneurship and small business management: Can we afford to neglect them in the twenty-first century business school? *British Journal of Management*, 7(4), 309-321.
- Gibb, A. (1999), Can we build 'effective' entrepreneurship through management development? *Journal of General Management*, 24(4), 1-21.
- Gibb, A., (2002), In pursuit of a new enterprise and entrepreneurship paradigm for learning: creative destruction, new values, new ways of doing things and new combinations of knowledge, *International Journal of Management Reviews*, 4(3), 213-232.
- Gorman, G., Hanlon, D. and King, W. (1997), Some research perspectives on entrepreneurship education, enterprise education and education for small

- business management: A ten-year literature review, *International Small Business Journal*, 15 (3), 56-78.
- Grady, R. and Pratt, J. (2000), The UK technology transfer system: calls for stronger links between Higher Education and industry, *Journal of Technology Transfer*, 25(2), 205.
- Greene, P. G., Katz, J. A. and Johannisson, B. (2004), Special issue: entrepreneurship education, *Academy of Management: Learning and Education*, 3 (3), 238-241.
- Grigg, T. (1994), Adopting an entrepreneurial approach in universities, *Journal of Engineering and Technology Management*, 11 (3, 4), 273.
- Haines, G.H.Jr. (1988), The ombudsman: teaching entrepreneurship, *Interfaces*, 18(5), 23.
- Hansemark, O., (1998), The effects of an entrepreneurship programme on need for achievement and locus of control of reinforcement, *International Journal of Entrepreneurial Behaviour & Research*, 4(1), 28.
- Hatten, T.S. and Ruhland, S.K. (1995), Student attitude toward entrepreneurship as affected by participation in an SBI program, *Journal of Education for Business*, 70(4), 224.
- Hesketh, A. J., (2000), 'Recruiting an elite? Employers' perceptions of graduate education and training', *Journal of Education and Work*, 13(3), 245.
- Hindle, K., (2002), A grounded theory for teaching entrepreneurship using simulation games, *Simulation & Gaming*, 33(2), 236.
- Hollingsworth, T. A., Klatt, L., and Zimmerer, T., (1974), An untapped resource for small business: Business school graduates, *Journal of Small Business Management (pre-1986)*, 12, 42.
- Holoviak, S.J. and Ackelsberg, R. (1983), Small business management assistance: a university experience in a rural environment, *American Journal of Small Business*, 8 (2), 3.
- Ibrahim, A. B. and Soufani, K., (2002), Entrepreneurship education and training in Canada: A critical assessment, *Education & Training*, 44 (8/9), 421.
- Ivancevich, J.M. (1991), A traditional faculty member's perspective on entrepreneurship, *Journal of Business Venturing*, 6(1), 1.
- Jack, S., and Anderson, A., (1999), Entrepreneurship education within the enterprise culture producing reflective practitioners, *International Journal of Entrepreneurial Behaviour & Research*, 5(3), 110.
- Jackson, S. and Audretsch, D., (2004), The Indiana University Advanced Research and Technology Institute: a case study, *Journal of Technology Transfer*, 29(2), 119.
- Jacob, M., Lundqvist, M., and Hellsmark, H., (2003), Entrepreneurial transformations in the Swedish University system: The case of Chalmers University of Technology, *Research Policy*, 32 (9), 1555.
- Katz, J.A., (1991), Endowed positions: entrepreneurship and related fields, *Entrepreneurship Theory and Practice*, 15(3), 53.

- Katz, J. A. (1994), Modelling entrepreneurial career progressions: Concepts and considerations, *Entrepreneurship: Theory & Practice*, 19(2), 23.
- Katz, J. A. (2003), The chronology and intellectual trajectory of American entrepreneurship education 1876-1999, *Journal of Business Venturing*, 18(2), 283.
- Kelmar, J.H. (1992), Business plans for teaching entrepreneurial behaviour, *Education & Training*, 34(1), 30.
- Klapper, R., (2004), Government goals and entrepreneurship education - an investigation at a Grande Ecole in France, *Education & Training*, 46(2/3), 127.
- Klofsten, M., (2000), Training entrepreneurship at universities: a Swedish case, *Journal of European Industrial Training*, 24(6), 337.
- Kirby, D., (1998), Students in small business: an assessment of the 1994 STEP student placement scheme, *International Small Business Journal*, 16(3), 133.
- Koh, H.C. (1996), Testing hypotheses of entrepreneurial characteristics A study of Hong Kong MBA students, *Journal of Managerial Psychology*, 11(3), 12.
- Krebs, R.E., (1985), Intrapreneurs within universities, *Journal of the Society of Research Administrators*, 16 (3), 15.
- Larson, C., (1974), Management assistance for the small businessman: A joint program of SBA and the university, *Journal of Small Business Management (pre-1986)*, 12, 6.
- Leitch, C., and Harrison, R., (1999), A process model for entrepreneurship education and development, *International Journal of Entrepreneurial Behaviour & Research*, 5(3), 83.
- Lewis, A., (2002), Teaching entrepreneurship, *Tech Directions*, 62 (3), 5.
- Long, W. A. and Nobuoki, O., (1988), Entrepreneurship education and adding value to new ventures, *Journal of Marketing Education*, 10(1), 11.
- Low, M., Venkataraman, S. and Srivatsan, V. (1994), Developing an entrepreneurship game for teaching and research, *Simulation & Gaming*, 25(3), 383.
- Luthje, C. and Franke, N., (2003), The 'making' of an entrepreneur: Testing a model of entrepreneurial intent among engineering students at MIT, *R & D Management*, 33 (2), 135.
- Macfarlane, B. and Tomlinson, K. (1993), Managing and assessing student enterprise projects, *Education & Training*, 35(3), 33.
- Matlay, H., (2001), Entrepreneurial and vocational education and training in central and Eastern Europe, *Education & Training*, 43 (8/9), 395.
- McBrierty, V.J. and O'Neill, E.P., (1991), The college role in innovation and entrepreneurship: an Irish experience, *International Journal of Technology Management*, 6 (5, 6), 557.
- McLarty, R., (2003), Graduate entrepreneurship: a critical review of problems, issues and personal competencies, *International Journal of Entrepreneurship and Innovation Management*, 3(5,6), 621.
- McMullan, W.E. and Gillin, L.M. (1998), Industrial viewpoint - entrepreneurship education: developing technological start-up entrepreneurs: A case study of

- a graduate entrepreneurship programme at Swinburne University, *Technovation*, 18(4), 275.
- McMullan, W.E. and Long, W.A. (1987), Entrepreneurship education in the Nineties, *Journal of Business Venturing*, 2(3), 261.
- McMullan, W. E., Long, W. A., and Graham, J. B., (1986), Assessing economic value added by university-based new-venture outreach programs, *Journal of Business Venturing*, 1(2), 225.
- Menzies, T., (2004), Are universities playing a role in nurturing and developing high-technology entrepreneurs? The administrators' perspective, *International Journal of Entrepreneurship and Innovation*, 5 (3), 149.
- Miller, A. (1987), New ventures: a fresh emphasis on entrepreneurial education, *Survey of Business*, 23(1), 4.
- Mortimer, K., (1995), Enterprise in Higher Education: Reflections from the chair, *Education & Training*, 37(9), 20.
- Mowery, D. C. and Sampat, B., (2005), The Bayh-Dole Act of 1980 and university-industry technology transfer: a model for other OECD Governments? *Journal of Technology Transfer*, 30 (1-2):115.
- NCGE (2004a), Mapping of existing activity to support graduate entrepreneurs, *National Council for Graduate Entrepreneurship Report*, <http://www.ncge.org.uk/mapping.php>
- NCGE (2004b), Making the journey from student to entrepreneur: A review of the existing research into graduate entrepreneurship, *National Council for Graduate Entrepreneurship Report*, <http://www.ncge.org.uk/review.php>
- Newby, P., (1998), After enterprise in higher education--holding the ground or sustaining the momentum? *Education & Training*, 40 (6/7), 307.
- Oakey, R., Mukhtar, S. and Kipling, M., (2002), Student perspectives on entrepreneurship: observations on their propensity for entrepreneurial behaviour, *International Journal of Entrepreneurship and Innovation Management*, 2(4,5), 308.
- Peterman, N., and Kennedy, J., (2003), Enterprise education: influencing students' perceptions of entrepreneurship, *Entrepreneurship Theory and Practice*, 28(2), 129.
- Parsons, M. G. and Kurtz, D., (1970), The role of collegiate business schools in education of managers for small business, *Journal of Small Business Management (pre-1986)*, 8, 3.
- Pittaway, L., Robertson, M., Munir, K., Denyer, D. and Neely, A. (2004). Networking and innovation: a systematic review of the evidence. *International Journal of Management Reviews*, 5/6 (3&4), 137-168.
- Pittaway, L. and Thedam, J., (2005), 'Mind the gap: graduate recruitment in small businesses, *International Small Business Journal*, 23(4), forthcoming.
- Poole, D. and Robertson, B. (2003), Hunting the snark or leading with purpose? Managing the Enterprise University, *Journal of the Australian and New Zealand Academy of Management*, 9 (3), 8.

- Porter, L.W. (1994), The relation of entrepreneurship education to business education, *Simulation & Gaming*, 25(3), 416.
- Ulijn, J., Duill, M., and Robertson, S., (2004), Teaching business plan negotiation: fostering entrepreneurship among business and engineering students, *Business Communication Quarterly*, 67(1), 41.
- Raffo, C., Lovatt, A., Banks, M. and O'Connor, J., (2000), Teaching and learning entrepreneurship for micro and small businesses in the cultural industries sector, *Education & Training*, 42 (6), 356.
- Ridder, A., and Van der Sijde, P., (2003), Raising awareness of entrepreneurship and e-commerce; a case study on student-entrepreneurship, *International Journal of Entrepreneurship and Innovation Management*, 3(5,6), 609.
- Robertson, M. and Collins, A. (2003a), Developing entrepreneurship in West Yorkshire: West Yorkshire universities' partnership and business Start-Up@Leeds met, *Education & Training*, 45 (6):303.
- Robertson, M., and Collins, A., (2003b), The video role model as an enterprise teaching aid, *Education & Training*, 45(6), 331.
- Ronstadt, R., (1987), The educated entrepreneurs: a new era of entrepreneurial education is beginning, *American Journal of Small Business*, 11(4), 37.
- Rosa, P., (2003), 'Hardly likely to make the Japanese tremble': The businesses of recently graduated university and college 'entrepreneurs', *International Small Business Journal*, 21(4), 435.
- Scott, M.G. and Twomey, D.F. (1988), The long-term supply of entrepreneurs: students' career aspirations in relation to entrepreneurship, *Journal of Small Business Management*, 26(4), 5.
- Sexton, D.L. and Upton, N.B. (1987), Evaluation of an innovative approach to teaching entrepreneurship, *Journal of Small Business Management*, 25(1), 35.
- Shane, S., (2004), Encouraging university entrepreneurship? The effect of the Bayh-Dole Act on university patenting in the United States, *Journal of Business Venturing*, 19(1), 127.
- Smalles, R., Cooper, S. and Keogh, W., (2002), Supporting university enterprise: The Scottish and US experience, *International Journal of Entrepreneurship and Innovation Management*, 2 (4, 5), 354.
- Solomon, G. (1975), Is the SBI helping? *Journal of Small Business Management*, 13(3), 10.
- Solomon, G.T. and Carhart, D.H. (1982), Management training in small business, *American Journal of Small Business*, 7(2), 50.
- Solomon, G.T. and Fernald, L.W.Jr., (1991), Trends in small business management and entrepreneurship education in the United States, *Entrepreneurship Theory and Practice*, 15(3):25.
- Solomon, G. T. and Weaver, M. K. (1994). A historical examination of small business management and entrepreneurship pedagogy, *Simulation & Gaming*, 25(3), 338. 94.
- Sonfield, M., (1981), Can student consultants really help a small business? *Journal of Small Business Management (pre-1986)*, 19, 3.

- Sotirakou, T., (2004), Coping with conflict within the entrepreneurial university: threat or challenge for heads of departments in the UK higher education context. *International Review of Administrative Sciences*, 70 (2), 345.
- Stephan, P., (2001), Educational implications of university-industry technology transfer, *Journal of Technology Transfer*, 26(3), 199.
- Stewart, J. and Knowles, V., (2000), Graduate recruitment and selection practices in small businesses, *Career Development International*, 5(1), 21.
- Stewart, J. and Knowles, V., (2003), Mentoring in undergraduate business management programmes, *Journal of European Industrial Training*, 27(2-4), 147.
- Tate, A. (1993), A strategy for enterprise in the University of Ulster, *IBAR*, 14 (1), 1.
- Thornberry, N., (2003), Corporate entrepreneurship: Teaching managers to be entrepreneurs. *The Journal of Management Development*, 22(4), 329.
- Thorpe, R., Holt, R., Pittaway, L. and Macpherson, A., (2006), Knowledge within small and medium sized firms: A systematic review of the evidence, *International Journal of Management Reviews*, forthcoming.
- Tranfield, D. R., Denyer, D. and Smart, P. (2003). Towards a methodology for developing evidence-informed management knowledge by means of systematic review. *British Journal of Management*, 14, 207-222.
- Vesper, K.H. and Gartner, W.B. (1997), Measuring progress in entrepreneurship education. *Journal of Business Venturing*, 12(5), 403.
- Wang, C. and Wong, P., (2004), Entrepreneurial interest in university students in Singapore, *Technovation*, 24(2), 163.
- Wani, V. P., Garg, T. K., and Sharma, S. K., (2004), Effective industry/institute interaction for developing entrepreneurial vision amongst engineers for the sustainable development of SMEs in India, *International Journal of Technology Transfer & Commercialisation*, 3 (1), 38.
- Westhead, P., Storey, D., and Martin, F., (2000), The Shell technology enterprise programme: student outcomes, *Education & Training*, 42(4/5), 272.
- Whiteley, T., (1995), Enterprise in Higher Education - An overview from the Department for Education and Employment, *Education & Training*, 37 (9), 4.
- Zhao, F. (2004), Academic entrepreneurship: case study of Australian universities. *International Journal of Entrepreneurship and Innovation*, 5 (2), 91.

APPENDICES

Appendix 1 Keywords used in Citation Searches

Business education	Higher education	Competencies
Business schools	Learning	Small Business
Colleges	Continuing education	Entrepreneurs
College students	Educators	Mentors
Graduates	Management development	Teaching
Universities	Managerial skills	Trainers
Undergraduates	MBA programmes	Training
Postgraduates	Professional development	Vocational Education
Skills	Student	

Appendix 2 Search Strings used in Citation Databases

1. Entre* OR enter* AND business education OR business schools OR colleges OR higher education OR Universit* AND NOT information systems
2. Small business OR SME AND business education OR business schools OR colleges OR higher education OR Universit* AND NOT information systems
3. Entre* OR enter* AND student* OR graduate* OR undergraduate* OR postgraduate* OR MBA
4. Small business OR SME AND student* OR graduate* OR undergraduate* OR postgraduate* OR MBA
5. Entre* OR enter* AND student learning OR continuing education OR vocational education
6. Small business OR SME AND student learning OR continuing education OR vocational education
7. Entre* OR enter* AND student competencies OR student skills
8. Small business OR SME AND student competencies OR student skills
9. Entre* OR enter* AND Teach*
10. Small business OR SME AND Teach*