Compulsory School-Based Enterprise Education as a Gateway to an Entrepreneurial Career

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Key Words

Entrepreneurship Education; Business Starts; Entrepreneurial Intentions

Abstract

The direct influence of school-based enterprise education on career choices may be limited as entrepreneurial intentions dissipate over time. This paper proposes that it is the indirect influence of school-based enterprise education, through encouraging voluntary engagement with other forms of enterprise education, which is more important. Drawing upon data from the United Kingdom (UK) Global Entrepreneurship Monitor (GEM) study this paper utilises a binary logistic regression approach and finds evidence to support the proposed indirect role. This shows the importance of collaboration between those delivering and designing enterprise education at all stages to ensure that young people are prepared correctly to move seamlessly from one stage to the next.

1. Introduction

Small and medium enterprises (SMEs) have long been recognised as an important engine for growth (Taatila, 2010; Huggin and Izushi, 2007), prompting policy makers to explore ways in which SMEs can be best supported (Guellec and Wunsch-Vincent, 2009). In the UK, successive governments have vowed to transform the country into one of the world's most enterprising economies. This is to be achieved not only by making it the best place to start a business, but also by embedding an entrepreneurial mind-set within all walks of life to enable businesses to achieve their entrepreneurial potential (BIS, 2010; BERR, 2008). There has also been recognition that the development of an enterprise culture is a long term process, and exposure to entrepreneurship from a young age is seen as crucial to develop entrepreneurial awareness and to reduce fear of failure (BIS, 2010).

Consequently, considerable attention has been paid to the role of enterprise education. The BIS (2010) report advocates that enterprise education be implemented at all levels from primary school to existing businesses, and the UK government provided £360 million between 2005 and 2008 to fund enterprise education in schools (Ofsted, 2005). A compulsory five days of entrepreneurship education has subsequently been introduced as part of the work-related learning curriculum (Gillie, 2012). Interventions involving compulsory participation have the advantage of potentially reaching a majority of the future workforce. Non-compulsory courses requiring voluntary participation are likely to require a pre-existing interest. Even with incentives and publicity from authorities, it is unlikely that interest will be increased sufficiently to ensure the same levels of participation as compulsory courses. Despite the increased interest, school-based enterprise education remains a relatively less explored topic when compared to equivalent courses in universities (Peterman and Kennedy, 2003). There is little consensus regarding the immediate objectives of intervention at this level, with insufficient evidence to link it with business start-up (Carsrud and Brannback, 2011).

However, if the main objective of enterprise education is to develop an enterprising culture, as the UK government has stipulated, then our measures of effectiveness have to move beyond business start-up activity as the 'be-all and end-all'. A better understanding of the ways in which school-based enterprise education can support the development of enterprising individuals is crucial. The concept of an enterprising culture has long been criticised for its intangible qualities, which prohibit the development of precise measures of its effectiveness (Jack and Anderson, 1999). This means there is a need to dissect the concept into more tangible and measurable objectives. Our study proposes a measurement that would capture a crucial antecedent of enterprise culture, based on voluntary participation in enterprise education beyond school. Drawing on the theories of interest development from educational science, we argue that school-based enterprise education serves an important indirect role in sustaining entrepreneurial interest, until the realisation of these aspirations becomes feasible. Sustained interest is the first step towards the development of a lifelong passion for entrepreneurship, and we argue that only where this is persistent and withstands the test of time can a true enterprise culture take root.

The main scope of our study is to examine whether compulsory school-based enterprise education increases the probability that participants will subsequently participate voluntarily in further enterprise education and training. The secondary scope of this study is to evaluate the possible impact that such sustained participation might have in changing the entrepreneurial intentions and behaviours of participants.

Our study provides evidence that compulsory enterprise education at school level does play a role in sustaining participants' engagement. This development of sustained interest provides grounds for a holistic, centrally coordinated approach to enterprise education. Knowledge of this role allows policy makers to plan the provision of enterprise education over a longer period than previously considered, which may improve effectiveness. For our secondary research objective, we present evidence that compulsory enterprise education at school level has little direct effect on entrepreneurial intentions and behaviours, but rather, further voluntary participation in university and government training schemes acts in a mediating fashion to provide an indirect link.

The paper is organised as follows. Sections 2 and 3 review the existing enterprise education paradigms before introducing the theoretical concept of sustained interest. The GEM data and approaches utilised are outlined in Section 4, with results presented and discussed in Section 5. Section 6 concludes with theoretical and policy implications, and limitations.

2. A review of the existing enterprise objective paradigms

Although enterprising individuals have been seen as at the heart of an enterprise culture, there is little consensus as to what makes an individual enterprising. The traditional view focuses on those who are starting and developing a small business (Kourilsky, 1995), but others such as Keat (1991) note that small business owners are not particularly enterprising. Gibb (1987) suggests that the enterprising individual is a multifaceted construct encompassing both entrepreneurial and intrapreneurial behaviours. In the remainder of the section, we review three existing measures of enterprise intervention effectiveness. We argue that, whilst each is helpful in itself, they only measure the attributes of an enterprising individual and capture what constitutes an enterprise culture to a limited extent.

2.1 The Start-up Paradigm

The business start-up rate is a reflection of how successfully an enterprise culture is disseminated amongst the population. Venture creation is a measureable construct, although many studies suffer from issues of self-selection and reverse causality (Rideout and Gray, 2013; Fayolle et al., 2006). Early enterprise education scholars, particularly those in North America, and policy makers tend to see it as the benchmark of success for enterprise interventions and policy implementation (Kourilsky, 1995). However, few empirical studies, in particular those focusing on the secondary school context, found the connection satisfactory (Jones-Evans et al., 2006). A major problem with the measure is that venture creation may not necessarily reflect the objectives of the interventions; most notably, new venture creation requires skills, competencies, networks and resources beyond what is provided in a school context (Mahlberg, 1996). Rushing school leavers into starting a business may result not only in aspiring entrepreneurs taking unnecessary risks, but also in the creation of ventures that are arguably less growth and innovation orientated (Kwong and Thompson, forthcoming). Those wishing to engage in venture creation may logically wait until the additional attributes not provided at school are acquired (Carsrud and Brannback, 2011).

2.2 The Attitudinal Transformation Paradigm

As engaging in an entrepreneurial event for most school leavers is impractical, this has led to calls for enterprise education at this level to be primarily about developing an interest and awareness (Draycott et al 2011; Kwong et al., 2013c). Those who develop a positive attitude towards entrepreneurship are believed to be more inclined to start a business and support others to do the same. Effectiveness assessments within this paradigm draw from shorter timeframes and lower

order constructs such as those classified as 'reaction' and 'learning' by Kirkpatrick (1959). Many of these measures are identified within Shapero and Sokol's (1982) Entrepreneurial Event (EE) and Ajzen's (1991) Theory of Planned Behaviour (ToPB) models as antecedents to entrepreneurial events, including perceived desirability, attractiveness, feasibility, self-efficacy and locus of control. With regard to achievement of these measures, findings have generally been more positive (Peterman and Kennedy, 2003; Man and Yu, 2007). However, there has been concern over the durability of the so-called stream-booster intervention programmes that are prevalent at the school level, as they require only passive commitment that does not demand action on the part of the learners.

2.3. Skills development

Enterprise education has long been associated with the development of a variety of skillsets that are crucial to the development of enterprising individuals (Martin et al., 2013; Volery et al., 2013). These include the technical and functional start-up skills required to develop business proposals, implement strategies, and generate finance and marketing plans (Freel, 1999). It is also linked to improved entrepreneurial skills such as opportunity recognition (Morris et al., 2013), as well as soft skills such as the ability to act independently, initiate actions, set goals and targets, and cope with uncertainties (Draycott et al., 2011). The latter skills in particular would not only facilitate business start-up activities but also cater for diverse career aspirations, and are consistent with the view of the European Commission (2006) that entrepreneurship is a basic skill alongside digital skills and literacy. The downside of skill development as a measure, however, is its incomparability (Morris et al., 2013). Programmes that are developed within the definition of a basic skill tend to be non-specialised, whilst others often place venture creation as the ultimate objective (McLarty et al., 2010). Consequently, few empirical studies have been conducted on an aggregate level with most existing studies being qualitative in nature (Rasmussen et al., 2011), or focussing on a specific programme (Dickson et al., 2008).

Each of these measures of effectiveness have their own strengths and limitations, but what is lacking is a common measure that would: a) measure an action post-intervention even when immediate venture creation or other entrepreneurial activities may not be realistically feasible; and b) reflect an entrepreneurial objective that is equally applicable to different interventions. In the next section, we propose the 'sustained interest paradigm', based on voluntary participation in enterprise education programmes beyond secondary school.

3. Sustained interest in the context of enterprise culture and the development of enterprising individuals

Studies have suggested that interest directs learners' energy towards positive engagement with learning (Dean and Jolly, 2012), and educational science literature on the phases of interest development has made a crucial distinction between sustained interest and shorter term situational interest (Hidi and Renninger, 2006). Whilst the latter can be triggered through a singular objective, for instance, the desire to pass a course, the former is not bound by context, and involves voluntary and often excessive effort that is driven by personal curiosity (Renninger and Shumar, 2002). Whilst both forms of interest are facilitative to learning (Edelson and Joseph, 2004), only the former is associated with the deeper level of learning that improves future recollection and application in a different context (Renninger and Hidi, 2002). Sustained interest is also found to induce self-regulatory behaviours: in other words, to take initiative to accumulate knowledge regarding the particular subject, overcome frustration and challenges, and anticipate subsequent steps to sustain

long term constructive and creative endeavours, often with seemingly minimal effort (Lipstein and Renninger, 2007).

In the context of entrepreneurship, sustained interest is particularly important. Entrepreneurial pursuits require individuals to not only identify opportunities, but also to exploit them. This is often a lengthy process that requires persistence and perseverance, and when pursuit of an opportunity does not go according to plan, individuals will need to invest additional effort without considering it a burden. There is also a need to recognise one's own limitations and to acquire new skills and resources accordingly (Cheung, 2014). This often involves time away from the pursuit (Kwong and Thompson, forthcoming), and therefore, maintaining interest plays a key role. Internalising entrepreneurship and making it part of a person's passions and interests is thus valuable in not only offsetting some of the pressures of the immediate, but also in encouraging acceptance of an entrepreneurial lifestyle where there is a proactive effort to discover what entrepreneurship has to offer.

Whilst sustained interest is largely self-generated (Hidi and Renninger, 2006), it could equally benefit from external support (Renninger, 2000). Compulsory enterprise education at school can often be seen as the initial line of intervention where students are first exposed to the notion of entrepreneurship. Nevertheless, to develop a sustained interest, educational science research suggests intensity, diversity and repetitiveness of engagement to be crucial (Csikszentmihalyi et al., 1993). We shall review each of the factors in more detail below before exploring ways in which enterprise education can contribute to the development of sustained interest.

3.1. Intensity of exposure

It is generally believed that the more intensive an engagement, the more likely that an interest in a subject be sustained (Hidi and Renninger, 2006). In the context of entrepreneurship, intensive enterprise training programmes such as those in away day or boot camp formats are found to be highly effective in developing participants' entrepreneurial aspirations, which are sustained over the medium term (Kwong et al., 2012a). Sustaining heightened aspirations with a one-off intervention programme can still be challenging, and studies suggest that positive attitudes towards the exposure do not always result in entrepreneurial behaviours (Carsrud and Brannback, 2011). This is because pressure of the immediate, such as preparing for an exam or finding a job upon graduation, may distract participants from their entrepreneurial ambitions (Kwong et al., 2012a), and suggests that intensity on its own may not be adequate in the development of sustained interest.

3.2. Repetitive and continuous engagement over time

Leinhardt et al.'s (2002) thesis on the 'island of expertise' views repetitive and continuous engagement to be an important factor in generating sustained interest. For instance, although a child's interest in a particular area, such as trains, can be triggered initially by an independent event, say receiving a toy train set as a present, interest in the subject can only be sustained through continuous engagement, for example, reading of books and museum visits. In doing so, a wealth of knowledge around the topic is acquired, which further reinforces the interest and generates an embedded identity that binds the person to the specific subject. Without repeated exposure, however, this interest may fade over time.

Repeated learning also contributes to the development of specialised knowledge (Leinhardt et al., 2002). Specialisation requires repeated exposure to domain-specific declarative knowledge, repeated practice in interpreting new content, making inferences to connect new knowledge to

existing knowledge, and repeated conversations with others who share the same interests (Crowley, 2002). Studies on expertise development suggest that a learner would normally need to spend 10,000 hours or about 10 years of practice in a domain before becoming an expert (Hayes, 1985). Acquiring substantive interest in and knowledge of entrepreneurship most likely requires more than a single one-off exposure, and without this repeated exposure the aspirations generated may dissipate over time (Lourenço et al., 2012; Kwong and Thompson, forthcoming).

3.3. Diversity of exposure

The theory of fluency development suggests that looking both within and across settings is essential in understanding the development of interest and competence (Barron, 2006). Different forms of engagement are important in the development of a common identity across communities, giving learners a broader sense of belonging and exposing them to a much wider support group (Barron, 2006). Diversity of exposure is important because technical competencies are best developed through exposure to the same subject within multiple settings and access to varied resources, as this allows greater generalisation. Successful generalisation in turn enables learners to develop a feeling of competence, and increases confidence that the skills acquired are relevant to life and society at large (Ladson-Billings, 1995). Diversity of exposure is of particular relevance in the context of entrepreneurship given the multi-layered nature of the enterprise culture construct which means different activities may be needed to bring out the entrepreneurial self of individuals.

Most current enterprise programmes are short in duration, and are often connected to educational and governmental establishments with specific agendas. This means that few programmes on their own can deliver the repetitive and diverse exposures that are required for sustained interest to develop. Repeated engagement with other forms of enterprise education would enable heightened interest generated through school-based enterprise education to be nurtured and sustained over a prolonged period of time. This would in turn enable aspiring entrepreneurs to accumulate appropriate skills, networks, finance and experiences for entrepreneurial activities without losing the initial interest. Such sustained exposure, we argue, would provide a base of entrepreneurial mind-sets and skills, which in turn facilitates entrepreneurial behaviours. We recognise voluntary future participation in enterprise programmes to be an important ‘mid-way’ behavioural measure to assess the effectiveness of school-based enterprise education. As far as we are aware, no study has previously examined the relationship between school-based enterprise education and further engagement in other forms of enterprise education programmes, although a few studies have examined the effect of enterprise education on future reengagement with academic subjects (HM Inspectors of Education, 2008).

4. Data and Methods

4.1 Data Collection

In order to examine the relationship between compulsory school-based enterprise education and a range of later stage sources of enterprise education, a data source covering a range of respondents from across the population is required. This is to capture all potential later stage enterprise education sources available for individuals to use. Longitudinal data covering a particular school-based enterprise intervention are one option. However, the length of time between the intervention and all potential follow up sources of education may make this infeasible in practice due to cost and high respondent attrition rates. This makes a large scale cross sectional dataset the most appropriate method of analysing this relationship.

The main data utilised in this study are drawn from the Adult Population Survey of the GEM study (Reynolds et al., 2005) - an international study of entrepreneurial behaviour and attitudes, from England and Wales, between 2006 and 2007. The data collection method consists of telephone interviews using a stratified random sample, ensuring a minimum of 2000 respondents from each of the Government Office Regions. For an exhaustive description of the data collection procedure utilised in the UK, please refer to Levie (2007). The data utilised here covers those aged between 18 and 45 years (*n*=16,343) reflecting the relatively recent expansion of entrepreneurship and small business based courses (Vesper, 1988; Vesper and Gartner, 1997; Kuratko, 2005; Solomon, 2007; Hannon, 2007).

A key advantage of the GEM data over other sources of data is that items are included in the survey that relate to respondents' participation in the enterprise education. The GEM data collects information on the enterprise education and training undertaken by respondents at four different points in their career: (1) at school, (2) as a formal work placement, (3) at college or university (henceforth university), and (4) as part of a government sponsored training scheme.[1] Although continuing education and the introduction of placements into university courses mean that it is possible for respondents to undertake these forms of education in a variety of orders, for the vast majority, school precedes other forms of education and training and thus allows us to establish causational linkage between school-based and other forms of enterprise education.

Those taking enterprise education may be a self-selecting sample with a higher proportion of participants displaying a prior desire to start a business of their own as well as possessing greater pre-existing abilities (Fayolle and Gailly, forthcoming; Rideout and Grey, 2013). This limits studies' potential to determine the true impact that enterprise education has upon attitudes towards and propensity to engage with entrepreneurial activities, such as new venture creation. In order to minimise this problem the GEM study asks those that have undertaken enterprise education at any of the four stages above whether this was voluntary or compulsory.

4.2 Data Analysis

The main emphasis of the paper is to consider whether enterprise education at school leads to greater voluntary involvement in other forms of enterprise education. The expectation being that

[1] Respondents were asked: "Have you ever taken part in any of the following? (i) Business or enterprise training at school?; (ii) Business or enterprise training at college or university?; (iii) Work experience in a small or medium sized business whilst at school or college?; (iv) A Government or public sector training course in business or enterprise skills?"

school-based enterprise education given its temporal displacement from major career choices would only have a limited effect on the work decisions of those exposed to it. However, by encouraging individuals to engage with later-stage enterprise education it may play an important role in generating sustained interest. This would suggest that any effect of school-based enterprise education on entrepreneurial activity is being mediated by later stage enterprise education. In order to investigate whether this is the case two main sets of relationships need to be investigated.

As the probability of engaging in entrepreneurial activities and the educational choices associated with this have previously been found to be influenced by a wide variety of personal and environmental factors it is important to utilise an analysis approach that controls for these other factors. To control for these other factors a multiple regression approach is adopted. This allows the analysis to take advantage of the large sample sizes available from the GEM data in order to isolate the influence of engagement in enterprise education at various stages of development and by type of engagement with the programmes (compulsory and voluntary). The large sample sizes of the GEM data can lead to relatively small effects being statistically significant. Although this means that all influences on decisions to voluntary engage with later stage enterprise education can be identified, it might be misleading in terms of the importance of these results. In order to account for this the odds-ratios relating to focal results are also reported in the text to indicate the magnitude of the effect on the probability of undertaking the activities of interest.

The first set of regressions will investigate to what extent compulsory enterprise education at school increases the probability of an individual engaging voluntarily with enterprise education at later stages of their education and training. As our focus is on examining the subsequent impact of school-based enterprise education, we have chosen those voluntarily undertaking university enterprise courses, formal work placements in SMEs, or government sponsored enterprise training as our dependent variables. Given the discrete nature of these variables, ordinary least squares regressions are inappropriate and instead binary logistic regressions are utilised.

As noted above, in addition to compulsory school-based enterprise education a variety of personal and environmental factors are likely to influence the probability that an individual engages with later stage enterprise education with an intention to improve their entrepreneurial skills or start a new business in the future. These can be grouped into personal characteristics (*PersChar*) and environmental factors (*Envir*) as outlined in equation (1) below. The personal characteristics included in the regressions are intended to control for: human capital; liquidity constraints; the extent an individual is embedded in their local community as reflected by their migration status; work status; and gender. The environmental factors that are likely to influence the perceived desirability and feasibility of new venture creation include: the strength of the local economy; the presence of congestion or agglomeration effects; and other unobserved regional influences. The rationale for including each of the personal and environmental characteristics along with the measures used to represent them are discussed in more detail below.

(1) $\text{EntreEd}_{\text{Volj,I}} = \alpha_1 + \boldsymbol{\beta_1 \text{PersChar}_i} + \boldsymbol{\gamma_1 \text{Envir}_i} + \varphi_{1,j}\text{EntreEd}_{\text{COMPSCH,i}} + \varepsilon_{1,i}$

Studies suggest that entrepreneurship and careers in general are a planned behaviour (Katz and Gartner, 1988; Giles and Rea, 1999). This would suggest that personal characteristics that increase the likelihood of voluntarily engaging with later stage entrepreneurship are likely to be those associated with greater engagement with entrepreneurship and entrepreneurial careers in general. Individuals will engage with this later stage enterprise education as an investment to prepare

themselves for their desired careers (Chen et al., 1998). Relevant human capital can be both in terms of experience and formal training and qualifications (Shane, 2008). Age is expected to have an inverted U-shaped relationship with entrepreneurship (Kim, 2007). This is a balance of the need to gain experience (Baum and Silverman, 2004), offset against the time required to obtain a return on the time and effort put into starting a business (Lévesque and Minniti, 2006). Experience is therefore represented by the age of the respondent centred around the average age, and the square of this. Centring the age variable makes the zero value more meaningful and reduces the collinearity between the two age terms (Cohen et al., 2003). Those with higher levels of formal education are found to display better opportunity recognition and broader networks, which may be converted into greater entrepreneurial engagement (Robson and Sexton, 1994; Arenius and De Clercq, 2005; Levie and Autio, 2008; Pickernell et al., 2011; Block et al., 2011). Recognising this, a dummy is included to represent the possession of university undergraduate degree level qualifications or above.

The impact of workstatus is complicated as those in employment are likely to possess ties to more valuable network partners (Arenius and De Clercq, 2005). However, those out of work have a lower opportunity cost of engaging in entrepreneurship (Blau, 1987; Evans and Leighton, 1989). Dummies are included to represent the following: full-time employment; part-time employment; students; out of work claiming benefits (unemployment); out of work not claiming benefits (economically inactive); and a final group including those classing themselves as disabled, homemakers, and the retired. Those entering a region from another UK region (in-migrants), or from another country (immigrants) may look at the resources available and spot opportunities that lifelong residents of a region miss (Kalantaridis and Bika, 2006; Levie, 2007).

As studies continue to find differences in the entrepreneurial propensities of women and men (Brush, 1992; Klapper and Parker, 2011) a dummy variable is included to capture this. A number of possible explanations have been suggested for this: greater risk aversion (Caliendo et al., 2009); different family and social roles (Cohen, 1996); direct discrimination (Fay and Williams, 1991); and perceived financial constraints (Kwong et al., 2012c). As financial capital is likely to be important in overcoming liquidity constraints (Kihlstrom and Laffont, 1979; Evans and Jovanovic, 1989), household income dummies place individuals into three categories: less than £17,500; £17,500 to £49,999; and £50,000 or more.

The environmental influences include economic conditions, which make entrepreneurship more profitable and pull entrepreneurs in (Storey and Johnson, 1987; Blanchflower and Oswald, 1990). These are captured by the unemployment rate (claimant count) in the local authority, which has a negative environmental level effect rather than the positive individual level effect discussed above (Ritsilä and Tervo, 2002). The second influence on entrepreneurial activity from the local environment is captured by the rural or urban nature of the economy as determined by the Office for National Statistics (2004) categorisation of wards within England and Wales. The relationship is unclear as rural areas tend to have a greater tradition of small business ownership and employment (Brooksbank et al., 2008) and lower costs from factors such as congestion (Reynolds, 1994). However, they lack the benefits of agglomeration economies which can include: clusters of similar firms (Delgado, 2010); specialised labour (Baker et al., 2005); and better information flows (Vernon, 1960).

In order to determine the effectiveness of compulsory school-based enterprise education it is necessary to consider its indirect effect on entrepreneurial attitudes and activities. The first part of the analysis considers the link with later stage enterprise education. The second part of the analysis

then considers whether there is a positive relationship between voluntary engagement with later stage enterprise education and entrepreneurial activities. This completes the causal chain from compulsory enterprise education at school to enterprise activities and behaviour. As discussed in the preceding sections, the benefits of enterprise education are not presumed to be restricted to outcomes associated with new venture creation and business ownership. As such, it would be preferable to investigate the link between voluntary engagement with later stage enterprise education and a broader measure of entrepreneurship, which incorporates both business ownership and intrapreneurship. Unfortunately, the GEM survey conducted in 2006 and 2007 did not include such a measure. This means that although imperfect we consider the mediating effect of later stage enterprise education on the relationship between compulsory school-based enterprise education and entrepreneurial intentions and nascent entrepreneurship.

The first measure, entrepreneurial intentions, is defined as those who feel that they will be involved in starting a business that they will own or part own and manage in the next three years. This means that this measure requires no commitment towards an entrepreneurial career, and a large number of this group may never actually instigate their business ideas. The second measure, nascent entrepreneurship, includes those that have actively engaged in starting a business. They must have undertaken at least one activity associated with starting their business, but these businesses are at the earliest stage of development, and have not paid profits or wages for more than three months in total[2].

Baron and Kenny (1986) suggest that a mediating relationship such as that described above can be examined by looking at three key relationships. They suggest that the independent variable should be significantly related to the dependent variable. In the example here compulsory school-based enterprise education should be significantly related to entrepreneurial intentions or nascent entrepreneurship (*EntreAct*) as outlined in equation (2) below. Second the independent variable should be significantly related to the intervening variable. This refers to our main relationship of interest discussed above (equation (1)). In other words, the role of compulsory enterprise education in encouraging further voluntary engagement with later stage enterprise education. Lastly when the intervening variable is controlled for any relationship between the independent variable and dependent variable should become insignificant. Thus, if later stage enterprise education completely mediates the relationship between compulsory school-based enterprise education and entrepreneurial careers (as captured by entrepreneurial intentions and nascent entrepreneurship) its inclusion in the regression of entrepreneurial activity should result in a non-significant relationship between compulsory enterprise education and entrepreneurial activity. This is shown by equation (3) where the impact of enterprise education is captured by the variable $EntreEd_{VOLj}$ where the subscript *j* reflects the level, school (*SCH*), university (*UNI*), work placement (*WP*) or government training scheme (*GOV*). A mediating relationship would result in φ_3 becoming insignificant and φ_4 being significant.

(2) $\text{EntreAct}_i = \alpha_2 + \boldsymbol{\beta_2 PersChar_i} + \boldsymbol{\gamma_2 Envir_i} + \varphi_2 \text{EntreEd}_{COMPSCH,i} + \varepsilon_{2,i}$

[2] To confirm that nascent entrepreneurs will be activity involved in the business follow up questions ask them to confirm that they will be owners or part owners of the resultant business, and that they will be actively involved in the management of the business. See Reynolds et al. (2005) for a detailed explanation of the questions used to define various stages of entrepreneurial engagement.

(3) $\text{EntreAct}_i = \alpha_3 + \boldsymbol{\beta_3}\textbf{PersChar}_i + \boldsymbol{\gamma_3}\textbf{Envir}_i + \varphi_3\text{EntreEd}_{\text{COMPSCH},i} + \varphi_{4,j}\text{EntreEd}_{\text{Volj},i} + \varepsilon_{3,i}$

Within the regressions we control for compulsory engagement with the relevant later stage enterprise education source in both equations (2) and (3), as their compulsory nature should mean that compulsory school-based enterprise education does not cause this engagement. Each of the later stage sources of enterprise education are examined in separate regressions as there is the danger of multicollinearity as those voluntarily engaging in later stage enterprise education could engage in more than one source.

It should be noted that given the nature of the activities being studied, models are better at estimating those factors associated with a greater probability of engagement rather than actually undertaking the activity. For example, Shapero and Sokol's (1982) model of the entrepreneurial event suggests that individuals' intentions are formed from the perceived desirability and feasibility of the activity, but for such intentions to become realised often requires a trigger event. These trigger events are often out of the control of the individual, such as the loss of full time employment for others and cannot be predicted by the model.

The mediating relationship proposed is depicted in Figure 1. Here compulsory school-based enterprise education may be found to have a positive relationship with entrepreneurial intentions or nascent entrepreneurship as captured by a significant coefficient φ_2 in equation 2.

PLEASE INSERT FIGURE 1 ABOUT HERE

The links at the top of Figure 1 depict the mediation of this relationship through voluntary later stage enterprise education. Here compulsory school-based enterprise education leads to voluntary engagement with voluntary later stage enterprise education (equation 1 coefficient φ_1), which then leads to greater entrepreneurial intentions and nascent entrepreneurship (equation 3 coefficient φ_4). With complete mediation the direct link from compulsory school-based enterprise education to entrepreneurial intentions and nascent entrepreneurship should be no longer significant (coefficient φ_3 in equation 3). However, as a partial mediating relationship may be present, φ_3 need not become insignificant. This means the key results for mediation being present, are coefficients φ_1 and φ_4 being significant (Kenny et al., 1998). It is also possible that the indirect effect via the mediating variable (φ_1 and φ_4) could have the opposite relationship to the direct effect (φ_3). This means that coefficient φ_3 could remain significant, but also means coefficient φ_2 in equation 2 could be insignificant as the two effects cancel out (MacKinnon et al., 2000).

Alternative approaches to testing for mediating relationships include testing the differences in the relationship between the independent variable when the mediating variable is and is not included in regressions of the dependent variable. In this case it would mean considering if there is a significant difference in the coefficients φ_2 and φ_3. In other words the difference in the effect of compulsory school-based enterprise education on entrepreneurial intentions or nascent entrepreneurship when voluntary later stage enterprise education is and is not accounted for. This allows for partial mediation to be identified as well as full mediation. Freedman and Schatzkin (1992) propose a t-test of the difference in φ_2 and φ_3 where the standard error of this is given by:

(4) $$\sigma_{\text{Freedman-Schatzkin}} = \sqrt{\sigma_{\varphi 2}^2 + \sigma_{\varphi 3}^2 - 2\sigma_{\varphi 2}\sigma_{\varphi 3}\sqrt{1-\rho_{XI}^2}}$$

Where $\sigma_{\varphi 2}$ and $\sigma_{\varphi 3}$ are the standard errors of the coefficients φ_2 and φ_3 respectively. ρ_{XI} is the correlation between the independent and intervening variables.

A third option is to examine the significance of the indirect effect through the product of the two coefficients φ_1 and φ_4. In other words the combined effect of the link from compulsory school-based enterprise education to voluntary enterprise education and that of voluntary enterprise education on entrepreneurial intentions or nascent entrepreneurship ($\varphi_1\varphi_4$). Sobel (1982) gives the standard error of this as:

$$\sigma_{Sobel} = \sqrt{\varphi_1^2\sigma_{\varphi 4}^2 + \varphi_4^2\sigma_{\varphi 1}^2} \quad (5)$$

The product of the coefficients is divided by this and a standard Z-test applied. Others suggest alternatives which incorporate the product of the two variances (Aroian, 1947; Goodman, 1960), but this usually has little impact on the results as this term is small. Based on simulations MacKinnon et al. (1998) suggest alternative critical values to those of the usual Z-test. MacKinnon et al. (2002) indicate that no test is without its potential problems, but suggest the product of coefficients test with adjusted critical values and the Freedman and Schatzkin (1992) difference of coefficients test have the most power. We use these tests along with the more widely used Baron and Kenny (1986), Kenny et al. (1998) and Sobel (1982) approaches. It is also true that any relationship between voluntary engagement with school-based enterprise education and entrepreneurial activities and attitudes is expected to operate in a similar manner with voluntary engagement in later stage entrepreneurial activity mediating this relationship. As noted in sections 1 to 3, the emphasis in this study is not on the impact of voluntary engagement with school-based enterprise education, as increasing participation in such activities would be much harder, if not impossible, for policy to achieve. However, the equations to be estimated, as outlined above, will still capture such a relationship. For completeness we include tests of mediation of voluntary school-based enterprise education activities by later stage activities.

5. Results

The existing literature relating to school-based and later stage enterprise education was discussed in sections 2 and 3. Based on this prior work it appears that the most important role of school-based enterprise education is to encourage further engagement in additional training at later stages to generate sustained interest. Table 1 below presents the regressions based on equation 1 outlined in the preceding section, where the dependent variables are the later stage entrepreneurship education sources, and school-based enterprise education enters each of the specifications as an independent variable. The regressions only explain a limited amount of the deviation present, ranging from 2.7 percent in the formal work placements regression to 8.8 percent in the university regression. The likelihood ratio tests, however, indicate that the null of constant probability can be rejected, whilst the null of a good fit cannot be rejected.

PLEASE INSERT TABLE 1 ABOUT HERE

The main variable of interest within these regressions is that associated with compulsory school-based enterprise education. The coefficient here will be positive and significant if compulsory school-based enterprise education has a key role in generating sustained interest by encouraging later stage participation. It is also interesting to note the difference with the dummy representing those that voluntarily participated in enterprise education at school as this will reflect those who already had an interest in entrepreneurship and would be expected to go on to voluntarily engage with further enterprise education.

The results suggest that, compared to those without enterprise education at school, those who had compulsory courses are significantly more likely to engage with university enterprise education and government training schemes. The impact is greatest when considering the probability of engaging with university education where compulsory school-based courses make respondents more than two and half times as likely to participate (odds ratio 2.714). However, this still compares to the self-selecting group who took school-based enterprise education on a voluntary basis who are six times as likely to follow this up at university (odds ratio 6.022). The influence of compulsory enterprise education at school on future participation in government training schemes is smaller. This is understandable as many of these will occur at a date more distant from the initial engagement, but still represents an almost doubling of the likelihood of future engagement with these courses (odds ratio 1.943). The results show that compulsory enterprise education at school has a substantial influence on the probability of individuals voluntarily engaging with enterprise education later in their educational and working careers in a variety of forms. The encouragement to engage with enterprise education at college or university is perhaps most valuable for both the individual and local economy. These educational/training schemes are likely to provide skills and knowledge that will be valuable regardless of whether those taking them choose to start their own business or move into employment within the public or private sector where the same skills are increasingly acknowledged as being desirable (Binks et al., 2006; Rae, 2010). Given that after accounting for other influences, those exposed to compulsory enterprise education at school are almost three times as likely to engage further as those who were not, this is clearly a substantial effect. This shows the value of Government policies in recent years, which embed such teaching in the school curriculum (Gillie, 2012). Government training schemes on the other hand, may be more commonly focused on new venture creation (Henry et al., 2004). The near doubling of the probability of engaging with such schemes at a later date shows the potential for compulsory school-based enterprise education to not only generate interest during the duration of the course (Peterman and Kennedy, 2003; Man and Yu, 2007), but also to ensure that this interest is sustained over a longer period of time by encouraging participants to engage with further study.

There is less evidence of the school-based enterprise education having an influence on participation in formal work placements, where the coefficient although positive is only weakly significant. This is potentially something that those designing and delivering enterprise education within schools may wish to address. Employers have regularly cited the limited work experience and employability skills of young people as a barrier to their employment (Wilton, 2012). With SMEs accounting for 60 per cent of private sector employment in the UK in 2014 (Department for Business, Innovation and Skills, 2014), such work placements in SMEs would be expected to be valuable (Wilton, 2012). It would also provide further diversity of exposure, which promotes sustained interest (Barron, 2006).

The other factors that influence engagement with later stage courses include: gender, age, and being born outside the UK. Although considerable efforts have been made in the UK to encourage more women to start entrepreneurial careers, it is clear that engagement with associated courses still remains below the level found for men. Understandably the probability of engaging with later stage enterprise education increases with age and understandably beyond a certain point this probability will not increase given the need to retain sufficient time to recoup any investment in education. There is also evidence that immigrants entering a UK region from abroad are more likely to look to voluntarily engage with enterprise education courses at college or university and participate in formal work placements. Prior studies have suggested that this may be influenced by

discrimination in the mainstream labour market (Barrett et al., 1996; Clark and Drinkwater, 2000), but may also in part due to a stronger tradition of small business ownership (Yuengert, 1995).

Based in the existing literature covered in sections 2 and 3 it was suggested that compulsory school-based enterprise education may potentially influence engagement with entrepreneurial activities and careers although indirectly with this relationship mediated by voluntary engagement in later stage enterprise education. The results presented above suggest that indeed compulsory school-based enterprise education has a substantial influence on the probability of engaging with these later stage education and training schemes. As outlined in section 4, the positive influence of compulsory enterprise education relies, however, on these later stage sources of enterprise education having a positive impact on entrepreneurial activities.

Tables 2 and 3 below present the binary logistic regressions of entrepreneurial intentions (expecting to be involved in a business start in the next three years), and nascent entrepreneurship (those actively starting a business at the time of the survey). These results examine the extent that compulsory school-based enterprise education has a direct influence on these particular manifestations of entrepreneurial attitudes and engagement with entrepreneurial activities as outlined by equation (2) in section 4. The tables also present regressions run including voluntary engagement with the three later stage sources of enterprise education to capture the second part of the mediating relationship (equation (3) in section 4). As with the regressions of voluntary engagement with later stage enterprise education reported previously relatively low levels of deviation are explained, but the null of a good fit to the data cannot be rejected and the null of constant probability is rejected.

PLEASE INSERT TABLE 2 ABOUT HERE

In terms of entrepreneurial intentions compulsory enterprise education taken at school is positively associated with a greater probability of intending to start a business in the next two years when voluntary engagement with formal work placements and government training schemes are not included in the regressions (φ_2 in equation (2)). This is not the case for the university-based enterprise education regression. Although compulsory engagement with university enterprise education is unlikely to be caused by school-based enterprise education, there is some correlation between the two, which reduces the significance of compulsory school-based enterprise education. Those that participate in compulsory enterprise education at school are approaching 20 to 30 percent more likely than those not taking enterprise education at school to indicate that they expect to be involved in a business start in the near future (odds ratios of 1.182 when controlling for compulsory university enterprise education and 1.297 when controlling for compulsory government training schemes). In contrast, those that take enterprise education at school on a voluntary basis are approaching twice as likely as those taking no enterprise education at school to possess entrepreneurial intentions (odds ratio 1.883 when controlling for compulsory university enterprise education). All coefficients on compulsory school-based enterprise education are reduced and become insignificant when voluntary engagement with later stage enterprise education is added the regressions (φ_3 in equation (3)). Although, voluntary engagement with school-based enterprise education remains a significant influence on the likelihood of an individual displaying entrepreneurial intentions after the addition of voluntary engagement with all later stage sources of enterprise education, the coefficients decrease in size. This indicates that where pupils display an early interest in enterprise this may still be retained without renewal, but the later stage enterprise education voluntarily engaged in by many does appear to play a role in sustaining this interest.

The voluntary sources of enterprise education having the largest influence are university-based enterprise education (odds ratio 1.982), and government training schemes (odds ratio 2.202). These results have positive implications for initiatives at the school level. For those taking compulsory school-based enterprise education, the results in Table 1 suggest engagement in these later stage activities is twice as likely for government training schemes and three times as likely for university courses. Once engaged with these later stage activities the probability of intending to start a business in the near future then approximately doubles. Bearing in mind that this is a very restricted measure of entrepreneurial intentions, which ignores intentions to work in a more entrepreneurial manner in waged employment, the benefits are likely to be considerable. It should, however, also be noted that the results above relate to the regressions run when using entrepreneurial intentions, which may not actually be realised in a large number of cases for a considerable time period, or at all (Kwong and Thompson, forthcoming). The formal work placements regressions show a similar positive relationship between voluntary engagement and entrepreneurial intentions although smaller (odds ratio 1.696). Given that compulsory enterprise education at school was only related to voluntary engagement in formal work placements at the 10 percent level it appears to have less influence through this mechanism. The test of the indirect effect ($\varphi_1\varphi_4$) as proposed by Sobel (1982) confirms a mediating role for voluntary university enterprise education and government training schemes, but not for formal work placements. However, when using MacKinnon et al.'s (1998) adjusted critical values a mediated relationship is suggested for all three later stage enterprise education sources. The difference in coefficients (φ_2 - φ_3) proposed by Freedman and Schatzkin (1992) also suggests a mediating role for all three later stage enterprise education sources. The equivalent tests for voluntary engagement in school-based enterprise education suggest a mediating role for later stage enterprise education, including for formal work placements.

PLEASE INSERT TABLE 3 ABOUT HERE

When considering the nascent entrepreneurship regressions presented in table 3 above, compulsory school-based enterprise education is not found to have a direct significant effect (φ_2). As noted by MacKinnon (2000) this could reflect the direct and indirect effects having opposite signs. Feasibly this might be the case where compulsory school-based enterprise education has a divisive effect on those exposed to it. Those positively influenced go on to later stage enterprise education, but for others they learn they are not suited/equipped for entrepreneurial careers, as Oosterbrook et al. (2010) found for Dutch university students. As Kenny et al. (1998) highlight, this means that the key results for the presence of mediation are the significance of coefficients φ_1 and φ_4 and a mediated relationship could still exist without a direct relationship existing, so that φ_2 need not be significant (MacKinnon et al., 2000).

The coefficients on compulsory school-based enterprise education all decreased in size when voluntary later stage enterprise education was included in the regression. As with entrepreneurial intentions voluntary engagement with university (odds ratio 1.731) and government supported (odds ratio 2.457) sources of enterprise education did increase the likelihood of being engaged in nascent entrepreneurship. The tests of a mediating relationship confirm the presence of a link from compulsory school-based enterprise education to nascent entrepreneurship even with the absence of a significant direct relationship. Regardless of whether the standard test of the indirect effect (Sobel, 1982) or that with adjusted critical values (MacKinnon et al., 1998) was used, a mediating relationship was only found for voluntary engagement with university enterprise education and government training schemes. The difference in coefficients test did suggest a mediating

relationship for all three sources. For voluntary engagement in school-based enterprise education later stage enterprise education from university and government sources appears to play a mediating role.

6. Conclusion

This study presents a novel theoretical paradigm for enterprise education research. Drawing upon the theory of interest development from the field of educational science, it is argued that the role of enterprise education is beyond business start-up activity, or the provision of specific skillsets to achieve this. Instead, within a context where the prospect and timing of starting a business is uncertain, creating a sustained and enduring interest, rather than a situational one, is crucial. It was outlined above that there is a strong role for enterprise education in consolidating interest in entrepreneurial endeavours, by providing diverse, continuous and repetitive exposure. This should nurture the entrepreneurial spark of participants until they are ready, technically and mentally, to engage in entrepreneurial activities of all types. They will also become more willing to support others to do likewise and thereby contribute fully to an entrepreneurial society.

The study provides the first empirical evidence towards the role of enterprise education in the development of sustained interest. The results show that compulsory school-based enterprise education has the potential to generate sustained interest in entrepreneurial activity. It does not directly influence entrepreneurial activity and attitudes, but instead operates through increased voluntary engagement with university-based enterprise education and government training schemes. Although the tests of mediation indicate some evidence of such a relationship for voluntary engagement with formal work placements, the results presented in Table 1 indicate that currently this mechanism appears to have less influence.

The results support calls from studies such as Vinten and Alcock (2004) and Thursby (2005), along with policymakers (Fagan, 2006), to embed enterprise in all stages of education and across all subjects. The literature on phases of interest development also leads us to the view that in supporting an entrepreneur's journey, enterprise education works best when drawn from multiple sources working together. This study has concentrated on compulsory school-based enterprise education because this is where policy is most likely to effectively ensure participation, but the results above suggest that a similar causal chain is also present for those that voluntarily engage in school-based activities.

To extend from the theoretical paradigm of sustained interest, we propose a holistic framework of enterprise education where an overarching objective is to unify the currently fragmented enterprise education provision. Engaging in the various programmes at different stages would allow aspiring entrepreneurs to maintain their ambitions, and at the same time, further refine the technical skills and knowledge required to engage in all types of entrepreneurial activity (Henry et al., 2005). Coordination and cooperation between providers is important. A clear practical implication of the sustained interest paradigm is that schools, universities and governmental agencies should be responsible for working together to ensure that whilst school-based enterprise education encourages further study (Yu, 2013), expectations of what this future study will consist of are not inappropriate (von Graevenitz et al., 2010; Oosterbeek et al., 2010). Likewise, university courses need to continue the efforts of recent years to ensure that they do provide the skills, knowledge and confidence that budding entrepreneurs require (Piperopoulos and Dimov, forthcoming). This, however, is by no means an easy task – to integrate enterprise education components with existing

curriculums, and achieve compatibility of learning, has already been found to be a challenge (Yu, 2013), but integrating and synchronising enterprise education provision at different levels produces an even greater challenge. The results indicate that such links will be important for both those whose interest was initiated by compulsory school-based enterprise education and those who voluntarily engaged due to a pre-existing interest. This may mean that those providing later stage courses have to consider whether there are different needs and requirements depending on where their participants' interest originates.

The study does have a number of limitations that future research would be advised to consider. Firstly, with the existing dataset we can only use new venture creation as the final objective. This neglects the broader view of entrepreneurship that sees entrepreneurship as an essential basic skill that is useful regardless of whether someone is working for themselves or others. Further study exploring the effectiveness of the holistic approach would enhance our understanding of the way in which the different enterprise education programmes can come together to achieve a variety of outcomes. Secondly, the grouping of enterprise education into four broad groups does hide much of the variation that is likely to be present. The content, form of delivery and duration of the courses are all important considerations (Piperopoulos and Dimov, forthcoming). Thirdly, the study also limits itself to the situation in England and Wales. International comparisons where different styles of school-based enterprise education have been utilised would help establish best practice and enable courses to be optimised, although it would also be important to bear in mind the contextual factors that may make entrepreneurship more or less desirable for young people considering it as a career. Fourthly, longitudinal work would be of considerable value in examining the underlying reasons why compulsory enterprise education at school acts as a gateway to some forms of later stage enterprise education, but not others, as was found to be the case for formal work placements in SMEs. Equally, those designing and delivering later stage enterprise education may have access to valuable information, such as opinions of students or training scheme participants, as to whether courses have met their expectations, and what role prior training had in forming these expectations. This relates closely to Oosterbeek et al.'s (2010) suggestions that enterprise education may have two effects, with the first on actual skills and the second on participants' perceptions of skills. Participation in entrepreneurial activities will be influenced by both, but the balance of the two effects will determine the changes and modifications required for enterprise education at all levels. Finally, whilst we have concentrated on nascent entrepreneurship rates, more is not necessarily better, and it is important that studies also consider the quality of the new entrepreneurial ventures: will they survive, are they innovative, how many jobs will they create and ultimately, what is their value to society?

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Table 1 – Binary logistic regressions of later sources of enterprise education and the influence of compulsory school based enterprise education

Dependent Variable		University Based	Formal Work Placements	Government Training Schemes
Participation in School Based Enterprise Education (base category no participation)	Compulsory	**0.9985**	0.1777	**0.6642**
		(0.000)	(0.060)	(0.000)
	Voluntary	**1.7953**	**0.9399**	**1.1412**
		(0.000)	(0.000)	(0.000)
Gender	Male	**0.2481**	**0.4032**	**0.1607**
		(0.000)	(0.000)	(0.005)
Human Capital	Age	0.0292	**0.0565**	**0.1409**
		(0.383)	(0.050)	(0.000)
	Age^2	-0.0378	**-0.0950**	**-0.1654**
		(0.461)	(0.031)	(0.005)
	University Graduate	**0.3148**	0.0009	-0.0360
		(0.000)	(0.985)	(0.553)
Workstatus (base category Full-Time Employed)	Part Time Employed	-0.1153	0.0919	-0.0819
		(0.104)	(0.120)	(0.276)
	Out of Work Force	-0.1033	**0.2950**	-0.1212
		(0.272)	(0.000)	(0.218)
	Student	0.1345	0.0551	-0.3459
		(0.306)	(0.638)	(0.060)
	Unemployed	0.0169	-0.0186	0.1166
		(0.916)	(0.888)	(0.464)
	Economically Inactive	0.2807	-0.0061	-0.0868
		(0.101)	(0.969)	(0.683)
Household Income (base category £17,500 - £49,999)	Under £17,500	-0.0849	0.0040	-0.0210
		(0.204)	(0.941)	(0.764)
	£50,000 or more	**0.2196**	0.0374	-0.0454
		(0.000)	(0.487)	(0.511)
Migration Status (base category Life-Long Residents)	In-Migrants	-0.0698	0.0108	-0.0499
		(0.198)	(0.814)	(0.391)
	Immigrants	**0.3450**	**0.3209**	0.0373
		(0.000)	(0.000)	(0.690)
Environmental Influences	Local Authority Unemployment	0.0412	-0.0364	0.0654
		(0.197)	(0.185)	(0.061)
	Urban	**-0.1700**	-0.0029	-0.0422
		(0.003)	(0.954)	(0.499)
	Constant	**-2.9381**	**-2.3802**	**-5.3371**
		(0.000)	(0.000)	(0.000)

Notes: p-values in parenthesis; emboldened values are significant at the 5 percent level

Table 1 – Continued

Dependent Variable	University Based	Formal Work Placements	Government Training Schemes
N	16,343	16,343	16,343
R^2	0.088	0.027	0.030
Percentage Correct	86.4	81.0	89.6
Hosmer-Lemeshow Test	10.12 (0.257)	14.87 (0.062)	13.93 (0.084)
LR test (null of constant probability)	1160.1 [27] (0.000)	427.4 [27] (0.000)	330.3 [27] (0.000)

Notes: p-values in parenthesis; emboldened values are significant at the 5 percent level

Table 2 – Binary logistic regressions of entrepreneurial intentions and the mediating influence of later stage enterprise education (controlling for compulsory engagement)

Source of Enterprise Education		University Based		Formal Work Placements		Government Training Schemes	
		No Vol.	Vol.	No Vol.	Vol.	No Vol.	Vol.
Participation in Enterprise Education (base category no participation)							
School Based	Compulsory	0.1676 (0.185)	0.0357 (0.779)	**0.2495** (0.044)	0.1933 (0.121)	**0.2602** (0.035)	0.1971 (0.113)
	Voluntary	**0.6331** (0.000)	**0.3969** (0.000)	**0.6423** (0.000)	**0.5427** (0.000)	**0.6444** (0.000)	**0.5218** (0.000)
University Based	Compulsory	**0.5155** (0.000)	**0.7098** (0.000)				
	Voluntary		**0.6840** (0.000)				
Formal Work Placements	Compulsory			0.1094 (0.095)	**0.3084** (0.000)		
	Voluntary				**0.5284** (0.000)		
Government Training Schemes	Compulsory					0.2477 (0.135)	**0.3796** (0.022)
	Voluntary						**0.7893** (0.000)
Gender	Male	**0.8319** (0.000)	**0.8074** (0.000)	**0.8465** (0.000)	**0.8207** (0.000)	**0.8437** (0.000)	**0.8329** (0.000)
Human Capital	Age	0.0547 (0.171)	0.0523 (0.193)	0.0540 (0.176)	0.0469 (0.241)	0.0545 (0.172)	0.0436 (0.276)
	Age^2	-0.0981 (0.109)	-0.0950 (0.122)	-0.0953 (0.119)	-0.0789 (0.199)	-0.0990 (0.105)	-0.0870 (0.156)
	University Graduate	**0.1986** (0.002)	**0.1572** (0.015)	**0.2234** (0.000)	**0.2175** (0.001)	**0.2253** (0.000)	**0.2342** (0.000)
Workstatus (base category Full-Time Employed)	Part Time Employed	**0.3534** (0.000)	**0.3631** (0.000)	**0.3516** (0.000)	**0.3428** (0.000)	**0.3516** (0.000)	**0.3547** (0.000)
	Out of Work Force	**0.3063** (0.006)	**0.3118** (0.005)	**0.3118** (0.005)	**0.2922** (0.009)	**0.3136** (0.005)	**0.3244** (0.004)
	Student	0.2142 (0.169)	0.1944 (0.215)	0.2066 (0.184)	0.2051 (0.188)	0.2113 (0.175)	0.2364 (0.130)
	Unemploy'	**0.9243** (0.000)	**0.9263** (0.000)	**0.9086** (0.000)	**0.9205** (0.000)	**0.9091** (0.000)	**0.9054** (0.000)
	Econ' Inactive	**0.9740** (0.000)	**0.9582** (0.000)	**0.9668** (0.000)	**0.9742** (0.000)	**0.9728** (0.000)	**0.9853** (0.000)

Notes: p-values in parenthesis; emboldened values are significant at the 5 percent level

Table 2 - continued

Source of Enterprise Education		University Based		Formal Work Placements		Government Training Schemes	
		No Vol.	Vol.	No Vol.	Vol.	No Vol.	Vol.
Household Income (base category £17,500 - £49,999)	Under £17,500	-0.0424 (0.584)	-0.0408 (0.600)	-0.0388 (0.617)	-0.0412 (0.595)	-0.0413 (0.594)	-0.0464 (0.551)
	£50,000 or more	0.1211 (0.096)	0.0967 (0.186)	0.1225 (0.092)	0.1232 (0.091)	0.1228 (0.091)	0.1259 (0.084)
Migration Status (base category Life-Long Residents)	In-Migrants	**0.2402** (0.000)	**0.2523** (0.000)	**0.2440** (0.000)	**0.2472** (0.000)	**0.2450** (0.000)	**0.2538** (0.000)
	Immigrants	**0.7978** (0.000)	**0.7603** (0.000)	**0.8197** (0.000)	**0.8170** (0.000)	**0.8041** (0.000)	**0.8037** (0.000)
Environmental Influences	LA Unemp'	-0.0117 (0.758)	-0.0141 (0.711)	-0.0145 (0.702)	-0.0117 (0.757)	-0.0148 (0.696)	-0.0203 (0.595)
	Urban	-0.1144 (0.103)	-0.0982 (0.163)	-0.1153 (0.100)	-0.1099 (0.118)	-0.1163 (0.097)	-0.1153 (0.102)
	Constant	**-3.4866** (0.000)	**-3.5165** (0.000)	**-3.5110** (0.000)	**-3.6328** (0.000)	**-3.4586** (0.000)	**-3.3092** (0.000)
N		16,343	16,343	16,343	16,343	16,343	16,343
R^2		0.061	0.069	0.059	0.065	0.059	0.069
Percentage Correct		91.2	91.2	91.2	91.2	91.2	91.2
Hosmer-Lemeshow Test		8.94 (0.347)	9.89 (0.273)	9.56 (0.297)	5.31 (0.724)	6.73 (0.566)	10.18 (0.253)
LR test (null of constant probability)		594.3 [28] (0.000)	676.2 [29] (0.000)	576.8 [28] (0.000)	630.0 [29] (0.000)	576.1 [28] (0.000)	674.2 [29] (0.000)
Mediation Tests – Compulsory School Based							
Sobel (1982) Test of Product of Coefficients			7.104 (0.000)		1.821 (0.076)		5.186 (0.000)
MacKinnon et al. (1998) Test of Product of Coefficients			7.104 (0.000)		1.821 (0.000)		5.186 (0.000)
Freedman and Schatzkin (1992) Test of Difference in Coefficients			15.421 (0.000)		58.077 (0.000)		19.681 (0.000)
Mediation Tests – Voluntary School Based							
Sobel (1982) Test of Product of Coefficients			8.931 (0.000)		6.730 (0.000)		8.764 (0.000)
MacKinnon et al. (1998) Test of Product of Coefficients			8.931 (0.000)		6.730 (0.000)		8.764 (0.000)
Freedman and Schatzkin (1992) Test of Difference in Coefficients			10.529 (0.000)		8.840 (0.000)		12.718 (0.000)

Notes: p-values in parenthesis; emboldened values are significant at the 5 percent level

Table 3 – Binary logistic regressions of nascent entrepreneurship and the mediating influence of later stage enterprise education (controlling for compulsory engagement)

Source of Enterprise Education		University Based		Formal Work Placements		Government Training Schemes	
		No Vol.	Vol.	No Vol.	Vol.	No Vol.	Vol.
Participation in Enterprise Education (base category no participation)							
School Based	Compulsory	0.2160 (0.274)	0.1063 (0.593)	0.3126 (0.109)	0.3006 (0.124)	0.2724 (0.161)	0.1867 (0.339)
	Voluntary	**0.3288** (0.014)	0.1389 (0.324)	**0.3464** (0.010)	**0.3247** (0.017)	**0.3379** (0.012)	0.1824 (0.181)
University Based	Compulsory	0.2810 (0.117)	**0.4331** (0.017)				
	Voluntary		**0.5487** (0.000)				
Formal Work Placements	Compulsory			**-0.2180** (0.044)	-0.1824 (0.112)		
	Voluntary				0.1062 (0.343)		
Government Training Schemes	Compulsory					-0.0705 (0.806)	0.0940 (0.744)
	Voluntary						**0.8989** (0.000)
Gender	Male	**0.8388** (0.000)	**0.8185** (0.000)	**0.8362** (0.000)	**0.8303** (0.000)	**0.8438** (0.000)	**0.8234** (0.000)
Human Capital	Age	**0.1442** (0.030)	**0.1429** (0.032)	**0.1453** (0.029)	**0.1439** (0.030)	**0.1442** (0.030)	0.1291 (0.052)
	Age^2	**-0.2117** (0.035)	**-0.2099** (0.037)	**-0.2195** (0.029)	**-0.2162** (0.031)	**-0.2122** (0.034)	-0.1945 (0.053)
	University Graduate	**0.2740** (0.006)	**0.2405** (0.016)	**0.2910** (0.003)	**0.2902** (0.003)	**0.2870** (0.004)	**0.2904** (0.003)
Workstatus (base category Full-Time Employed)	Part Time Employed	**0.3475** (0.006)	**0.3538** (0.005)	**0.3430** (0.007)	**0.3412** (0.007)	**0.3454** (0.006)	**0.3462** (0.006)
	Out of Work Force	-0.1385 (0.471)	-0.1351 (0.483)	-0.1396 (0.468)	-0.1444 (0.453)	-0.1374 (0.475)	-0.1350 (0.483)
	Student	**-1.0402** (0.014)	**-1.0566** (0.013)	**-1.0450** (0.014)	**-1.0460** (0.014)	**-1.0448** (0.014)	**-1.0072** (0.018)
	Unemploy'	0.2092 (0.422)	0.2104 (0.419)	0.2070 (0.427)	0.2089 (0.422)	0.2040 (0.433)	0.1901 (0.467)
	Econ' Inactive	**0.7393** (0.004)	**0.7262** (0.005)	**0.7341** (0.004)	**0.7341** (0.004)	**0.7327** (0.004)	**0.7531** (0.003)

Notes: p-values in parenthesis; emboldened values are significant at the 5 percent level

Table 3 - continued

Source of Enterprise Education		University Based		Formal Work Placements		Government Training Schemes	
		No Vol.	Vol.	No Vol.	Vol.	No Vol.	Vol.
Household Income (base category £17,500 - £49,999)	Under £17,500	0.2010	0.2037	0.2001	0.1996	0.2017	0.1919
		(0.087)	(0.083)	(0.089)	(0.090)	(0.086)	(0.103)
	£50,000 or more	-0.0258	-0.0415	-0.0268	-0.0268	-0.0252	-0.0194
		(0.823)	(0.719)	(0.816)	(0.816)	(0.827)	(0.867)
Migration Status (base category Life-Long Residents)	In-Migrants	0.1536	0.1613	0.1558	0.1563	0.1553	0.1616
		(0.118)	(0.101)	(0.113)	(0.112)	(0.114)	(0.101)
	Immigrants	0.1382	0.1001	0.1188	0.1161	0.1438	0.1309
		(0.365)	(0.515)	(0.438)	(0.448)	(0.346)	(0.393)
Environmental Influences	LA Unemp'	-0.0485	-0.0501	-0.0497	-0.0491	-0.0498	-0.0552
		(0.418)	(0.404)	(0.407)	(0.413)	(0.406)	(0.358)
	Urban	-0.2025	-0.1886	**-0.2073**	**-0.2059**	**-0.2045**	-0.2011
		(0.051)	(0.069)	(0.045)	(0.047)	(0.048)	(0.053)
	Constant	**-5.9894**	**-6.0262**	**-5.8709**	**-5.8913**	**-5.9722**	**-5.7632**
		(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
N		16,343	16,343	16,343	16,343	16,343	16,343
R^2		0.032	0.037	0.033	0.033	0.032	0.044
Percentage Correct		96.7	96.7	96.7	96.7	96.7	96.7
Hosmer-Lemeshow Test		6.29	9.81	5.66	8.03	8.92	9.78
		(0.615)	(0.278)	(0.685)	(0.430)	(0.349)	(0.281)
LR test (null of constant probability)		154.4	175.8	156.3	157.1	152.1	211.4
		[28]	[29]	[28]	[29]	[28]	[29]
		(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
<u>Mediation Tests – Compulsory School Based</u>							
Sobel (1982) Test of Product of Coefficients			4.398		0.847		4.843
			(0.000)		(0.279)		(0.000)
MacKinnon et al. (1998) Test of Product of Coefficients			4.398		0.847		4.843
			(0.000)		(0.060)		(0.000)
Freedman and Schatzkin (1992) Test of Difference in Coefficients			8.239		8.528		17.002
			(0.000)		(0.000)		(0.000)
<u>Mediation Tests – Voluntary School Based</u>							
Sobel (1982) Test of Product of Coefficients			4.744		0.947		7.357
			(0.000)		(0.255)		(0.000)
MacKinnon et al. (1998) Test of Product of Coefficients			4.744		0.947		7.357
			(0.000)		(0.040)		(0.000)
Freedman and Schatzkin (1992) Test of Difference in Coefficients			5.084		1.144		9.586
			(0.000)		(0.253)		(0.000)

Notes: p-values in parenthesis; emboldened values are significant at the 5 percent level

Figure 1 – Mediating effect of voluntary later stage enterprise education on the relationship between compulsory school based enterprise education and entrepreneurial activity