

## ENHANCING ENTREPRENEURIAL SELF-EFFICACY AND INTENTIONS THROUGH EDUCATION: THE BENEFITS OF AUTHENTIC EXPERIENCE

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### ABSTRACT

Many skills and attitudes associated with enterprise are cultivated through authentic experience and enhanced within the workplace. There is increasing interest in how individuals might develop them earlier in their lives. This paper reports on EDGE, an eight-week extra-curricula programme, supported by public-sector agencies and Glasgow and Columbia Universities, to develop entrepreneurial capacity in school and university participants. The paper presents results of evaluation, using a multi-survey methodology, to establish change in a range of behaviour, skill and intention measures. Results are compared with those of another enterprise intervention to inform the debate on approaches to programme design and delivery.

### INTRODUCTION

The development of entrepreneurial capital is attracting increased attention as an innovative and talented workforce is viewed as an essential resource for any organisation. Some individuals become venture creators, working alone or with others in entrepreneurial teams to found new organisations; most seek employment within existing ventures where they use their innovative capabilities to contribute to new product, process and service development. Research shows that while many individuals spend their working lives in organisations owned by others, a minority pursue entrepreneurial career paths, typically in their mid- to late-thirties (Cooper 1973, Cooper 2006, Majid 2006, Oakey et al. 1990, Roberts 1991). Government and other public- and private-sector agencies are concerned how best to support individuals to make valuable contributions in new and existing organisations.

Many skills and attitudes associated with innovation and enterprise are cultivated through authentic experience and enhanced within the workplace; however, there is increasing interest in how individuals might develop them earlier in their career. Education is recognised as having a key role to play (Chen et al. 1998), resulting in some countries, including Scotland, introducing enterprise across the school curriculum, starting with pupils as young as five years of age. The focus on young people is driven in part by a desire to develop a more entrepreneurial culture within society. Attitudes acquired in early life often influence intentions and behaviours later on and, arguably it is easier to change the attitudes of young people than those in mid-career. Important in bringing about changes in attitudes and behaviours is building confidence in skills and abilities which underpin innovation and entrepreneurial behaviour. It is recognised that student skills, ability and self-confidence in activities associated with innovation and enterprise, such as recognising opportunities and being able to develop and put plans into action to exploit such opportunities, will be important determinants in the likelihood of an individual deciding to pursue their future use (Chen et al. 1998).

During the last decade many higher education institutions have embraced the enterprise agenda and developed courses for students in disciplines as diverse as engineering and humanities (Cooper et al. 2004, Cooper and Hetherington 2005). Research points to the need to convey not only knowledge about enterprise but also to employ teaching and learning approaches within which learners strengthen their entrepreneurial self-efficacy (Cooper and Lucas 2006, Lucas et al. 2006), the enduring belief that they have the ability to perform specific tasks (Bandura 1997). Authentic experience has been identified as an important source of self-efficacy (Lucas et al. 2006), and high and low levels of self-efficacy have important consequences for an individual's belief in their ability to perform (Bandura 1997, Chen et al. 1998). Building on the premise that learning interventions may be capable of

realising positive shifts in attitudes and intentions towards entrepreneurship, a variety of entrepreneurship programmes are being developed to complement one-off and term/semester-long offerings in schools, colleges and universities.

This paper adopts the lens of self-efficacy to evaluate the outcomes of one such entrepreneurship education initiative, the Encouraging Dynamic Global Entrepreneurs (EDGE) programme, the product of collaboration between higher education and public sector agencies (including Scottish Enterprise Dunbartonshire, Careers Scotland and the Scottish Executive). EDGE seeks to provide a diverse group of young people (high school pupils from Scotland and university students from Scotland and the United States (US)), with a high impact learning experience which will assist them to develop entrepreneurial skills and capabilities and positive attitudes towards enterprise (Cooper 2005). The programme employs a range of learning situations/approaches, giving participants the chance to learn through different types of experiential activity and exposure to role models through which they may engage in modelling behaviour (Gibson 2004). The EDGE programme begins with an intensive two-week immersion period which is followed by a six-week period during which teams of participants undertake management consulting assignments for local entrepreneurial businesses.

The eight-week programme took place for the first time in Glasgow in Summer 2005 with 48 high school and university participants. Parallels between content and modes of delivery and aspects of the EDGE and the Cambridge-MIT Institute (CMI) Enterprisers programme ([www.enterprisers.org.uk](http://www.enterprisers.org.uk) and Cooper and Lucas 2006) facilitate benchmarking, since both are being evaluated using common instruments and methodologies. A distinguishing feature of EDGE is the period of authentic work experience which it offers; theory suggests that authentic experience is a powerful source of self-efficacy. It was hypothesised, therefore, that the programmes will deliver different overall outcomes. Findings are presented which explore participant engagement in pre-entrepreneurial behaviour, development of skills and abilities in areas central to innovation and entrepreneurship and changes in attitudes towards future work contexts. Results indicate that while part of EDGE and Enterprisers deliver similar benefits, the period of authentic experience in EDGE delivers marked positive benefits in the areas of self-efficacy and entrepreneurial intentions. Results from both programmes suggest that educational interventions impact positively on self-efficacy, and that the incorporation of authentic experience in relation to courses may realise different participant outcomes. Implications for the enhancement of entrepreneurial potential through education and broader issues are explored.

### **SELF-EFFICACY AND ITS LINKS TO BELIEFS, ATTITUDES, INTENTION AND BEHAVIOUR**

In advance of a discussion of the EDGE and Enterprisers programmes and evaluation results, theoretical issues are explored briefly to provide context for the subsequent discussion.

The degree of confidence and self-belief which an individual possesses in his ability successfully to undertake actions associated with innovation or new venture creation will be influential in determining whether or not they undertake such behaviours (Chen et al. 1998, Lucas and Cooper 2006). Self-efficacy, first postulated by Bandura (1997), is pivotal to an individual's willingness to entrepreneurially, through activities including the identification and pursuit of opportunities. Self-efficacy beliefs are "people's judgement of their capabilities to organise and execute courses of action required to produce given attainments" and it is consequential that "people's level of motivation, affective states, and actions are based more on what they believe than on what is objectively true." High or low levels of self-efficacy will have a marked impact on the likelihood that they will engage in behaviours which they perceive to be challenging and which call for persistence in the face of difficulty. Lucas and Cooper (2004) posit that self-efficacy underpins a range of dimensions which are highly relevant to the enterprise agenda, as high levels of self-efficacy are linked to behaviours such as innovation and opportunity recognition (Ardichvili et al. 2003) and career persistence (Mau 2003).

In situations where an individual's self-perceived level of ability and skill is high with respect to a particular task or within the more broadly-prescribed enterprise domain, they will be more willing to undertake activities in that area. This implies that activities which help to develop enhanced levels of self-efficacy may be likely to lead to increased levels of confidence which, in turn, will feed further innovative and dynamic behaviour. The concept of stretch is important in understanding how challenging activities may lead to enhanced levels of self-efficacy as actions which are perceived to be somewhat outside the achievable domain, when completed successfully, bring about heightened levels of confidence and self-belief. Negative experiences, however, may reduce levels of self-efficacy if individuals, for example, attribute failure to internal as opposed to external factors. Those with low levels of self-efficacy will be less inclined to put themselves into situations which would, if managed successfully, enhance their self-efficacy. It is important that individuals have an accurate self-image to

benefit from both positive opportunities to develop further, as well as avoid situations which could result in erosion of self-efficacy.

The above discussion has explored aspects of the mechanisms for enhancing and eroding self-efficacy; it is important to understand something of the contexts in which it can be developed. Authentic mastery, vicarious experience and reflection and feedback to appraise an individual's skills are some of the most important sources in the development of self-efficacy (Bandura 1997). Heightened emotional states also influence the development of self-efficacy so that activities which engage an individual more positively or actively are likely to bring about shifts in levels. Via vicarious learning, one may learn from observing both the success and failure of others, and modest levels of personal failure may also feed authentic mastery (Lucas and Cooper 2004) if the individual is able to recognise that it was not a fundamental lack of ability which led to failure, but some other factor, such as lack of effort expended.

Behavioural models build upon the concept of self-efficacy to suggest how self-efficacy, concerned as it is with beliefs and attitudes, may in turn influence intentions and subsequent behaviour. In Bird's (1988) model it is argued that intentions towards entrepreneurship are influenced by beliefs and attitudes while Shapero and Sokol (1982) introduce the importance of perceived desirability and feasibility in the genesis of the intention to act. Betz and Hackett (1981, 1997) relate self-efficacy to career intention in that confidence to succeed in a specific career will influence selection of particular paths. Higher levels of self-efficacy will be required to select and be successful in areas perceived as challenging and non-standard. The link between self-efficacy and inclination towards persistence in the context of difficult situations is relevant in the context of pursuit of entrepreneurial pathways where confidence is central to starting a company. Individuals require confidence in their skills in areas such as innovation, opportunity recognition and the intention to start a venture (Anna et al. 2000, Ardichvili et al. 2003, Baum and Locke 2004, Chandler and Jansen 1992, Chen et al. 1998, Krueger 1993 and 2000, Krueger and Brazeal 1994, Markman et al. 2002).

A number of authors suggest that intention to start a company is central to entrepreneurship (Bird 1988, Krueger 1993; Krueger et al. 2000). The beliefs of an individual with regard to their abilities in tasks and actions which are central to entrepreneurship may influence whether or not they pursue such behaviour. Nevertheless, there is a series of important steps in the causal chain since beliefs inform attitudes, which inform intentions, which ultimately lead to behaviour (Fishbein and Ajzen 1975); bringing about change in beliefs and attitudes is not likely to be sufficient to realise changes in behaviour. An individual will display entrepreneurial behaviour after having formed an intention to do so. Intentions reflect a person's willingness to pursue a certain course of behaviour, taking account of constraints imposed by the external environment or the individual's background/abilities. Boyd and Vozikis (1994) cite Ajzen's (1987) work which associates perceived control over behaviour with Bandura's self-efficacy concept. Both ideas are built around the concept of perceptual factors which are associated with attaining particular goals.

Shapero and Sokol (1982) point to three determinants of entrepreneurial intention; perceived desirability or personal attractiveness of starting a new business; propensity to act, founded upon personal inclination; and perceived feasibility, which is built around a sense of personal capability. It is suggested by Krueger et al. (2000) that it is possible to enhance the perceived desirability and feasibility of entrepreneurship, which in turn raises the question as to how this might best be achieved in an educational context. For levels of entrepreneurial behaviour to be enhanced it is necessary to not only develop positive attitudes toward entrepreneurship but also to realise shifts in intentions, as an antecedent to influencing behaviour (Cooper and Lucas 2006).

### **Engendering change through education and experience**

Analysis of such models suggests that in order to deliver enhanced levels of motivation towards entrepreneurship educational programmes should attempt to stimulate positive changes in confidence levels so that individuals learn, try and persist in the face of adversity.

It is important to adopt teaching and learning approaches which target the development of specific skills and abilities which are known to be associated with entrepreneurship. For students to be attracted towards venturing/enterprise as a career, either in the role of an entrepreneur or as an employee who works in an entrepreneurial organisation owned and managed by others, educationalist should consider how best to employ teaching and learning techniques which present it as a feasible and desirable option. Thus, how one teaches may be equally as important as what is delivered in terms of programme content.

Educators in the entrepreneurship field have a range of methods at their disposal, which vary from passive to active, highly experiential techniques (Figure 1). Student engagement in the learning process is important in the light of earlier comments regarding sources of self-efficacy and emotional

states; the more active the engagement, the more likely it is to bring about changes in self-efficacy levels. Lectures to large groups in fixed-seating lecture theatres are an example of an approach positioned at the passive end of the spectrum, based as they usually are around one-way communication from teacher to learner. Case study teaching provides greater opportunities for interaction and more active engagement of pupils/students in the learning process (Krebner 2001); however, it is still a step removed from the entrepreneurial personality, unless one is fortunate enough to be able to bring a protagonist from the case study organisation into the classroom to input into the session. A range of pedagogical approaches enable learning through the experience of others, as well as through personal experience (Rae and Carswell 2000); bringing entrepreneurs and students into close proximity provides multiple opportunities for vicarious and experiential learning. Entrepreneurs may come into the classroom as guest speakers so that students are able to learn directly from those who have first-hand experience of the peaks and troughs of venturing (Chen et al. 1998). It is important that entrepreneurs stress the difficult aspects of venture creation and do not make it sound easy; the challenges which have been overcome and the need to persist in the face of such difficulties are important lessons to be shared. Where an entrepreneur hosts a visit to their company, or offers in-company projects (Cooper et al. 2004) or student placements (Lucas et al. 2006), such activities provide a very tangible opportunity to observe the practice of enterprise in action.

Figure 1: “Ladder of Learning”: – The experiential learning continuum in entrepreneurship education

	<b>Educational Technique</b>	<i>Degree of interaction</i>	<i>Proximity to entrepreneur as source of learning</i>	<i>Opportunity for questioning re entrepreneurial situation</i>	<i>Involvement and depth of learning– Ladder of learning</i>
<b>Experiential Learning Continuum</b>	<b>In-company project</b>	Intense	‘On the spot’	Very high	Extremely active, High
	<b>Company visit guided by the entrepreneur</b>	Medium	There, but only fleetingly	High	Active, Moderate
	<b>Case study, with entrepreneur in class</b>	Medium	As a visitor	Medium	Active, Moderate
	<b>Interactive class sessions</b>	Medium	Remote	Medium	Active, Modest
	<b>Case study, text/video only</b>	Low	Remote	Low	Active, Low
	<b>Lecture</b>	Low, non-existent	Extremely remote	Low to non-existent	Passive, Low

Source: Cooper et al. (2004)

While vicarious learning enables students to observe and draw lessons from the experience of others, arguably, the most effective and powerful way for student to develop increased confidence in their skills and capabilities is through authentic mastery. Role play offer the chance to learn new skills in a mocked-up situation but the opportunity to gain hands-on, real-world experience through undertaking a live and meaningful project, preferably for a organisation with which the learner is able to interact on a regular or semi-regular basis, presents a very powerful context in which to test out the application of theoretical and applied concepts in a live setting. Encouraging students to reflect on that authentic experience will engage them in the reflective learning cycle (Kolb 1984). Reflection has been shown to deepen learning, in particular where experience is closely linked to the field of study (Krebner 2001). Gaining hands-on experience may lead to the development of heightened levels of self-efficacy

as a result of subject mastery within particular task-domains (Bandura et al. 1982; Gecas 1989; Pajares 1996). The opportunity to observe effective people in their venture environment offers not only a source of observation and vicarious learning but also presents the observer with access to role models who may generate a sense of desirability related to the field of work where the model is observed (Scherer et al. 1989). This equates with the top rung on the ladder (Figure 1), providing as it does, the greatest degree of exposure to the entrepreneur, venture environment (company) and work context. A period of engagement with an entrepreneurial organisation provides the opportunity to learn about the practical aspects of applying “theoretical” knowledge within an applied environment. The experience may also increase knowledge and motivation levels of those who aspire towards a career path as an entrepreneur or employee in a small company by making “subsequent study more meaningful” (Beard 1998). Where internships are used they have been demonstrated to improve student performance significantly compared with students who have not participated in them (English and Koeppen 1993). Student may develop stronger motivations to pursue that path, or may recognise that they might not be suited to it after all. At a more general level, company-based activities are likely to help learners to develop stronger interpersonal skills, such as communication and team-working, as well as appreciate the realities of working within an organisation.

Such a discussion suggests that through careful planning and programme design it is possible to develop enhanced levels of self-efficacy and foster positive perceptions regarding the desirability of entrepreneurship, by employing different complementary teaching and learning approaches. The use of individual and group exercises provides opportunities for participants to enhance skills such as team working and leadership which are important aspects of self-efficacy associated with venture creation. Team activities can be used to achieve a blending of participants from different national, cultural, social and academic backgrounds, which can help to build understanding between constituencies whose contrasting and differing origins may harbour significantly different perspectives and norms. Developing an appreciation of contrasting perspectives helps build understanding and increases the sense of subject mastery (Driver 2003; Gear et al. 2003; Poell and Van der Krogt 2003). Where it is possible to integrate assessment and feedback into the learning process, this has been shown to influence the development of self-efficacy (Humphreys et al. 1997). Assessment on a reasonably regular basis provides learners with tangible evidence of changes in performance, which in turn enhances self-efficacy (Orpen 1999) and facilitates the identification of areas which would benefit from additional attention to build competence. Experiential and reflective practice and critical thinking have been shown to promote deep learning (Barclay 1996; Cope and Watts 2000; Jack and Anderson 1999; Kriebner 2001; Loo and Thorpe 2002, Van Woerkom et al. 2002) and to be associated with the development of self-belief and self-efficacy (Ndoye 2003).

Following this discussion of self-efficacy and intention and the types of teaching and learning approaches which might be used to bring about increases in both, the focus now turns to consideration of the EDGE programme and a brief discussion of the Enterprisers programme with which it will be compared in the empirical section of the paper.

## THE PROGRAMMES

### EDGE

The EDGE programme has been developed through a collaborative partnership between a number of public-sector bodies (which include Scottish Enterprise Dunbartonshire on behalf of Scottish Enterprise National and Careers Scotland), the University of Glasgow (Scotland) and Columbia University (US). As such, it brings together a group of stakeholders who are strongly committed to developing human capital and supporting economic development through education and career planning, and others whose focus is on the wider economy through engagement in activities to support the establishment and growth of new and existing ventures. The 48 participants in the EDGE programme in the 2005 pilot included undergraduate students from the University of Glasgow (15) and Columbia University in the US (16) as well as high school pupils (17) from a number of schools in Dunbartonshire, near Glasgow, Scotland. The university participants were drawn from a diverse range of disciplines which included business/management, film studies and comparative literature. Twelve students took degree programmes in subjects such as accountancy, business management and economics and a further ten students followed programmes including engineering or science. The school pupils represented an equally diverse group; eight of the 17 had studied business/management during the previous year and a further six intended to study the subject in the following school year.

The EDGE programme was designed to offer a rich variety of opportunities for participant learning and development. The first two weeks of the pilot programme were designed to provide an immersion programme of study which would enable students and pupils from any subject background to gain significant knowledge on a range of subjects related to business and enterprise. Themes

explored included creativity and the identification of new market opportunities, how to design and conduct market research, what are the stages and steps in business planning, what resources do ventures need and where can they be accessed, how to build effective teams and best practice in conducting effective and successful consulting projects. There were a number of activities which complemented classroom-based sessions; these included external team-building sessions, a cultural visit to the Scottish Parliament and a tour around the local area in Dunbartonshire, intended to orientate participants and engage them in learning more about the economic context and locality where they were situated and in which they would undertake the second phase of the programme; the consulting projects for local companies. The overall programme was facilitated by a member of the Columbia University staff, and there were regular presentations by guest speakers, entrepreneurs and other resource providers or business support specialists, who shared their perspectives on and experiences of enterprise creation, including the highs associated with success and the lows experienced as a result of mistakes and failures.

The varied array of guest speakers provided participants with exposure to multiple role models, including entrepreneurs and others supporting entrepreneurial venturing such as accountants, lawyers and external marketing consultants. These opportunities to observe a range of individuals from the enterprise arena provided the chance for students and pupils to gain new knowledge and learn vicariously from the observation of others. Lessons were shared about challenges and the need for persistence in the face of adversity which assisted the learning process and enhancement of self-efficacy. These inputs exposed EDGE participants to realistic views as to how hard it is to start a business and also provided participants with a unique perspective on a wide range of enterprise-related career options for those whose first choice might not be to set up their own venture.

The two-week immersion programme was followed by a six-week period during which students and pupils worked together in consulting teams (broadly two pupils and four students - two from Glasgow and two from Columbia). Each team was tasked with undertaking real business development consulting project for two entrepreneurial companies. Train and Elkin (2001) argue that the most effective learning is achieved when grounded in real-life experience; this approach provided participants with the opportunity to gain authentic experience on live projects. Each of the eight teams was assigned its own "home space," a dedicated professional office from which to work for the duration of the projects. Teams were provided with very short briefing document for each of their projects and were expected to meet with the client to scope the project and then engage as often as required to complete the assignment. Each group was charged with developing formal reports for the client companies and made a formal presentation of their findings to each client at the company's premises. In addition to undertaking the company-based consulting projects, each team developed a plan to launch a venture of its own, which it developed into a formal business plan and presented to a panel of experts the end of the six-week period. Each of the project groups was allocated a mentor for the consulting phase whose role it was to support them through the period. Every Friday a learning review was held at the University of Glasgow which provided a structured opportunity for reflection, feedback and sharing of experience. Participants were also encouraged to keep a reflective diary or learning log during the programme.

### **Enterprisers**

Enterprisers ([www.enterprisers.org.uk](http://www.enterprisers.org.uk)), originally called as CMI Connections, brings together students from UK universities and a number of overseas institutions, principally, MIT, for an interactive and highly participative, residential, week-long programme (Cooper and Lucas 2006). It is intended to develop entrepreneurial skills, build confidence and create networks among participants who come from different academic disciplines and cultural backgrounds. Participants learn about entrepreneurship, acquire tools and develop/enhance their skills in areas such as networking, team building and creativity. They learn about resources required to engage in new projects and ventures, have the chance to be part of a network of like-minded students and establish links with faculty and learn about support available to sustain them in their venturing activities. The emphasis is on helping participants to develop entrepreneurial skills and develop a "can do" attitude within a "safe" environment. To date there have been ten programmes in the UK, involving more than 550 participants. Enterpriser participants are characterised by the diversity of academic backgrounds from which they are drawn; there is no requirement to have studied entrepreneurship prior to attending the programme. As a result the programme has attracted students from areas as diverse as Scottish studies, civil engineering, politics and law.

The programme focuses on four key themes, developed originally by Shai Vyakaram of the Centre for Entrepreneurial Learning at the University of Cambridge. These themes are related to the project/venture development process and are relevant to the development of ideas/opportunities from

new business ventures to not-for-profit initiatives. Each theme broadly forms the focus for a day of the programme; “The entrepreneur within each of us” focuses on defining entrepreneurship and understanding one’s personal motivations, values, ethics and goals; “Launching a great idea” explores creativity and idea generation, meeting unmet customer needs and early stages in the project plan; “What it will take to succeed” explores leadership and teams, identifying and accessing resources and the importance of networks in resource acquisition and project implementation; finally, “Keeping the dream alive” identifies methods of sustaining projects into the future. Content is delivered using a variety of techniques to provide students with perspectives on the venture/project creation process. Large and small group sessions are employed and students work on their own on other occasions. Presentations from guest entrepreneurs provide participants with opportunities to learn vicariously from practicing entrepreneurs (including social and profit-based) who provide role models and opportunities for networking. Students engage in reflection around the learning process and note their reflections in a journal.

The two programmes share a common intensive period of entrepreneurship “immersion” (the first two weeks of EDGE and the week-long Enterprisers programme). The distinctive difference is the period of authentic experience which the consulting project element offers within the EDGE programme. The analysis which follows pays attention to changes both during the programmes and during the post-programme period.

### RESEARCH DESIGN

In determining an appropriate research methodology the social sciences are generally supportive of multi-method approaches to research as a means to escape the likelihood that the methods themselves are sources of bias and because they have very different strengths and weaknesses. It is important to seek ways to establish internal validity, whether or not an experimental treatment or, more generally, a programme of activity makes a difference (Campbell and Stanley 1963).

The EDGE programme provided the opportunity to assess the impact of an intensive “taught” immersion programme and a period of experiential learning through the consulting phase of the EDGE initiative. The design of the research undertaken on EDGE and Enterprisers was intended to establish whether the programmes were a cause of change in several forms of entrepreneurial self-confidence as well as entrepreneurial intent, and test to see if any changes found were enduring. For the EDGE programme surveys were administered at the start, end of immersion, end of programmes and six-months post-programme time-points. The approach for Enterprisers involved a three-step questionnaire; start, end of programme and six-months post-programme. The survey immediately at the end of Enterprisers used a subset of the longer scales employed at the start since the purpose was only to document whether significant changes had occurred. The instruments gathered data on a variety of subjects ranging from personal background information, participants’ self-assessment of their confidence in skills associated with entrepreneurship and attitudes towards contrasting types of future work environment and job roles. A range of measure was employed to explore whether or not attitudes and behaviours perceived as important in self-efficacy and intent changed. The measures are discussed prior to the presentation of results in each section.

Strong parallels between content and modes of delivery of the EDGE immersion and CMI Enterprisers programme enable benchmarking to be undertaken using the results of the end of immersion survey for EDGE and the end of programme survey for Enterprisers, as well as the six-month surveys to explore overall programme impacts. Of the 48 students who participated in EDGE 2005, 36 completed the six-month follow-up or 75%. To date more than 550 students have participated in ten Enterprisers events; this paper draws on the surveys for 165 students who participated in the second, third and fourth events, with six-month data for 76 or 46% of the participating students in those events. Given the emphasis on change within individuals, the remaining discussion focuses on the results of those who completed the six-month follow-up surveys.

### MEASURES AND RESULTS

The impacts of the EDGE immersion may be compared with those of the intensive Enterprisers programme as there are strong parallels in programme content and delivery. The results achieved at the various stages of assessment are presented including the six-month follow-up surveys for both programmes. Pre-entrepreneurial behaviour results are discussed for EDGE before the discussion moves on to consider self-efficacy and intent for both EDGE and Enterprisers.

#### Pre-entrepreneurial behaviour

Most participants are unlikely to start companies for many years, but CMI has developed a “trajectory metric” which explores whether a programme has set participants on a path showing behaviour

towards entrepreneurship. It is provided by questions considered to be pre-entrepreneurial behaviours expected of those alert to opportunities, evaluating ideas which appear. They ask the frequency that individuals talk about ideas for starting companies, whether they return to those ideas, and whether they take steps to assess ideas. Respondent had a choice of responding with a frequency range from “Almost never” to “Very often”. The assumption is that if individuals are actively engaged in these behaviours, they are demonstrating an awareness of opportunities that might occur, and investing some time in their evaluation. Some individuals will engage in such activities and never start companies, but if a programme generates heightened levels of awareness it may be setting individuals on a path to entrepreneurial activity (Lucas and Cooper 2004). Data are included for EDGE only. One of the activities measured was talking about ideas for starting a company (Table 1). Respondents provided further information about who they had talked to at least once a month since EDGE, from both within and outside the EDGE community.

Table 1 Pre-entrepreneurial behaviour of EDGE participants by educational institution

Activity	<i>Percent saying they do activity “Often” (6+ times a month)</i>							
	Columbia University		University of Glasgow		Dunbartonshire Schools		Total	
	Start	Post 6-months	Start	Post 6-months	Start	Post 6-months	Start	Post 6-months
Talked about an idea for starting a company	54.5	63.6	33.3	58.3	23.1	69.2	36.1	63.9
Pursued an idea for starting a company talking about it more than once	45.5	36.4	8.3	25.0	15.4	38.5	22.2	33.3
Took steps (e.g., looked into markets or technology) to follow up on an idea	27.3	18.2	8.3	16.7	0.0	38.5	11.1	25.0

Participants had reached out to facilitators (28%), mentors (11%) and guest speakers (8.5%) from the EDGE programme. It is encouraging to see that the participants in all groups having been using the opportunity to network with EDGE participants from their own (44%) and other institutions (37%). There are high levels of those networking outside their own institution which represents proactive action on the part of EDGE participants. On another level, it is one thing to discuss an idea for a new company with those who have the shared experience of EDGE but quite another to engage in such a discussion with those from outside the confines, and perceived “safety”, of the EDGE community. It is clear, however, that participants have been stimulated to talk with other students/pupils (50%), teachers/lecturers (22%), other friends (50%) and family (58%) about ideas. It suggests that has EDGE engaged participants and developed their confidence to discuss and share ideas with others. In a more public forum, 44% of participants had discussed an idea at a public event at least once a month. Compared with the levels identified at the start of the programme, these levels generally indicate a marked upwards shift in active engagement in enterprise activities. A minority of participants had sought assistance from external agencies and specialist departments within their university with respect to taking ideas forward (14% not-for-profit ideas, 19% for profit ideas). This type of action requires a serious commitment to and level of engagement with the idea.

**Entrepreneurial self-efficacy and confidence in skills**

The original concept of entrepreneurial self-confidence was career self-confidence and confidence in functional skills. The EDGE and Enterprisers evaluation of self-confidence carried over a battery of skills questions used by Terenzini et al. (1991), and included a number more specific to entrepreneurship. To assess the confidence of EDGE participants in their skill to follow a vocational path of entrepreneurship, the participants in the programme were asked to make summary judgments about their knowledge and ability to perform the role of being an entrepreneur. Each participant was asked to rank from poor to excellent their skill to understand what it takes to start their own business, and then whether they could actually start a successful business if they decided to try. They were also asked to rate their skills with respects to a number of functional areas, some of which called out abilities specific to entrepreneurship such as the skill to “recognise an opportunity.”

The results shown here with respects to self-efficacy are a subset of the common items between the two programmes (Table 2). The findings suggest that both EDGE and Enterprisers have had consequential and enduring impacts on participant self-confidence, with much of the change found at the end of the events evident to varying degrees six months or more after the programmes. The EDGE

programme generally generated immediate changes in participant self-confidence across the range of items during both the immersion and consulting phases. Evidence from the six-month survey indicates that while levels have fallen back for some items, levels have continued to rise with respect to a number of measures such as clearly describe a problem orally and evaluate arguments. While the Enterprisers programme shows generally enhanced levels post-programme results for most of the Enterprisers items had fallen back after six-months whilst those for EDGE suggested that more robust and sustained increases had been achieved (Table 2).

Table 2 Self-efficacy items measured at different points of the programmes

Participants rating skill/ability as “very good” to “excellent”		%			
		% Start of programme	% End of Immersion/end of Enterprisers	% End of EDGE	% Post 6-months
Recognise a good opportunity when you see it	<i>EDGE</i>	33.3	50.0	58.3	55.6
	<i>Enterprisers</i>	29.3	59.2		51.4
Motivate others to work together	<i>EDGE</i>	44.4	61.1	63.9	72.2
	<i>Enterprisers</i>	38.7	52.9		52.7
Understand what it takes to start your own business	<i>EDGE</i>	17.1	52.8	75.0	61.1
	<i>Enterprisers</i>	14.7	53.5		40.5
Start a successful business if you want to	<i>EDGE</i>	19.4	38.9	69.4	61.1
	<i>Enterprisers</i>	9.5	49.3		33.3
Clearly describe a problem orally	<i>EDGE</i>	38.9	47.2	50.0	75.0
	<i>Enterprisers</i>	30.7	52.1		46.7
Negotiate with others who do not share your views	<i>EDGE</i>	36.1	44.4	61.1	52.8
	<i>Enterprisers</i>	30.7	38.6		41.7
Create novel solutions to problems	<i>EDGE</i>	36.1	50.0	47.2	52.8
	<i>Enterprisers</i>	33.3	52.3		34.8
Evaluate arguments and evidence to judge the strength of alternatives	<i>EDGE</i>	47.2	55.6	66.7	80.0
	<i>Enterprisers</i>	49.3			47.3
Apply an abstract concept or idea to a real problem or situation	<i>EDGE</i>	31.4	50.0	52.8	58.3
	<i>Enterprisers</i>	35.5			30.7
Listen to the ideas of others with an open mind	<i>EDGE</i>	80.6	61.1	72.2	86.1
	<i>Enterprisers</i>	57.3			60.0
Negotiate successfully with others who do not share your views	<i>EDGE</i>	36.1	44.4	61.1	52.8
	<i>Enterprisers</i>	30.7	38.6		41.7
Create novel solutions to problems	<i>EDGE</i>	36.1	50.0	47.2	52.8
	<i>Enterprisers</i>	33.3	52.3		34.8

The results show that for the two main indicator items of understand what it takes to start a business and start a business if you wanted to there is a significant increase from the start of the event to the end of EDGE immersion/Enterprisers. These changes are sustained for both programmes at

significant levels six months after the programme ( $p < .001$ ). Considering the wider list of items, while the levels for some items decline six months after the event, a sizeable number still demonstrate positive changes which are significant increases on the levels at the start of programmes. The number of items which show a decline is smaller for the EDGE programme than that for the Enterprisers group. It is apparent that the scores for some of the EDGE items continue to increase after the event. Together these results show that EDGE and Enterprisers events have caused a consequential and, in many cases, statistically significant long-term impact on the self-confidence of participants.

**Entrepreneurial intent**

The central outcome measure was the active intention of the individual to start a new venture. A measure of an individual’s intention to pursue entrepreneurship was included on the surveys to see if any increase in entrepreneurial self-confidence has an associated impact on the participants’ intention to start a company. Participants were asked to indicate their agreement with a set of statements on a scale from “strongly disagree” to “strongly agree”. Two items asked about joining a start-up in the near term, and another expressed a determination to start a company sooner or later. A third statement was used to see if the participant was attracted by high risk/high pay-off ventures, and the fourth asked if one often thought about starting a company. These items have formed a successful scale in earlier research at MIT, with Cronbach’s alphas that fell generally between .78 and .81, with one study finding an alpha of .68. The results with respect to entrepreneurial intent suggest interesting contrasts (Tables 3 and 4).

Table 3 Entrepreneurial intent items for EDGE and Enterprisers

Percentage of participants stating that they agree moderately or strongly with each of the following:		Start of Programme	End EDGE immersion/ end of Enterprisers	End of EDGE Programme	Post 6-months
If I see an opportunity to join a start-up company in the next few years, I’ll take it	<i>EDGE</i>	30.6	44.5	50.7	42.4
	<i>Enterprisers</i>	34.2	50.7		44.8
The idea of high risk/high pay-off ventures appeals to me	<i>EDGE</i>	33.3	36.1	52.8	57.6
	<i>Enterprisers</i>	34.2	38.6		28.5
I often think about ideas and ways to start a business	<i>EDGE</i>	50.0	72.2	69.4	57.6
	<i>Enterprisers</i>	47.4	55.0		56.6
At least once I will have to take a chance and start my own company	<i>EDGE</i>	61.1	63.9	72.2	69.7
	<i>Enterprisers</i>	52.7	74.7		64.0

Table 4 Changes in intent scale scores for EDGE and Enterprisers

		Change, start to end of EDGE immersion/ Enterprisers programme	Change, start to end of EDGE	Change, start to 6-month follow-up
Entrepreneurial Intent (The four intent items summed)	<i>EDGE</i>	$p < .001$	$p = .002$	$p = .002$
	<i>Enterprisers</i>	$p < .001$		$p = .554$

Examination of the results with respect to the four items included in all of the assessment instruments suggests that there is evidence of increases, some marked and some modest, in intention levels as a direct result of participation in the programmes (Table 3). The intention levels for EDGE continue to rise in three of the four items between the end of the immersion programme and the end of the eight-week programme. If the data for the six-month evaluation are examined, it is evident that for the Enterprisers programme the intention levels for three of the four items show declines to insignificant levels in three of the four items. With respect to EDGE, the declines are less sharp and

the changes are still significant for three of the four items six-months after the programme. The intent scale, generated by combining scores for the four individual intent items (Table 4), shows that the Enterprisers event and the EDGE immersion both produced significant changes in intention levels, changes which were still evident six months after the event in the case of EDGE, but which were no longer evident in the case of Enterprisers. A suggested partial explanation is that authentic experience gained in EDGE may have resulted in anchoring of intention levels at the higher levels.

### DISCUSSION AND CONCLUSIONS

A distinctive feature between the two programmes was the period of practical experience in EDGE. Participants worked in mixed teams, each taking their turn to lead the group for a week at a time, so that each member played a leadership role and was responsible for determining the direction of the team for that week, including allocating tasks to team-members. Participants undertook live projects, for example, exploring new domestic and overseas markets and investigating new product and service opportunities. They had the opportunity to talk with actual and prospective customers and work with entrepreneurs in their client companies. They were required to act as professional consultants and embed quality into all aspects of their work. They also had the opportunity to work on their own team project, which enabled them to apply lessons learned during the programme, both directly and vicariously, to their own proposition. As a result of the variety of experiences they were able to ground their perceptions of their skills and reflect on their attitudes to future work in the context of actual practice. Feedback from their entrepreneurs, other experts and from fellow group members enabled individual participants to identify their strengths and weaknesses and develop a realistic view of their capabilities.

Both programmes were intended to build entrepreneurial capacity and strengthen the likelihood that participants would pursue entrepreneurship. It is apparent from the results that in the areas of building self-confidence and a strong sense of capability in skills the two programmes have been successful. The “understand what it takes to start a business” and “could start a business if you wanted to” items show dramatic increases as a result of the programmes, changes which endure six months after the events. Opportunities to survey participants at key stages provide comfort that changes measured were in large part as a result of participation in the programmes. It is interesting that benchmarking the two programmes with respect to areas when they shared similarities was able to demonstrate that some similar changes were achieved across the two programmes. Both programme involved very intensive work engagement so that participants spent many hours together working on assignments and activities central to the two programmes. The follow-up surveys conducted six months after the programmes show that the heightened levels of self-confidence persisted. In the case of EDGE the levels with respect to a sizeable number of items had continued to rise. Qualitative data point to the subsequent involvement of EDGE participants in a range of enterprise-related activities and group activities where participants have taken leadership roles, giving them the opportunity to continue to develop their skills. Feedback from participants suggests that involvement in EDGE acted as a stimulus to kick-start proactive engagement in often quite challenging activities. The higher levels of self-confidence had encouraged participants to engage in new activities, which had provided the opportunity for further development of confidence in skills and abilities, establishing a positive spiral of development, as theory would suggest.

The programmes differ in terms of their enduring impacts on intentions. The scale used here suggests that whilst positive short-term changes are achieved by both programmes, EDGE is more effective in generating changes which endure over a six-month post-programme period. There are two elements which may be significant here, the acquisition of authentic mastery which is perceived to be the most effective source in building efficacy and intentions, and the evidence that the programme has developed proactive individuals who are prepared to try new things, based upon their greater confidence. These aspects might together be influencing intentions. The opportunity to continue to study the EDGE programme which is currently underway will provide the opportunity to determine how representative the results are for the EDGE programme, through repeated measures, and will allow the link between self-efficacy and intentions to be explored further. Common instruments and assessment methodologies are essential if such research is to take place.

This research benefits from an assessment methodology involving repeated measures to evaluate the short- and longer-term impacts of interventions. The paper also demonstrates the value of using common approaches to assessment in order to distinguish between specific programme outcomes, and identify ways in which different programme elements may realise contrasting benefits, of significant interest to those involved in the development of education programmes and those who support and fund them.

Results from both the EDGE and Enterprisers programme suggest that educational interventions are able to have a positive and enduring impact on the development of self-efficacy, known to be a moderator of entrepreneurial behaviour. These findings have implications for discussions focused around the enhancement of entrepreneurial potential through education. When aiming to build self-efficacy, a diverse group of participants engaged in a targeted skills-based programme with active student involvement in the learning process allowing students to experience a depth of learning, achieves significant gains in general participant confidence in enterprise-related skills. Evidence confirms prior research which indicates that increases in self-efficacy seem to endure over time. In EDGE enduring impacts are also evident in participants' intentions towards entrepreneurship. These impacts make programmes such as EDGE appropriate to run at the high school and university level while student views of enterprising careers may be more malleable even though the average age of entrepreneurship is typically in one's mid- to late-thirties. Additionally, completion of an EDGE-type programme also increases the attractiveness of careers in enterprise, essential for future economic growth.

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