ENHANCING SELF-EFFICACY FOR ENTREPRENEURSHIP AND INNOVATION: AN EDUCATIONAL APPROACH

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ABSTRACT

This paper reports on the Enterprisers programme, a five-day, extra-curricula educational event supported by CMI and designed to increase entrepreneurial capabilities and intent. The pre-, post-, and six month follow-up survey design is outlined, and the concepts of entrepreneurial self-confidence and skills self-confidence are described. The results show that the Enterprisers events had a substantial and persistent impact on participant self-confidence to become entrepreneurs, but the programme had only a limited impact on entrepreneurial intention. A discussion includes attention to the implications of this work for the model of self-efficacy and intent found in the literature.

INTRODUCTION

Methods of developing a more competitive economy are the focus of much government effort. Like many nations, the United Kingdom (UK) has given priority and substantial funding to the promotion of entrepreneurship as a path to enhanced levels of innovation and economic growth. A key element in its national strategy is the engagement of universities in initiatives using education to increase entrepreneurial knowledge, skills and intention among undergraduate and postgraduate students. Following the model of Krueger and Brazeal (1994) suggesting that self-efficacy is a key predictor of entrepreneurial intention, this study considers how a UK entrepreneurship programme called Enterprisers seeks to enhance the self-confidence of university undergraduates and the concomitant impact that event has on intention. In the process of reporting on the limits of the effects of entrepreneurship events, the study will seek to show that there are several forms of self-confidence with complementary but different effects on intention.

The Enterprisers programme was developed under the aegis of the Cambridge-MIT Institute (CMI) to develop a model programme that would serve this national strategy. The premise in the Enterprisers design was the belief that students can be motivated to start new enterprises by enhancing self-confidence in their entrepreneurial skills, and a successful, one-week intensive event which fosters undergraduate leadership at MIT was reorganised to stress entrepreneurship rather than leadership in general. First, an entrepreneurship event was designed and offered to test the new programme at MIT, and then it was piloted in 2003 at the University of Durham

Originally called Connections, Enterprisers has now been offered seven times in the UK and continues to provide data in a quasi-experimental design intended to inform understanding of entrepreneurial education. This paper reports on the Enterprisers programme which has now engaged over 400 students from more than 22 UK universities and the Massachusetts Institute of Technology in a five-day, extra-curricula educational event intended to increase entrepreneurial capabilities and intention.

By traditional assessment standards, a relatively rigorous evaluation design has been used so that the programme would serve as a type of experimental laboratory where CMI and participating universities could learn the reasons behind success or failure in ways that could guide further development. As the programme went on, there was a discovery that conclusions depended to some degree on which form of self-efficacy was being studied, leading to an attempt here to address alternative definitions of self-confidence and self-efficacy.

The plan of this paper begins with a discussion of the related yet distinct concepts of self-competence, career, skill and task-based self-efficacy, and their comparative role in predicting entrepreneurial intent. An overview of the Enterprisers events that are the focus of the research is then provided, with particular attention to its components intended to strengthen participant confidence in their entrepreneurial abilities. The research design used in the programme evaluation is described, and the definition and measures of entrepreneurial self-confidence and intention used in the surveys are presented. Then the results are presented to show that the Enterprisers events had a substantial and enduring impact on their self-confidence to become entrepreneurs, but that the programme effects had at best a limited impact on entrepreneurial intention. The concluding discussion considers the value of the research design used in this research, and the implications of this research for the Krueger and Brazeal model.

ENTERPRISERS, ENTREPRENEURIAL SELF-CONFIDENCE AND ENTREPRENEURIAL INTENT

Beliefs, attitudes, intentions and behaviour

A critical factor in the decision to start a new company is the degree of confidence that an individual possesses in their skills and abilities to embark upon and undertake successfully all the stages of the new venture creation process. The concept of self-efficacy (Bandura 1997) is central to the willingness of individuals to act in an entrepreneurial way, to identify and seize opportunities. Self-efficacy beliefs are "people's judgment of their capabilities to organise and execute courses of action required to produce given attainments" and have the consequence that "people's level of motivation, affective states, and actions are based more on what they believe than on what is objectively true" (Bandura 1997). Individuals require an accurate sense of their abilities if they are not to put themselves into a position where they are likely to fail, which will have the negative effective of decreasing their level of self-confidence. Individuals develop confidence in their abilities and increase self-efficacy from a number of sources which include authentic mastery, failure (personal or that of others) and vicarious experience where observation of others leads to modelling (Bandura 1997).

Self-efficacy has been shown to predict individual behaviour and performance in a range of contexts (Stajkovic and Luthans 1998) resulting in effects which, in many cases, endure for years. Highly efficacious people are likely to possess greater confidence in their abilities to embark on challenging courses of action, and to persist in the face of obstacles which appear between them and their goal. Success will feed the sense of self-competence, thereby enhancing further an individual's belief in their capability to undertake difficult task successfully. The less efficacious individual, even when they may possess the necessary skills, will be less inclined to embark on a course of action which takes them into new and uncharted territory (Bandura 1986); should they bring themselves to take steps along a challenging route, they will be more likely to give up when faced by an obstacle. Self-limiting decisions on what areas are pursued deprives the less efficacious individual of the opportunity to perform successfully and break the vicious which is otherwise in danger of being perpetuated.

Another view of self-efficacy involves the application of this concept to the confidence that individuals feel that they can succeed along a specific career path. Betz (2000, 2004) and Betz and Hackett (1981, 1997) have identified that self-efficacy expectation influences career choice. Betz and Hackett (1993) asked individuals if they could successfully complete the educational requirements for a job, and then whether they could perform the duties of that job. This approach has been found particularly useful in assessing the effects of self-limiting gender bias on occupational choice, and in career counseling (Pajares 1996). There are some careers which individuals with low self-efficacy beliefs will tend to avoid; for example, women with low levels of self-efficacy will tend to avoid careers which are traditionally male-dominated. Betz (2004) also points to the likelihood that individuals who lack self confidence in their career-related skills will under perform, a view that complements Baum and Locke's (1984) work which highlights the link between higher levels of self-efficacy and confidence in new business success and growth. Increased self-efficacy will, thus, be important if individuals are to consider career options which are seen as challenging and non-standard, and are to persist within careers (Mau 2003).

The link between self-efficacy and persistence is of particular significance in the context of entrepreneurship. The path to entrepreneurship is characterised by the need to recognise opportunities, create products/services, build a company, hire staff, deliver products/services to market, access the resources to do all of these things, as well as complete all the other tasks associated with venture creation and growth. Barriers and set-backs are all part of the 'deal', so entrepreneurs have to be confident and committed to seeing a plan through to fruition. In light of the difficulty of these tasks, it is not surprising that high levels of confidence is central to starting companies, and that self-confidence in one's skills has been linked to behaviours such as innovation, opportunity recognition and intention to start a new venture (Anna *et al.* 2000, Ardichvili *et al.* 2003, Baum and Locke 2004, Boyd and Vozikis 1994, Chandler and Jansen 1992, Chen *et al.* 1998, Krueger 1993 and 2000, Krueger and Brazeal 1994, Markman *et al.* 2002). Baum and Locke (2004) revealed that goals, vision and again self-efficacy were the explanatory factors for new ventures which were more successful and had grown over time.

The literature suggests that the intention to start a company is at the heart of entrepreneurship (Bird 1988, Krueger 1993; Krueger at al. 2000). An individual's beliefs with respect to their abilities in a range of activities central to entrepreneurship may influence the likelihood that, eventually,

they will pursue such behaviour; however, there are a number of important steps in the chain of causality as beliefs inform attitudes, which in turn inform intentions, which lead ultimately to behaviour (Fishbein and Ajen 1975). Thus, changing beliefs and even attitudes, arguably, is not sufficient to bring about changes in behaviour; for an individual to display entrepreneurial behaviour calls for them to have formed the intention to do so. Intentions are conceived as reflecting a person's willingness to pursue a certain behaviour, taking into account constraints and limits which might be imposed by the external environment or the background/abilities of the individual. Boyd and Vozikis (1994) point to Ajen's (1987) work which associates the concept of perceived control over behaviour with Bandura's self-efficacy concept. Both concepts are built around the idea of perceptual factors which are directly associated with attaining certain goals. If levels of entrepreneurial behaviour are to be enhanced it in necessary, therefore, not only to develop positive attitudes toward entrepreneurship but also to bring about shifts in intentions as an antecedent to influencing behaviour.

With this evidence of the importance of self-efficacy in general, its role in sustaining intention, its predictive power of work performance in the business world including a link between founder self-efficacy and start-up success, it is reasonable to expect that self-efficacy might play an important role in the development of entrepreneurs and their performance. It is recognised that education and previous experience play a part in influencing attitudes to business start-up (Peterman and Kennedy (2003); the question is the extent to which it is possible for education to influence not only attitudes but also intention and then, ultimately, behaviour.

Influencing beliefs, attitudes and intentions through education

In order to influence beliefs, attitudes and intentions towards entrepreneurship through education it is important to consider how programmes might bring about changes in levels of self-confidence of individuals so that they will be motivated to attempt new activities and persist in the face of difficulty. In designing programmes it is possible to use the theoretical constructs discussed above in order to determine not only what content is included within the curriculum, but also what pedagogical techniques are adopted to deliver that content. In this way both content and pedagogy may be employed to best effect to bring about changes in attitudes and confidence toward skills and competences which are linked to entrepreneurial behaviour.

Deep learning is recognised as being promoted by experiential and reflective teaching and learning methods (Barclay 1996; Cope and Watts 2000; Krebner 2001; Loo and Thorpe 2002) which are also relevant in the development of self-belief and self-efficacy (Ndoye 2003). As outlined above, self-efficacy can be developed through vicarious experience, so that self-efficacy for entrepreneurship can, therefore, be conceptualised as being enhanced through the use of pedagogical approaches which encourage students to learn through the experience of others, as well as through their own experience (Rae and Carswell 2000).

The greater the level of emotional engagement in an activity the greater the likelihood of bringing about positive changes in an individual's self-efficacy beliefs (Wood and Bandura 1989). Given that changing beliefs is the first step on the road to influencing behaviour this suggests the need to adopt techniques which will engage students actively in the learning process. At the passive end of the spectrum students learn through the integration of brief examples into the

theoretical or concept-based lecture. The student will take a slightly more active role in learning during case study classes which employ written case materials to explore the entrepreneurial event or other aspect of the venture creation process (Krebner 2001). Guest entrepreneurs as speakers enable students to learn directly from those who have first-hand experience of the innovation and venture creation process (Cooper *et al.* 2004), providing the observer with the opportunity to gain a sense of the desirability of pursuing a similar course of action to the entrepreneurial speaker. Where an entrepreneur cannot be present in the classroom the use of video profiles can prove an effective tool for teaching and learning (Robertson and Collins 2003); here, however, students do not have the chance to engage with the speaker or observe their interaction with others through question and answer situations.

Speaker choice and discussion themes will be influenced by the lessons which are to be delivered, thus, from a theoretical perspective it may be possible to structure and focus the use of guest speakers as role models to maximise the likelihood of influencing student beliefs and attitudes. Where speakers introduce examples which demonstrate how they overcame failure, coped with difficulty and persisted to overcome significant challenges, students are able to learn vicariously very important lessons about persistence and feasibility. If several role models are being used, they may be selected as a set in a way that carries its own message. It may for example be desirable to introduce role models who are at different stages of their careers, to create a sense of the steps along the pathway to entrepreneurial success and the feasibility of attaining those levels.

One might also consider the similarity of the speaker with the intended audience. Gibson (2003) identifies a number of attributes which individuals may use to determine whether or not they take lessons from a role model. The dimensions he identifies are positive/negative, global/ specific, close/distant and hierarchically superior/peer subordinate. In selecting role models to speak with student groups, considering their attributes suggests the importance of considering characteristics such as age, gender, ethnic background, subject/sector of activity and level of success. In Enterprisers those concerned that entrepreneurs are necessarily less than ethical were excited by a speaker involved in what is sometimes called social capitalism. A very young entrepreneur can be counted on to inspire an undergraduate audience.

The incorporation of individual, small and large group activities offers the potential to develop other aspects of self-efficacy and skills important in enterprise creation, such as teaming, while blending those from different backgrounds and cultures is also important in developing understanding of different perspectives and subject mastery (Driver 2003; Gear *et al.* 2003; Poell and Van der Krogt 2003). Evidence from the fields of training and development regarding assessment and feedback points to their role in influencing the development of self-efficacy (Humphreys *et al.* 1997); increased regularity of assessment and feedback provides tangible evidence of changes in performance which can be influential in enhancing self-efficacy (Orpen 1999). Critical thinking and reflection have been linked to the achievement of deep learning and practices such as journaling and the use of learning logs may be used to support such activities (Barclay 1996; Jack and Anderson 1999; Loo and Thorpe 2002; Van Woerkom *et al.* 2002).

Following this discussion of issues associated with the selection of pedagogical approaches in entrepreneurship education, the Enterprisers programme is now considered, with particular attention to its components intended to strengthen participant confidence in their entrepreneurial abilities.

The Enterprisers Programme

Enterprisers (www.enterprisers.org.uk), originally known as CMI Connections, brings together principally undergraduate students from UK universities and MIT for a highly interactive and participative, week-long, residential programme. It is designed to develop entrepreneurial skills, build confidence and create meaningful relationships among participants from diverse cultural backgrounds and disciplines. During the programme participants learn about entrepreneurship and how to pursue their passions, acquiring the tools and developing/enhancing their skills for pursuing projects and building new organisations. The curriculum content and delivery have been conceived to equip participants with entrepreneurial project/venture skills, for example, networking, team building and creativity. Participants learn about the resources required to realise new activities, develop a network of like-minded students across different countries and universities and establish contacts with a variety of university faculty members and links to resources within their own institutions. The emphasis is on helping participants to unlock their entrepreneurial spirit, instilling a "can do" attitude and encourage them to acquire the skills, confidence and contacts to realise ambitions within a "safe" environment, with support from faculty and those in the entrepreneurial community.

To date there have been seven programme in the UK, Durham 2003, Strathclyde 2003, Durham 2004, Herriot-Watt 2004, Durham 2005, Brighton 2005 and WestFocus (West London) 2005. The early programmes involved approximately ten students and two facilitators from each of six universities, and two to three lead facilitators; more recent programmes have included students from a larger number of universities, with few students from each institution. Participants are characterised by the diversity of backgrounds from which they come, and there is no requirement that they have to have studied entrepreneurship prior to attending Enterprisers. As a result students from fields as diverse as Scottish Studies, Mechanical Engineering and Law have taken part in events. While in the main the participants have been university undergraduates, graduate students have participated. Facilitators are generally involved in small business and enterprise teaching or have a personal interest or involvement in entrepreneurship. Facilitators receive two days of training prior to the event. Programmes have also drawn upon human resources in the enterprise community by bringing in guest speakers (including social and profit-based entrepreneurs as well as fanciers) and other entrepreneurial participants to acts as role models and provide the opportunity for students to network with and learn from those who have created their own ventures.

Programme curriculum and delivery

The programme focuses on four key themes, originally incorporated into the curriculum by Shai Vyakaram of the Centre for Entrepreneurial Learning at the University of Cambridge, which underpin the project/venture development process and support students in 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 (Moi): defining and understanding entrepreneurship and understanding one's self and personal motivations, values, ethics and goals;

Launching a great idea (Ideation/Peopleology): understanding what an entrepreneur is, the process of creativity and idea generation, meeting unmet needs of the customer and developing the first elements in the project plan;

What it will take to succeed (Nuts 'n' Bolts): leadership and teams, the identification and acquisition of resources and the value and use of networks in resource acquisition and project execution;

Keeping the dream alive (Crystal Ball): maintaining motivation and commitment, celebrating progress and sustaining projects into the future.

The curriculum is delivered using a range of pedagogical techniques to create contrasting learning environments through which students gain perspectives on the new venture/project creation process. While large group sessions are employed to deliver elements of the core curriculum, such as ethics, creativity, presentation skills and networking, frequently during such sessions students are broken into smaller, tutor-facilitated groups to engage in highly participative, interactive exercises. Occasionally, students work independently, for example, to develop their own project idea and pitch. The essence of these activities is to engage the learning in a highly experiential and hand-on way, heightening their emotional involvement with the subject, which builds upon the theoretical concept discussed earlier.

Presentations from guest entrepreneurs, representing a range of backgrounds, ages, markets and experiences, enable participants to learn vicariously from practicing entrepreneurs, and to appreciate the positive and negative aspects of new project genesis and implementation. The diversity of backgrounds allows some of the issues raised by Gibson's work (2003) on the identification of role models to be addressed. It is anticipated that students will align themselves with the different role models and appreciate the diversity of career paths taken by the speakers. From this vicarious observation they will then be able to draw personal lessons on how they might think about work opportunities as steps in a career, in particular in terms of desirability, feasibility and their own person capability to succeed in their desired domain. Other sessions focus on topics such as project planning, resources and networking. Participants engage in exercises to develop key skills, such as in presentations and pitching (abilities to describe project concepts orally), and learn the importance of feedback and constructive criticism. Students are encouraged to engage in reflection on the learning process and record their reflections in a daily journal or learning log.

RESEARCH DESIGN AND MEASUREMENT

The general design of this research gave priority to establishing that Enterpriser events were a cause of change in several forms of entrepreneurial self-confidence as well as entrepreneurial intent, and testing to see if any changes found were enduring. This requires a three step questionnaire, beginning with the administration of a questionnaire at the beginning of the event. There were two post-tests whose scope was determined by the stress of the research on enduring change. A survey immediately before the Enterprisers event was concluded was used to collect data on perceptions of various programme elements that could be related to outcomes to see if the research could attribute success or failure to specific components of the event. At this point to keep the questionnaire shorter, only a selected subset of the longer scales were used

since the purpose was only to document that significant changes had occurred. Then six months later a questionnaire was sent to all participants asking them to complete the full set of outcome questions that had been asked at the pre-test.

This procedure has been followed first for a pilot event at the University of Durham, and then with relatively stable instruments for subsequent events. While to date more than 370 students have participated in seven events, the research team is in a continuing process of collecting the six month surveys of the more recent events, and six months have not passed since the event held in January 2006. At the time of this writing, data are available for pre-post event surveys for 218 students who participated in the second through fourth holding of Enterprisers, with six month data in hand for 75 or 33.9% of the participating students in those events.

Measurement.

The original concept of entrepreneurial self-confidence was career self-confidence and confidence in functional skills. The 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. The central outcome measure was the active intention of the individual to start a new company.

Entrepreneurial self-confidence. Rather than consider the development path of entrepreneurs as particularly unique, one might see it as a career path not unlike that followed by attorneys or engineers. They are heavily influenced by parental occupation, and many pursue it as a vocational goal at an early age. While entrepreneurs do not generally have a undergraduate course of study dedicated to being an entrepreneur, university courses for entrepreneurship continue to expand. With nations encouraging their young adults to leave other fields and pursue entrepreneurship and growing media attention to the subject, it is increasingly a salient career option. This perspective suggests one might then draw on the more general literature on vocational behaviour including the work of Lent and Hackett (1987) who suggest that career self-efficacy is critical for the pursuit of any type of career. They note that career self-efficacy is itself only the name of a category of phenomena and is not itself a psychological trait. Instead an individual has differing degrees of career self-efficacy for particular occupations or professions, which could include entrepreneurship. For the purpose of this paper, entrepreneurial self-efficacy for undergraduates and younger professionals is seen as a belief in one's ability to master the skills and perform the tasks relevant to becoming an entrepreneur.

Much of the early work with this concept measured it without specifying its content. That is, one asks the individual whether they are capable of performing the role of a given occupation without calling out the skills that might be required, or the tasks that would need to be completed. Betz and Hackett (1993), for example, provide a useful and detailed guide for their study of male- and female-dominated occupations. For each of several occupations (e.g., nurse, teacher), individuals were asked quite simply if they were confident that they could meet the educational requirements of a given job, and whether they could perform the (unspecified) duties of that job.

To assess the confidence of Enterprisers participants in their skill to follow a vocational path of entrepreneurship, the participants in the Enterpriser events were similarly asked to make summary judgments about in this case about their knowledge and ability to perform the role

of being entrepreneurship. Each student 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.

Functional skill self-confidence. Here the focus is reversed. Instead of asking about a vocational domain, with skills left unstated, the focus is on the self-confidence in skills without regard to what vocational paths might be involved. One of the most useful for the purpose of this research has been the work of Terenzini *et al.* (1991). They report on a set of scales designed to determine the quality of engineering education. A factor analysis was used to group a set of items into several skill domains, including two that are included in the Enterprisers evaluation. Confidence in problem-solving skills were probed by asking the participants how they would rank their skill to "solve an unstructured problem", "apply an abstract idea of concept to a real problem", and "evaluate arguments and evidence" of competing alternatives. This area includes the role of communications in problem-solving, as in their skill both orally and in writing to clearly describe a problem. (See Table 2). The questionnaire also drew on their items for group skills including such skills as to "listen to the ideas of others", "pay attention to the feeling of group". Additional items were added to the skills battery in order to call out abilities more specific to entrepreneurship, including the somewhat general skill to "recognise an opportunity."

Entrepreneurial Intention. A measure of an individual's intention to pursue entrepreneurship was included on the pre-, post-event and six month surveys to see if any increase in entrepreneurial self-confidence has a concomitant impact on the participants' intention to start a company. Two items (see Table 1B) are asked about joining a start-up in the near term, and another statement 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 was asked to see if one often thought about starting a company.

The 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. In this research the alpha statistic for reliability is found to be .66 at the pre-test, and .75 among those that completed the follow-up survey six months later.

Results

The results of this research suggest that Enterprisers has had consequential and enduring impact on participant self-confidence, with much of the change found at the end of the event still present after a half year or longer. There is, however, only a minimal effect if any at all on entrepreneurial intentions.

The first results (Table 1) show there is for all self-confidence items a significant increase from the start of the event to its close four and a half days later. Those saying that they rated their skill to design something new as good to excellent rose from 61.0% to 81.7%; the proportion rating their ability to recognise a good opportunity rose from 72.0% to 86.8%. Similar changes are found for the skills of solving an unstructured problem, describing problems clearly both orally and in writing, probing to clarify facts, and motivating others to work together. Around half (ranging from 92 to 105) of the 218 participants changed showed an increase in their self-ratings of these skills, and all changes are statistically significant when the sign test is computed.

Table 1: Self-confidence in Entrepreneurial Skills and Intention at Post-event Survey

A. <u>Self-confidence in skills</u>: Current levels compared to university students	Percent ranking skill "Good" to "Excellent"		Response changes from pre- to post event survey and sign test			
Post-test N=217, 99.5% response rate	Pre-Event	After event	N	Number increase	Total changes	Z value
Design something novel and innovative.	61.0%	81.7%	218	103	136	6.002***
Solve an unstructured problem.	75.2%	88.6%	218	95	132	5.048***
Clearly describe a problem orally.	67.9%	82.6%	217	105	141	5.811***
Clearly describe a problem in writing.	67.7%	78.9%	216	92	123	5.500***
Ask probing questions that clarify facts.	70.2%	87.2%	218	102	138	5.618***
Motivate others to work together.	71.4%	84.4%	218	100	135	5.594***
Recognise a good opportunity.	72.0%	86.8%	218	96	132	5.222***
Understand what it takes to start your own business.	41.0%	87.7%	217	168	180	11.628***
Start a successful business if you want.	41.0%	82.2%	217	169	178	11.993***
B. <u>Entrepreneurial Intent</u>. Pre- and post-event items and scale score.	Percent who agree or agree strongly		N	Number increase	Total changes	Z value
If I see an opportunity to join a start-up company in the next few years, I'll take it.	39.7%	56.2%	219	95	144	3.833***
The idea of a high risk/high payoff ventures appeals to me.	37.0%	45.2%	219	76	120	2.921**
I often think about ideas and ways to start a business.	54.4%	62.1%	219	73	119	2.475**
At least once I will have to take a chance and start my own company.	59.8%	78.1%	219	91	117	6.009***
Entrepreneurial Intent average scale score	5.20	5.58	219	t = 6.929, significant at .001		

* $p<.05$; ** $p<.01$; *** $p<.001$. The Sign Test was used to estimate statistical strength of significance because t-test or other methods using difference of means are inappropriate for the pre- and post-test of the same group (Cliff 1991). Given a nul hypothesis that any change found will be random and equally probable in either direction, the sign test calculates the probability that the number of changes is disproportionately in the hypothesised direction (one-tail test).

The two items summarising their summary self-rated skill to become entrepreneurs showed even greater change. At the beginning of Enterprisers, 41.0% of the participants felt they had a good to excellent understanding of what it requires to start their own businesses, and at the end of the week 87.7% felt that they had that level of knowledge. At the same time 41.0% also rated their ability to start a company as good to excellent, compared to 82.2% at the end of the event. The change data shows that 169 and 168 students respectively had a positive gain in their confidence in these summary judgments of their entrepreneurial ability.

The third result found in the event post-test is a modest increase in the strength of the participant entrepreneurial intention. Looking at the separate items, one finds increases in the proportions that "agree" or "strongly agree" to the four statements. The largest gains are found in the statement that one would take an opportunity to join a start-up in the next few years (pre-test 39.7%, post-test 56.2%), and the desire to at least once start one's own company (pre-test 59.8%, post-test 78.1%). The number of positive changes showing a strengthened agreement to the items range from 73 to 95, and all are statistically significant When the items are combined in the entrepreneurial intention scale, the average pre-test scores is 5.19, and it rises to 5.57 at the close of the event, an increase that is significant at the .001 level.

Together these results show that the four Enterprisers events evaluated here have caused a consequential and statistically significant impact on the self-confidence and entrepreneurial intention of the participating students.

Enduring effects of Enterprisers. The baseline pre-test is then compared with the follow-up survey conducted six months or more after the events to see how if this change persisted over time. Because the narrow purpose of the post-event survey was to show that the cause of change could be isolated to the Enterprisers event, only a short list of skills was put on the questionnaire. Here the results of the change from the pre-event survey to a survey sent out six months later include a longer list of items selected from Terenzini's set of group and problem solving skills, and additional skills believed to be associated with entrepreneurship. Due to a relatively low response rate of 33.9% to the follow-up survey, data is available for 75 participants for this analysis. When change data are compared for these participants, the general result is that their heightened self-confidence found at the end of each Enterprisers is shown to have endured. The results are less supportive of a belief that the programme increased actual intent.

When one compares the pre- and six month surveys, the most conspicuous finding is the results found immediately after Enterprisers are generally found to have persisted. The levels of self-rated skills that are good to excellent for this panel still show a substantial increase. Believing one is at least good at designing something novel shows an increase from 54.7% to 67.6%. Similar results are found for the problem solving skills like solving an unstructured problem (from 65.3% up to 81.1%), applying an abstract concept to solve a problem (56.2% up to 82.4%), and the ability to clearly describe problems orally (64.0% up to 86.5%) and in writing (62.7% to 79.7%). Self-perception of leadership skills increases, with heightened confidence that the participants can motivate others to work together (74.7% to 84.9%), and lead a group whose members disagree (52.0% up to 67.6%). More specifically linked to entrepreneurship are the abilities to recognise new opportunities and to be able to execute. Participants rating their ability to recognise opportunity as good or better is seen to have increased from 66.7% to 79.5%. The skill of putting a detailed plan into action increases from 62.7% to 83.8%, and delivering on a job one has promised to do rises from 48.0% to 90.5%.

Not surprisingly given the persistence of change in self-rated skills, self-rated competence to start companies also remains high, with striking increases persisting after six months. Feeling that one is good or better at understanding what it takes to start a company goes from 34.7% to 71.2%; being able to go out and start a company rises from 36.5% to 59.5%.

Table 2: Self-confidence in Entrepreneurial Skills and Intention Six Months after the Event

Self-confidence in skills: Self-ranking compared to other university students	Percent ranking skill "Good" to "Excellent"		Response changes from pre- to post event survey and sign test			
Response rate at post-test, 33.9%, for N=75	Pre-Event	After 6 months	N	Number increase	Total changes	Z value
Design something novel and innovative.	54.7%	67.6%	74	33	48	2.598**
Solve an unstructured problem.	65.3%	81.1%	74	32	45	2.832**
Develop ways to resolve conflict in a group.	53.3%	85.1%	73	34	47	3.501***
Apply an abstract idea or concept to a real problem or situation.	56.2%	82.4%	72	35	54	2.177*
Clearly describe a problem orally.	64.0%	86.5%	74	39	53	3.434***
Clearly describe a problem in writing.	62.7%	79.7%	74	38	51	3.501***
Work on collaborative projects as a member of a team.	88.0%	89.2%	74	26	44	1.206
Ask probing questions that clarify facts.	70.7%	86.3%	73	29	39	3.042**
Recognise a good opportunity.	66.7%	79.5%	73	34	47	3.063**
Motivate others to work together.	74.7%	84.9%	73	33	47	2.771**
Lead a group whose members disagree.	52.0%	67.6%	74	37	47	3.938***
Put a detailed plan into action.	62.7%	83.8%	74	33	50	2.263*
Deliver on a job you have agreed to do.	48.0%	90.5%	74	31	42	3.086**
Understand what it takes to start your own business.	34.7%	71.2%	73	50	57	5.695***
Start a successful business if you want.	36.5%	59.5%	73	49	58	5.252***
B. Entrepreneurial Intent. Pre- to post event change in items and scale score.	Percent who "slightly agree"		N	Number increase	Total changes	Z value
If I see an opportunity to join a start-up company in the next few years, I'll take it.	33.3%	45.3%	76	29	52	0.832
The idea of a high risk/high payoff ventures appeals to me.	34.7%	34.7%	76	26	56	-0.535
I often think about ideas and ways to start a business.	46.7%	57.3%	76	30	50	1.414
At least once I will have to take a chance and start my own company.	52.0%	64.0%	76	32	48	2.309**
Entrepreneurial Intent average scale score	4.98	5.13	75	t =1.193, not significant		

* p<.05; ** p<.01; *** p<.001.

The tracking of the number of changes allows us to see if these higher levels of self-rated abilities are due to very large changes among a few, or are broadly felt among a large proportion of the participants. With the exception of working on a collaborative project which began at such a high level that increases were hard to achieve, from 29 to 39 individuals, or over 40% of these students, increased confidence in their separate skills This change data also allows the computation of statistical tests of the binomial probability that this number of positive changes could have occurred by chance using the sign test, and the result is that all except the collaborative team task have changes that are statistically significant.

The magnitude of persistent change of entrepreneurial self-confidence from the pre-test to the six month survey for these participants is even greater. The self-rating that the participants have a good or better capacity to understand what it takes to start a company still increases greatly from 34.7% to 71.2%. Feeling one would be good at starting a company increases from 36.5% to 59.5%. The self-ratings of 50 and 49 participants, two-thirds of the six month panel, are shown to have increased their confidence about pursuing entrepreneurship (significant at the .001 level).

When one considers the attitude scale used to measure entrepreneurial intent, the results are quite different. Where the post-event scale scores as well as the separate items clearly show positive increases, after the passage of six months the evidence is problematical. First the average scale score has dropped back to 5.13, only marginally higher than the 4.98 average for this group. In general one then concludes that the increase in entrepreneurial intent found at the post-test was transitory. When the attitude scale items are considered separately, it is clear that change has persisted in one item, the notion that "at least once" the participant will start a company. At the end of Enterprisers, 78.1% agreed with this statement, but in the intervening six months it has dropped to 64.0% (compared to 52.0% for this group at the start of the event).

DISCUSSION

Enterprisers set out to strengthen the likelihood that its participants would pursue entrepreneurship, and from one perspective it was successful. The confidence that the participants had the knowledge and capability to start a company soared as a direct result of the programme. To claim that any programme caused a desirable effect is often open to challenge, but here the evidence seems clear. These students were from diverse backgrounds that make it difficult to argue that the change came from some external source. They were relatively isolated and spent very long days and evenings together, with virtually no common experience during the week excepting the programme itself. Whatever change was found at the end of the week can be attributed to the short-term influence of Enterprisers activities.

The follow-up survey was six months or more later, and the levels of self-confidence generated by Enterprisers still persisted. It is difficult to argue that some external factor might have enabled these longer term effects when the students had returned to many different universities in different countries, with English students showing the same enduring effects as the students in Wales, Scotland, and Northern Ireland, not to mention the MIT students who returned to the United States. One can only remark then that Enterprisers, a programme lasting five days, caused a large, robust and persistent change in the entrepreneurial self-confidence of these participants.

What makes this outcome the more remarkable is the brevity of the programme itself. Perhaps this surge of self-confidence results from the fact that the participants were self-selected and both ready and eager to be persuaded that they had leadership and entrepreneurial potential. It is less remarkable that the effects endured because of the nature of self-efficacy. As shown by the work of Mau (2003), once established self-efficacy can have a strong and long lasting influence as confidence encourages accepting further challenge, with success feeding back in a spiralling process to enhance self-efficacy further.

The negative result is that the programme did not do much to change the active intention of the participants to start a company. The scale of entrepreneurial intention used here has been used in other research, and it has generally been found to capture an estimate of short term, immediate intentions to start a company. There is one item in the scale, however, that holds open a longer time frame, with a sense that sooner or later one will want to try to start a company. Note that is the one item that shows persistent and significant increase over the pre-test survey after six months. Perhaps then Enterprisers has increased a desire to be an entrepreneur that can be more readily triggered by need or opportunity in the future.

Conclusion

A practical conclusion is that a research design of type presented here enables one to isolate cause and effect, and provide systematic data that a programme is, or is not, effective. The importance of the six month follow-up survey is made evident. Had the research stopped with the post-event survey, one would have concluded quite incorrectly that both confidence and intention were dramatically enhanced. In the case of Enterprisers, it seems clear that the programme has been highly successful in establishing a foundation of entrepreneurial self-confidence.

The measures and data collected now permit further analysis that can identify what specific programme elements are associated with that success. Future work will take characteristics of the programme as perceived and reported on the post-event about such things as -- for each participant -- the speakers that attracted them and the activities that most interested them. Differences across individuals can be related to the change data to see what factors contributed most to the growth of self-confidence and which parts of Enterprisers have little if any impact. In this way a revised, even more successful Enterprisers can be created.

A final point is that this research hopefully demonstrates that a deeper understanding of entrepreneurial development can be found in treating programmes as quasi-experiments. Enterprisers was originally organised with a general expectation that change in entrepreneurial intention would follow. This evaluation casts doubt on this belief, and contradicts the view in the literature that increasing self-efficacy, variously defined, predicts heightened entrepreneurial intention. One view is that entrepreneurial career or skills self-confidence as used here is not the form of self-efficacy that is the most relevant to enhancing intent. Alternatively, it may be that self-efficacy is a prerequisite, as in a necessary but not sufficient condition for intent, or there may be some other complex relationship at play. Whatever the nature of this relationship, one can see Enterprisers as a field experiment that demonstrates that self-confidence in entrepreneurship can increase without a continuing change in intention. There is, therefore, not a simple cause and effect relationship between entrepreneurial self-confidence and entrepreneurial intention.

References

Ajen, I (1987) "Attitudes, traits and actions: dispositional predication of behavior in personality and social psychology", 1-63 in L Berkowitz (ed.) *Advances in experimental social psychology*, San Diego, Academic Press.

Anna, AL, Chandler, GN, Jansen, E and Mero, NP (2000) "Women business owners in traditional and non-traditional industries", *Journal of Business Venturing,* 15, 279-303.

Ardichvili, A, Cardozo, R and Ray, S (2003) "A theory of entrepreneurial opportunity identification and development", *Journal of Business Venturing*, 18, 105-123.

Bandura, A (1986) *Social Foundations of Thought and Action: A social cognitive theory*, Englewood Cliffs, NJ, Prentice-Hall.

Bandura, A (1997) *Self-Efficacy: The Exercise of Control*, New York, Freeman.

Barclay, J (1996) "Learning from experience with learning logs", *Journal of Management Development*, 15, 6, 28-43.

Baum, JR and Locke, EA (2004) "The relationship of entrepreneurial traits, skill, and motivation to subsequent venture growth", *Journal of Applied Psychology*, 89, 4, August, 587-598.

Betz, NE (2000) "Self-efficacy theory as a basis for career assessment", *Journal of Career Assessment*, 8, 205-222.

Betz, NE (2004) "Contributions of self-efficacy theory to career counseling: a personal perspective", *The Career Development Quarterly*, 52, 4, 340-353.

Betz, NE and Hackett, G (1993) "*Manual for the occupational self-efficacy scale*", http://seamonkey.ed.asu.edu/~gail/occse1.htm.

Betz, NE and Hackett, G (1981) "The relationship of career-related self-efficacy expectation to perceived career options in college women and men", *Journal of Counseling Psychology*, 28, 399-410.

Betz, NE and Hackett, G (1997) "Applications of self-efficacy theory to the career assessment of women", *Journal of Career Assessment*, 5, 383-402.

Bird, B (1988) "Implementing entrepreneurial ideas: the case for intention", *Academy of Management Review*, 13, 3, 442-453.

Boyd, NG and Vozikis, GS (1994) "The influence of self-efficacy on the development of entrepreneurial intentions and actions", *Entrepreneurship Theory and Practice*, Summer, 63-77.

Chandler, GN and Jansen, E (1992) 'The founder's self-assessed competence and venture performance', *Journal of Business Venturing*, 7, 223-236.

Chen, CC, Greene, PG and Crick, A (1998) 'Does entrepreneurial self-efficacy distinguish entrepreneurs from managers', *Journal of Business Venturing*, 13, 295-316.

Cooper, S, Bottomley, C and Gordon, J (2004) "Stepping out of the classroom and up the ladder of learning: an experiential learning approach to entrepreneurship education", *Industry and Higher Education,* February, 11-22.

Cope, J and Watts, G (2000) "Learning by doing: an exploration of experience, critical incidents and reflection in entrepreneurial learning", *International Journal of Entrepreneurial Behaviour & Research*, 6, 3, 104-124.

Driver, M (2003) "Diversity and learning in groups", *The Learning Organisation*, 10, 3, 149-166.

Fishbein, M and Ajen, I (1975) *Belief, attitude, intention and behavior: an introduction to theory and research*, Reading, MA, Addison-Wesley.

Gear, T, Vine, R, Read, M and Minkes, A.L (2003) "Group enquiry for collective learning in organisations", *Journal of Management Development*, 22, 2, 88-102.

Gecas, V (1989) "The social psychology of self-efficacy", *Annual Review of Sociology*, 15, 291-316.

Gibson, DE (2003) "Developing the Professional self-concept: role model construals in early, middle and late career stages", *Organization Science*, 14, 5, 591-610.

Humphreys, P, Greenan, K and McIlveen, H (1997) "Developing work-based transferable skills in a university environment", *Journal of European Industrial Training*, 21, 2, 63-69.

Jack, S and Anderson, A (1999) "Entrepreneurship education within the enterprise culture: producing reflective practitioners", *International Journal of Entrepreneurial Behaviour and Research*, 5, 3, 110-125.

Krebner, C (2001) "Learning experientially through case studies? A conceptual analysis", *Teaching in Higher Education*, 6, 2, 217-228.

Krueger, NF (1993) "The impact of prior entrepreneurial exposure on perceptions of new venture feasibility and desirability", *Entrepreneurship Theory and Practice*, 18, 1, 5-21.

Krueger, NF (2000) "The cognitive infrastructure of opportunity emergence", *Entrepreneurship Theory and Practice*, Spring, 5-23.

Krueger, N and Brazeal, D (1994) "Entrepreneurial Potential and Potential Entrepreneurs", *Entrepreneurship Theory and Practice*, Spring, 18, 3, 91-104.

Krueger, N, Reilly, MD and Carsrud, AL (2000) "Competing models of entrepreneurial intentions", *Journal of Business Venturing*, 15, 411-432.

Lent, RW and Hackett, G (1987) "Career self-efficacy: empirical status and future directions", *Journal of Vocational Behavior,* 34, 279-288.

Loo, R and Thorpe, K (2002) "Using reflective learning journal to improve individual and team performance", *Team Performance Management: An International Journal*, 8, 5/6, 134-139.

Markman, GD, Balkin, DB and Baron, R (2002) "Inventors and new venture formation: the effects of general self-efficacy and regretful thinking", *Entrepreneurship Theory and Practice*, Winter, 149-165.

Mau, W-C (2003) "Factors that influence persistence in science and engineering career aspirations", *The Career Development Quarterly*, 51, 234-243.

Ndoye, A (2003) "Experiential learning, self-beliefs and adult performance in Senegal", International *Journal of Lifelong Education*, 22, 4, 353-366.

Orpen, C (1999) "The impact of self-efficacy on the effectiveness of employee training", *Journal of Workplace Learning: Employee Counselling Today*, 11, 4, 119-122.

Pajares, F (1996) "Self-efficacy beliefs and mathematical problem-solving of gifted students," *Contemporary Educational Psychology,* 21, 325-344.

Peterman, NE and Kennedy, JK (2003) "Enterprise education: influencing students' perceptions of entrepreneurship", Winter, 129-144.

Poell, RF and Van der Krogt, FJ (2003) "Project-based learning: towards a methodology for learning in groups", *Journal of Workplace Learning*, 15, 5, 217-228.

Rae, D and Carswell, M (2000) "Using a life-story approach in researching entrepreneurial learning: the development of a conceptual model and its implications in the design of learning experiences", *Education + Training*, 42, 4/5, 220-227.

Robertson, M and Collins A (2003) "The video role model as an enterprise teaching aid", *Education + Training*, 45, 6, 331-340.

Stajkovic, AD and Luthans, F (1998) "Self-efficacy and work-related performance: a meta-analysis", *Psychological Bulletin*, 124, 240-261.

Terenzini, PT, Cabrera, AF and Colbeck, CL (1991) "Assessing Classroom Activities and Outcomes," 29th ASEE/IEEE Frontiers in Education Conference, November 10-17, San Juan, PR.

van Woerkom, M, Nijhof, WJ and Nieuwenhuis, FM (2002) "Critical reflective working behaviour: a survey research", *Journal of European Industrial Training*, 26, 8, 375-383.

Wood, R and Bandura, A (1989) "Social cognitive theory of organizational management", *Academy of Management Review*, 14, 3, 361-384.