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Can entrepreneurship be taught?

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Abbreviations

DfID	UK Department for International Development
EET	Entrepreneurship Education and Training
GEM	Global Entrepreneurship Monitor

1 Introduction

The UK Department for International Development (DfID) has commissioned a literature review on the evidence of whether that entrepreneurship can be taught and what areas can be taught.

Query 1: What is the evidence that entrepreneurship can be taught and, to the extent it can, what areas of it can be taught and what (if any) rely on an innate ability?

This literature review examines the existing evidence about entrepreneurship education and training (EET). The paper provides a conceptual framework for EET and describes some of the main characteristics associated with education and training in entrepreneurship. It then proceeds to analyse the existing evidence.

It is important to highlight that this is the first of two papers looking at the issue of education and entrepreneurship. This first paper will look at the general evidence from across the world, while the second will focus specifically on Africa.

2 Methodology

The approach taken by this literature review includes conducting a broad-based search of relevant content, based on the main focus of the paper, keeping a record of search strategies and inclusion/exclusion criteria such as time frame, focus of the paper, methodology, etc. The literature review covers the academic literature, research and technical papers, government reports and working papers which are considered to be useful to answer the main research questions.

The list of documents reviewed is by no means exhaustive; it represents material available online or through data bases. The selection criteria were broadly defined as any text reviewing, analysing, evaluating or describing entrepreneurship education and training programmes.

The term impact is used only colloquially, as rigorous research on the topic is still limited. With only a handful of methodical external impact evaluations, the review relies mostly on observational research and the 'grey literature'.

The review considers only reports written in English.

3 Literature review

Entrepreneurship has never been more important than the current moment. As societies face challenges that resist staid and rigid economic solutions, entrepreneurship and innovation forge new paths -- fostering sustainable development, creating jobs, generating economic opportunities and advancing human development. Entrepreneurship is flexible and adaptive, resisting certain "rationalized" controls while embracing the innovative methods in which human beings interact and process their worlds. The concurrence of globalization, technological innovation, and demographic trends highlights the effects and importance of entrepreneurship, in both developed and developing economies.

While there is no accepted universal definition of entrepreneurship, for the purpose of this paper we define entrepreneurship in the broad sense as "the pursuit of opportunities, whether they are to create start-ups, spin-outs or entrepreneurial activities in larger organizations (private or public) or social ventures (WEF, 2009)."

Considering the increasing importance of entrepreneurship, then the question remains whether entrepreneurship can be taught? This question has been widely and vigorously debated across sectors for years. Many have embraced the notion that, "entrepreneurs are born, not made," and therefore they possess specific, innate personality traits. However, the evidence supporting an "entrepreneurial personality profile" is weak. While entrepreneurs do share some common psychological characteristics, there is no typical personality profile. Entrepreneurs are as diverse a group of people as any other (Davidsson, 2013).

The sharp increase in the number of entrepreneurship education and entrepreneurship training programmes also seems to suggest a certain level of consensus supporting learned entrepreneurship. To those policy makers and practitioners who aim to increase entrepreneurship, the idea that entrepreneurs can be "made" is highly enticing.

As interest in entrepreneurship increases, the number of programmes promoting entrepreneurship and training the next wave of entrepreneurs has grown. EET programmes aim to develop in individuals the skills, knowledge and attitudes needed to become an entrepreneur. EET programmes are based on research that indicates that certain behaviour, considered entrepreneurial behaviour, can be taught and learned across a range of ages. The wide range of EET programs runs from formal education to informal interventions with content as varied as bookkeeping for farmers to soft-skill strengthening for college graduates. The diversity of these interventions reflects the variety of people who can be considered entrepreneurs (Robb et al, 2014).

However, despite the sharp increase in EET programs, research on the effectiveness and impact of said programmes is still limited and existing evaluations tend to be methodologically weak. More needs to be done to better understand what works, what does not and where to focus (Valerio et al 2014; Robbs et al 2014; Martin et al 2013; McKenzie and Woodruff 2012; Glaub and Frese 2011; GEM 2010; Béchard and Grégoire, 2005). According to Fayolle (2014) these views are consistent with Gorman et al (1997) and Matlay (2005, 2006), suggesting the need to not only improve the quality of research in the sector but also conduct longitudinal studies to assess impact over time.

3.1 The conceptual framework and current issues about EET

Definitions of entrepreneurship education, similar to entrepreneurship, are varied and emphasise different aspects of the entrepreneurship process. Alberti et al (2004) defines entrepreneurship education as the "structured formal conveyance of entrepreneurial competencies – concepts, skills and mental awareness used by individuals during the process of starting and developing their growth-orientated ventures." For Bechard and Toulouse (1998) "entrepreneurial education focuses on combining and carrying out a new combination of business elements while education for small business ownership focuses on the skills needed to reproduce or acquire an existing business."

The Global Entrepreneurship Monitor (GEM, 2010) defines entrepreneurship education as "the building of knowledge and skills 'about' or 'for the purpose of' entrepreneurship generally, as part of recognized education programmes at primary, secondary or tertiary-level educational institutions." This definition, aligns with the working definition provided by Robb et al (2014) "EET represents academic education or formal training interventions that share the broad objective of providing individuals with the entrepreneurial mind-sets and skills to support participation and performance in a range of entrepreneurial activities", which will be used for this report.

On the other hand, entrepreneurship training is defined as "the building of knowledge and skills in preparation for starting a business. Thus, the purpose of entrepreneurship training is very specific, unlike the purpose of entrepreneurship education, which can be much broader." (GEM 2010). Similarly, Robb et al (2014) state that entrepreneurship education usually focuses on building knowledge and skills about or for the purpose of entrepreneurship, while entrepreneurship training aims to build knowledge and skills, explicitly in preparation for starting or operating an enterprise.

Programs may also be classified based on their target group. Due to the academic nature of entrepreneurship education, these programmes tend to target those undergraduate and graduate students in secondary or higher education. Entrepreneurship training programs typically target potential or practicing entrepreneurs who are not necessarily part of a formal education program. Potential entrepreneurs are a range—from necessity-driven, vulnerable, unemployed workers to tech-savvy, opportunity-driven start-up innovators. In the same vein, practicing entrepreneurs can range from micro-enterprise owners to high-growth entrepreneurs (GEM 2010; Robbs et al 2014).

Complicating the picture further is that the question of which types of entrepreneurship education and training works best: primary, secondary or higher education; non-school training programmes; traditional approaches; or a "learn by doing" approach (Valerio et al, 2014). Emerging evidence seems to suggest that the "learn by doing" hands-on approach is more effective at developing entrepreneurial skills and attitudes than traditional methods such as lectures (GEM, 2010).

Another unsettled topic of discussion is what to teach. Some programmes focus on the technical business skills related to issues of financing, managing growth and hiring and training of employees; others cover a much broader spectrum that includes attitudes, creativity and innovation, basing this education on the understanding that entrepreneurship education and training "can create positive perceptions and desire among individuals to start businesses" (GEM, 2010; European Commission Report 2012).

Under the conceptual framework presented by Robb et al (2014) and Valerio et al (2014), EET outcomes are classified into four domains:

- *Entrepreneurial mind-set:* Associated with the socio-emotional skills and awareness of entrepreneurship. Also refers to entrepreneurial motivation and future success as an entrepreneur. In this case EET programmes will measure socio-economic skills linked to entrepreneurship such as leadership, creativity, risk, innovation, etc.
- *Entrepreneurial capability:* Indicates the entrepreneur's competencies, knowledge and technical skills. Some EET programmes focus on providing entrepreneurs with the knowledge and skills they need to open and manage a venture. These types of programs measure the extent to which participation in a particular intervention has equipped beneficiaries with these technical skills
- *Entrepreneurial status:* Here, work status is understood as the state of the beneficiary through entrepreneurial activity. Programs can measure whether a beneficiary has started an enterprise or not, whether the enterprise has increased the beneficiary's income, etc.
- *Entrepreneurial performance:* Measures whether entrepreneurial performance has changed as a result of a particular intervention. Measurement of performance can be done by examining whether entrepreneurs who participated in the EET programme perform better than those who did not, or by measuring improvement in specific indicators.

In addition to the four main domains, both authors argue that outcomes can be influenced by the programme context and characteristics of both the programme and participant.

The EET conceptual framework will be used as guidance to classify the evidence presented in the following section.

Note that entrepreneurship, and the correlating decision to enter into business, is not a simple cut and dried weighing of numbers. Many complex factors influence individuals who become entrepreneurs. Mind-set, skills, status and performance are measured in many of the studies, but outside factors also play a major role. The current business climate and environment, availability of finance and capital, large or small social networks, security, investment and belief in a positive future—all of these influence entrepreneurs. Improvements and education in the entrepreneurial mind-set and skills may make individuals more ready to plunge into entrepreneurism, but it may not be all necessary to increase status and performance.

3.2 The evidence

3.2.1 Entrepreneurship education

Entrepreneurship in secondary education: A meta-analysis conducted by Valerio et al (2014) of nine programmes of entrepreneurship education in high school found that only one programme had an available impact evaluation, highlighting the lack of evidence in this space. The analysis showed that most programmes had a positive effect in cultivating the entrepreneurial mind-set and developing awareness towards entrepreneurship. While some sought to increase capabilities related to business, economics and financial knowledge, impact in this area was limited.

Entrepreneurship in higher education: Williamson et al (2013) argues that there is evidence that "entrepreneurship education in higher education leads to acquisition of knowledge, skills, and competences related to starting a business, managing a business or developing a small business." Similarly, Gortman et al (1997) concluded that there is "preliminary evidence" that entrepreneurship education has a positive impact on entrepreneurship attributes and attitudes and that there is consistence evidence that entrepreneurship can be taught. These studies suggest entrepreneurship education can positively affect capability, though they state that evidence is still light.

Martin et al (2013) undertook a quantitative review of the existing literature on EET. The meta-analysis examined 42 independent studies from a range of countries and took into account methodical rigours. The study is considered to be the first large-sample empirical report on the impact of entrepreneurship education (Foyell, 2014). The study found a positive and significant relationship between EET and entrepreneurship-related human capital assets, through the acquisition of entrepreneurship-relevant knowledge and skills, and in direct entrepreneurship outcomes, including starting and sustaining a start-up. The study also found that academic programmes tend to have a stronger effect on entrepreneurship outcomes than training programs, while training programmes have a stronger effect on entrepreneurial skills than academic programmes. The research also found that studies with lower methodological rigour tended to exaggerate the effects.

Pittaway and Cope's (2007) systematic literature review found that entrepreneurship education had "a positive impact on student's propensity and intentionality towards entrepreneurship," thereby supporting the idea that EET can support mind-set development towards entrepreneurship in students. However, they stated that there was little evidence to conclude if it helped create better or more numerous entrepreneurs.

Von Graevenitz et al (2010) in their research study found that undergraduate students in Germany who had taken part in a compulsory entrepreneurship course as part of their business degrees demonstrated a significant increase in their skills and confidence in business planning. DeTienne and Chandler (2004) found that entrepreneurship education in the US, controlling for socio-demographic variables, has a positive effect in the participant's capability to create new business opportunities. Both of these studies support EET as a force to increase the effectiveness of a student's capability in entrepreneurship.

A meta-analysis conducted by Valerio et al (2014) of 10 EE programmes targeted at higher education found that "there is a relationship between entrepreneurship outcomes and academic-focused EET interventions." Two of ten programmes examined had impact evaluations available showing a positive effect in mind-set and capability but delivered mixed results when it came to status.

Similarly, the review conducted by Williamson et al (2013) found evidence to show that entrepreneurship education leads to changes in entrepreneurial attitudes and perceptions, but less evidence exists regarding entrepreneurship education and increased propensity to take specific actions towards developing or starting a business.

A study of the Berger Entrepreneurship Program at the University of Arizona showed strong evidence that entrepreneurship education had a positive effect on risk-taking and the creation of new businesses. According to Charney et al (2000) "on average, entrepreneurship graduates are three times more likely than non-entrepreneurship graduates to start new business ventures. Controlling for the personal characteristics of graduates and other environmental factors, entrepreneurship education increased the probability of an individual being instrumentally involved in a new business venture by 25 percent over non-entrepreneurship graduates". This supports a positive change in mind-set fostered by EET.

The annex provides a sample of evaluations conducted about entrepreneurship education, at high school and higher education level. It summarises some of the key findings relevant to this research. The table was constructed using information from Valerio et al (2014).

3.2.2 Entrepreneurship training

The meta-data analysis conducted by Cho and Horati (2013), which included 37 impact evaluation studies and 1,116 estimates for six different types of outcomes, covering 25 countries across all six regions, is one of the strongest studies to attempt to discover what works and what doesn't in terms of entrepreneurship training, particularly in developing countries. The findings of the meta-analysis suggest "combinations of different intervention types matter for different beneficiaries under different contexts."

Regarding training programmes, vocation and business training seem to work better than financial training and can be improved by adding either financing support or counselling. Business training for entrepreneurs, in particular, seems to be a "relatively cost-effective way of promoting business performance and growth with a short intervention period, although improved knowledge and practice through training does not always materialize as increased income."

In terms of financing tools, the study suggests there are few differences among the effectiveness of cash, in-kind grants, and microcredit.

The study also highlights the importance of customisation for each outcome of interest while addressing specific, relevant constraints. Programmes promoting skills along with financing support have greater positive effects on labour market activity. At the same time, training alone can be useful to improve business knowledge and practice, and financing itself has positive effects in enhancing business performance by releasing credit constraints.

When considering gender, the greatest impact comes from providing access to credit which suggests that access might be the main constraint faced by women. The findings of the analysis also show that involving the private sector in the delivery of the programmes and conducting long term evaluations of the programmes tend to have positive effects. An ILO (2104) study found that business training alone had mixed effects on the start-up and survivorship of women's business. It had a positive effect in some cases and negative impact on others. This seems to suggest that business training alone may be helpful, but is not sufficient in encouraging business creation, particularly in light of the other constraints female entrepreneurs' likely face.

The meta-analysis conducted by the ILO (2014) has also shown that from five business training programs that had a positive effect on women's business creation, in three of them the impact was not substantial. Furthermore, negative effects on the survival of women's business were seen when intensive business training programs encouraged entrepreneurs to think more strategically about profitability. Soon after the training, businesses that were not profitable decided to close down. Training has had a positive effect on improving business knowledge of female entrepreneurs and in raising their aspirations and motivations.

Similarly, a study conducted de Mel, McKenzie and Woodruff (2012) in Sri Lanka found that for women who already had business, training alone had an impact on business practices but no impact on profits or sales. However, when training was combined with grants it lead to larger and significant improvements in profitability in the short term. The impact dissipated after the second year. For women who were looking to start a business, training helped speed up the process but lead to no increase in business ownership. Both profitability and business practices of the new entrants were increased by training, suggesting training may be more effective for new owners than for existing businesses.

A meta-analysis conducted by Valerio et al (2014) of entrepreneurship training for existing entrepreneurs showed mixed results for the effectiveness of training on firm performance, whether measured by firm expansion, profits, or survivability. The analysis did find positive outcomes regarding the capacity of programmes to enhance participants' business knowledge and skills, as well as improving the practices entrepreneurs implement in their businesses. The authors also highlight that while there were no clear conclusions about the connection between enhanced knowledge, skills, and practices and the overall performance of an enterprise, two meta-analyses that were part of their research did demonstrate promising linkages. According to the findings of the study, "training by itself is unlikely to sufficiently transform an enterprise in the short run to be captured by these evaluations, training programmes do appear to have the potential to strengthen existing entrepreneurs' knowledge, skills, and business practices, which may accrue benefits to entrepreneurs and their enterprises over time. Additionally, the evaluations do find notable, positive, and significant impacts on enhancing entrepreneurs' access to loans, although this may say more about who often sponsors this type of training—commercial banks and micro-finance institutions, for example—than it says about the quality and content of the training itself. Given the population these programmes are targeting, their value depends on how useful they are to the individual entrepreneur who is investing precious time and resources to participate." Training, as supported in this study, can affect positively the capability of entrepreneurs, but there are multiple caveats as the authors point out.

A GEM (2008) study conducted across 38 countries conclusively argues that the gains from training vary by context. According to the study "training is most effective in contexts with favourable institutional environments, where the training induced positive skills perceptions and intentions can be translated into action." The results of the study also demonstrate that training is likely to increase awareness about entrepreneurship, self-efficacy and intentions. However, it has less influence on opportunity identification and fear of failure. Interestingly, the gains from training in terms of increased activity are greater in more developed economies. In factor- and efficiency-driven economies, increasing training coverage appears to generate diminishing returns; in innovation-driven countries, it appears to generate increasing returns up to a point.

Farilie at al (2012) conducted an evaluation of the large-scale training programme "Growing America Through Entrepreneurship." The study confirmed the positive effects of training on employment and the likelihood to start a business in the short-term. However these effects tended to vanish over the medium and long term, and the study did not find measurable effects on survival, growth or earning from established small businesses. The positive results from the evaluation did not hold up for women, which might suggest gender-bias in the content delivered. Performance measurements through training remain relatively difficult to measure, especially over the long-term, as the authors note.

Evaluations of the programme "Jovenes," which targets vulnerable youth through a combination of interventions in Latin America, suggest that vocational and life skills training when combined with an internship in the private sector could be useful for self-employment (Attanasio et al., 2011). This addresses the use of training to increase capability, which may be a more effective model.

Similarly, impact evaluations of skills training programmes for self-employment and business development targeting vulnerable populations in Malawi, Sierra Leone and Uganda had overall positive effects on psycho-social well-being but mixed results when it came to labour market outcomes (Cho and Honorati, 2013). The authors also mentioned that the effects of financing through microcredit or grants vary across studies. While some studies have shown that increased

access to finance had a positive effect on business outcomes, others suggest that access to credit did not necessarily improve entrepreneurial activities.

Cho and Honorati (2013) also highlight that the complexity of evaluating training programmes increases as they combine other financial and advisory support tools. Furthermore, even similar programmes in different places have heterogeneous results.

The annex provides a sample of evaluations conducted about entrepreneurship training. It summarises some of the key findings relevant to this research. The table was constructed using information from Valerio et al (2014).

3.2.3 Financing and Training

Separate studies both indict and promote financing in entrepreneurship training. Both Tarozzi et al (2013) and Karlan and Zinman (2011) find some evidence that financial access paradoxically negatively impacts the performance of initial entrepreneurship performance. However, Augsberg et al. (2012) and Banerjee et al. (2014) find that increased financial availability coupled with training may positively affect performance, as it grants access to capital that would otherwise be unavailable.

de Mel, McKenzie and Woodruff (2012) find that there is very little difference in the medium and long-term in longevity, status and performance if entrepreneurial training is coupled with financing. They suggest that certain growth constraints exist beyond simple capital—especially among women in developing countries—that lead to the lack of strong evidence to support the finance-coupled training. This also may be due to different perceptions of gender in the workforce.

Overall, larger surveys of multiple works in this field are aggregated by the ILO and Women Entrepreneurship Development Brief, and find that there is some limited evidence that training alongside financing fosters better outcomes, matching capability to performance. The study has also found early evidence that business training combined with follow-up technical assistance, and business grants together with business training, tend to be more effective in supporting the business growth of existing female entrepreneurs. However, the studies and reviews lack sufficient rigor and time to arrive at a definite conclusion.

3.3 Conclusion

The evidence seems to suggest a certain level of professional agreement that yes, entrepreneurship can be taught. Different types of interventions can target entrepreneurial mind-set, capability, status or performance through both formal and informal education.

While several authors have spotlighted the importance of building a more rigorous and stronger evidence base, the existing evaluations and meta-analysis do reveal some of the emerging results of the impact of EET.

The evidence so far has shown that entrepreneurship education in higher education does have a positive effect on cultivating the entrepreneurial mind-set and developing awareness towards entrepreneurship. Studies have also found there is a positive impact on student's propensity and intentionality towards entrepreneurship. As mentioned before, an important finding is that academic programmes tend to have a stronger effect on entrepreneurship outcomes than training programs, while training programmes have a stronger effect on entrepreneurial skills than academic programmes.

In terms of training, several authors, and this report itself, have highlighted the importance of taking context into account. As previously stated, combinations of different intervention types matter for different beneficiaries under different contexts. Not only context, but also the customization of programmes to target beneficiaries is considered highly important to gain

positive effects. Training has also proven to be effective in strengthening knowledge, skills, and business practices, which may accrue benefits to entrepreneurs and their enterprises over time.

Overall, there is evidence for the benefits of entrepreneurship education and training, but this same evidence acknowledges the scarcity of hard data and more in-depth study. With these caveats, conclusions can be drawn to the effectiveness of EET across mind-set, capability, status, and performance. Strong evidence does exist to link training to credible increases in capability. Effects of education on capability and performance had little evidentiary support, while improvements in mind-set and status were more noted. Again, context is key in evaluating these findings, as is recognition of the inherent difficulties of measuring entrepreneurship data.

A summary of the findings is reflected in the table below:

Entrepreneurial outcome	***Education***	***Training (+other tools)***
Mindset	Strong evidence	Strong evidence
Capability	Strong evidence	Strong evidence
Status	Some evidence	Some evidence
Performance	Weak evidence	Weak evidence

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5 Annex

5.1.1 Evaluations conducted about entrepreneurship education and training

The table summarises some of the key findings relevant to this research. The table was constructed using information from Valerio et al (2014).

Name	***Country / Region***	***Programme***	***Findings***
Entrepreneurship education – high school			
BIZ—BizWorld	Netherlands	The program aims to teach children ages 11–12 the basics of business and entrepreneurship as well as to promote teamwork and leadership in the classroom through an experiential learning program that takes five days. BizWorld launched in Netherlands in 2004 and is a global entrepreneurship education program geared toward primary school students. Over 350,000 children from 84 countries have participated in the program. Type of evaluation: Randomized field experiment	The study evaluated the direct (short-term) effects of early entrepreneurship education on the development of cognitive, non-cognitive entrepreneurial skills, and entrepreneurial intentions using a randomized field experiment. The sample consisted of 85 schools, a total of 118 classes and 2,751 students in the last year of primary school. The response rate was 87.7%. Since the program was delivered at the class level, the unit of analysis was the class level rather than the school. The schools and classes were assigned to a treatment or a control group. *Key findings:* The treatment effect was positive and statistically significant for seven of the nine non-cognitive skills tested: self-efficacy, need for achievement, risk-taking propensity, persistence, analysing, creativity, and proactivity. The estimated effect on cognitive entrepreneurial skills (entrepreneurship knowledge) was positive although not significant. The estimated effect on entrepreneurial intentions (owning business) for children was negative and significant. Analysis on the heterogeneity of treatment effects showed that the treatment effects remained or increased slightly when controlling for individual, school, and neighbourhood characteristics and year of data collection.
EOEAS—Entrepreneurial Orientation and Education in	Austria	The EOEAS program aimed to enhance students' start-up-related instruction and entrepreneurial knowledge by improving students' attitudes toward entrepreneurship.	The study focused on the following outcomes: personality (achievement, motivation, locus of control, innovative orientation); resources (attention to business and economics, knowledge of business and economics,

Austrian Secondary Schools Study		Evaluation type: Quasi-experimental design	experience in leadership and organization, network and activities inside and outside school; start-up inclination (start-up probability); environment (entrepreneurs in the student's surroundings, use of technology, supportive upbringing); and process (entrepreneurship orientation of the school, independence/criticism as values in instruction, entrepreneurship-oriented instruction methods, and team oriented methods) The sample included six general secondary schools, four commercial academies, three secondary technical schools, and one secondary school for technical and business professionals. In addition, a sample of Austrian participants in an international junior entrepreneur contest ("Junior") was selected. A total of 875 students and 36 contest participants were surveyed in 2001. *Key findings:* Self-employment was the least-preferred option in all school types; Commercial academy and secondary technical school graduates were more likely to start a career after graduation; Commercial academy students had more opportunities to gain practical experience and demonstrated the strongest entrepreneurship orientation, although these conditions did not lead to higher start-up inclinations or a pronounced entrepreneurial orientation; Education processes seemed to fulfil an important function in the development of entrepreneurial orientation. Schools could influence this effect by reinforcing business and economics knowledge. However, the development of start-up inclinations seemed to be more closely linked to social influences in the micro-social environment.
NFTE Network for Teaching Entrepreneurship	United States	NFTE aims to teach students entrepreneurial skills that help them create a business plan. NFTE targets high schools where at least half of the student body is eligible for free or reduced-price lunch, having reached over 500,000 students who are typically at risk of dropping out of	The evaluation of the NFTE program in Boston, Massachusetts, was carried out in two phases. The first phase surveyed students from two large public high schools in 2001–02. The second phase expanded the universe of schools from two to six public high schools to allow the analysis of possible program impacts in a wider range of learning contexts. The sample included a total of 17

		school. Lessons include the concepts of competitive advantage, ownership, opportunity recognition, marketing, finance, and product development—and all tie back to core math and literacy skills. Evaluation type: Quasi-experimental design	classrooms, 13 teachers, and 268 students, out of which 158 students received the NFTE program (treatment) and 110 students were selected for comparison classes (control). The evaluation studied the role of NFTE in promoting the development of entrepreneurship, including entrepreneurship thinking and behaviour. *Key findings:* The entrepreneurial behaviour score increased for NFTE students compared to the control group. The entrepreneurial behaviour score for NFTE students registered a significant increase of 7.5%. The entrepreneurial behaviour score for comparison students did not register significant changes, although in some domains, the trend declined; While NFTE students began with marginally lower locus-of-control scores than the comparison group, they increased their score by about 3% after the intervention, outscoring the control group. Similarly, immigrant students participating in the program improved in their locus of control by about 4.5% while the score of similar students in the comparison group declined by approximately 2.5%; Results from the values-in-action scales (originality, curiosity, industriousness, and hopefulness) were not found to be significant. Although not significant results, NFTE students scored marginally higher than the comparison group in the pre-test; meanwhile, the gap narrowed at post-test with the comparison group's score increasing and the NFTE students' score decreasing; NFTE students expressed increasingly strong interest in occupations requiring advanced training or formal education, including college
INJAZ Junior Achievement|	Morocco, Lebanon, Jordan, Saudi Arabia, United Arab Emirates, and Egypt	The Junior Achievement (JA) program aims to provide basic business skills and financial literacy to students to start up and run their own businesses and to promote work readiness among students. The beneficiaries are upper secondary students in Morocco, Lebanon, Jordan, Saudi Arabia,	The evaluation assessed the impact of entrepreneurship education on producing skills to initiate and sustain a business. The methodology was based on matching pre and post surveys of treatment and comparison groups. Interested beneficiaries were not randomly assigned to either group, and due to limitations in implementation, they could only match pre- and post-surveys in limited cases. Its total size was 1,454, of which 617 were interviewed for the

		United Arab Emirates and the Arab Republic of Egypt. Evaluation type: Quasi-experimental design	baseline of the comparison group and 837 for the treatment group. The outcomes studied included student knowledge, skills and attitudes, and behavioural intentions about entrepreneurship. *Key findings:* Participants in the JA programs had very high levels of access to entrepreneurs in their lives. Around 80% had siblings who were entrepreneurs, and 30–74% indicated that their parents or neighbours were entrepreneurs; Participants had medium levels of knowledge of basic entrepreneurial concepts; Participants had high and positive aspirations, views of self and others, self-efficacy, and interest in business creation; Participants had favourable attitudes towards entrepreneurship and business.
Junior Achievement Company Program	Sweden	The program objective is to provide opportunities to train and develop creativity, entrepreneurship, and practical business skills. The beneficiaries are students at the upper secondary level in Swedish schools. Evaluation type: Quasi-experimental design using Propensity Score Matching	The evaluation assessed the long-term relative effects of entrepreneurial performance of those in JACP, relative to those who did not participate. The methodology was a quasi-experimental design based on Propensity Score Matching of individuals who participated in JACP during the mid-1990s with those who did not by using publicly available databases. The pool of individuals for the treatment group was around 166,606. The sample size was 224,838 individuals, of whom 10,103 comprise the treatment group (individuals who participated in the JACP between 1994 and 1996) and 214,735 comparable non-participant individuals. The outcomes measured were the probability of starting a business, entrepreneurial income, and firm survival. *Key findings* Participation increased the likelihood of starting a new business by at least 20% when compared to the non-participants of JACP; JACP participation had a positive effect on expected income in the range of 7% to 18%; There was no significant effect on firm survival due to JACP participation

Entrepreneurship training – Higher Education			
BEP - McGuire Entrepreneurship Program (formerly Berger)	United States	The McGuire Entrepreneurship Program aims to prepare students to successfully apply entrepreneurial principles, whether they start their own business or go to work in a corporation. Specifically, the program focuses on students' capabilities and status. Based at the University of Arizona's Eller College of Management, the program attracts top-tier undergraduate and graduate students from the university who wish to major in entrepreneurship (if undergraduates) or receive a concentration in entrepreneurship (if master's of business administration students) Evaluation type: Tracer Survey	A tracer survey was developed to assess how BEP affected the entrepreneurial intentions and achievements of students it graduated over the years. The evaluation studied the trajectories of business entrepreneurship and non-business entrepreneurship cohorts from 1985 to 1998. The evaluation assessed the formation of new ventures, likelihood of self-employment, sales growth rate of emerging firms, accumulation of graduates' assets, and technology transfer from the university to the private sector. A total of 2,024 surveys were mailed to graduates from the non-entrepreneurship business school graduates and 460 entrepreneurship graduates, all of who had graduated from the university between 1985 and 1998. The final response rate was 511 for the non-entrepreneurship business graduates and 105 for the entrepreneurship graduates. *Key findings:* Entrepreneurship education increased the probability of an individual being involved in a new business venture by 25% over non-entrepreneurship graduates. Entrepreneurship students were 11% more likely than non-entrepreneurship students to own their own businesses after graduation; Entrepreneurship education contributed to the growth of firms, especially smaller emerging firms. On average, smaller emerging firms that were owned by or employed entrepreneurship graduates had greater than five times the sales and employment growth than those that employed non-entrepreneurship graduates; Entrepreneurship graduates received an average annual income that was 27% higher compared to the average annual income of non-entrepreneurship graduates; Entrepreneurship education increased a business school graduate's probability of being associated with a high-tech firm by nearly 13% and of developing new technological products by almost 9%; Entrepreneurship education enhanced the transfer of technology from the university to the private sector, and promoted technology-based firms and products. Among self-

			employed entrepreneurship graduates, nearly 23% owned a high-technology firm, compared to less than 15% of non-entrepreneurship graduates who owned a firm.
University Entrepreneurship Track/Business Plan Thesis Competition	Tunisia	BPTC is aimed primarily at increasing self-employment, fostering an entrepreneurship culture among university graduates, and more broadly improving participants' employment outcomes. In 2009, the Government of Tunisia introduced this entrepreneurship track in the tertiary education curriculum. Students may opt into the entrepreneurship track, which consists of business training (from a local employment office), coaching to develop a business plan (from entrepreneurs), and supervision from university faculty. Evaluation type: randomized control trial	For the academic year of 2009–10, 1,702 students (about 9% of all eligible students nationwide) participated in the entrepreneurship track—some students applied in pairs so a total of 1,506 projects were registered. The evaluation assigned 757 projects to the treatment group and 742 to the control group. Information was collected at the beginning of the 5-month program (February 2009) and 9 to 12 months after graduation from the program (April–June 2011). Information collected included indicators on socioeconomic characteristics, labour, aspirations for the future, personality traits, and behavioural skills related to entrepreneurship. *Key findings:* Approximately one year after graduation, graduates of the entrepreneurship track had a higher probability of being self-employed. Although the effects were small in absolute terms (ranging from 1 to 4 percentage points), given the low prevalence of self-employment in the control group, the small absolute effects imply that beneficiaries were on average 46–87% more likely to be self-employed compared to the control group; There was no evidence that the program significantly affected overall employment as captured by the likelihood of being employed in the last seven days. In fact, estimates were negative and pointed to a reduction in the probability of holding wage employment and although not significant, the decrease was of the same magnitude as the increase in self-employment, suggesting the possibility of substitution effect from wage employment to self-employment; The program did not promote higher quality jobs among participants. There were no significant program impacts on employment in the formal sector, firm size, hours of work, or earnings; The intervention produced strong impacts on participants' self-reported business skills and networking proxies. About

			77% of program graduates reported knowing how to produce a business plan, compared to 45% in the control group; Intervention led to measurable, significant and robust changes in several domains of the "Big Five," including a decrease in agreeableness and an increase in extraversion. There was no evidence to indicate that the entrepreneurship training positively affected conscientiousness and emotional stability, and other entrepreneurial traits such as tenacity or power motivation remained unchanged; Participants were found to be more likely to be confident in obtaining credit and to have applied for credit (conditional on having a business idea), but they were neither more likely to know how to apply for credit nor to have obtained credit
Bødo Graduate School of Business	Norway	The objectives of the Bødo entrepreneurship major are entrepreneurship awareness and small business development. Founded in 1985, the Bødo entrepreneurship track offers a major in entrepreneurship to its students enrolled in the master's degree in business program. Since 1987, the annual number of students selecting the entrepreneurship major has ranged from 15 to 30. Evaluation type: Tracer Survey	The evaluation assessed entrepreneurial behaviour and entrepreneurial intention among business school graduates. The methodology consisted of a tracer survey of alumni who graduated from the business school between 1987 and1994. A total of 720 questionnaires were mailed and 374 were returned. The final sample was found to be representative of the alumni. Key findings: Entrepreneurship was found to be a function of factors that can be altered through education; Having a major in entrepreneurship was positively associated with new firm formation (a major in entrepreneurship was the only variable that was significantly related to new firm formation); Having a major in entrepreneurship was positively associated with entrepreneurial intentions
College Carve-Out Education	China	In Chinese universities, carve-out education aims to encourage students to start their own businesses. A big component of carve-out education is to impact entrepreneurial intention among students.	The evaluation analysed five variables, including carve-out education, business knowledge, entrepreneurial abilities, psychological quality, and entrepreneur intention. The evaluation used a structure equation model (SEM) to study the complex relations among these five variables. The SEM consisted of two models; one was an equation model,

		Evaluation type: Structure equation model using survey data from current students	which was used to verify the linear relationship between potential independent variables (education, business knowledge, ability, psychological quality) and potential dependent variables (business knowledge, ability, psychology quality, and intention), while another measurement model was used to verify the linear relationship between potential variables and real variables. *Key findings:* The evaluation found a positive and significant correlation between college carve-out education and business knowledge, entrepreneurial ability, and psychological quality; between business knowledge and intention and between entrepreneurial ability and intention and between psychological quality and intention; The evaluation did not find a significant correlation between education and intention or knowledge and ability.
Grande École	France	The École Supérieure de Commerce (ESC) in Rouen offers three types of entrepreneurship courses that differ in both content and duration—all of which aim to expand students' familiarity with entrepreneurship. The first program is the Projet Entreprendre, which is geared toward first-year students—they use the course to turn a business idea into a business plan. The focus is on getting students to develop a blend of knowledge, skills, and attitudes to enable them to recognize the links between management theory and entrepreneurial practice. The second is a dominante program consisting of an 11-week intensive course (180 hours) that aims to deepen the entrepreneurship knowledge among thirdyear master's students. Finally, the third one is comprised of short courses (6–12 hours) focusing on topics	The study evaluated students' attitudes toward entrepreneurship and entrepreneurs as well as their desired career choices, with the intention to identify differences between first- and second-year ESC students. The sample consisted of a group of undergraduates, between ages 19 and 22, who were either about to enter the program (first-year students) or had just completed the program (second-year students). The survey was sent to 280 first-year students, of whom 82 responded, and 276 second-year students, of whom 60 students responded. The evaluation investigated students' perspectives on entrepreneurs and entrepreneurship, students' attitudes toward entrepreneurship, and the influence of entrepreneurs as family members on the career choice of students. *Key findings:* There was an upward shift in students' attitudes toward entrepreneurship as a career choice between first- and second year students. While only 26.5% of first-year students surveyed saw themselves as potential entrepreneurs, the percentage for second-year students surveyed was 50. Similarly, while 30.9% of first-year

		such as "Entrepreneurship in Europe" and "Female Entrepreneurship." These courses are part of the general ESC program and/or specialized master's program Evaluation type: Surveys of undergraduate and graduate students	students could envisage setting up their own business, among second-year students, this rose to 53%; About 81% of first-year students surveyed mentioned wanting to work in a large organization upon completion of their studies, compared to 60% for second-year students; The proportion of students who mentioned wanting to work in a small or medium enterprise dropped from 54% for first-year students to 31.7%for second-year students.
Entrepreneurship training			
Atención a Crisis	Nicaragua	The Atención a Crisis program was a one-year pilot program that combined a traditional safety net with interventions to improve households' ex ante risk management through income diversification. The program had two objectives: (a) to serve as a short-term safety net by providing cash transfers to reduce the need for adverse coping mechanisms and (b) to promote long-run upward mobility and poverty reduction by enhancing households' income diversification and risk-management capacity. The program targeted agricultural households that faced increased exposure to weather shocks linked to changes in rainfall and temperature patterns. The program was targeted primarily to women and complemented an on-going conditional cash transfer program with two interventions to promote income diversification: (a) a vocational training scholarship and (b) a productive investment grant. The program targeted a total of 3,000 households for a one-year period in six municipalities. Evaluation type: Randomized control trial	The evaluation design consisted of a randomized control trial to estimate the program impacts on consumption, income, income diversification, participation, and returns in non-agricultural activities. The sample included 3,002 eligible households in the treatment communities (56) and a random sample of 1,019 eligible households in the control communities *Key findings:* Two years after the end of the intervention, both the productive investment grant and the training helped to protect against the negative impact of shocks and reduce the variability of consumption and income, while the basic CCT package did not offer protection against the negative effect of shocks; The productive investment grant and training showed positive and significant results in increasing consumption (12% and 9%, respectively) as shock intensity increased by one standard deviation; The effect on consumption of only the training package showed a strong positive and significant impact. Conversely, there was no significant impact found on consumption for only the vocational training package; In terms of household participation and returns to non-agricultural activities, results showed that the households that received the productive investment grant package were 13 percentage points more likely to engage in non-agricultural self-employment, although no significant impact was found on non-agricultural wage employment. The

			magnitude of the impact on returns is large, amounting to a 15–20% annual return on the initial investment of US$200. For households that received the training package the increases shown were not significant.
Economic Empowerment of Adolescent Girls and Young Women	Liberia	EPAG's objective is to smooth young women's transition from school to wage or self-employment. The program offers a six-month classroom training component (business development skills or job skills, life skills, and entrepreneurship skills; followed by six months of job placement and support. The program is targeted to young women ages 16–27 who are not currently in school and reside in one of the nine target communities in and around Monrovia and Kakata City. Participants receive small stipends contingent on classroom attendance and a small bonus for completing the training program (US$20). Evaluation type: Randomized pipeline research design	The evaluation measured the impacts of the skills packages on employment, behaviours, empowerment and agency, and family welfare. The study used a randomized pipeline research design—randomly assigning beneficiaries to receive training in either the first round or the second round. Approximately 2,500 young women were accepted to participate in the program. *Key findings* The program increased employment among trainees by 50% compared to those in the control group; Positive employment outcomes were driven primarily by the business development skills trainees, whose monthly income increased by US$75 per month; The programme increased girls' savings compared to the control group. At midline, the treatment group had a total of US$44 more in savings compared to the control group; There were no significant changes to borrowing or lending among beneficiaries.
Juventud y Empleo	Dominican Republic	The program objective was to increase employment opportunities for the low-income population, achieved by facilitating access to the labour market through training, counselling, and modernization of the country's labour regulations. Evaluation type: Experimental design	The study evaluated the impact of job training interventions on reducing the time of unemployment and the search time for employment, increasing employability, income and the duration of employment. The evaluation applied an experimental design where the eligible population was randomly selected for training. The sample consisted of 786 individuals in the treatment group and 563 in the control group. A *Key findings:* There was no impact found on the employment rate of participants; Employment rate post-intervention was 57% for the treatment group and 56% for the controls;

			Although there were caveats in the estimation, the treatment group had higher monthly labour earnings—about 17% higher than the control group. The earnings effects were larger for the youngest age group, for residents of Santo Domingo, and for those with some secondary education; There were no large or systematic effects on hours worked per week in the overall sample or by subgroups; There was no evidence of a large or systematic quality effect in terms of training institutions.
Jóvenes en Acción	Colombia	Jóvenes en Acción had the objective of providing a combination of in-classroom training and on-the-job training to urban young people between the ages of 18 and 25 in the two lowest socioeconomic strata. Evaluation type: Randomized control trial	The evaluation assessed the impact of the program on employment and earning effects as well as formal sector employment and earnings. A randomized control trial was conducted; the total sample consisted of 3,300 individuals broken down into a treatment group (1,650 individuals) and a control group (1,650 individuals). *Key findings:* Individuals who were offered the training did better in the labour market. Compared to those not offered training, they were more likely to be employed, showed a 6.8% increase in paid employment, and had about 12% higher wage and salary earnings. Women offered training were more likely to have paid employment and to be employed in the formal sector and earn higher overall and formal wages (results for men were estimated imprecisely); Training increased the probability of having a formal sector job by 0.053 and a written contract by 0.066; Training increased wage and salary earnings in the formal sector but not in the informal sector;
FINCA Entrepreneurship Program	Peru	The program aims to teach entrepreneurial skills that improve business practices to clients of FINCA-Peru, a micro-finance institution that trains low-income female entrepreneurs using a village-banking methodology Evaluation type: Randomized control trial	The study tested whether micro-entrepreneurs were maximizing their profits given the resources available to them, and whether lessons on business development improved FINCA-Peru clients' profits. A randomized control trial was conducted to evaluate the effectiveness of integrating business training with microfinance services, using a sample of FINCA Peru's pre-existing lending clients

			Key findings: Basic business training to pre-existing clients did not lead to higher profits or revenues on average. However, difference-indifference specifications found a positive but small impact on enterprise revenues; Positive changes in four business skills and practices outcomes were significant at 95% (keeping records, an index of business knowledge, the use of profits for business growth, and implementation of innovations in the business); No training impact was found on household decision making; The training led to a 4 percentage point increase in the client retention rate—generating an increased net revenue for FINCA; The training had no effect on loan size or accumulated savings; Sometimes the stronger training effects were found for those clients who expressed less interest in the training in the baseline survey.
Rules of Thumb	Dominican republic	ROT's objective was to improve participants' business practices and firm performance. Evaluation type: Randomized control trial	The evaluation assessed the impact of different financial accounting classes on firm-level and individual outcomes. 1,200 loan clients from ADOPEM (one of the Dominican Republic's largest banks) were randomly assigned a basic accounting course, a Rule of Thumb entrepreneurship course, or no training *Key findings:* The impact of financial literacy training varied by its delivery method: the training program based on simple rules of thumb led to significant improvements in the way SMEs managed their finances relative to groups not offered training or offered the standard accounting training; ROT training increased by 6–12% the reported likelihood of separating business and personal cash and accounts, keeping accounting records, and calculating revenues formally, in comparison with the control group, which did not receive training. The estimates were significant at the 5% level. No statistically significant effects were found on the business practices of those assigned to the accounting treatment;

			Individuals assigned to the ROT treatment reported a substantial increase (about US$31) in revenues during bad weeks. This value was significant at the 5% level. No discernible effects of the accounting program were found on revenues; Economically large increases in savings, 6%, were found for the participants in the ROT trainings and were significant at the 10% level. No effect on savings was found for the group that received the basic accounting training; and Follow-up visits did not affect the outcomes for clients in the rule-of-thumb-based training. In contrast, the follow-up visits to the participants in the basic accounting training showed a significant increase in savings levels of about 10% and an increase in the probability of implementing the accounting practices taught in class. But no improvements on real outcomes of the businesses, such as sales, were found. This suggested that effectiveness might be a matter of delivery method or the likelihood of implementing techniques conditional on understanding them.
ILO's Start and Improve Your Business training program	Sri Lanka	The program aims to help women start new businesses and to make existing businesses more productive. The beneficiaries are women who operate subsistence enterprises and those who are out of the labour force but are interested in starting a business. Evaluation type: Randomized control trial	The evaluation assessed how business training and grants affect the running of a business and their profitability. The methodology was based on a randomized experiment conducted among women in urban Sri Lanka. *Key findings:* Training alone did not appear to be enough to get subsistence businesses run by women to grow, although results were more encouraging for using business training to help women out of the labour force as well as for improving profits and management of these businesses; Training led to improvements in business practices for existing firms, although the magnitude was relatively small; Training (with or without grants) had no impact on the survival of existing firms; Training along with grants had no significant impact on the profits or sales of existing firms; Training sped up the creation of new businesses;

			Businesses started by trained entrepreneurs were more profitable up to two years later, with profits and sales that were up to 40% higher.