Abstract
Europe 2020 focuses strongly on young people, with a headline target of reducing early school-leaving and increasing tertiary attainment. Two other headlines also share a clear youth dimension - to reduce the risk of poverty and to increase the share of the population in employment.

Because education is paramount in shaping young people's attitudes, skills and culture, it is vital that entrepreneurship education is addressed from an early age. After all, entrepreneurship is not solely about business creation, but also about setting the right environment for the development of a skilled, innovative, entrepreneurial workforce able to anticipate change and face challenges.

With the overall objective of shedding some light on how far Member States have gone (in terms of strategies) in promoting entrepreneurship and how strongly it is embedded both in school curricula and in teachers' trainings/attitudes, the CULT Committee requested PolDep B to organise a workshop on "Youth education & entrepreneurship".

The present document is the compilation of the background papers and power point presentations prepared for the workshop.
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LIST OF ABBREVIATIONS

- **CPD**  Continual Professional Development
- **EL**  Entrepreneurial Learning
- **EE**  Entrepreneurship Education
- **ICT**  Information and communications technology
- **JA-YE**  Junior Achievement-Young Enterprise
- **MS**  Member State
- **OECD**  Organisation for Economic Cooperation and Development
- **SEECEL**  South East European Centre for Entrepreneurial Learning
- **STEM**  Science Technology Engineering and Mathematics
- **T&L**  Teaching and Learning
- **VET**  Vocational Education and Training
EXECUTIVE SUMMARY

Background
Youth unemployment rates are particularly high across Member States (MSs). The EU believes that through education and training in transversal and entrepreneurial skills young people will be better equipped to compete for jobs, become self-employed and contribute to the innovative and competitive capability of an employer organisation. The development of transversal skills requires new creative ways of teaching and learning, and the inclusion of real world experience that is practical not theoretical. This paper describes entrepreneurship as a process going beyond the identification and teaching of competences, showing where knowledge acquisition, attitudes and intentions development, are fundamental to the process of entrepreneurship and the expression of entrepreneurial behaviour and outcomes.

Aim
The aim of this paper is:
To shed light on how far Member States have gone (in terms of strategies) in promoting entrepreneurship and how strongly it is embedded both in school curricula and in teachers' training/attitudes.

This paper focuses on the development of entrepreneurial learning for young people aged approximately 13-19 years and attending secondary education schools or colleges. It seeks to address three questions:

- Is entrepreneurship treated as a key competence at school?
- How open are schools to "incursion" from the "business world"?
- Have there been any "revolutions" in the education/training system? If so, how far have those fundamental changes gone?

The methodology adopted comprised the identification and analysis of secondary sources of bibliographic information.

Entrepreneurship in Secondary Education in Member States

At a practical level, the EC's definition of entrepreneurship is: "an individual's ability to turn ideas into action" through the development of entrepreneurial and transversal skills which can be applied in both self-employment and other employment contexts, with a view to enhancing an individual's ability to contribute to social and commercial activity and wider society.

The extent to which teachers engage in developing transversal skills, in particular an entrepreneurial mindset and competences, varies across countries due to the differences in continuing professional development and teacher education in entrepreneurship. This is compounded by the different systems of education at secondary level. Some competences are easier for young people (aged 13-16 years) to grasp (for example, leadership and team-working), whereas others, for example, risk-taking, are particularly difficult for them.

The sole focus on competences and entrepreneurial skills development is an issue. Entrepreneurship itself is highly complex and situation specific. Situations are defined as opportunities or threats which person identifies and interprets. Further questions concern attitude toward the opportunity or threat and knowing how to rise to the challenge posed. This intentional process is not only governed by self-belief, but also by peer pressure and the attitude of authority figures such as, for young people, parents and teachers. Gender is
also important as, for example, girls and boys respond differently to perceived risk. This process is further complicated by the role of domain knowledge. For adults this may manifest itself as a profound knowledge of a specific subject and/or market. Domain knowledge is likely to include technical skills – know how – which is learnt through experience and by doing. Formal education alone is not the means by which such knowledge is imparted. Informal methods should help engage the student and result in more highly motivated individuals. The teacher should therefore understand the process in its entirety and be able to apply innovative teaching methods to develop such understanding in her students.

Whilst there are examples of good practice in several MSs, teacher education and training to deliver entrepreneurial outcomes is not widely distributed across schools and MSs. Creating and running a start-up business is one of the more commonplace activities, but it is rarely underpinned by classes in business finance or economics, marketing or sales. Rather than thinking solely in terms of entrepreneurial transversal skills development for entrepreneurship, practical classes should be accompanied by relevant knowledge taught to the student in modular form, which is then accessible, on a need-to-know basis.

A further important dimension of the entrepreneurial process is feedback. There are multiple steps to the entrepreneurial process, decisions that have to be taken at different points which shape the vision, create a meaningful dialogue about opportunity formation and how it may be achieved. This steering and manoeuvring involves reflection about what one is doing and whether it is perceived to be the right thing, involving the right moves. Experience is thus exposure to successful and unsuccessful steps taken in the production of meaningful, legitimate and approved business outcomes. This does not appear to be addressed in the classroom formally or informally nor through vocational education and training.

There are a number of critical constraints, not least of which is resources within the school and external teacher training and CPD. It is very easy to write wish lists of what teachers should be doing in the classroom, but without the necessary resources, the basic training and the support within the school and at national level, the achievement of entrepreneurial competence in students is likely to be unmet. Three approaches are being pursued to address this issue in the MSs. There are:

- some good examples of teacher training and CPD which may be drawn upon and scaled up;
- examples of non-formal and informal education that are intended to supplement formal teaching in 'traditional' subjects;
- VET and apprenticeships. However, whilst such approaches give students hands on experience, there is as yet little evidence that such schemes promote direct cooperation between schools and companies or the development of entrepreneurial skills.

**Assessment**

Assessment suggests that there is still a great deal of work to be done in MSs to develop entrepreneurial capability in young people in order to equip them for the world of work and in life skills. There is still no depth in understanding entrepreneurship and more needs to be done to develop and train staff as well as students.
Recommendations

Over all the key recommendations are:

1. To teach students entrepreneurship as a main stream subject, with particular emphasis on the entrepreneurial process in all MSs; younger secondary pupils would do this through practical exercises exemplified by YE, while teaching entrepreneurship to older students would be project-based. This means that teaching staff should be trained in entrepreneurship.

2. Further, modules in basic finance, economics (cross-cutting geography, trade and globalisation) and business environments (linked to ICT and the use of the internet in business) should be included in the curricular of all schools across all MSs to underpin and facilitate students' understanding of the entrepreneurial process, the development of entrepreneurial competences, transversal skills and an innovative mindset;

3. To increase contact between schools, business, industry and commerce by: (a) include a work placement as part of the training of teachers and prior to entering the classroom; (b) including more industrial liaison as a prerequisite of teacher education through hands on projects within the community; (c) developing the teaching qualifications to include a compulsory entrepreneurship/business certificate as a minimum;

4. To introduce a new position in all secondary schools and colleges of industrial liaison and careers advisory officer across all MSs. Such an appointee would work across the school, to provide project support, external contacts and links to facilitate the development of authentic scenarios for skills development, business gaming and start ups, and within company intrapreneurial skills. Further the appointee would help students consider their career options, and the choices that would enable them to pursue their preferred pathway.

5. To monitor how gender disparities in respect of entrepreneurial learning in all disciplines are addressed at secondary school and college levels across all MSs. This means including practical ways of teaching subjects to minimise gender and maximise equality in the training and development of teachers.

6. To establish more links to assure tertiary - secondary education liaison, at a regional as well as local level to further enhance teacher CPD in entrepreneurship and innovation in all MSs;

7. To create more schools with particular subject specialisms to enable students to find their career pathways; to consider further the differentiation of upper secondary schools (years 11-13) into academically and vocationally oriented colleges across all MSs.

8. VET should also be further developed to address work skills' requirements, through workplaces of VET teachers and training in entrepreneurship, as part of their CPD.

9. For the EU to provide funds (perhaps through ERASMUS+) for trainee teachers to spend a gap year in industry as part of their certification; to provide grants for extant teaching professionals to spend time in industry and develop their understanding of industry's needs and training, education and employment issues. Also, the EC to monitor and collect research evidence on the impact of the above recommended measures.
**GENERAL INFORMATION**

Youth unemployment rates are particularly high across Member States (MSs). The EU believes that through education and training in transversal and entrepreneurial skills young people will be better equipped to compete for jobs, become self-employed and contribute to the innovative and competitive capability of an employer organisation (EU, 2012). The development of much needed transversal skills (critical thinking, problem-solving, initiative, collaboration) would be addressed through a comprehensive strategy to develop entrepreneurial skills at all levels. But this requires new creative ways of teaching and learning, and the inclusion of real world experience that is practical not theoretical. The teaching (if one can) of qualities may be necessary, but is not sufficient. The context in which people operate in the work place, the culture and ways of working are an essential prerequisite for the development of an appropriate skills base. Vocational education and training systems are essential to begin to close the gap between educational and workplace environments, but how this is offered should be done in an imaginative, engaging and measured way to ensure appropriate learning outcomes.

**Aim**

The aim of this paper is:

To shed light on how far Member States have gone (in terms of strategies) in promoting entrepreneurship and how strongly it is embedded both in school curricula and in teachers' training/attitudes.

To achieve this end, the thesis is that of the promotion of youth entrepreneurship. In this paper 'youth' is defined as young people between the ages of 13-19 years, and in secondary education. Hence, this paper focuses on the development of entrepreneurial skills and seeks to address three questions:

- Is entrepreneurship treated as a key competence (same/different level as/than the other key competences?) at school?
- How open are schools to this "incursion" from the "business world"?
- Have there been any "revolutions" in the education/training system? If so, how far have those fundamental changes gone?

We will consider primarily secondary but also tertiary educational environments as well as non-formal/informal education and training for the development of entrepreneurial skills and competences. Hence there are cross-cutting issues; of the added value that may be gained from such non/in-formal E&T. Furthermore, we consider the role of the teacher in the delivery of entrepreneurial skills. In this paper we will not consider the added value (if any) of introducing children to entrepreneurship at an early age as this is the main subject of a separate presentation.

This paper aims to provide a critical assessment of the ways in which the challenges of introducing entrepreneurship in the education curricula are addressed. The paper falls into three parts: Description of the nature of entrepreneurship and its introduction in secondary schools and colleges; Assessment and critical evaluation of the effectiveness of measures to teach entrepreneurial skills; recommendations for policy and action.

The methodology adopted comprised the identification and analysis of secondary sources of bibliographic information.
ENTREPRENEURSHIP EDUCATION IN SECONDARY SCHOOLS IN MEMBER STATES

European Council conclusions on entrepreneurship in education and training defined entrepreneurship to mean:

"an individual's ability to turn ideas into action. It includes creativity, innovation and risk-taking, as well as the ability to plan and manage projects in order to achieve objectives. This supports individuals, not only in their everyday lives at home and in society, but also in the workplace in being aware of the context of their work and being able to seize opportunities, and is a foundation for more specific skills and knowledge needed by those establishing or contributing to social or commercial activity. This should include awareness of ethical values and promote good governance."

Hence, according to the Key Competence Framework, there are five key competences that enable an individual to turn ideas into action. They are: creativity, innovation, critical thinking, initiative and risk-taking. Furthermore, the European Parliament believes that these competences are fundamental for personal and professional development in times of such rapid technological and economic turbulence, for both career enhancement and enhanced personal well-being.

Given this definition and background to the thinking of the EC, how do schools treat entrepreneurship; is it viewed as a set of competences?

For the most part, schools across the MSs vary in how they treat entrepreneurship and have much more complex models for embedding entrepreneurship in the non-formal system of teaching and learning (T&L) with the objective of developing entrepreneurial skills in students.

For example, Junior-Achievement-Young-Enterprise (JA-YE) is based on a company programme run in schools for 30-35 weeks, 3-6 hours a week. To do this successfully the teacher is required to develop external links with the local business community, who will help facilitate the learning process. However I argue that the continual professional development (CPD) for teachers should include developing a personal profile of entrepreneurial skills and qualities; and becoming competent in the knowledge and skills for business development and innovation processes. This is based on the premise that one can only teach what one understands. This is particularly important where teacher is dealing with older students (say, level 9 & 10). The methodology for students involves learning by doing through a company start-up programme. Research shows there are 50% more start-ups among former students of JA-YE compared to control groups.

In these respects, entrepreneurship is not viewed simpliciter as a set of competences; competences may be necessary but they are not sufficient to instil entrepreneurial behaviour in young people. Furthermore, some competences are easier for young people (aged 13-16 years) to grasp (for example, leadership and team-working), whereas others, for example risk-taking, are particularly difficult for them (Chell and Athayde, 2009).

One well understood model of entrepreneurship processes (Ajzen, 1991; Krueger, 2000) includes peer influences on attitudes to behaving entrepreneurially, and emphasises the importance of intention if entrepreneurial outcomes or goals are to be achieved. Attitude toward the behaviour, where behaviour is seeing and rising to challenges, seeking and

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seizing opportunities, is also seen as fundamental to entrepreneurship and suggests a critical dimension for teaching methodology.

Entrepreneurial behaviour does not occur in vacuo, but in relation to situations which are defined as opportunities or threats and being controllable or not (Krueger & Brazeal, 1994; Krueger 2000). How such situations are interpreted depends on persons' mental models to interpret environmental cues. The intentional process depends on self-belief (self-efficacy\(^\text{4}\)), the belief that it is desirable and feasible to take action, and respond to the opportunity.

Risk-taking is fundamental to entrepreneurial behaviour (Rauch & Frese, 2007). Furthermore, girls and boys respond differently to risks, but initial timidity of females can be overcome by explaining the nature of the risk and the different ways its potential effects may be mitigated. Girls then respond positively to handling perceived risky situations and challenges. The whole dimension of risk is multi-layered, complex and situation-specific for example, people do not necessarily respond similarly to risks associated with finance, drugs, sex, etc (Alexander et al. 1990; Weber, 2010; Weber et al, 2002).

**Cognition; knowledge; experience; the role of creativity**

The cognitive dimension of entrepreneurship has been well researched and is recognised as being integral to creativity (Amabile, 1983; 1990). The process brings into play not only skills, abilities and motivation to perform, but also domain-relevant knowledge. The education of young people engages with this process by imparting knowledge and technical skills to perform a task and recognises the talents of pupils to apply themselves. However, domain-relevant knowledge is that which is learnt through experience, and the profound understanding of the knowledge underpinning an idea, its value to others and its subsequent development and exploitation (Chell, 2009: 253). Formal education is not the means by which such knowledge is imparted; non-formal, informal education and experience also have a significant if not fundamental part to play.

This model also shows how reliance on imparting knowledge alone is not sufficient to achieve a skilled performance. Execution requires training in a cognitive relevant style, a conducive work style, and an implicit and explicit understanding of heuristics (cognitive short-cuts) for achieving desired ends (Alvarez & Busenitz, 2001). Further this model emphasises the importance of motivation. The student has to be engaged in the process and want to achieve the desired outcome. Hence attitude to the task, understanding the nature of that task and personal motivation are crucial. Motivation is often affected by perceived constraints, the student's confidence that s/he can overcome any obstacles and his/her intrinsic levels of motivation (e.g. wishing to achieve the goal for pride, recognition and not extrinsic motivators, pay or financial rewards).

According to Roberts (2012) the role of the teacher is to build a creative generation which is inquisitive, persistent, imaginative, disciplined and collaborative. Students in high performing schools would not only have achieved high test scores, but would also be independently motivated. The school ethos is made manifest through teachers who challenge their students, offer authentic activities, organised in workshops and carried out by groups of students not individuals. The teaching is student-centred, students are self-managing and the approach is inclusive\(^5\).

There is a further aspect of cognition which concerns the nature of perceived challenges and the recognition and pursuit of opportunities. The latter is said to define entrepreneurial behaviour (Shane, 2003; Gaglio, 2004). Here the question is what can (and is) done within the classroom to enable the student to develop alertness to opportunities. Thus, it behaves

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the teacher to understand the process more thoroughly and be able to impart it to her students through practical actions.

Current thinking in respect of embedding entrepreneurial learning into teaching suggests that EL can be embedded in any subject. There are various platforms that teachers can access to enable them to enhance their skills through e-learning, finding collaborators, partners and other teachers with whom they can share ideas. For example E-twinning.

Entrepreneurial behaviour is grounded in place, product or process and the clever entrepreneur is capable of going beyond what is immediately known and developing something new. The practice of business game playing enables the student to learn (a) what s/he needs to know in respect of: place, product, process; (b) whose interests are to be served i.e. what stakeholders; and, (c) how s/he should go about rising to the challenge and achieving the desired entrepreneurial outcomes. The teacher should make explicit what is implicit in this process. Each aspect of the process is important though often the focus is on (c) without sufficient emersion in (a) and (b). The latter involve the student in doing some background research including understanding the market and potential customer base, as well as potential stakeholders and the part that they might play. While (c) focuses on who the entrepreneur is and whether s/he should be building a team to accomplish the task.

Team-building and the exercise of skilled leadership capability are transversal skills that underpin effective entrepreneurship. Potential entrepreneurs rarely act alone, even though they may have produced the initial idea. Soon they have to get other people involved to network, fend off rivals, and build a team. Such skills can be effectively learnt in the classroom, on the sports field and during non-formal activities.

**Having the right attitudes and behaviours**

The early and middle years in a young person's education help form the right attitudes and values that underpin behaviour, but in entrepreneurship experience also counts; so how are schools and colleges enabling young people to gain valuable experience and why does it matter? For decades we have understood that entrepreneurs need feedback. In the above description of the entrepreneurial process there are multiple steps, decisions that have to be taken at different points which shape the vision, create a meaningful dialogue about opportunity formation and how it may be achieved. This steering and manoeuvring involves reflection about what one is doing and whether it is perceived to be the right thing, involving the right moves. Experience is thus exposure to successful and unsuccessful steps taken in the production of meaningful, legitimate and approved business outcomes.

Vocational Education & Training (VET) provides some older students – late secondary and college students – with vocational skills and competences. A relatively high proportion of companies (67%) were generally positive towards the basic skills sets provided by the VET system. However, transversal skills are not amongst those that are delivered. Perhaps more worryingly, employers complained that graduates of the system lacked appropriate attitudes and mindset that would show a readiness for the world of work. This underscored the requirement that teachers in VET should be better trained.

**Teacher interventions and impact of student entrepreneurship**

The extent to which teachers will engage in developing transversal skills, in particular an entrepreneurial mindset and competences, varies across countries because of the variation in CPD and teacher education in entrepreneurship. This is compounded by the differential

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6 http://www.etwinning.net/en/pub/index.htm
systems of education at secondary level as evidenced by the Austrian/Germanic systems of education. Here the system comprises gymnasia which offer a general academic education and separate technical and vocational schools and colleges which focus on application, technical and vocational skills and knowledge. Where there is no such distinction in types of school at secondary level, the challenge for the teacher is to deliver a syllabus in an innovative way to ensure that, on the one hand, knowledge of the subject is learnt, whilst skills are acquired through different methods and approaches to the subject matter.

In contrast, in the UK a typical secondary school (student ages from 11-16 years) offers a range of subjects in the Arts (e.g. languages, history, drama, music), the Sciences, (e.g. astronomy, biology, chemistry, mathematics, physics), Social Sciences (e.g. geography, health & social care, media studies, ICT) and Technical Subjects (e.g. Technology – food, graphics, textiles, resistant materials; music technology). Non-examined courses typically include, Physical education, Citizenship, Careers, Enterprise and Health. The school is likely to have 'themed days' which aim to develop the students' personal and entrepreneurial skills, and may include visits to local businesses and workplaces. The emphasis is academic attainment and is comparable to the Austrian gymnasia. Three observations may be made: (a) the separation of skills' teaching; (b) the absence from the curriculum of subjects such as economics and finance; and (c) most obviously the absence of any attempt to embed entrepreneurship education across the disciplines. This falls short of what is needed to prepare students for future careers in which they draw on transversal skills and an entrepreneurial mindset.

Whilst the majority of schools in the UK are state schools a number of different types of school have been established, specifically academies and free schools. Indeed, the different types of schools potentially offer opportunities to address mixed educational needs. However, the newness of the recently established waive of academies and free schools is of itself a constraint.

**Constraints and ways of overcoming them**

Constraints within which teachers operate are multi-layered: in the UK, state run schools operate within a national curriculum, are overseen by an inspectorate and are essentially functioning in a competitive system, whereas at the other extreme, free schools are, by and large, deregulated (with the exception of attainment in literacy and numeracy); resources likewise vary, some schools being better endowed; at local level, there may be pressure on class sizes, difficulties in organising team teaching, few links to local businesses, especially when the school is located in a rural area. Further, the role of Head of School is crucial in determining the importance placed on embedding entrepreneurship in school curricular.

Probably the critical constraint is teacher training and CPD. It is very easy to write wish lists of what teachers *should* be doing in the classroom, but without the necessary resources, the basic training and the support within the school (and at national level) the achievement of entrepreneurial competence in students is likely to be unmet. Three approaches are being pursued to address this issue in small or large part in the MSs. There are:

- some good examples of teacher training and CPD which may be drawn upon and scaled up;
- examples of non-formal and informal education that are intended to supplement formal teaching in 'traditional' subjects;
- examples of NVT and apprenticeships.

Teacher training in entrepreneurship or 'entrepreneurial learning' depends crucially on the school making space and rearranging its ways of doing to accommodate the subject in its own right, and as a way of approaching the teaching of other disciplines. For example, St
Mary's University College, Belfast\(^9\) offers a suite of courses from Certificate to Master's level which address many of the issues facing teachers and schools in the presentation of entrepreneurial learning in the school environment. The issue is one of culture and practice. Throughout the educational system, primary, secondary and tertiary, there is a strong tendency for subjects to become walled edifices, with boundaries that are not easily breached. This silo mentality has the unfortunate consequences for students for whom it is then manifestly more difficult to think laterally, across disciplinary boundaries; to link together ideas in an innovative and creative way.

Teaching methodologies are advancing; now learning by doing is recognised as the more effective way of instilling understanding, retention of knowledge and information and associated ways of doing effectively, that is, in a skilled way. The balance between absorbing knowledge in a passive (as opposed to active) way is thus shifting, but has it gone far enough? The teaching of entrepreneurship, entrepreneurial and transversal skills underscore this point. Transversal skills such as, problem-solving, effective communications, leadership capability and risk-taking are cross curricular. The teaching issue is how to fit the development of such skills within the content of their particular subject and to sufficiently understand the context so that there is a good fit, and one which is readily understandable by students. This kind of teaching goes far beyond the textbook; the context and content should be well grounded in evidence, real and authentic cases and examples for illustrative purposes. Perhaps one of the most difficult tasks the teacher has to achieve in this progressive methodology is getting students to take responsibility for their own learning. The kind of immersion that can be achieved using authentic cases, business games and projects that students can work on outside of the classroom aid this process, but ultimately students must be convinced that they are doing this for their own personal learning not for the school.

At St Mary's University College, they are restructuring their Bachelor and Master's in Education Programmes so that entrepreneurship education is embedded in the programmes. This is achieved through a 'binary approach' to EE; the embedding within a degree programme and, secondly, taking the certificate of EL alongside the degree. The entrepreneurial learning includes; economic literacy and a work-based assignment through ERASMUS or study in the USA; and a further theme in social entrepreneurship in which the teacher reports and reflects on, and commits to, voluntary activities. What this system of teacher training demonstrates is the need for thorough emersion both in their discipline and in entrepreneurship to ensure that the teacher is equipped once in the classroom to achieve entrepreneurial learning outcomes in her students.

Ljubic (2012) identifies two sets of learning outcomes as a consequence of in depth teacher training which progress from the teacher being able, initially, to define and explain then to a deeper level, being able to analyse and justify. For instance, a teacher should initially be able to identify and describe two different career paths, which after in depth training, becomes 'justify different career paths'. Further, she should initially be able to 'list the phases of entrepreneurial activity in a classroom or school example' which becomes 'ability to plan the phases ... with the cooperation of the local community'.\(^{10}\) She lists 28 learning outcomes in total.

Enhancements to entrepreneurial learning include engagement with local businesses and the local community. Such links have to be cultivated and may be perceived as an additional (sometimes unwelcome) duty falling on the shoulders of an already busy member of staff. The role of industrial liaison does not appear formally in the job description of many or indeed any teaching staff at secondary level. However staff whose


education and training encompasses entrepreneurial learning, who see their role in a progressive way should welcome the opportunity to forge solid links. By the same token the school should permit time for such activities and promote this and other non-formal educational opportunities for students. JA-YE is one very clear example of external links being forged beyond the school into the local community. Other examples occur through non-formal education. For example in the UK older secondary students may be encouraged to participate in the Duke of Edinburgh Awards programme or the Prince’s Trust.

Where schools and colleges provide VET and promote apprenticeships there continue to be problems of collaboration and direct cooperation between companies and schools to promote the development of entrepreneurial skills. This is in part a resource issue, but it is also a matter of belief. Few companies believe that apprenticeships would deliver entrepreneurial skills in their companies. However fundamentally there is not yet a robust VET-company collaborative system across the MSs. Indeed support for such a system in many MSs was found to be patchy or counterproductive.

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**ASSESSMENT OF THE IMPACT OF ENTREPRENEURSHIP EDUCATION**

A recent report from the European Commission presents key evidence from 91 national and transnational projects that “entrepreneurship works”\(^\text{12}\). This includes evidence of the impact on individuals through all three levels of the education system. There is evidence to show that EE leads to higher employability, improved entrepreneurial skills and attitudes, behavioural changes, and enhanced intentions to start a business; at the institution level there is evidence to suggest, where a stronger entrepreneurial culture in schools is achieved, there is higher engagement of teachers, and intensified engagement of stakeholders. An obvious issue, however, is that the evidence reveals incomplete coverage across MSs; there is an absence of scaling up; and if those examples, given by way of illustration, are the best, where are the examples of poor practice or even failure to implement successfully? In entrepreneurship much can be learnt from failure.

Further, Rosendahl Huber et al. (2014), Rosendahl Huber (2015), in evaluating studies of entrepreneurship at primary school level, sounds a note of caution; of the need to use randomised research designs with control groups in order to assess impact. Moreover, entrepreneurship is a process with an indeterminate duration and there has been scepticism concerning whether specific personality characteristics (such as, need for achievement, risk-taking propensity, self-efficacy) do indeed affect distal performance outcomes. Rauch (2014) summarises and explains his work which, using meta-analytic techniques, demonstrates just such effects. However, further research is required which uses rigorous research designs and demonstrates not only short term effects but also those that endure.

A further critical issue is the extent to which the preparation of teachers for conveying knowledge of, and about, entrepreneurship, the development of basic and transversal skills in students, and their breadth of stakeholder, local and business contacts, is adequate. Entrepreneurial training of teaching staff is still imperfectly distributed across the MSs. Awareness raising across staff in each school is often minimal notwithstanding the platforms that exist for teacher collaboration and e-learning.

Entrepreneurship is complex and one cannot teach what one does not understand. Teachers vary in respect of their own work experience outside education. This is particularly important at secondary, older secondary, college, and in regard to VET. How entrepreneurship is taught depends on age of student where for older students (secondary and tertiary) it is best taught as an occupation and as a method in real-life conditions. This means, for example, if the student is studying, say, catering, engineering or health care, the approach to entrepreneurship should be grounded in authentic situations. For younger students, aged 11-15 years, simulations, such as game playing and problem-solving tasks, and business start-ups – set up and played out over a 6 month period as evidenced in JA-YE, increase entrepreneurial learning. Often though this activity is the designated task of one or two teachers in a school whose other staff can then pursue their regular T&L activities. This on the face of it appears to be inadequate suggesting insufficient embedding is taking place in the schools concerned. However, there are examples of good practice, such as Walloon, showing greater development of teacher awareness of entrepreneurship; and also SEECEL, which developed training programmes for teachers and management staff in schools in 8 SE European countries and measured their effectiveness. Further, through, for example, the Entrepreneurship Spirit programme, it is possible to raise

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awareness, but embedding was not extensive. There was some evidence of this in Denmark, Norway, UK-England and the Netherlands.

Such issues of teacher training are resource-intensive and rarely mentioned in the reports cited. Delivering entrepreneurial learning requires that the teacher opens her mind from the domain specific knowledge of her chosen subject, be that science, social science or the arts, to the presentation of the material in an entirely different way; student-centred, challenging, collaborative, skills development-oriented. The addition of entrepreneurship at certificate or some other level of competence is one way forward. Indeed of the examples cited, teacher training in entrepreneurship can vary from a certificate along with the B.Ed. degree to masters and even doctoral level training. The key point is the relative absence of formal level training and the need for this to change across all MSs.

There are different ways that entrepreneurship is viewed for T&L purposes; teaching about entrepreneurship (where the subject matter is conceptual if not theoretical) and teaching for entrepreneurship (where the subject matter is practical and skills-based). Teachers need to understand both the theory and practice of entrepreneurship and the development of entrepreneurial mind-sets. The suggested ratio should follow the 80:20 rule, where there is a preponderance of practical understanding developed.

The boundaried way in which education systems work in many MSs is likely to detract from the effectiveness of EE. At primary level gaining a working understanding of key concepts through play gives way to practical programmes of start up, with enhancements through non-formal education, at junior and secondary levels. This should be seen in relation to, not only learning outcomes, but career identification, awareness and employability. Hence we need to see evidence of an innovative mindset that is attractive to employers across the piece; as yet there is scant evidence of this. At tertiary level the boundaries appear to be even more rigid, with the pursuit of an academic or practical career through, on the one hand, the university system or, on the other, technical education, apprenticeships and internships. Whilst there are solid examples of innovation and entrepreneurship in the universities (e.g. MIT, Universities throughout the UK), and a degree of embedding, more could still be done. Lecturing and university management staff, as is the case in secondary schools, are not generally trained in entrepreneurship.

A cross-cutting issue is that of gender. Insufficient attention has been given to gender impacts on EL. This is surprising given that we know about disparities in take up of STEM subjects between males and females (Stephan & El-Ganainy, 2007; deBruin et al, 2007; Karataş-Özkan & Chell, 2015). Moreover, a recent OECD report (2015) shows a continued gap in attainment in mathematics and that the choice of STEM subjects is lower in girls. We also know from GEM studies that there is a higher incidence of start up activity by males and that females tend to be more risk averse (Harding & Bosma, 2006). However, there are now more women obtaining degree level education and it would appear that female entrepreneurs in the US and Europe are "a particularly educated group" (Kelley et al. 2013: GEM 2012 Women's Report13). But, it would appear that these well-educated women are tending to run businesses with lower potential, suggesting they are not performing to their full capability. Findings such as these have implications for young people's engagement in the labour market and the price they can get for their labour. The GEM study recommends, for example, that youth (and particularly females) may benefit more from early start up activity before they have family commitments and associated financial obligations. This they suggest, may have the added benefit of preparing them for other employment roles later and also as a source of role models for other aspiring young women entrepreneurs. The relative absence of E & T initiatives in the developed countries of Europe to address such issues is unacceptable.

13 http://www.gemconsortium.org/docs/2825/gem-2012-womens-report
RECOMMENDATIONS

In general, however, taken collectively, many of the pieces of the jigsaw that is E&T in transversal and entrepreneurial skills are known across the MSs. However, a step change is required to further embed entrepreneurship in secondary education. To this end the following measures should be addressed:

1. There is a need to teach secondary-level students entrepreneurship as a main stream subject, with particular emphasis on the entrepreneurial process in all MSs: School Years 8 & 9 (i.e. 13-14 year old pupils) practical exercises exemplified by YE; and School Years 10-11 (15-16 year old students) a project- based course. This means that teaching staff trained in entrepreneurship will be required. The training, perhaps by means of a certificate course in EL along with a degree-level course in teacher training in particular disciplines, would include 20% conceptual understanding and 80% practical knowledge of entrepreneurship, and its implications for students' career pathways;

2. There is a paucity of education and training of students across MSs in basic finance, economics (cross-cutting geography, trade and globalisation) and business environments (linked to ICT and the use of the internet in business) for entrepreneurship and innovation; and how such knowledge and understanding might impact on the students career choice and life beyond school and the education system;

3. There is insufficient contact between schools and business, industry and commerce. This may be addressed in a number of ways; (a) encouraging teachers to take a work placement as part of their training and prior to entering the classroom; (b) including far more industrial liaison as a prerequisite of teacher education through hands on projects within the community; (c) developing the teaching qualifications to include a compulsory entrepreneurship/business certificate as a minimum;

4. Re-examining the schools' offering for careers and life beyond school, it is suggested that a new position should be developed in all secondary schools and colleges of industrial liaison and careers advisory officer across all MSs. Such an appointee would work across the school, to provide project support, external contacts and links to facilitate the development of authentic scenarios for skills' development, business gaming and start ups, and, within company, intrapreneurial skills. Further, the appointee would help students consider their career options, and the choices that would enable them to pursue their preferred pathway.

5. More work needs to be done to address how gender disparities in respect of entrepreneurial learning in all disciplines are addressed at secondary school and college levels across all MSs. This means including practical ways of teaching subjects to minimise gender and maximise equality in the training and development of teachers.

6. Additional linkages should be established to assure tertiary - secondary education liaison especially at a regional as well as local level to further enhance teacher CPD in entrepreneurship and innovation;

7. The notion of different kinds of schools with particular subject specialisms should help the development and application of transversal and entrepreneurial skills. Further consideration should be given across all MSs to adopting the German model of differentiating vocationally- versus academically- oriented schools and colleges for students in school years 11-13 to help them find appropriate and desired career pathways.
8. VET should also be further developed to address work skills requirements through work placement of VET teachers as part of their CPD. They should also be trained in entrepreneurship, entrepreneurial and transversal skills in a situated way.

9. The role of the EU might play through, for example ERASMUS+, would be to provide funds for trainee teachers to spend a gap year in industry as part of their certification; to provide grants for extant teaching professionals to spend time in industry and develop their understanding of industry's needs and training, education and employment issues. Also the EC should monitor and collect research evidence (possibly in collaboration with OECD) on the impact of the above recommended measures.
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LIST OF ABBREVIATIONS

CULT  Culture and Education Committee
EE    Entrepreneurship education
RCT   Randomised Controlled Trials

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EXECUTIVE SUMMARY

Background
Given the key role entrepreneurial activity has in fostering economic growth and innovation, the evaluation of measures that may stimulate successful entrepreneurship is of the highest interest to both academics and practitioners alike. Since entrepreneurship education programmes are used worldwide as a policy tool, testing their effectiveness is important to provide solid grounds for future policy decisions. The aim of this paper is to give an overview of the limitations of previous impact evaluation studies as well as to discuss the solutions that have been applied.

This paper presents evidence that impact evaluation studies using less rigorous methodological approaches might give an overly optimistic assessment of the impact entrepreneurship education programmes have (both in terms of short-term and long-term results). One of the solutions to this problem is the use of randomised field experiments. The evaluation studies that have been performed using this experimental research design, in which the participants are randomly assigned to the treatment and the control group, have mostly found modest effects as well as contradictory results (see Table A1 for an overview). This seems to suggest that the effectiveness of entrepreneurship education programmes to promote entrepreneurial knowledge, skills and intentions is not as clear-cut as is commonly believed.

Recent evidence on the effectiveness of an entrepreneurship education programme in primary education suggests that it might be fruitful to focus on the development of entrepreneurial skills at an early age. Moreover, the model of skill formation introduced by Nobel laureate James Heckman and his colleagues suggests that cognitive and non-cognitive skills are developed during different stages in life, where the skills learned during one period in life (e.g. at primary school) augment the benefits of investments in these skills in subsequent periods (e.g. at high school or university). Early investments in skills may thus be particularly effective in the long run. If the model of skill formation also holds for the development of entrepreneurial skills, it could be that the effects of entrepreneurship programmes in tertiary education will become larger among people who participated in these programmes at a younger age. Furthermore, recent research in the field of labour economics shows that non-cognitive (entrepreneurial) skills are not only useful for those interested in pursuing an entrepreneurial career but also have a positive effect on labour market outcomes in general.

Recommendations

For future research
The results presented in this paper show that more research is needed to understand the impact of entrepreneurship education. Based on the overview of the findings presented in Table A1, the first recommendation of this paper is to compare the effectiveness of EE programmes at different educational levels (i.e. in primary, secondary and higher education). In this comparison it is important to also take the efficiency of the different education programmes into account in terms of time and money spent on the programme in relation to the achieved results. Secondly, in order to truly understand the impact of EE it is would be good to know if, and to what extent, participation in an EE programme
crowds out the learning of other types of knowledge and skills (i.e. to measure the so-called opportunity costs of EE). Finally, although the measurement of long-term effects is difficult, it is valuable to understand if there are indeed positive spillovers from early investment in entrepreneurial skills as predicted by the general model of skill formation.

**For future policy**

This paper points to several limitations of previous impact evaluation studies. Most prominently, self-selection of individuals into entrepreneurship education programmes (or into school or tracks offering such programmes) potentially leads to an overestimation of the effectiveness of these programmes. If students with stronger pre-treatment interests in entrepreneurship education possess certain unobserved characteristics, such as ambition, motivation and perseverance, that are beneficial for future labour market outcomes, both in entrepreneurship as well as in paid employment, then it is impossible to distinguish what causes the successful outcomes. Moreover, another crucial feature to measure the effectiveness of EE programmes is to control for the initial values of the outcome variables as well as for other factors (beyond the EE programme) that might also affect these outcomes (i.e. by using a pre-post, treatment-control design). The first recommendation of this paper for future policy is that when reviewing programme evaluations it is important to be aware that these methodological difficulties exist and that they might lead to an overestimation of the programme’s effectiveness.

To address the methodological difficulties described above, randomised field experiments have become the “gold standard” of impact evaluation studies. Randomised controlled trials (RCTs) are often used in medical trials, but up until recently their application in economics was scarce. In RCTs a group of people is randomly divided into a control group and a treatment group. In the context of programme evaluation, the control group participates in the regular school curriculum and the treatment group participates in the EE programme. As a result of the random treatment assignment the students in each of the two groups are on average equal in terms of all observed and unobserved characteristics. This means that any differences that are observed in the average group outcomes (e.g. in terms of knowledge or skills) after the treatment period can be attributed directly to the treatment, i.e. are caused by the EE programme.

The use of this method requires that during the evaluation period the control group is excluded from participation in the EE programme. Unfortunately, to many policy makers, teachers and other parties involved it often seems unfair to exclude a certain group of students from a new and promising education programme. However, only by randomly assigning people to the treatment and to the control group, and by comparing the difference in outcomes between these groups after the treatment is it possible to measure the true effectiveness of the entrepreneurship education programme. Hence, the final recommendation of this paper is to apply more RCTs in the evaluation of (entrepreneurship) education policies. To go back to the comparison to medical trials: before a new medicine is introduced to the general public, all the responsible parties involved want to make sure that this medicine is actually effective in reaching the objective it is designed to achieve. Why not hold a similar standard for the introduction of a new entrepreneurship education programme?
GENERAL INFORMATION

The Entrepreneurship 2020 Action Plan states that entrepreneurial activity, both in terms of new venture creation as well as inside large organisations (i.e. intrapreneurship), is a key element to foster economic growth and to stimulate innovation within the European Union. One policy measure that aims to stimulate entrepreneurial activity and that has been implemented worldwide is entrepreneurship education. The use of entrepreneurship education as a policy measure is based on the assumption that being an entrepreneur is not just something you are born with. It implies that the things you can learn through (formal) education are helpful in becoming or being more successful as an entrepreneur. From a policy perspective this is an appealing thought. The idea that entrepreneurship can be taught through formal and informal education creates a window of opportunity for (educational) policies aimed at enhancing entrepreneurship. However, in times of stringent budgets, the evaluation of the effectiveness of (policy) measures that may stimulate successful entrepreneurship is of interest to both practitioners and academics alike. It calls for an evidence-based understanding of the effectiveness of entrepreneurship education.

The EU policy on entrepreneurship is aimed at developing an entrepreneurial, flexible and innovative workforce in order to ensure future economic growth and to reduce (youth) unemployment. A recent report by the European Commission describes the implementation of entrepreneurship education at different levels of society. More specifically, the this report evaluates the impact of entrepreneurship education through three different channels:

- national or regional strategies;
- institutional changes;
- specific courses and classes.

In this briefing note the focus will only be on the latter, i.e. on the impact of specific entrepreneurship courses or classes on individual outcomes (in terms of knowledge, skills and attitudes) and on individual behaviour. The aim of this paper is to provide an overview of the limitations of previous impact evaluation studies as well as to discuss the solutions that have been applied. Moreover, recent insights from studies conducted within the field of labour economics measuring (long-term) impacts of other educational interventions will be used to indicate the (potential) broader societal effects of entrepreneurship education programmes.

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15 The term ‘entrepreneurship’ refers to “an individual’s ability to turn ideas into action. It includes creativity, innovation and risk-taking, as well as the ability to plan and manage projects in order to achieve objectives” as defined in the Consil Conclusions December 2014.
16 Available at: http://ec.europa.eu/enterprise/policies/sme/promoting-entrepreneurship/education-training-entrepreneurship/index_en.htm
GOALS OF ENTREPRENEURSHIP EDUCATION

**Short term:**
- Develop entrepreneurial knowledge and skills
- Increase awareness for entrepreneurship as a possible carrier option
- Experience (or try out) entrepreneurship in a safe environment

**Long term:**
- Increase (successful) entrepreneurship
- Reduce costs of unsuccessful start-ups
- Increase entrepreneurial behaviour of entire workforce

**The goals of entrepreneurship education**

In order to be able to assess the impact of EE programmes they have to be evaluated against the objectives they aim to achieve. The outcomes for individuals can be separated into short-term and long-term objectives.

The short-term goals of entrepreneurship education programmes are usually threefold. Firstly, most of these programmes are aimed at teaching children, pupils and students of all ages entrepreneurial skills and knowledge (both theoretical and practical). Entrepreneurial skills or transversal skills\(^{17}\) are beneficial within all kinds of work environments. Whether it is in self-employment or in an increasingly uncertain work environment, skills typically associated with entrepreneurs, such as flexibility, creativity and pro-activity, are becoming increasingly important (Chell and Athayde, 2009). Hence, these skills are relevant for everybody, not only for those interested in pursuing an entrepreneurial career.

The second aim of most entrepreneurship education programmes is to increase awareness of entrepreneurship as a possible career opportunity. This way, important skills can be taught to those people who want to become entrepreneurs and those people who already possess the skills to become successful entrepreneurs can be made more aware of entrepreneurship as a possible occupation or career path.

Finally, another important aspect of (practical) entrepreneurship courses is that they allow the participants to experience what an entrepreneur does and what it takes to be an entrepreneur within a (financially) safe environment. The students have the opportunity to try out entrepreneurship without the threat of (potential) costs associated with business failure that may negatively influence their own career or society at large.

In the long run this set of objectives should ultimately result in the increase of entrepreneurial activity of the entire workforce (entrepreneurs and employees) and in the reduction of costs associated with unsuccessful start-ups.

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\(^{17}\)“Transversal skills refer to the ability to think critically, take initiative, solve problems and work collaboratively”

1. EVIDENCE ON LEARNING ENTREPRENEURSHIP

**KEY FINDINGS**

- The environment matters, in early youth: 1/3 nature and 2/3 nurture
- Parents provide role models

**Limitations of impact evaluations:**
- Few account for other influences (pre-post, treatment-control research design)
- Self-selection into EE programmes hinders the estimation of unbiased effects
- Self-selection leads to overestimation of the programmes’ effectiveness

1.1. Nature or nurture?

Evidence from the twin and genetic studies has shown that parents are important in the decision of their offspring to become an entrepreneur (see e.g. Dunn and Holtz- Eakin 2000, Colombier and Masclet 2008). That is, entrepreneurial parents are more likely to have entrepreneurial children (Lindquist et al., 2015). Parents can be important in two ways: (1) in providing the “entrepreneurial” genes, or (2) through the environment they create. If entrepreneurship is only passed on by means of genetic factors from one generation to the next, then there is limited scope for policy makers or policy tools to enhance entrepreneurship.

In order to know which parental factor is more important, you need to be able to separate the two. But how can you separate the in-born (pre-birth) factors, from the environmental (post-birth) factors? A recent study by Lindquist et al. (2015) using a huge sample of Swedish adopted individuals, including information on the individuals and the two sets of parents (i.e. biological and adoptive parents), shows that the post-birth factors (i.e. the adoptive parents) account for twice as much as pre-birth factors (i.e. the biological parents) in the intergenerational association in entrepreneurship. This evidence shows that the environment (in early youth) matters. Moreover, the researchers show that one of the potential mechanisms underlying this association is driven by role models, where mothers provide role models for their daughters and fathers for their sons.

This is good news from a policy perspective. It indicates that in addition to a genetic component, the environment in early youth matters in the development of entrepreneurial activity. The next question that needs to be addressed is if this also implies that entrepreneurship can be taught in school.

1.2. Evidence on Entrepreneurship Education programs

A lot of research on this topic has been performed. In many cases the conclusions from this research are very positive. However, several limitations to (many of) these studies apply and therefore these positive results should be interpreted with some caution. The main limitations can be summarised as follows.
First of all very few studies have both pre and post treatment measurement of the outcome variables of interest. This pre-post measurement is important to be able control for the initial values of the outcome variables of interest. For example, when questioning alumni from an EE programme about their attitudes and intentions towards entrepreneurship, one needs to control for their initial attitude and intentions to be able to say something about the effect of the programme. Secondly, in order to control for other influences that might also affect the outcome variables of interest, a treatment-control group comparison should be used. When studying the effectiveness of an EE programme all pupils are participating in some form of education during the observation period. Hence, it is expected that also the pupils in the control group develop certain knowledge and skills, as a result of their participation in the regular school curriculum. The use of a control group is therefore essential to take these other factors into account and to make sure that the pre-post comparison in the treatment group does not lead to an overestimation of the impact of the programme (see Figure 2 for an illustration). A third limitation that applies to many impact evaluation studies is self-selection. That is, many studies compare students that self-selected into entrepreneurship programmes or courses to students (at the same institutions) that did not choose to take these courses. This selection into an EE programme or course is likely to be correlated with unobserved characteristics such as an individual's motivation during the programme and a person's initial entrepreneurial ability. Thus, simply comparing the entrepreneurial outcomes of individuals who chose to participate in an entrepreneurship education programme with those who did not is similar to comparing apples with oranges, and will lead to a biased estimate of the effect of the programme.

The examples described above highlight several drawbacks to the impact evaluation studies that have been conducted so far. A recent meta-analysis by Martin et al. (2013) provides an in depth evaluation of 42 studies from the (academic) entrepreneurship literature. Based on this meta-analysis the limitations can be summarised as follows (Source: Martin et al. (2013), Table 1, p.216):

- very few studies use a pre-test/post-test treatment/control group comparison (11 out of 42)
- even fewer use random assignment of students to treatment and control groups (6 out of 42)
- A comparison between the results from randomised and non-randomised impact evaluation studies shows that the selection bias leads to an overestimation of the effect that EE programmes have on (individual) human capital assets and entrepreneurship outcomes.

The following sections describe several impact evaluation studies, divided by short-term and long-term effects, to illustrate the limitations presented above.

**Short-term effects**

The study by Peterman and Kennedy (2003) investigates the effects of participation in the Young Achievement Australia (YAA) enterprise programme on perceived desirability and feasibility of starting a business. The researchers use a pre-test-post-test treatment-control group design and find positive results of the programme on both outcome variables. Unfortunately, the students in this study are not randomly assigned to the treatment and the control group but are free to participate in the entrepreneurship education programme (or not).

Souitaris et al. (2007) use a quasi-experimental design to investigate the effect of several entrepreneurship courses on attitudes and intentions. The sample in their study consists of science and engineering students from two universities (London, UK and Grenoble, France),
who participated in different compulsory or elective entrepreneurship courses. Intentions changed positively and significantly for the treatment group as compared to the control group. In this paper only the self-selection of students into the elective entrepreneurship courses potentially leads to (unobserved) pre-treatment differences between the treated and the untreated that could result in an upwardly biased estimate of the programme’s impact.

Von Graevenitz et al. (2010) solve the self-selection issue by using students participating in a compulsory entrepreneurship course (Business Planning), which is part of the Bachelor curriculum at the Munich School of Management. The sample consists of a matched sample (for which both pre- and post-tests were received) of 196 students. The use of a compulsory course has the advantage that the selection into the course is not driven by some (unobserved) predisposition toward entrepreneurship but at most by some predisposition towards business studies in general. The researchers find that the course has a significant positive effect on entrepreneurial skills but that the intention to found a business declines after participation in the course. Von Graevenitz et al. (2010) point out that an overall decline in entrepreneurial intentions might actually be the preferred response to the programme. If the programme provides the students with a more realistic view of what it entails to be an entrepreneur, this could cause a positive sorting effect in that only those students with high entrepreneurial ability will choose an entrepreneurial career. The only drawback of this research set-up is that it does not include a control group to control for any other (outside) influences on the students.

**Long-term effects**

Volery et al. (2013) study the effectiveness of entrepreneurship education at upper-secondary level in Switzerland. The researchers use a pre-, post-, and post-post test quasi-experimental design including 494 students in the treatment group and 238 students in the control group. The use of the post-post test has a clear advantage over the use of only a post-test directly after the programme, as it allows the researchers to measure the stability of the effects of the programme. The results show that the programme has a positive, but small, impact on entrepreneurial skills. Moreover, in line with the findings by von Graevenitz et al. (2010), the entrepreneurship education programmes in this study do not seem to have an impact (neither positive nor negative) on the intention to become an entrepreneur. However, in their conclusion the authors explicitly mention that, due to the self-selection of students into the courses, there were observed pre-treatment differences in terms of “entrepreneurial personality traits, and entrepreneurial intentions” (p.443).

There are also a few studies reporting the long-term effects of entrepreneurship education programmes in terms of entrepreneurial success and labour market outcomes more in general. For example, Beary (2013) studies the effectiveness of the Network for teaching entrepreneurship (NFTE) programme and Elert et al. (2015) use a rich dataset to study the long-term impact of the Swedish JA-YE high school programme. Both papers report positive effects on the long-term effects of these education programmes. However, the students in both studies self-selected into the different entrepreneurship education programmes. This means that these students had already at the outset different inclinations towards entrepreneurship than those students that did not participate in the courses. If students with stronger pre-treatment interests in entrepreneurship education possess certain unobserved characteristics, such as ambition, motivation and perseverance, that are beneficial for future labour market outcomes (both in entrepreneurship as well as in paid employment) then it is impossible to distinguish what caused the successful entrepreneurship and labour market outcomes. Was it caused by the participation in the entrepreneurship programmes or did these students have other personality traits or certain
characteristics (long) before they even participated in the respective programmes, which would have led them to become successful irrespective of their participation in one of the programmes? Because we cannot observe this so-called counterfactual (i.e. what would have happened to an individual had he or she made a different choice) it is impossible to precisely determine what has caused the positive effect on the observed outcomes.

To solve this problem, the Swedish study uses an advanced statistical method (called Propensity Score Matching) to construct a suitable control group and account for the self-selection of the students into the programme. Their results show that the JA-YE high school programme has a positive effect on the probability of starting a business as well as the income earned as an entrepreneur. However, the programme does not seem to have an effect on firm survival.

Another, and arguably the cleanest, way to create a good counterfactual is through the use of randomised experiments. This research method will be discussed in more detail in the next section.
2. **FIELD EXPERIMENTS**

**KEY FINDINGS**

- A *correlation* is not the same as a *causal effect*
- Impact evaluation requires a *counterfactual* to determine what would have happened *without the programme*

Based on randomised experiments:

- **Positive** (short-term) effect of early EE on entrepreneurial skills
- **Limited** evidence for the effectiveness of EE in secondary or higher education
- **Limited** evidence for the effectiveness of entrepreneurship training at later stages

### 2.1. Research method

The previous chapter shows that self-selection into entrepreneurship education programmes (either at the school or at the individual level) in many impact evaluation studies potentially leads to an overestimation of the effectiveness of these programmes. The crucial missing link in these studies is the counterfactual. The counterfactual measures what would have happened to a person that chose to participate in an entrepreneurship education programme had he or she not participated in this programme. The difficulty in measuring the counterfactual is that it is impossible to observe the same person in two scenarios at the same time. To address this problem randomised field experiments have become the “gold standard” of impact evaluation studies. Randomised controlled trials (RCTs) are often used in medical trials, but up until recently their application in economics was scarce.

To illustrate this research method we can take a closer look at the experimental process surrounding the development and introduction of a new medicine. Before the introduction of any new medicine to the general public its effectiveness is tested extensively. The aim of medical RCTs is to estimate a causal effect of a new drug on the treatment of a certain disease. To be able to estimate a causal effect, a group of people is *randomly* divided into two (or more) subgroups. Each of these subgroups receives a certain different treatment. As a result of the random treatment assignment and with a large enough sample, the people in each of the subgroups are on average equal in terms of all observed and unobserved characteristics. Hence, the only difference between these (sub)groups is in the treatment that they are exposed to. This means that any differences that are observed in the average group outcomes after the treatment period can be attributed directly to the treatment, i.e. are *caused* by the treatment.

In medical trials the treatments typically consist of the old medicine, the new medicine and a placebo, which serves as the control group. In the context of programme evaluations, the treatment is the entrepreneurship education programme itself and the control group (or the placebo) is the regular school curriculum. The outcome variables of interest in this case are then based on the objectives of the programme under evaluation and could be, for example...
the development of entrepreneurial skills and knowledge or changes in attitudes or behaviour.

The benefit of this experimental design is that it solves methodological difficulties that hinder the estimation of causal effects, such as self-selection, omitted variable bias or reverse causality. As discussed in the previous section, people who are more interested in entrepreneurship are more likely to enrol in an entrepreneurship education programme and/or are more likely to chose a school or college that offers such a programme. This selection into the school, the college or the programme is likely to be correlated with unobserved characteristics such as an individual's motivation during the programme and a person's initial (entrepreneurial) ability and ambition. Thus, simply comparing the entrepreneurial outcomes of people who chose to participate in an entrepreneurship education programme with those who did not is likely to lead to an overestimation of the effect of the programme. Moreover, also the teacher and student population in general in schools and colleges offering EE programmes might be different in terms of observed and unobserved characteristics. Thus, to understand what would happen if EE would be a compulsory component for all schools (at all educational levels), looking at the results achieved by schools that chose to adopt the EE programmes voluntarily are likely to lead to an overestimation.

2.2. Evidence from Randomised experiments

This section provides an overview of the evidence on the effectiveness of EE programmes from randomised experiments (see Table A1 in the appendix for an overview). The meta-analysis by Martin et al. (2013) analyses the findings of six papers related to entrepreneurship education and training that used a randomised control-treatment design. Out of these six studies, there are five papers related to the evaluation of entrepreneurship training for adults or starting entrepreneurs. The only paper that was conducted within the setting of formal (vocational) education among adolescents is a paper by Oosterbeek et al. (2010).

Entrepreneurship education

The study by Oosterbeek et al. (2010) looks at the effects of a student mini-company (SMC) programme that is part of the (international) JA-YE programme. In this case, the programme is taught at one location of a vocational college but not at another location of the same college in the same area in the Netherlands. In order to address the possible self-selection of programme participation (i.e. location choice based on the presence of the SMC programme) the relative distance (in km) from where the students' parents live to the school location is used to check if the enrolment of students across the two locations was random. The final sample consists of 250 students, 104 in the treatment group and 146 in the control group.

To evaluate the programme’s effectiveness this study looks at the effects on entrepreneurial intentions and at the development of entrepreneurial skills. In contrast to the studies by Peterman and Kennedy (2003) and Souitaris et al. (2007) that evaluate similar programmes, the results in this paper are less positive. Oosterbeek et al. (2010) find that the education programme has no, or sometimes even negative, effects on the development of entrepreneurial skills. Moreover, in line with the findings reported by Volery et al. (2013) and von Graevenitz et al. (2010) they find that it has a significant negative effect on students’ intentions to become an entrepreneur.

Entrepreneurship training
It goes beyond the scope of this paper to extensively discuss the effectiveness of entrepreneurship training for adults. However, since most randomised field experiments were carried out in this context, it is relevant to briefly summarise the findings on the effectiveness of entrepreneurship education for this target group. Particularly, it is valuable to know if age is one of the factors that limit the effectiveness of entrepreneurship education at secondary or tertiary education. One could argue that this type of training is more effective for those individuals who are actually starting up or running a business, than for students setting up a mini company within the protected environment of their school curriculum.

The results found on the effectiveness of different entrepreneurship training programmes in different countries are rather mixed. The study by Friedrich et al. (2006) finds positive effects for starting entrepreneurs is South Africa, but the sample they study is very small. The studies by Karlan en Valdivia (2011), Gine and Mansuri (2014), and Berge et al. (2014) all report the results from training programmes that are related to micro-finance programmes in Peru, Pakistan and Tanzania, respectively. Karlan and Valdivia (2011) find positive effects on business knowledge. However, they do not find an (positive) impact of entrepreneurship training on business outcomes. The study by Berge et al. (2014) reports a positive impact of the combination of a human capital and a financial intervention. However, this finding is much stronger for males than for females. Similarly, Gine and Mansuri (2014) find that the programme they study is positive for males in terms of the development of business knowledge as well as business outcomes. For the women in their sample they do find a positive effect on business knowledge, but not on business outcomes. The paper by Michaelides and Benus (2012) evaluates a large-scale entrepreneurship-training programme in the United States, called GATE. The authors report positive effects of this experiment for the unemployed, but not for participants who were not unemployed. A more recent study by Fairlie et al. (2014) on the effectiveness on the same programme is even less positive. The results from this study show that the initial positive effects for the unemployed do not last in the long run. Overall Fairlie et al. (2014) classify the effects of this large-scale entrepreneurship-training programme as short-term and limited in scope.

2.3. Conclusion

Comparing the effects found in the randomised impact evaluation studies with the results reported by the non-randomised studies Martin et al. (2013) still find an overall positive effect of entrepreneurship education and training on entrepreneurship intentions and entreprenurial outcomes. However, their analysis shows that looking at studies without randomised assignment to entrepreneurship education programmes and courses indeed lead to an overly optimistic assessment of the effectiveness of these programmes.

The overview of the studies presented in section 2.2 shows that there is scope for more evaluation studies using randomised treatment assignment. This is especially true for the evaluation of entrepreneurship education within (all levels of) formal education, i.e. primary, secondary and tertiary education. The next chapter describes the results of a recent paper that partly bridges this gap in the literature, and describes the results of a randomised field experiment that was conducted to measure the impact of early entrepreneurship education (i.e. primary school).
3. EARLY ENTREPRENEURSHIP EDUCATION

**KEY FINDINGS**

- **Positive effect** on development of non-cognitive entrepreneurial skills (e.g. self-efficacy, persistence, creativity, etc.)
- No effect on development of entrepreneurship knowledge
- Entrepreneurial skills are **relevant for labour market outcomes** in general
- Importance of **early investment** in skills: might lead to **positive spill-overs** in future periods

The text in this chapter is based on the paper “The effect of early entrepreneurship education: Evidence from a field experiment”, co-authored with Randolph Sloof and Mirjam Van Praag (European Economic Review 72, 2014, 76-97). The aim of this chapter is to describe the effectiveness of *early* entrepreneurship education.

**Motivation**

A theoretical motivation to look at early entrepreneurship education is provided by Cunha and Heckman's (2007) general model of the technology of skill formation. This model emphasizes the importance of early investments in both cognitive and non-cognitive skills. It strongly suggests that an investment in skills not only has a direct impact on the current stock of skills but also produces spillover effects in subsequent periods by boosting current skills and by making investments later in life more productive. Estimating the model using the Children of the National Longitudinal Survey of Youth from 1979, Cunha and Heckman (2008) and Cunha et al. (2010) find that early investments in skills may indeed be particularly effective in the long run.

Obviously, the (potential) future spillover benefits of early investments in skills only occur if the early investment has an immediate impact on the stock of skills in the first place. In this paper we therefore evaluate the direct (short term) effect of early entrepreneurship education.

**The Bizworld programme**

To this end, a leading entrepreneurship education programme (called Bizworld) that is taught worldwide in the final grade of primary school is evaluated. The Bizworld programme aims to teach children aged 11 or 12 the basics of business and entrepreneurship through an experiential learning programme that takes five days (within a time span of 2 to 4 weeks). At the start of the programme, the class is divided into teams of five or six children. During the lessons, all five with a practical orientation, the children set up a toy business in friendship bracelets and go through a firm’s entire business cycle (from start-up to liquidation). More specifically, the teams have to: write and present a business plan in order to raise start-up capital, design and manufacture products (friendship bracelets), calculate production costs and determine product prices, sell the products during a sales market to the pupils in the grade below, and finally they have to complete a profit and loss statement. Individual team members have strong incentives to care about the business performance of their team.
**Design of the field experiment**

The field experiment described in this chapter was designed as follows. Of the 118 classes that registered to take part in the Bizworld programme, 85 classes were randomly assigned to the treatment group and 33 classes were assigned to the control group. The children had to complete two extensive questionnaires, one before the start of the programme and one after. These questionnaires were used to measure the children’s entrepreneurial skills, knowledge and intentions as well as a wide array of relevant background questions. The final sample used for the evaluation of the programme consists of 2431 children and includes only those pupils who filled out both questionnaires.

One of the requirements of the Bizworld foundation was that we could not exclude classes from participating in the programme. In order to obtain the randomisation and meet this requirement, a wait-listed control group approach was used (see Figure 1). This means that in the classes in the control group the programme was taught a month or two later than in the classes in the treatment group. This ensured that the treatment group had completed the programme in the meantime and that there was still enough time for the control group to run both the pre and post measurement and participate in the EE programme before the end of the school year.

The measurement of the treatment effect is illustrated in Figure 2. In order to measure the effect the Bizworld programme has on the outcome variables of interest a so-called difference-in-differences analysis is used. In this type of analysis the development in skills and knowledge over time is compared between the treatment and the control group. Since all the children in the sample are in school during our observation period, some development in these skills is expected even without participation in the programme. Additionally, other everyday activities, e.g. at sports clubs or other social events, could also be beneficial for the development of non-cognitive skills. As becomes apparent from the illustration in Figure 2, only looking at the development of knowledge and skills over time of the children in the treatment group would lead to an overestimation of the programme’s effectiveness (even without the self-selection bias discussed in the previous chapter).


Figure 2: Illustration of estimated treatment effect

Results
To assess the impact of the programme we focus on pupils' development of entrepreneurship knowledge and a set of non-cognitive skills relevant for entrepreneurial activity. The results indicate that knowledge is unaffected by the programme. However, we find that the programme has a robust positive effect on seven (out of nine) non-cognitive entrepreneurial skills. Self-reported scores on (constructs of) Risk taking propensity, Creativity, Need for Achievement, Self-Efficacy, Pro-activity, Persistence and Analysing all increase significantly more in the treatment group than in the control group. Finally, in line with findings from previous studies, the results show that, if anything, the programme has a negative effect on the entrepreneurial intentions of the children.

Discussion
The findings presented above, especially on non-cognitive skill development, are quite different from the mixed results found in the impact evaluation studies described in the previous chapter (e.g. Peterman and Kennedy (2003), Souitaris et al. (2007), von Graevenitz et al. (2010) and Oosterbeek et al. (2010)). All of these studies measure the effectiveness of entrepreneurship programmes aimed at adolescents in secondary or higher education and most of them focus on the impact on entrepreneurial intentions only. Oosterbeek et al. (2010) measure the impact on the development of entrepreneurial skills, besides intentions. They find insignificant effects for a student mini-company programme in the Netherlands. Thus, our results tentatively suggest that it might be more efficient to invest in the development of entrepreneurial skills of children rather than of adolescents. On top of the large immediate (short term) impact that we measure, the empirical literature on the technology of skill formation inspired by Cunha et al. (2007) suggests that early investments may also have positive spillover effects to later periods.

Moreover, these non-cognitive skills are not only relevant within an entrepreneurial context. There is an emerging body of research that emphasizes the importance of non-cognitive skills in predicting future labour market outcomes (Heckman (2006), Heckman et al. (2006) and Heckman et al. (2013)). For example, in the Perry Pre-school programme evaluated by Heckman et al. (2013) it was not an increased IQ but rather the increase in
non-cognitive skills that caused the difference in labour market outcomes between the treatment and the control group years later. Moreover, the improvements in labour market outcomes reported by Chetty et al. (2011) as a result of the project STAR were caused by improvements in personality skills and behaviour, rather than by increased test scores. Hence, entrepreneurship education could not only be beneficial to enhance successful entrepreneurship, but also to positively affect labour market outcomes in general.

Limitations

Naturally, there are also a few limitations to the study described in this chapter. One of the drawbacks is the wait-listed control group approach that was used. Due to the fact that the control group ultimately participates in the education programme, they can no longer be used as a control group for future research, e.g. to measure potential long-term effects of the programme. Moreover, a word of caution is required with respect to the exact mechanism that drives the results of this entrepreneurship education programme. Some qualitative evidence shows that teamwork, in addition to (or instead of) the entrepreneurship element of the programme, might be an important factor in the development of the non-cognitive skills. Unfortunately, with the current set-up of the field experiment it is not possible to disentangle the effect of these two mechanisms. Finally, another drawback of this research project is that we do not measure the opportunity cost of the programme. Even though the programme only lasts five days, it would be interesting to know if, and to what extent, participation crowds out the learning of other types of knowledge and skills.
4. CONCLUDING REMARKS

4.1. Lessons learned

Given the key role entrepreneurial activity has in fostering economic growth and innovation, the evaluation of measures that may stimulate successful entrepreneurship is of the high interest to both academics and practitioners alike. Research has shown that the environment in early youth is an important factor in determining entrepreneurial activity. The fact that environmental factors can influence entrepreneurial choice and behaviour creates an opportunity for policy makers to design interventions aimed at increasing entrepreneurship. Since entrepreneurship education programmes are used worldwide as a policy tool, testing their effectiveness is important to provide solid grounds for future policy decisions.

As discussed in the first section of this paper, there are several limitations to many of the impact evaluation studies that have been conducted so far. Research shows that impact evaluation studies using less rigorous methodological approaches give an overly optimistic assessment of the impact entrepreneurship education programmes may have (both in terms of short-term and long-term results). The evaluation studies that have been performed using an experimental research design, in which the participants were randomly assigned to the treatment and the control group, have mostly found modest effects as well as contradictory results. This seems to suggest that the effectiveness of entrepreneurship education programmes is to promote entrepreneurial knowledge, skills and intentions is less clear-cut than is commonly believed.

However, in most of these studies the focus has been on entrepreneurship programmes targeted at adolescents in secondary or higher education. The insignificant effects found there may well be due to the fact that entrepreneurial skills and knowledge are more easily developed earlier in life or because the returns to training programmes later in life depend on investments in knowledge and skills made earlier. In fact, the model of skill formation introduced by Nobel laureate James Heckman and his colleagues emphasizes such dynamic spillover effects. In this model cognitive and non-cognitive skills are developed during different stages in life, where the skills learned during one period in life (e.g. at primary school) augment the benefits of investments in these skills in subsequent periods (e.g. at high school or university). Early investments in skills may thus be particularly effective in the long run.

Evidence on the effectiveness of early investment in non-cognitive entrepreneurial skills is provided by the recent study by Huber et al. (2014). The entrepreneurship education programme taught at primary schools that is evaluated by Huber et al. (2014) has a significant positive effect on the development of seven non-cognitive skills that are relevant for entrepreneurial activity. If the model of skill formation also holds for the development of entrepreneurial skills, it could be that the effects of entrepreneurship programmes in tertiary education will become larger among people who participated in these programmes at a younger age.

Additionally, the early development of non-cognitive skills may have a wider impact. Recent studies in the field of labour economics have shown that non-cognitive skills have a positive
effect on labour market outcomes in general. Taken together, these results tentatively suggest that non-cognitive (entrepreneurial) skills are best developed already at an early age.

4.2. Recommendations

The aim of this paper is to give an overview of the limitations of previous impact evaluation studies as well as to discuss the solutions that have been applied. The results presented in this paper show that more research is needed to understand the impact of entrepreneurship education. Evidence from a natural experiment presented in the study by Lindquist et al. (2015) point to the influence of the environment (in early youth) in determining entrepreneurial activity. Moreover, recent evidence on the effectiveness of an entrepreneurship education programme in primary school suggests that it might be (more) fruitful to focus on the development of entrepreneurial skills at an early age. This finding is supported by recent research in the field of labour economics on the effect of non-cognitive skills on general labour market outcomes. However, thus far only one early entrepreneurship programme in primary school has been evaluated and the effect of the programme is measured only directly after the programme. Future research is needed to establish the stability of these effects and to investigate whether there are indeed spill-over effects from early investment in entrepreneurial skills, that make investment in these skills later in life more productive, as predicted by the general model of skill formation. Moreover, in future research it is important to compare different types of programmes in order to better understand what type of programme is most effective and most efficient. In such an analysis the opportunity costs of participating in an EE programme should also be taken into account. A proper cost-benefit analysis of EE programmes also includes an estimate on if, and to what extent, participation crowds out the learning of other types of knowledge and skills. Finally, evidence on adult entrepreneurship training programmes indicates that regular programmes affect men and women differently. We have also learned that in early youth parents provide role models for their children along the gender dimension. This knowledge could be used to investigate if this type of role modelling is also applicable to educational settings later in life. These recommendations are in line with those proposed by Chell (2015) on the development of entrepreneurship in secondary education.

The first recommendation of this paper for future policy is that when reviewing programme evaluations it is important to be aware of the methodological difficulties that exist in these studies and that these difficulties might lead to an overestimation of the programme’s effectiveness. To address the methodological difficulties described above, randomised field experiments have become the “gold standard” of impact evaluation studies. In RCTs a group of people is randomly divided into a control group and a treatment group. In the context of programme evaluation, the control group participates in the regular school curriculum and the treatment group participates in the EE programme. The use of this method requires that during the evaluation period the control group is excluded from participation in the EE programme. Unfortunately, to many policy makers, teachers and other parties involved it often seems unfair to exclude a certain group of students from a new and promising education programme. However, only by randomly assigning people to the treatment and to the control group, and by comparing the difference in outcomes between these groups after the treatment is it possible to measure the true effectiveness of the entrepreneurship education programme. Hence, the final recommendation of this paper is to apply more RCTs in the evaluation of (entrepreneurship) education policies.

To go back to the comparison to medical trials: before a new medicine is introduced to the general public, all the responsible parties involved want to make sure that this medicine is actually effective in reaching the objective it is designed to achieve. Why not hold a similar standard for the introduction of a new entrepreneurship education programme?

18 Cf. the terms of reference of this note entrepreneurship is defined according to the Key Competence Framework and refers to “an individual’s ability to turn ideas into action. It includes, among others, creativity, innovation, critical thinking, sense of initiative and risk taking”.

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REFERENCES


## Annex

### Table A1: Summary results from randomised experiments

<table>
<thead>
<tr>
<th></th>
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PROGRAMME
PROGRAMME

- 10:30 - Introduction by the CHAIR of the Committee on Culture and Education (CULT), Ms Silvia COSTA
- 10:45 - Mr Simone BALDASSARRI - European Commission - DG GROWTH - Entrepreneurship and Social Economy
- 11:00 - Ms Maria PODLASEK-ZIEGLER - European Commission - DG EAC - Youth policy and programme
- 11:15 - Ms Elizabeth CHELL, Professor of Entrepreneurial Behaviour and Research Consultant at Kingston University (UK)
- 11:30 - Ms Laura ROENANDAHL HUBER - Researcher on entrepreneurship education at the University of Amsterdam, Department of Markets and Organizations
- 11:45 - Questions & Answers
- 12:15 - Intervention by MEP Rapporteur Ms Michaela ŠOJDROVÁ
- 12:30 - Closing by the CULT Chair, Ms Silvia COSTA
The Promotion of Youth Entrepreneurship
Secondary Education for Entrepreneurship

Professor, Dr Elizabeth Chell
Kingston University, London
Structure of the Presentation

1. Background
2. The State of Entrepreneurship Education
3. Assessment of its Impact
4. Recommendations
1. Background

**Education and training:**
- Given high unemployment rates amongst young people in MSs, education in entrepreneurship is proposed as a possible antidote.

**Aim**
- To examine the treatment of entrepreneurship in secondary schools
- To assess how open schools are to business & commerce
- To assess the extent of change in schools in E&T
2. Secondary Education in Entrepreneurship

**Key competences:**
- EC has identified: creativity, innovation, risk-taking, planning, workplace awareness, ability to seize opportunities

**Entrepreneurial process**
- Need to go beyond teaching competences
- Developing understanding thro’ JA-YE
- But some competences difficult to grasp
- Risk-taking particularly so for 13-16 year old children
- Need to look at other models of entrepreneurial process
2. Secondary Education in Entrepreneurship

**Entrepreneurial process**

- Need to go beyond teaching competences
- To include attitudes, intentions, goals & social influences
- Entrepreneurial behaviour occurs in relation to situations...situations that are defined by opportunities or threats
- Young people need to be able to recognise such situations, how they are likely to respond to them
- While teachers need to build the YP’s self belief, and possible actions that might be taken
- Teachers also need to identify and handle boys & girls different responses to perceived risk
2. Secondary Education in Entrepreneurship

**Entrepreneurial process**

- The cognitive dimension; domain relevant knowledge & understanding the nature of the task
- Work style & heuristics
- Motivation; wanting to achieve the goal must be personally important
- School ethos is critically important to creative exploration of opportunities
- Teachers should challenge students, offer authentic activities, organise workshops, & teach groups not individuals
2. Secondary Education in Entrepreneurship

Entrepreneurial process

- Entrepreneurial learning can be embedded in any subject & good practice explored through a range of platforms.
- YP‘s education in entrepreneurship must include feedback & reflection on what one is doing, yielding experience of the right steps taken.
- As yet VET is not working for older students, transversal skills are not being delivered.
- In secondary schools, skills teaching tends to be separate, there is an absence of embedding, & relevant subjects e.g economics & financial mgt are not taught.
2. Secondary Education in Entrepreneurship

**Constraints & ways of overcoming them**

- Need to include Entrepreneurship in national curricular. For this to happen: resources required, class sizes, team teaching, rural location, HoS, teacher training & CPD
- Good examples of teacher training & CPD identified & scaled up
- Get over the silo mentality
- Adopt more progressive teaching methodologies
- Teach the teacher entrepreneurship at a deeper level
- Include more industrial liaison in teacher training
- Facilitate cooperation between schools & external companies
3. Assessment

Entrepreneurship works:

- Leads to high employability, improved skills & attitudes, & where stronger entrepreneurial culture in schools higher teacher involvement

Preparing teachers for entrepreneurial learning

- One cannot teach what one does not understand
- All teachers need to understand entrepreneurship if they are to develop understanding of it in their students
- Teacher training does not adequately address this
- The cross-cutting issue of gender is not included sufficiently in teacher training & CPD
4. Recommendations

The need for a step change:
- Bits of the jigsaw that comprises EL are known in different parts of the MSs but the parts need to be pulled together and scaled up

Specific recommendations
- Teach entrepreneurship as a main subject in secondary schools
- Increase contact between schools & external organisations
- Establish position of industrial liaison & careers advisor in all schools
- Identify ways of teaching to minimise gender disparities & maximise equality
4. Recommendations

Specific recommendations continued:

- Establish more links between tertiary & secondary education to enhance teacher CPD in entrepreneurship & innovation
- Consider establishing vocationally versus academically-oriented schools & colleges for year 11-13 students
- VET should be further developed to address workplace requirements thro’ more work placements of VET teachers
- The role of the EU in supporting trainee teachers in gap year in industry; provide industry placement grants for teachers; monitor the impact of the above measures.
Can entrepreneurship be taught?
A critical note on impact evaluation studies

Laura Rosendahl Huber
University of Amsterdam
Max Planck Institute for Innovation and Competition
Structure of the Presentation

1. Introduction
2. Limitations of impact evaluations
3. Randomised experiments
4. Recommendations
1. Introduction

Growth in entrepreneurship education

Source: JA-YE (the Netherlands), * estimate
1. Introduction

Are programmes effective?

Evidence seems to indicate that entrepreneurship education:

- leads to enhanced entrepreneurial skills
- helps to boost entrepreneurial attitudes and intentions
- helps to boost career ambitions in general
2. Limitations of impact evaluations

Findings should be interpreted with caution:

- Few account for other influences (use pre-post, treatment-control design)
- **Self-selection** hinders the estimation of unbiased effects
- Self-selection leads to **overestimation** of the effectiveness
What goes wrong? It’s the counterfactual!

- Correlation is not the same as causal effect

- Correlation: 0.94
- Should we start subsidizing cheese consumption?
- Impact evaluation requires a counterfactual
3. Randomised experiments

Example: early entrepreneurship education

- 85 primary schools
- 2500 children in last grade (11-12)

Just like in medical trials:
- Random assignment
- Treatment = Bizworld programme
- Control = regular school curriculum

- Two questionnaires (before and after)
- Outcomes: Skills and knowledge
What the experiment looks like

Skills/knowledge

- Treatment group
- Control group

Effect of Bizworld

\[ \delta = \Delta_T - \Delta_C \]

Time

February

BizWorld

May/June
Early entrepreneurship education

Main findings:

- Positive effect on development of non-cognitive skills:
  - Self-efficacy
  - Need for Achievement
  - Risk taking
  - Persistence
  - Analyzing
  - Pro-activity
  - Creativity

- No effect on entrepreneurship knowledge

- Importance of early investment
- Relevant skills, not only for entrepreneurship
# Summary randomised experiments

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4. Recommendations

For future research:

- More and better
- Compare different programmes
  - Effectiveness
  - Time/cost efficiency
  - Opportunity costs
- Determine the long term effects (incl. spill-over effects)
4. Recommendations

For policy makers:

- Be critical: correlation ≠ causal effect
- Be patient: better understanding leads to better policy
- Do not be afraid to apply randomised trials
  - Think of medical trials
  - Trade off short-term and long-term objectives
POLICY DEPARTMENT B
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