



Entrepreneurship Education: A road to success

13 Case studies

Prepared for the study 'Compilation of evidence on the impact
of entrepreneurship education strategies and measures'

EUROPEAN COMMISSION

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Introduction

In 2013 DG Enterprise and Industry commissioned ICF International to conduct a mapping exercise of examples of research on the impact of Entrepreneurial Education. Desk research was carried out and 13 Case Studies were prepared and compiled in this document.

The desk research was organised as a systematic country research in all 28 EU-Member States plus 14 Non-EU-countries,¹ combined with a 'high level mapping', consisting of a) interviews with high-level experts and b) identification of robust academic examples of impact measurement in entrepreneurship education. Overall aim of desk research and high level mapping was to identify and screen examples of measuring entrepreneurship education impact on the individual, the institution, the economy, and society. Emphasis was put on the identification of causal links between the levels, wherever possible.

In total, 91 studies from 23 countries were identified; the results were compiled in an Excel database.² From this database, 13 examples were selected for case studies. The cases selected all undertook the endeavour to show how a type of input (a policy strategy, an entrepreneurship education class in general or higher education, an extra-curricular activity etc.) - led to immediate results, intermediate outcomes and/or global impacts; using a solid research approach and methodology. All cases selected stand for measuring the impact of a specific type of initiative (e.g. a national strategy for entrepreneurship education, an initiative to achieve institutional change in a school, a compulsory module on entrepreneurship in VET-schools, an initiative of teacher education etc.).

Additional research was undertaken (interviews, review of literature in original language, if appropriate, on-site visits). On each example, a case study was drafted, which described and analysed impacts as observed by the examples of impact measurement.

The table below gives an overview on the examples selected.

Table 1.1 Overview on cases selected for case studies

	Cases	Country	Key characteristics
1	South East European Centre for Entrepreneurial Learning (SEECCEL)	Western Balkans and Turkey	SEECCEL measured the impact of its provisions across countries and in different types of schools. The measurement undertaken looked at participants' entrepreneurial attitudes and knowledge, and impact on schools.
2	JA-YE – Junior Achievement - Young enterprise	Several EU: BE, BG, DK, EE, FI, IT, NO, RO, SK, PL, BU, CZ, IE, RO, SK, ES, LI, SE, UK; and CA, USA	JA-YE is probably the best-known entrepreneurship education provider (especially regarding mini-companies programmes) across Europe and in many other countries globally. Several examples measuring impact of a similar programme exist, which allows for a comparison across different countries and different education levels.
3	Youth Entrepreneurship Strategy (YES) and Action Plan	Wales (UK)	The Welsh government measured the impact of the YES Strategy based on specific indicators in several surveys (run under the YES Strategy or run on a national level (GEM) or UK-level). The indicators used aimed at monitoring the long-term cultural shift towards entrepreneurship, which is one of the main goals of the Strategy.

¹ Albania, Bosnia and Herzegovina, Canada, Israel, Kosovo, Lebanon, Liechtenstein, Macedonia (the Former Yugoslav Republic), Norway, Palestine, Russia, Serbia and Turkey, and the USA.

² An overview is available upon request.

	Cases	Country	Key characteristics
4	EEP – The Entrepreneurship Education Project	Global	EEP is a global, longitudinal research initiative which offers insights into the impact of entrepreneurial education on (1) the motivational processes underlying students' road to entrepreneurship and (2) the process of identity transformation from student to entrepreneur. Data from more than 70 countries and over 400 universities were gathered.
5	ASE Teacher Training Activities	Wallonia (Belgium)	ASE promotes entrepreneurial spirit in Wallonia, inter alia through targeting teachers across the region, raising their awareness on entrepreneurship. It was measured how the activities have impacted on perceptions of entrepreneurship, and how the topic was integrated in the teaching. Head-teachers were involved in the surveys, allowing to measure impact on schools.
6	UPI – Creativity and Innovation in Primary School	Slovenia	UPI entrepreneurship education courses, financed by the Slovenian state, were measured as to their impact on primary education pupils. This concerned especially the development of skills/knowledge pertinent to an entrepreneurial mind-set, such as creativity.
7	Misgav Elementary School	Israel	Misgav elementary school, previously a regular Israeli school, was transformed into an experimental entrepreneurial school. A study investigated the subsequent change of the organisational culture and the entrepreneurial profile of the school, and the impact of entrepreneurial education on pupils.
8	E-Vitamin Entrepreneurship Education Programme	Spain	This case examined the impact of the E Vitamin programme on secondary education students' self-efficacy, pro-activeness, risk propensity and intention to become self-employed. The analysis of the results also provided insights on the importance of developing high self-efficacy for teachers.
9	Entrepreneurship Education Courses in 27 VET-schools	Switzerland	Three different entrepreneurship education courses were offered in 27 Swiss VET schools. A study showed positive impact on VET students, indicating that pre-existing personality traits and beliefs have significant influence on entrepreneurial intentions.
10	Entrepreneurship Education National Action Plan 2007-2012	The Netherlands	This meta case study discusses the results of the evaluation of programmes under the National Action Plan for entrepreneurship education. Various examples of measurement were combined to underline the impact of entrepreneurship education strategies on young people in different age groups.
11	Impact of Entrepreneurship Education in Denmark	Denmark	A longitudinal study was launched in Denmark in 2011 which measures the impact of entrepreneurship education in different age/student cohorts. Denmark is a country with significant experience in entrepreneurship education. This on-going measurement provides data which offer significant depth to the understanding of how entrepreneurship education has positive impact on Danish students of different age groups.

	Cases	Country	Key characteristics
12	National Action Plan 2010-2014 in Norway	Norway	Norway has a strategy (Action Plan) on entrepreneurship education in place for many years already (since 2004). An evaluation was undertaken which involved pupils/students from several schools across the country and showed regional differences in impact
13	Entrepreneurial Impact: The Role of the Massachusetts Institute of Technology (MIT)	USA	The Massachusetts Institute of Technology (MIT) offers a comprehensive entrepreneurship ecosystem to students (and staff): besides entrepreneurship education courses, research centres, mentoring programmes and other types of support helped graduates to become entrepreneurs. A study measured the impact on the entire institution and analysed the contribution of the companies founded by graduates on (state and national) economy, and on employment and innovation.

The aim of the case studies was to collect facts and figures about the impact of entrepreneurship education on (one or several) different levels (individual, organisation, society, economy, and to collect concrete examples of how concrete strategies and initiatives led to results.

- ➔ **What change was achieved and on what level?** What concrete data are there?
- ➔ What type of intervention (policy strategy or educational initiative) was undertaken and by whom? What were the aims of the intervention (policy objectives and/or educational aims)? Who implemented it? How, with what scope and on what educational level? **How was that change achieved?**
- ➔ Based on the measurement results: Can the intervention be considered successful? Did it reach its aims and objectives? **How were the results of the measurements used?** Did the data (or will they) support a review of the intervention and/or sustainable implementation? If yes, how?

Moreover, it was aimed to present more detailed insights into the methodology used for the measurement:

- ➔ **How were the data collected?** How were the data measured? Who initiated the measurement? Who carried it out?)

Hence, the Case Studies focused on the results of the impact measurement, but also presented information about the input and the way the data obtained were or will be used. Hence, they tell the 'story' of the strategy/initiative in relation to the policy cycle (planning / implementation / evaluation / review).

This document presents the 13 detailed Case Studies in full length. The data and evidence gained in the case studies, together with the other cases identified through desk research, are the intelligence that informed the final report to this study.

Final Study Report – Entrepreneurship Education: A road to success³

The prevailing impression that emerged from the evidence collected is that **entrepreneurship education works**. The data compiled in the final report to this study showed that students participating in entrepreneurship education are more likely to start their own business and their companies tend to be more innovative and more successful than those led by persons without entrepreneurship education backgrounds.

³ The report 'Entrepreneurship Education: A road to success. A compilation of evidence on the impact of entrepreneurship education strategies and measures' is available as a separate document.

Entrepreneurship education alumni are at lower risk of being unemployed, and are more often in steady employment. Compared to their peers, they have better jobs and make more money.

Notably, effects tend to cumulate and lead to acceleration: those who participated in a higher number of entrepreneurship education measures benefited more over time.

The positive impact is not restricted to students and alumni. Besides impact on the individual, evidence from the examples reviewed for this study also shows impact on educational institutions, the economy and society.

1 Case Study 1: SEECEL

1.1 Description of the strategy / initiative

This case study discusses the implementation of the South East Europe Centre of Entrepreneurial Learning (SEECEL)⁴ School Professional Toolkit (SPT) and the measurement of its impact on selected schools across the eight countries of SEECEL. For SEECEL countries, entrepreneurial learning is defined as 'concept of education and training which supports an entrepreneurial way of thinking and is based on the development of individuals, including basic principles of efficiency in everyday life without a particular focus on business start-up – all of which lead to entrepreneurial literacy for the society as a whole'⁵.

The measurement was initiated by the identified need for evidence, based on scientific proof, on the effectiveness of the Entrepreneurial Learning: a Key Competence Approach (ELKCA) instrument⁶. Also, the measurement would highlight areas for improvement. Another driver was the fact that, entrepreneurial learning as a key competence is included in national policies in the eight countries, as fostering the competitiveness of the economy and promoting the inclusiveness of its citizens⁷.

The SPT is an integral part of the Entrepreneurial Learning Package⁸. The latter consists of three pillars, with an equal-number of working groups having collaborated towards the development of: i) the definition of the learning outcomes of entrepreneurial learning; ii) the definitions of the key competences that teachers need to have for entrepreneurial learning and ways to train teachers on entrepreneurial learning and teaching methods and iii) an entrepreneurial school model. From the three pillars of the Entrepreneurial Learning Package, the SPT focused on ISCED 2 teachers.

The goal of the project was to measure the impact on ISCED 2 school professionals (teachers and school management teams)⁹ in selected schools from all eight countries, regarding the development of entrepreneurial competences; and also assess the capability of teachers to include entrepreneurial learning as a key competence in their regular teaching process, in line with the EU key competence and cross-curricula approach.

More specifically, the project was developed through the following steps:

- ➔ SEECEL developed a three-level assessment of entrepreneurship as a key competence at ISCED 2. The assessments included: i) schools and their progress in becoming entrepreneurial; ii) teachers and school management staff through a questionnaire and iii) learning outcomes based on Bloom's taxonomy¹⁰.
- ➔ Four schools were selected by the national authorities in each country. They all had to meet 10 criteria¹¹. The schools would be 'labelled' as being focused on one of the **four key curricula areas**: language; social science; science; and arts, physical and technical.

⁴ Information on SEECEL can be found [online] at: <http://www.seecel.hr/>; cited 10 April 2014.

⁵ SEECEL (2011).

⁶ SEECEL (2013) A Key Competence Approach in Practice.

⁷ As stated in an interview with SEECEL representatives.

⁸ SEECEL (2011).

⁹ The 'school management team' is also comprised of teachers.

¹⁰ [online] Available at: https://www.schreyer.institute.psu.edu/pdf/Bloom_pyramid.pdf; and <http://www.celt.iastate.edu/pdfs-docs/teaching/RevisedBloomsHandout.pdf>; cited 23 April 2014.

¹¹ Please see section 1.8

- ➔ Training was provided to teachers and the school management team on how to incorporate entrepreneurial learning in their teaching. Training was either basic (5-7 hours) or advanced (25-30 hours). The initial training informed participants about the overall aims of the project and the goals/performance that was expected from each school. The training provided to teachers/school management staff also considered the curricula types. Schools were required to involve at least 20 teachers, who all received training. The initial training was also delivered to the school management team.

After the training, schools were required to develop a unique action plan¹², which was part of the annual school plan. There were no prescriptive action plans, so as to allow creativity from schools¹³ and fully respect the characteristics of the local environment of each school.

The school-based activities included in the action plans were in line with regular school practice, as defined by national curriculum frameworks. The Action Plan was then shared with SEECEL for reflection. It is interesting to note that the involvement of the School Board in the development and implementation of the action plan was considered an important quality indicator by SEECEL. A common agreement was reached with the school, after feedback was incorporated and a contract was signed between the two parts. All schools were supported financially with a small budget; therefore, through these action plans, SEECEL also had the opportunity to assess if the schools used the budget efficiently.

The Action Plan comprised the following steps:

- ➔ **Run a pre-test** (baseline data collection): all teachers and school management teams involved in the project participated (see the section on methodology for more details about the questions).
- ➔ **Launch a pilot of the project for one year**: schools had to plan lessons based on the learning outcomes for entrepreneurial learning developed by SEECEL. Teachers were delivering all subjects by using entrepreneurial learning methods and promoting entrepreneurship as a key competence. In addition, schools were required to organise extra-curricular activities to meet the goals of the project. They had the autonomy to choose the way in which they would realise these activities, depending on the local economy structure and the learning outcomes they had in their curricula (for example, visits to banks or local entrepreneurs). Various approaches were observed across schools and countries¹⁴, with local authorities usually being involved.
- ➔ During the project piloting, teachers could **communicate and share experiences/questions/material**, etc., through the Community of Practice (CoP) that had been built within the project. Additionally, teachers and national contact points had the opportunity to use an online platform, where one could share experiences, seek solutions and guidance, etc. SEECEL also engaged external experts to answer specific questions. The platform was very well-received by participants¹⁵.
- ➔ **Run a post-test** (final data collection): the post-test included the same questions as the pre-test. Data were gathered and analysed to reach conclusions on the instrument and next steps.
- ➔ Hold **peer-visits to enable mutual learning**.

¹² Please see section 1.8

¹³ Examples of schools' approaches can be found in SEECEL (2011) A Key Competence Approach in Practice ISCED Level 2.

¹⁴ Examples of action plans/school activities can be found in SEECEL (2013) A Key Competence Approach in Practice ISCED Level 2.

¹⁵ As stated by interviewees from Bosnia and Herzegovina and Montenegro.

Challenges during implementation

Reportedly in Bosnia and Herzegovina, some teachers faced difficulties with adjusting their teaching in order to achieve entrepreneurial learning outcomes. This is attributed to their lack of previous entrepreneurial knowledge. Even before the project, teaching basic economic concepts and an economic way of thinking had also been challenging in some cases.

Not all teachers were engaged in the project, due to different views on entrepreneurship education and its implementation in low education levels. For example, in one of the participating schools, about one-eighth of teachers agreed to participate. The ones that did participate however even offered personal time and they worked vigorously throughout the project.

The challenges present during implementation may have also been due to schools' lack of experience with participation in projects, especially those involving collaboration with other countries; this was observed in some cases in Montenegro.

1.2 Results of the impact measurement

Even before the measurement took place, the pilot project reportedly was well-received and positively affected participants.

Reportedly, the training was well-received by participating teachers, especially those who had not received any training on entrepreneurial learning prior to project implementation, which includes the majority of teachers in all SEECEL countries¹⁶. Evidence from Bosnia and Herzegovina stress that the initial meeting with SEECEL and the explanation of entrepreneurial learning 'came as a surprise'- as embedding entrepreneurial learning into teaching seemed challenging. After the training/pilot project however, teachers with no prior knowledge recognised that each subject has an entrepreneurial learning element.

Based on the pre- and post- tests, the impact of the instrument on teachers/school management staff was measured. The impact was also measured at the curricular level (for each of the four types), school level and country level. Assessing the impact of the training and the project overall on different groups and considering the different domains of Bloom's taxonomy allows for a better understanding of the effectiveness of the tool. The findings could provide the basis for future research on country differences, types of curricula, etc.

¹⁶ According to SEECEL.

1.2.1 Impact on teachers and school management staff

In regards to the impact on the cognitive and affective domains (see the section on methodology) on the curriculum area's level, the results overall underline that there was a different impact **across the four types of curricula**. More specifically:

Regarding participants' *cognitive domain* ('levels of remembering and understanding'), significant positive impact was observed in the language and science curricula. The impact was rather negative for respondents from the social sciences curriculum.

In the *cognitive domain* ('higher levels of learning'), statistically significant impact occurred for respondents in social science and the arts and the technical and physical education curricular area.

Participants from schools focusing on *language curriculum* demonstrated the most common shifts regarding their views on the recognition of school professionals in entrepreneurship education. This information was provided through the cognitive domain ('higher levels of learning') subscale.

In the *affective domain*, positive changes took place in all curricular areas. However, significant positive changes were evident for participants from language, social science and the arts, technical and physical education curricula. Changes most commonly occurred at schools focusing on the arts, physical and technical education curriculum.

Comparing results among the four curricula types, it is evident that the project had the largest impact on participants from **social science curriculum schools**, based on results for the affective domain and the cognitive domain (higher levels of learning).

The opinion of teachers and school management staff regarding specific elements of entrepreneurial learning¹⁷ was also tested. Participants seem to have been differently impacted, based on the school curricula type.

- ➔ Language curriculum: Participants changed their opinion in relation to the recognition of the importance of all listed skills needed for a new business start-up; and also in relation to financing, innovativeness, and business planning.
- ➔ Social science curriculum: Only a slight change in opinion was observed on the importance of skills needed for a new business start-up. The largest change occurred in relation to the recognition of the importance of innovativeness.
- ➔ Science curriculum: The recognition of the importance of finances for starting a business was the area with the greatest change.
- ➔ Arts, technical and physical education curriculum: A slight change in the opinions of participants was evident about the importance of skills needed for a new business start-up.

Interviewees underlined that the positive outcomes for social sciences curricula could be attributed to the fact that entrepreneurially-related concepts are already embedded in social sciences. Thus, teachers with this experience could be expected to be more familiar with teaching entrepreneurial concepts before the project. This underlines that **the pre-conditions of teachers can greatly affect if and how they will be engaged with and affected by relevant projects/initiatives**. This means that *one size (training) does not fit all*.

¹⁷ The questions regarded prerequisites to start a business.

Therefore, training on entrepreneurial learning/entrepreneurship as a key competence at ISCED 2 should be further adjusted to the background of the teachers.

1.2.2 Entrepreneurship competence at school level

Individual schools were the unit of change for the SPT approach. Therefore, results were assessed for individual schools as well, across countries. It was found that:

- ➔ At the school level and regarding the *cognitive domain*, both for 'levels of remembering and understanding' and 'higher levels of learning,' changes most commonly took place in social science curriculum schools.
- ➔ Relevant changes in the *affective domain* were most often observed for arts, technical and physical education curriculum schools.
- ➔ The recognition of the role of teachers and school managers in entrepreneurship education was improved across schools after the project. Most commonly, positive change was registered for language curriculum schools.

1.2.3 Entrepreneurship competence in different countries

The measurement allowed for cross-country comparisons, although it is noted that the training offering was different among countries, regarding length, trainer and content.

Significant impact was found in most countries, as depicted in the following Table 1.1

Table 1.1 Statistically significant impact found in countries (countries are displayed according to the rank of their impact)

Domain where impact was found	Country
cognitive domain (level of remembering and understanding)	BHI, HR, KS, MEN
cognitive domain (higher levels of learning)	ALB, BHI, MEN
cognitive domain (higher levels of learning) focusing on the school professionals' role in entrepreneurship education	significant changes were not observed in any country
affective domain	ALB, BHI

Source: SEECEL (2013) School Professional Toolkit

Experts underline that the findings per country and the comparison between them should only be viewed by taking into consideration country characteristics, the current education policies in each country, as well as the level of development and state of implementation of entrepreneurship education.

Overall, **the most significant impact was observed in Bosnia and Herzegovina and Montenegro**, in all levels of the cognitive domain. In Bosnia and Herzegovina, significant positive changes were also identified in the affective domain. Significant positive impact also occurred in the cognitive domain (higher levels of learning) and the affective domain in Albania.

Significant positive impact on Bosnia and Herzegovina and Montenegro

According to interviewees, the significant positive impact of the project on Bosnia and Herzegovina can be attributed to teachers' high level of engagement with the project. It could be supported that the project was viewed as a way to improve teaching methods and education overall, thus contributing to tackling the challenges that the country faces. Additionally, involved teachers grasped the opportunity to receive training through the project on a topic that they had not been trained in. Therefore, the effects are visible even after the project and the measurement were completed; teachers continue to embed entrepreneurial learning in their teaching and run relevant extra-curricular approaches.

In addition to the promotion of entrepreneurial learning and teaching, the project also resulted in endorsing collaboration between the 10 counties of the country, as well as between the SEECEL countries; schools autonomously collaborated through the platform and study visits.

In Montenegro, it is believed that the impact was so significant due to the broad change that the project brought about in teaching methods. Teaching in schools in Montenegro mainly consists of 'teacher lectures.' Students obtain a great deal of 'academic' knowledge; however they do not necessarily learn how to conclude, improve, and implement knowledge. This was recognised by the Government, which decided to make improvements and recognised the importance of entrepreneurship as a key competence. Through the project, teachers used methods that were very different than the ones formerly used. Teaching methods were modified, and so was the type of knowledge that participants developed, which led to significant positive impact.

The project and the new teaching methods it introduced were so well-received that, according to national representatives, ISCED 1 teachers also showed interest and asked to be informed. In some cases, they even introduced similar (entrepreneurial) teaching methods in their classes on a voluntary basis. As expected, the project also brought significant changes in the approach towards teaching and knowledge, specifically of entrepreneurship as a key competence.

1.2.4 Strategic piloting impact on the school management staff

The school management staff seem to have been less impacted, since most changes were not statistically significant. However, statistically significant impact was found for the school management staff at schools focusing on the language curriculum and science curriculum, regarding the *cognitive domain (level of remembering and understanding)*. From a country perspective, only staff in Croatia was found to demonstrate a significant change, based on the pre- and post- tests.

Overall, the project had:

- ➔ some impact in most schools and countries, but this impact was not always statistically significant;
- ➔ positive impact on the entrepreneurship related learning outcomes in the affective domain; and
- ➔ negative impact on the participants' recognition of the school professionals' role in the implementation of entrepreneurship education (see factors in the methodology section).

1.2.5 Understanding the results

Interpreting the quantitative results, but also based on observations from the overall process, the project and the measurement itself could be improved¹⁸. Results underlined that there is *no one unique entrepreneurial learning model for all teachers*; it needs to be adjusted to reach the demands and specificities of the curricular area. The pre-knowledge and pre-conditions of teachers, as well as the environment, play a role, therefore adjustments will be made to the training, but also the questionnaire. Regarding the knowledge of teachers on entrepreneurship, the results stressed the need to provide initial teacher training.

Although the findings demonstrated that the overall impact was statistically insignificant in most cases, they allowed for an understanding of where and why significant impact was observed and could perhaps initiate future research to explore the reasons for no impact or a negative impact.

Country representatives from Bosnia and Herzegovina and Montenegro stress the positive influence of the project in their countries. Most importantly, the project seems to have contributed to *a cultural shift*, at least for the involved teachers in the relevant schools. There were examples (MEN) where the good practices were also disseminated to other ISCED level teachers as well. This stresses *the multiplicity effects of the project*. Moreover, policy steps regarding entrepreneurship education have reportedly been taken in these two countries promoted by the project. Interestingly enough, it is reported that the positive influence of the project did not only include the results of the project; countries/schools benefited from the piloting process per se as well. As one country representative stresses, the project showed participants the importance of exchanging experiences with other schools and the cooperation between schools, the local community, entrepreneurs, etc.

1.3 Methodology of measurement

National authorities were required to choose four schools. Overall, 32 schools participated. SEECEL, in close cooperation with board members from each country, had decided to include schools that focus on different curricular areas, so as to check that the instrument works across curricula. After public dialogue and a presentation of the project and the main curricular areas from SEECEL, schools self-assessed their strengths regarding these curricular areas and chose which one to pilot. The four types were based on the national curricula of each country. The initial training provided by SEECEL to all participants included training on the curricular type.

The quantitative section of the larger study of strategic piloting addressed one primary impact question and four exploratory questions. The questions were formulated with the focus on learning outcomes. The exploratory questions were expressed with respect to the revised Bloom's taxonomy.

1.3.1 Research design - quantitative section of the study

The measurement included a quantitative section. Qualitative data was also collected from SEECEL, but it was not analysed or included in the SPT results publication. The methodology used in this pilot study was based on quasi-experimental design. Results were collected from the pre-test and the post-test and they were analysed on a teacher/school management staff basis, school and country basis. The questionnaire included demographic questions, 20 questions on entrepreneurship and a knowledge test on entrepreneurial concepts (8 questions). The knowledge test focuses on financial/economic literacy. For the

¹⁸ As indicated in interviews with SEECEL representatives.

20 questions, respondents needed to choose from a 5-level scale¹⁹. These questions touch upon various elements of entrepreneurship: such as perceptions towards entrepreneurship and entrepreneurs (of the respondent, his/her peers; in the school and the country) and entrepreneurship-promoting teaching methods. According to SEECCEL, these questions can be considered relevant to the affective domain and higher levels of learning in the cognitive domain, according to Bloom's taxonomy.

The questionnaire was developed in English and then translated to local languages. Translations were conducted by the national authorities, so it can be inferred that there was no issue.

In the pre-test 518 responses were collected and 520 in the post-test, which is considered a satisfactory sample size for such a project²⁰.

For the analysis, the entrepreneurship-relevant questions were grouped into factors which could provide more information than one variable could. Three factors were isolated, each including at least five variables:

- ➔ Factor 1: Entrepreneurship-related learning outcomes in the affective domain;
- ➔ Factor 2: Entrepreneurship-related learning outcomes in the cognitive domain- higher levels of learning; and
- ➔ Factor 3: Entrepreneurship-related learning outcomes in the cognitive domain- higher levels of learning/ school professionals' role in entrepreneurship education.

These factors were relevant to Bloom's taxonomy. The questions on entrepreneurial knowledge were relevant to the *cognitive domain –level of remembering and understanding*.

Therefore, for country/schools' analysis, changes were assessed regarding the factors overall, not the variables. The part of the questionnaire that regarded knowledge on entrepreneurship education was not analysed through the factors. It should be noted that the impact on the types of curricula and per country was measured for the school management staff subsample.

The research results were also revised by two academic reviewers.

1.3.2 Points for future consideration

The methodology that was used in the measurement appropriately served the goals of the project and managed to assess the impact of a relatively complex project, while also handling a big sample. However, one could address some points for consideration:

- ➔ **Sample:** The methodology used the school as the unit of change. Replies from teachers and school management staff were anonymous and without some identification possibility. Although anonymity is a strong element of a methodology, it made the matching of the pre-and post-sample difficult.
- ➔ **Choice of methodology:** Quasi-experimental design methodology (simple pre-post design without a control group) was used in this case study. The quasi-experimental design methodology is widely recognised and used in social sciences research. However, it can be considered to be rather complex. Regarding the fact that no control group was included in the measurement:

¹⁹ Likert scale: totally disagree – disagree – neither – agree – totally agree.

²⁰ See section 1.8 for the numbers of questionnaires delivered in the pre and post-questionnaire.

- Constructing a suitable control group (of teachers) from each of the 'treated' schools would not have been possible due to the strong spill-over effects of the project: the researchers stress that since the whole school was exposed to the direct and indirect activities under the project, identifying a control group of uninfluenced individuals from the same school would not have been feasible.
- A control group from comparable schools or teachers that did not participate in the project (untreated) could have been constructed – it should be noted though, that the random assignment of schools into treatment and control groups would not be a mandatory prerequisite for quasi-experimental designs. Including such a control group could have made the findings more robust by shedding light on possible changes in teachers' attitudes that would have occurred without the programme. Taking a difference-in-differences approach would have been a possibility. However, the results of the measurement can be considered sufficiently robust even without the use of a comparison group, under the reasonable assumption that there were no other important events or activities outside the project that could have exerted a significant influence on teachers'/school management staff's knowledge and perceptions on entrepreneurial learning. Hence, the changes observed among the 'treated' schools can be attributable to the project.
- ➔ **Control variables:** It can be assumed that the impact of the project differed across individuals, depending upon a set of individual characteristics such as family background and relation to entrepreneurship, prior work experience as an entrepreneur, etc., - that the literature has proved to affect one's entrepreneurial knowledge, awareness and propensity. Apparent differences in the project's impact on the different curricula might be partially explained by the different composition of teaching staff. For most study designs and model specifications there are possibilities to control for these characteristics. However, it may have been less feasible to introduce such control variables under this specific study design (a major problem would be the fact that the pre- and post-test samples were not fully matched/paired).
- ➔ **Use of qualitative information:** SEECEL collected qualitative information through the measurement that was not analysed in the publication on the measurement results. However, this information was presented in the SEECEL (2013) A Key Competence Approach in Practice ISCED Level 2 publication²¹. This information could be used in the future to explore the responses further; for example, the extent to which questions may have been interpreted differently between countries.

Regarding next steps and the measurement of future projects, SEECEL stresses they need to:

- ➔ harmonise topics in the questionnaire, which needs to be adjusted to curricular areas; and
- ➔ check that pre and post sample items are the same. In the eight countries, teachers may teach at a school only for one semester and then move to another school (this is especially the case for younger teachers). SEECEL will try to ensure that the same respondents are included in the pre-and post- questionnaire.

²¹ [online] Available at:

<http://www.seeceel.hr/UserDocsImages/A%20Key%20Competence%20Approach%20in%20Practice.pdf>

1.4 Using the results of the impact measurement

The results of the measurement were shared with the SEECEL Board, where two representatives of each country sit. Therefore, national authorities were informed primarily through this channel.

According to SEECEL, the results have been integrated into the development of entrepreneurial learning policy framework strategies in SEECEL Member States, as the results were used as evidence to take national actions to promote entrepreneurship education. Therefore, the measurement offered data for evidence-based policy making. This is even more important given the financial constraints that all countries face and the fact that Croatia (as an EU member) and the rest of the countries (having pre-accession status) need to justify their actions to secure EU funds, as they implement EU policy frameworks (Croatia) and work towards future membership in the EU.

After the piloting, peer learning activities took place, where schools visited other schools and shared their experiences in vivo.

In Bosnia and Herzegovina, the results of the measurement provided valuable information to the relative authorities (such as the agency of pre-primary, primary and secondary education).

All schools were informed by the Ministry of Civil Affairs on the results, which were also posted on the Ministry's website. Several seminars were held where teachers presented their model of work during the project. A large conference was also held to promote entrepreneurial learning, supported by the ETF. Besides teachers, the conference involved representatives from education authorities at all education levels stakeholders from other Ministries (beyond Education), SMEs Agency and policy makers. The conference included a specific session on the schools' activities and how they incorporated entrepreneurial learning in each subject.

According to authorities in Bosnia and Herzegovina, it can be stated that the results of the SEECEL measurement positively impacted and promoted/supported:

- ➔ the training of at least 300 teachers on entrepreneurship education on a national level, supported by the European Training Foundation (ETF) and UNICEF;
- ➔ technical assistance project, 'Entrepreneurial Learning in Education Systems in BIH' (IPA 2007), which was implemented in 2010/11: the project regarded the development of an entrepreneurship education strategy in the country. As of 2012, there is an entrepreneurship education strategy in place. Besides the strategy, which is one of the key outputs, the project piloted a cross-curricula approach in more than 20 schools, both elementary and secondary;
- ➔ Entrepreneurial Learning in Education Systems (ELES) (22 projects running from 2014): the schools' experience during the pilot and the overall results were communicated to the project ELES team. The project aims at developing curricula with entrepreneurial learning outcomes (that SEECEL has developed) and establishing a connection between the worlds of education and economy.

²² [online] Available at: <http://www.seecel.hr/kick-off-conference-entrepreneurial-learning-in-education-systems-eles-of-bosnia-and-herzegovina-phase-ii>

In Montenegro, the results were uploaded onto the website of the Bureau for Education Services²³ to inform all schools. Triggered by the project and the results, the Bureau drafted an action plan on how to assist teachers to improve their competences and how to include entrepreneurship as cross-curricular competence. The relevant publication was in the form of guidelines for all compulsory subjects of the curricula. Overall, the pilot per se and the results had a significant impact on the recognition of the importance of entrepreneurship education; political support to the Bureau's relevant activities, and support from other stakeholders such as teachers, has reportedly increased.

Building on the results, in September 2014, all primary education schools (ISCED 1 and ISCED 2) will implement entrepreneurial learning as a key competence through the existing curricula.

1.4.1 Next steps planned²⁴

The measurement also served SEECEL's goal in testing the instrument per se and offering insights on areas for improvement. As described earlier, the limitations of the measurement and the pilot overall were recognised, so as to advance to the next phase of the project. The latter started in late 2013 and will last for three years. In October 2013, the first working group met and began working on developing ideas for transfer of the methodology, broadening the approach (from one curriculum area to the whole-school curriculum), improve the measurement tools (adding elements to the questionnaire) etc.

The four schools per country that had participated in the first pilot and the measurement will operate as 'good examples'/experimental schools and will try to share with other schools their learning from this project. In this process, they will be guided and supported by national authorities.

The next piloting will take place in the school year 2014/15.

1.5 Conclusions

The results of the SPT offer support to proving the impact of entrepreneurship education, and insights on how to better measure relevant projects.

More specifically, the measurement proved that the impact of entrepreneurship education was different between types of curricula, stressing the importance of adjusting measurement tools to the different target groups. The cross-country approach, inherent to SEECEL's activities offers an interesting example of the same measurement rolled out in different countries. Although the eight countries share common cultural elements (most of the SEECEL countries were under the same state until relatively recently, which has led to some similarities in the way national education systems were developed), there are definitely variances in educational approaches, policies and targets that should be taken into consideration in cross-country analyses.

As with all measurements that include more than one group of respondents, the results offer the basis for further research on the reasons that the impact was insignificant or even negative in some cases. So, it can be supported that the results can both foster evidence-based policy making (as it seems to be the case at least in some of the countries), but also highlight areas for improvement in

²³ [online] Available at: http://www.zzs.gov.me/rubrike/preduzetnicko_ucenje/ (provided by interviewee from Montenegro).

²⁴ As of April 2014.

the entrepreneurship education approach (i.e. how teachers were trained) and the measurement tool per se.

This measurement example is an integral part of the whole SEECEL approach and its activities. However, it could be used as blueprint from other countries or clusters of countries. In such cases, policy makers should keep in mind the following, according to SEECEL experts:

- ➔ The pre- and post- sample should be matched. Special care should be given in cases where the sample comprises individuals with high mobility, as in the case of (young) teachers in SPT.
- ➔ Measurement tools and the methodology used can be inspirational, but they should be viewed as parts of the whole context/project and approach of SEECEL.
- ➔ When measuring the impact of entrepreneurship education programmes/ initiatives that involve teachers/ school management teams, the latter need to be carefully prepared.
- ➔ Tool-wise, running the pre- and post- tests online facilitates the whole process, as a database can be easily developed. It will also allow teachers to develop their digital skills.
- ➔ During the implementation, teachers should be supported to share experiences/questions.

1.6 References

SEECEL (2011) Entrepreneurial Learning: A Key Competence Approach – ISCED level 2.

SEECEL (2013) School Professional Toolkit.

SEECEL (2013) Entrepreneurial Learning: A Key Competence Approach in Practice- ISCED Level 2.

1.7 Details on methodology: criteria and questionnaires used

Table 1.2 Criteria for the selection of pilot schools

	Criteria
1	Accessible by public transport
2	Have a minimum of two school classes per educational age group (generation) in school (preferable for Montenegro)
3	IT equipped and majority of teaching staff and school management must use IT equipment in professional work
4	The school website must be functional
5	Have a pre-existing systematic approach to school-parent and school-local authority cooperation
6	School staff have a positive attitude towards entrepreneurial learning
7	Teaching staff are familiar with interactive teaching methods
8	Member(s) of the school management team should be able to communicate in English
9	School management has experience in project implementation and budget implications
10	Teaching staff and school management are familiar with self-evaluation and external evaluation

Source: SEECEL (2013) A Key Competence Approach in Practice ISCED Level 2, p.15

Table 1.3 Contents of action plans developed by participating schools

Preparation of lesson plans with included defined learning outcomes and their implementation during regular classes.	Pre- and post-piloting teacher questionnaire (minimum 20 teachers) using the developed SEECEL instrument.
Annual school programme where entrepreneurial learning is included in all activities.	Development of at least three personal development plans for teachers.
Detailed description of the organisation and implementation of basic teacher training (5-7 hours for the entire school staff) and advanced teacher training (25-30 hours).	Organisation and celebration of the EU small and medium enterprise (SME) week. Financial plan.

Source: SEECEL (2013) A Key Competence Approach in Practice ISCED Level 2

Table 1.4 Questionnaires included in data analysis by curricular area

	Language	Social Science	Science	Arts, physical and technical
Pre	94	167	118	139
Post	111	165	101	143

Source: SEECEL (2013) School Professional Toolkit

1.8 Questions used for measurement

This section presents the questions used for measurement. These questions built the core of the measurement. They are drawn from the SEECEL (2013) School Professional Toolkit publication, pp. 12-13.

The primary impact question addressed by the quantitative section of the study on strategic piloting was:

- ➔ What impact does the entrepreneurial learning project have on the teachers' and school management staff's entrepreneurship-related learning outcomes in eight pre-accession countries in Southeast Europe?

Three exploratory questions were also explored:

- ➔ Does the study have a significant impact on the teachers' and school management staff's entrepreneurship-related learning outcomes in four curricular areas (language, social science, science, arts, technical and physical education)?
- Does the study have a significant impact on the teachers' and school management staff's entrepreneurship-related learning outcomes in the cognitive domain, on the level of remembering, in four curricular areas?
- Does the study have a significant impact on the teachers' and school management staff's entrepreneurship-related learning outcomes in the cognitive domain, on the higher levels of learning, in four curricular areas?
- Does the study have a significant impact on the teachers' and school management staff's entrepreneurship-related learning outcomes in the affective domain, in four curricular areas?
- ➔ Does the study have a significant impact on the teachers' and school management staff's entrepreneurship-related learning outcomes at different schools?
- Does the study have a significant impact on the teachers' and school management staff's entrepreneurship-related learning outcomes in the cognitive domain, on the level of remembering, at different schools?

- Does the study have a significant impact on the teachers' and school management staff's entrepreneurship-related learning outcomes in the cognitive domain, on the higher levels of learning, at different schools?
- Does the study have a significant impact on the teachers' and school management staff's entrepreneurship-related learning outcomes in the affective domain, at different schools?
- Does the study have a significant impact on the teachers' and school management staff's entrepreneurship- related learning outcomes, in eight countries (Albania, Bosnia and Herzegovina, Croatia, Kosovo*, Macedonia**, Montenegro, Serbia, Turkey)?
- Does the study have a significant impact on the teachers' and school management staff's entrepreneurship-related learning outcomes in the cognitive domain, on the level of remembering, in eight countries?
- Does the study have a significant impact on the teachers' and school management staff's entrepreneurship-related learning outcomes in the cognitive domain, on the higher levels of learning, in eight countries?
- Does study have a significant impact on the teachers' and school management staff's entrepreneurship-related learning outcomes in the affective domain, in eight countries?
- ➔ Does the study have a significant impact on the school management staff's entrepreneurship-related learning outcomes, on the level of curricula area and country?

2 Case Study 2: JA-YE – Junior Achievement

2.1 Description of the strategy / initiative

This case study report discusses the findings of 11 evaluation and meta-analysis studies that examine the impact of JA-YE programmes on participants.

JA Worldwide® (JA-YE in Europe) is the world's largest provider of entrepreneurship education programmes. JA-YE Europe is a not-for-profit association registered in Belgium with 39 member organisations. In 2013, JA-YE Europe was active in 38 countries in broader geographical Europe, having reached 3.2 million students²⁵. Three times more students are treated by JA-YE programmes worldwide in 120 countries²⁶.

The table below shows their distribution across the EU and other European countries.

Table 2.1 JA-YE member organisations in the EU and other European countries

European Union and associated countries	Countries	No.
EU 28	Austria, Belgium (fr and nl), Bulgaria, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Poland, Portugal, Romania, Slovakia, Spain, Sweden, UK (with a specific representation on the Isle of Man)	27
Accession countries	FYROM, Iceland, Serbia, Turkey	4
EFTA	Iceland, Norway, Switzerland	3
Geographical Europe	Albania, Armenia, Moldova, Russia	4
Non-Europe	Israel	1
TOTAL		39²⁷

JA-YE member organisations in the countries offer programmes to primary, secondary and university students aiming at strengthening their financial literacy, their understanding of the business world and overall broadening their horizons regarding entrepreneurship and their role in tomorrow's economy, while teaching them about enterprise, entrepreneurship, business and economics in a practical way. The JA-YE approach is based on a progression model; the learning outcomes are spelled out across the curricula and across educational levels (EQF level).

To implement their activities, JA-YE member organisations bring the public and private sectors together to provide students in primary, secondary and higher education with high-quality education programmes. Business representatives volunteer to mentor students in shaping and establishing their mini-companies, for example, or give guest lectures at schools. Consequently, JA-YE member organisations work depends on the partnerships it builds with schools and the business community. Depending on the country, JA-YE member organisations programmes are funded by government, businesses, institutions, foundations and individuals.

The role of entrepreneurs/business representatives is of fundamental importance in the development of JA-YE member organisations programmes, since one of

²⁵ [online] Available at: <http://ja-ye.org/about-ja-ye-europe>; cited 6 May 2014.

²⁶ [online] Available at: <http://ja-ye.org/about-ja-ye-europe/ja-worldwide>; cited 6 May 2014.

²⁷ Iceland is both an EFTA and an accession country, but it was only counted once.

their goals is to *bring the real world into schools*. They act as mentors and their long-term engagement is extremely important. In the programmes that run at the university level, JA-YE member organisations stress the key role of stakeholders: all of them should be involved and engaged. The business world should be involved in these programmes as well, to ensure that the products delivered at the end of the programmes are relevant to business needs and innovative. It could also be supported that the involvement of business representatives also promotes the employability of students.

The core programmes of JA-YE member organisations²⁸ are adjusted to each education level, to better serve the needs and goals of each age group. Specific initiatives take place in Europe and beyond by JA-YE Europe, offering students broader opportunities to develop their skills and understanding in a practical way²⁹.

The most widely known programme run by JA-YE member organisations across Europe is the Company Programme. The Company Programme is implemented in cooperation with schools in secondary education and lasts for one school year. It consists of five steps.

1. Motivation and ideas: Creativity and brainstorming to generate a business idea;
2. Organising: Deciding on the name of the company and the brand, contacting the business volunteers, defining the roles and jobs in the company, and establishing the boards;
3. Shaping and establishing: Generating start-up capital, defining the product and the market, finalising the business plan, and going international;
4. Getting ready for action: Dealing with procurement and production, proceeding with sales, budgets and bookkeeping;
5. Competing and closing: Closing the company, reporting and participating in competitions.³⁰

The studies included in this report regard several JA-YE programmes (see Table 2.2), but most of them concern the Company Programme. However, despite the popularity of the programme, it is worthwhile noting that only about 10 per cent of the 10 million students reached by JA-YE member organisations worldwide take part in the mini-Company Programme.³¹

2.1.2 Measuring the impact of JA-YE programmes

Measuring the impact of its programmes is a core part of JA-YE's strategy. This is evident from the significant number of relevant studies that have taken place on a variety of programmes across the world.

Impact measurement is recognised as a means to convince policy makers and funders about the effect of the JA-YE programmes run by JA-YE member organisations and the benefits of entrepreneurship education overall.

²⁸ [online] Available at: <http://ja-yecoreprogrammes.org/index.php>; cited 6 May 2014.

²⁹ [online] Available at: <http://ja-ye.org/programmes/european-initiatives>; cited 6 May 2014.

³⁰ Making an impact: Annual Report 2013. JA-YE Europe.

³¹ As stated in an interview undertaken by ICF International in April 2014.

Young Enterprise, UK³²

The key drivers of the 'Impact 50 years of Young Enterprise' publication were the promotion of the charity's work and giving leverage to entrepreneurship education. This shaped the way the results were presented and the focus on case studies and qualitative results. This was considered more appropriate to further engage all relevant actors, such as schools, teachers, funders and practitioners.

2.2 Results of the impact measurement

The studies analysed in this report address different JA-YE programmes carried out by national organisations. As mentioned above, the Company Programme is the one most frequently addressed (see the table below).

The table below shows their distribution across the EU and other countries.

Table 2.2 JA-YE studies reviewed in this case study report

Study	JA-YE programmes addressed	Organisation	Link
1. Making an impact. Assessing Junior Achievement of Canada's value creation (2011)	All programmes	Junior Achievement Canada	https://www.jaworldwide.org/inside-ja/Reports/2011%20Making%20an%20Impact%20JA%20Canada.pdf
2. Practice makes perfect? A longitudinal investigation of Junior Achievement Sweden alumni and their entrepreneurial careers, 1990-2007	Company Programme	Junior Achievement Sweden	https://www.jaworldwide.org/inside-ja/Reports/Swedish%20Evaluation.pdf
3. The effects of education and training in entrepreneurship – A long-term study of JA Sweden alumni labour potential and business enterprise	Company Programme	Junior Achievement Sweden	http://ratio.se/media/205370/effekter_av_utbildning_i_entrepren%C3%B6rskap.pdf (in SE) ³³
4. Giovani, economia e spirito imprenditoriale [Youth, economy and entrepreneurial spirit]	Company Programme (Impresa in azione)	Junior Achievement Italy	http://www.jaitalia.org/images/Ricerca%20Giovani,%20economia%20e%20spirito%20imprenditoriale.pdf
5. Impact. 50 Years of Young Enterprise	All the programmes: Company Programme (67%), Graduate Enterprise (18%), Other (11%), Do not remember (4%)	Young Enterprise UK	http://www.young-enterprise.org.uk/resources/50th/50thBook.pdf
6. Junior Achievement Ireland. Enterprise Challenge programme 2010/2011. National Evaluation Report (2011)	Enterprise Challenge	Junior Achievement Ireland	No link available

³² As stated in an interview by a representative of YE UK.

³³ An English version can be found here: <http://www.tesguide.eu/policy-strategy/itemid/33352/>

7. Experiences from participation in JA-YE Company Programmes. What experience did participants in Company Programmes have during their time as company founders – and what happened next? (2007)	Company Programme	Countries involved: Belgium, Denmark, Estonia, Finland, Norway, Romania, Slovak Republic.	http://old.ja-ye.org/Download/Experiences%20from%20participation%20in%20JA-YE%20Company%20Programmes.pdf
8. Business skills. A survey of JA-YE Participants	JA Titan, Company Programme, JA Economics	Countries involved: Poland, Czech Republic, Romania, Slovak Republic, Bulgaria, Belgium, Spain, Lithuania, other countries	http://old.ja-ye.org/Download/business_survey_final.pdf
9. Financial literacy. A survey of JA-YE participants	JA Banks in Action, Company Programme, JA Economics	Poland, Slovak Republic, Romania, Bulgaria, Czech Republic, United Kingdom, Ireland, other countries	http://old.ja-ye.org/Download/financial_survey.pdf
10. Junior Achievement USA: a solution to increasing graduation rates	All the programmes	Junior Achievement USA	https://www.juniorachievement.org/documents/20009/84285/2011-JA-USA-A-Solution-to-Increasing-Graduation-Rates.pdf/7d732c0a-4d7f-4a73-896f-2dc94dd9a8d3
11. JA Graduation Pathways	All the programmes	Junior Achievement USA	http://www.ja.org/files/white_papers/JA-Graduation-Pathways-2011.pdf

Source: ICF International research

The studies include different countries where the programmes offered by the national organisation have a diverse rate of penetration. For instance, in the UK, the Nordic countries, and Canada, JA-YE programmes have been implemented for many years and have reached an important number of students. According to the reports, in the UK it has reached 3.8 million people from 4 to 25 years old in the last 50 years; in Canada, around 2.5 million also in a period of 50 years; and in Sweden 166,606 persons participated only in the Company Programme during high school between 1980 and 2009. For Sweden (as for Norway), that would mean a penetration rate of up to 20 per cent.³⁴ Other countries have implemented the programmes more recently and therefore have more modest levels of participation. This is the case of Italy where the Company Programme started in 2002 and reached around 6,000 students from 2002 to 2007.

The studies analysed in this report provide abundant information on **immediate results** (e.g. learning outcomes, increased engagement, intention to start

³⁴ As stated in interview with ICF International.

businesses) and **intermediate outcomes** (e.g. enhanced employability, better earnings, higher rate of start-up businesses). Some studies also provide **evidence of global impact, namely on economic growth**, and the inputs/activities are also addressed. The following subsections describe the most significant findings.

JA-YE programmes apply innovative approaches to teaching by connecting what is learnt in the classroom to the outside world (inputs/activities): perceptions of participants

- ➔ The study, 'Junior Achievement USA: A solution to increasing graduation rates,' examines how JA addresses the connection between what students learn in the classroom and how it can be applied in the outside world. It mentions the following findings from nationwide evaluations of JA:
 - 91 per cent of teachers and volunteers agreed or strongly agreed that Junior Achievement programmes connect what is learned in the classroom to the outside world.
 - More than eight out of 10 (84 per cent) of Junior Achievement (JA) alumni indicated that the programmes allowed them to link what they learned in the classroom to real life.
 - Three quarters (76 per cent) of teachers and volunteers agreed or strongly agreed that JA better prepares students for the world of work.
 - More than 8 out of 10 of high school students who recently participated in JA programmes reported that the Junior Achievement programme better equipped them for the future.
- ➔ According to the study, 'Business skills. A survey of JA-YE Participants,' on average, about 60 per cent of students agreed (or strongly agreed) with the following statements: 'The JA-YE programme connected very well the classroom with real life'; and 'The JA-YE programme required me to take control of my own learning process.'
- ➔ The study, 'Financial literacy. A survey of JA-YE participants,' demonstrates that about two thirds of the students agreed/strongly agreed with the previous statements.

JA-YE programmes contribute to the development of entrepreneurial knowledge and skills (immediate results – entrepreneurial learning outcomes)

Several studies have analysed the level of economic and business knowledge and skills, as well as the level of other more transversal skills, of JA-YE participants:

- ➔ The study, 'Making an impact. Assessing Junior Achievement of Canada's valued creation,' highlights that:
 - More than 80 per cent of the alumni regard JA as important in developing their analytical capabilities and business sense.
 - More than 70 per cent cite JA as significantly impacting the advancement of their financial literacy skills and budgeting.
 - Over 80 per cent regard that their JA experience was important in strengthening their self-confidence and developing communication, decision making, interpersonal, leadership and problem solving skills.
- ➔ The study, '*Giovani, economia e spirit imprenditoriale*' (Youth, economy and entrepreneurial spirit), finds that:
 - 83 per cent of participants consider that the programme contributed to developing team work skills.

- ➔ The UK study, 'Impact. 50 Years of Young Enterprise,' reports that alumni claimed Young Enterprise improved their ability to: achieve objectives, cope with problems, deal with change, do business planning, start-up a company, build business relationships and networks, innovate, spot opportunities and evaluate ideas.
- ➔ The study, 'Junior Achievement Ireland. Enterprise Challenge programme 2010/2011. National Evaluation Report,' finds that after the Enterprise Challenge programme:
 - 95 per cent of primary students understood how to best advertise a new business;
 - three quarters of second-level students could correctly recognise the most appropriate behaviour for interviews;
 - 87 per cent of primary students and 65 per cent of second-level students could correctly recognise the characteristics that employers regard as important and seek in their employees; and
 - 87 per cent of primary students and 73 per cent of secondary students understood the purpose of a CV.
- ➔ The study, 'Experiences from participation in JA-YE Company Programmes. What experience did participants in Company Programmes have during their time as company founders – and what happened next?' highlights that:
 - The majority of former participants find the Company Programme useful with regard to the development of entrepreneurial skills.
 - 70 per cent of participants stated that the Company Programme had strengthened their team work skills.
 - Two thirds of participants claimed that their problem-solving skills were increased.
 - Half (52 per cent) of participants believed that their decision-making abilities had improved.
 - Two thirds of participants stated that the Company Programme had strengthened their ability in economic thinking.
 - More than half (55 per cent) felt that their qualification to run a business had improved.
 - Participants from Estonia and Slovakia evaluated more positively than the average participant, the usefulness of the Company Programme regarding the acquisition of entrepreneurial skills.
- ➔ The study, 'Business skills. A survey of JA-YE Participants,' discusses the results of students participating in JA programmes in a test with questions on business and economic concepts and business skills:
 - On average, the respondents replied correctly to 56.2 per cent of the questions.
 - The three JA-YE programmes (JA Titan Classroom, Company Programme and JA Economics) that participants attended seem to have led to similar learning effects.
 - The performance of students was found to increase along with the number of JA programmes they have participated in.
 - The multiplying effect of more than one JA programmes/related initiatives is also demonstrated by the fact that students perform better when they participate in a JA Titan programme, a JA Titan national competition or the European competition, similarly to the effect of a combination of JA

Titan with other JA-YE programmes or of a combination of two or more JA-YE programmes.

- Students from Lithuania and Bulgaria achieved the highest scores, whilst the lowest scores are from the Slovak students.
- ➔ The same study also used a number of questions measuring students' perceptions of the programmes and their impact. Regarding learning outcomes, students claimed that the programmes had an impact on:
 - Their skills development, especially 'how to manage money,' but also communication and team work skills, how to run a company, decision-making skills, planning and organisation skills. Students also indicated that, they overall felt better prepared for the future.
 - Providing a more thorough understanding of and insight into certain business, financial and economic topics (namely marketing and the market economy) and what is needed to start a company. Students also indicated that they better understood the importance of certain aspects of business life (e.g. strategy and leadership) and the attitudes needed (e.g. perseverance and being responsible).
 - Around two thirds (between 57 per cent and 68 per cent) of students agreed/strongly agreed that their participation in JA-YE programmes contributed to the development of their business and life skills. Interestingly enough, students' test scores seemed to be linked to their level of agreement with the statement: 'Participation in JA-YE programmes has given me a very good insight into what business is all about' (68 per cent average agreement).
- ➔ The study, 'Financial literacy. A survey of JA-YE participants,' used a similar methodology to the previous study and found that:
 - On average, respondents correctly answered 62.8 per cent of the questions.
 - The impact on students is stronger when programmes combine a theoretical and a practical approach. This is supported by the fact that students in 'Banks in Action' (participating in both the classroom experience and competition) scored the highest (79 per cent of correct questions) while students in JA Economics alone scored the lowest (57 per cent of correct questions).
 - Students' performance is found to be very good when they have participated in two or more JA-YE programmes.
 - Country differences are observed, as students from the Czech Republic and Bulgaria achieved the highest scores. The opposite holds for students from Ireland and the Slovak Republic.
 - 70.5 per cent of the students understand the key influence of education and skills on their future income.
 - 80.2 per cent of the students agree that the primary sources of income for most people aged 20-35 are salaries and wages. Forty-three per cent identified the type of income created over time through savings and compound interest.
 - Most of the students (73.6 per cent) understood what drives prices in a competitive marketplace (supply and demand) and more than half (58.3 per cent) understood that inflation is the most significant impacting factor on people's purchasing power.
 - 73.3 per cent are familiar with the use of ATM cards and aware of the cost of such services.

- 74.5 per cent found it easy to understand basic money management (budgeting to save a certain amount of money).
- About two thirds of the students correctly identified the possible impact of currency fluctuations on commodity prices and international trade (rising cost of exports for example).
- The relationship between wages and productivity was well understood by students. About 65 per cent correctly identified that an increase in productivity will most likely improve the wages of European workers.
- However, almost two fifths of students surveyed had a realistic understanding of how credit markets work and which type of loans and lenders are likely to cost less.
- Less than half of students seemed to grasp the concept of short and long-term investment strategies.
- Between 62 per cent and 71 per cent of students agreed/strongly agreed with the statements: participation 'has given me a very good insight into what business is all about'; 'taught me very well how to manage my money'; 'has improved considerably my problem-solving capacities'; and 'helped me to prepare for the future.' The most frequently mentioned learning effect was 'how to manage money.'

The impact of JA-YE programmes on school attainment is not clear, but there is evidence of their contribution to increased engagement (immediate results)

- ➔ The Swedish study, 'The effects of education and training in entrepreneurship,' reports mixed results about education attainment:
- JA Sweden alumni had relatively lower average grades in upper secondary school than the control group. The difference is small, yet statistically significant³⁵.
- JA alumni are more likely to begin university level programmes in comparison to the control group (60.7 per cent versus 55.7 per cent). However, the differences are smaller when it comes to completing university programmes (41.1 per cent compared to 40.3 per cent).

The impact of JA-YE programmes on school engagement has been more widely documented by studies. Moreover, some of the findings point to a greater intention to pursue further studies among participants in these programmes, in comparison to other students:

- ➔ The study, 'Making an impact. Assessing Junior Achievement of Canada's valued creation,' mentions that around 65 per cent of the alumni claim that JA had a significant impact on them on staying in high school and enrolling in post-secondary education.
- ➔ The study, 'Junior Achievement Ireland. Enterprise Challenge programme 2010/2011. National Evaluation Report,' finds that, after the programme:
- 90 per cent of primary students and 78 per cent of second-level students believed that it is more difficult to get a job when you leave school without your Leaving Certificate;
- 94 per cent of primary students and 98 per cent of second-level students plan to get both the Junior Certificate and Leaving Certificate;
- 93 per cent of both primary and second-level students were interested in attending a university or college after completing the project.

³⁵ At the 5 per cent level.

- ➔ The study, 'Business skills. A survey of JA-YE participants,' finds that, on average, about 60 per cent of students agreed/strongly agreed with the following statements: 'JA-YE programme facilitated a better relationship with my teachers' and 'The JA-YE programme made school much more interesting for me.'
- ➔ The study, 'Financial literacy. A survey of JA-YE participants,' finds that about two thirds of the students agreed/strongly agreed with the previous statements.
- ➔ According to the results of 'Junior Achievement USA: A solution to increasing graduation rates' study:
 - 75 per cent of teachers and volunteers agree/strongly agree that JA programmes help students' appreciate the importance of staying in school;
 - In recent high school programme evaluations, an average of 8 out of 10 students report that JA programs strengthened their understanding of the importance of staying in school;
 - 67 per cent of JA alumni report that JA made them realise the importance of staying in school;
 - Longitudinal studies found that JA students were significantly more likely than their peers to be certain that they would graduate from high school, continue to post-secondary education and graduate from college.

JA-YE programmes contribute to an increased interest and change in attitudes about business and entrepreneurship (immediate results)

- ➔ The study, 'Making an impact. Assessing Junior Achievement of Canada's valued creation,' observes that about 65 per cent of the alumni indicate that JA had significant impact on their choice to further study and follow a career in business.
- ➔ The study, 'Business skills. A survey of JA-YE Participants,' finds that:
 - 72 per cent of the participants in JA-YE programmes agreed (or even strongly agreed) with the statement 'Participation in JA-YE programmes was fun and exciting.'
 - 75 per cent agreed with the statement 'Participation in JA-YE programmes provided a considerable challenge to me.'
 - Almost one third (27 per cent) of students claimed the programme made them change their plans for the future. About half of those students anticipated that they would take a different career path. Twenty-five per cent had become interested in/eager to launch their own business later. About 10 per cent had a clearer view about the type of profession they wanted to follow and another 15 per cent stated they would pursue a career in business. Changes in future plans included following higher education studies for 40 per cent of the students. One third of the latter group of students intends to study business or economics at a university or other higher education institutions.
- ➔ The study, 'Financial literacy. A survey of JA-YE participants,' observes similar percentages:
 - 73 per cent of the participants in JA-YE programmes agreed/strongly agreed with the statement 'Participation in JA-YE programmes was fun and exciting.'
 - 79 per cent agreed with the statement 'Participation in JA-YE programmes provided a considerable challenge to me.'

- One third (33 per cent) of students claimed they had changed their plans for the future. The change included a new career path for almost 40 per cent of them, including 12 per cent of aspiring entrepreneurs and 14 per cent who stated they will follow a career in banking. Another 40 per cent of those that declared their future plans had changed were now aiming at higher education studies, with about 25 per cent of them aspiring to study business or economics at university/other higher education institutions.

JA-YE programmes contribute to the engagement in projects (immediate results)

- The study, 'Experiences from participation in JA-YE Company Programmes. What experience did participants in Company Programmes have during their time as company founders – and what happened next?' observes that:
 - 15 per cent of the former Company Programme participants between 20 and 29 years old had started their own businesses.
 - 85 per cent of the JA-YE students were still running their company.

JA-YE programmes contribute to the intention to start businesses (immediate results)

- In the study, 'Making an impact. Assessing Junior Achievement of Canada's valued creation,' around 70 per cent of alumni surveyed indicated that JA had a significant impact on their desire to be an entrepreneur or launch their own business.
- The study, '*Giovani, economia e spirit imprenditoriale*' (Youth, economy and entrepreneurial spirit), observed that 56 per cent of participants and 47 per cent of non-participants stated their interest in running their own business.
- According to the study, 'Experiences from participation in JA-YE Company Programmes. What experience did participants in Company Programmes have during their time as company founders – and what happened next?,' 36 per cent plan to establish a business within the next three years and almost half (44 per cent) stated that the Company Programme involvement reinforced their will to establish a business.
- The study, 'Business skills. A survey of JA-YE Participants,' finds that almost one third of students responded that their future plans had changed. About half of those who indicated that their plans had changed, envisioned a different career path from which they had originally planned. Twenty-five per cent had become interested in starting their own business later.
- The study, 'Financial literacy. A survey of JA-YE participants,' observes similar percentages: 33 per cent of students responded that they had changed their plans for the future and 12 per cent of these students had decided to start their own business in the future.

JA-YE alumni show better capacities for self-employment and start-up and venture creation (intermediate outcomes)

- According to the study 'Impact. 50 Years of Young Enterprise':
 - The proportion of Young Enterprise alumni firms that are limited companies (42 per cent) is much higher than the 'typical small company in the UK' (27.7 per cent) and the control group (23 per cent). According to researchers, this may be related to the Young Enterprise training, as alumni could have developed a better understanding of how to 'protect themselves against risk' from the training. However, this *conceptual link*

cannot be supported by evidence and should be regarded as a possible explanation of the research authors.

- Young Enterprise alumni entrepreneurs were asked how they deal with the economic crisis. Almost half (49.6 per cent) identified increasing sales as their main business objective and one third were developing new products or services to 'make things better for their customers.' These attitudes underline that a significant portion of alumni entrepreneurs are resilient to the crisis and are responding to it with expansions and improvements in their products. There were, however, alumni with more reserved attitudes towards the crisis (6.5 per cent) aimed at maintaining sales' volume and 5 per cent believed more efficiency (interpreted as internal cuts) would bring a solution to the adverse crisis effects.
- Alumni are more likely to be serial entrepreneurs than the control group. This tendency can be supported by the fact that the alumni seem to be less deterred by the prospect of failure than the control group.

JA-YE alumni show a higher rate of start-up or venture creation (intermediate outcomes)

- ➔ The Swedish study, 'Practice makes perfect?,' finds that:
 - 4.8 per cent of the JA-YE alumni (versus 3.8 per cent of the control group) were active as full-time entrepreneurs during any of the years 1986-2008.
 - JA Sweden alumni are much more likely to start *more ambitious firms* (interpreted as corporations versus proprietorships or partnerships). The rate of those starting a corporation differs significantly between JA Sweden alumni and the control group. Male JA Sweden alumni are 60 percentage points more likely than the males of the control group to engage in entrepreneurship by starting a corporate firm; female JA Sweden alumni are 80 per cent more likely than the females of the control group.
 - Female JA Company Program (JACP) alumni were significantly more likely than other women to engage in entrepreneurship as adults, especially regarding starting corporations.
- ➔ According to the Swedish study, 'The effects of education and training in entrepreneurship,' participation in JACP increases the probability that an individual will start a firm later in life by at least 20 per cent.
- ➔ The study, 'Making an impact. Assessing Junior Achievement of Canada's valued creation,' finds that alumni are 50 per cent more likely to start their own business.
- ➔ According to the study, 'Impact. 50 Years of Young Enterprise,' 42 per cent of alumni surveyed started firms compared to 26 per cent in the control group of non-alumni.
- ➔ According to the study 'Experiences from participation in JA-YE Company Programmes - What experience did participants in Company Programmes have during their time as company founders – and what happened next?' by the time they are 25 years old, alumni demonstrate higher start-up rates (15 per cent) than the average population in Europe (5-6 per cent).

There is some evidence that supports that JA-YE alumni have higher employment rates and more often hold management positions; however, results from all JA-YE studies are mixed (intermediate outcomes)

- ➔ The Canadian study, 'Making an impact,' finds that:
 - Alumni are three times more likely than the control group to hold senior and middle management positions.

- Alumni are 25 per cent less likely to be unemployed than individuals in the control group.
- ➔ The Swedish study, 'The effects of education and training in entrepreneurship,' observes that:
 - JA alumni are more likely to become managers: 7.4 per cent of JA Sweden alumni were found to be managers 16 years after secondary school, versus 5.1 per cent for the control group. This means that, JA Sweden alumni had a 44 per cent higher probability of becoming managers than the control group.
 - The share of those who are 'weakly established' in the labour market³⁶ is lower among JA Sweden alumni than the control group. In 2010, almost 10 per cent of JA Sweden alumni and 12 per cent of the control group were 'weakly established.' The probability of a weak establishment was therefore 12 per cent lower for alumni compared to the control group.
 - The mean number of days of unemployment is lower for alumni than for the control group, while the difference was statistically significant³⁷. In 2010, the mean number of these days was 7.9 for alumni and 10.1 for the control group. JA Sweden alumni were more than 20 per cent less likely to be unemployed than the control group.
- ➔ On the other hand, the study, 'Experiences from participation in JA-YE Company Programmes. What experience did participants in Company Programmes have during their time as company founders – and what happened next?,' does not find strong support regarding differences in the employment levels³⁸ of former participants in JA-YE programmes relevant to other young people.

JA-YE alumni have higher income (intermediate outcomes)

- ➔ According to the Canadian study, 'Making an impact,' the average income of alumni is 50 per cent higher than that of the control group.
- ➔ The study, 'The effects of education and training in entrepreneurship,' finds that in 2010, JA Sweden alumni earned higher income as employees compared to the control group; JA Sweden alumni enjoyed, on average, 35,700 Swedish kronor (SEK), or 12 per cent higher annual income than the control group. So, there was a difference of more than an average monthly salary.

There is evidence that indicates that JA-YE alumni launch companies which create more jobs, generate more profit and involve more innovative sectors than the relevant control groups. However, the analysis on the survival of firms has produced mixed findings (intermediate outcomes)

As for the productivity and innovation of businesses:

- ➔ The Swedish study, 'Practice makes perfect?,' finds that the firms started by JA Sweden alumni led to more job creation and generated more revenues:
 - The mean size of firms started by alumni as sole proprietorships or partnerships is two employees, and the mean size of corporations started by JA Sweden alumni is nine employees. Both figures are significantly

³⁶ Defined as an individual whose income is below a limit of income calculated by Statistics Sweden.

³⁷ On the 1 per cent level.

³⁸ Based on Eurostat employment rates.

larger than the overall mean size of new firms in the Swedish economy in terms of employment.

- Job creation is higher among the firms started by JA Sweden alumni than in the control group, both for corporations and proprietorships/partnerships. According to the results from the first four years of research, alumni-founded corporations are on average 7.5 per cent larger in terms of job creation, than the ones in the control group. The respective difference for proprietorships/partnerships is again in favour of JA alumni and reaches 3.5 per cent.
- The revenues of alumni-funded corporations are on average 20 per cent higher than comparable firms of the control group. The same holds true for proprietorships/partnership firms (6 per cent higher for the JA alumni).
- ➔ The study, 'Impact. 50 Years of Young Enterprise,' compared the alumni firms to the 'typical small firm in Britain,' as defined by national statistics. It found that:
 - Regarding sectors, the typical small firm in Britain is in construction, has no or few employees and a modest turnover. On the contrary, Young Enterprise alumni firms are active in more creative and technologically advanced sectors; for example, digital businesses such as 'cloud' computing services (21.2 per cent), consultancy (18.6 per cent) and other high-tech sectors including advanced engineering (10.3 per cent), product development, and environmental technologies. Alumni firms were also found in '*fashionable 'retro' heritage tourism*'; oil and gas exploration; the manufacture of polymers for corrosion control; advertising agencies; design consultancies; internet sales and importers of various goods. Exploring characteristics of the control group, businesses highlight that the majority of the latter are active in fewer sectors, such as healthcare and education (18 per cent), advertising, design and recruitment (9 per cent), hotels and tourism (7 per cent) and engineering (5 Per cent). So, they are overall less diverse in comparison to alumni-led firms.
 - Alumni firms are found to be more likely to create more jobs than those of the control group. Eleven per cent of the alumni firms have 51-99 employees compared to 9 per cent of the control group. Large corporations in terms of employment (100-249 employees, represented only 2 per cent of the alumni-led firms, however there is no such firm in the control group.
 - Young Enterprise alumni firms enjoy a higher turnover than the control group. Twelve per cent of them have a turnover greater than £500,000, versus 3 per cent in the control group; 3per cent of Young Enterprise businesses have a turnover of more than £1m, when no company of the control group has achieved this.

Regarding the survival of businesses:

- ➔ The study, 'Making an impact,' finds that JA alumni firms usually have greater longevity than the average Canadian new venture.
- ➔ On the other hand, the 'Practice makes perfect?' study, found similar patterns regarding the survival of firms started by educated persons in Sweden as well as internationally. Less than half of the JA Sweden alumni firms survive five years or longer. These firms have slightly higher survival rates than the control group, but the year-to-year differences between the two groups are small (from one to three percentage points).
- ➔ Again regarding Sweden, 'The effects of education and training in entrepreneurship' study results demonstrate that participation in the JA

Company Programme had marginal impact on the survival of the alumni-created firm. According to the authors, the observed lack of impact of JA programmes on the survival of businesses could be explained by the fact that alumni have a higher probability of attaining a good salary and managerial position as employees, compared to the control group. They would thus have a somewhat greater tendency than the control group to terminate their firms and choose a career as employees, even if these firms tend to be more successful than those of the control group.

There are estimations of a positive global impact of JA-YE programmes on the economy and society (global impacts)

- The Canadian study, 'Making an impact,' calculates that:
 - JA delivers value through improving participants' level of completed education. The authors calculate a total annual impact directly attributable to JA of C\$105,000,000. This is based on the number of alumni who indicated that JA was the driving force behind the decision to have completed various levels and types of education.
 - The authors determine an annual impact of C\$425M based on the number of JA alumni who cite JA as the driving force behind their decision to start a business, versus the general population, and all associated jobs created.
 - The authors use an interesting methodological approach to calculate the return on investment from JA Canada. The calculations take into account effects on participants as well as what could be regarded as opportunity costs that are avoided due to positive career choices and developments of participants: students kept in high school, post-secondary students enrolled, students studying business, direct jobs created, indirect jobs, additional job equivalents³⁹ and likeliness to collect social assistance. According to the approach, JA creates an annual return of 45:1 in terms of societal prosperity for every dollar spent in JA. As it includes elements that are apt to the labour market, education and social policy, calculations used data from relevant national sources.
- The impact on the economy and society is also measured by the, 'Impact. 50 Years of Young Enterprise' study. Economic impact is perceived as the number of start-ups created by alumni: but also the skills that participants develop, which promote their employability. Regarding societal effects, they are contextually linked to the destination of participants; in other words, it was examined whether participants were less likely to be unemployed or not in education or training⁴⁰.

2.3 Methodology of measurement

As the studies had different target groups, timelines and objectives, variances can be found between the methodologies used. The table following summarises the information on the methodologies applied by the JA-YE studies and their key characteristics. Four of the studies were carried out by the JA-YE regional or national centres themselves. Others were commissioned by JA-YE and carried out by university departments, research centres or consultancies. Some of the reports on the studies have a clear dissemination purpose to inform the general public about the JA-YE programmes and their results (reports 5, 8, 9, 10, 11 in the table), while others are more of an academic nature or regard evaluation

³⁹ According to the authors, JA companies last 30 per cent longer than the average Canadian company resulting in the equivalent of an additional 2,500 jobs created.

⁴⁰ As stated by an interviewee from Young Enterprise UK.

reports to be mainly used internally (1, 2, 3, 4, 6, 7). The latter group of studies include more methodological details.

The tools more frequently used include surveys and questionnaires; in some cases, interviews and focus groups were also used. The two studies from the United States present secondary data based on the findings of research on the topic. The two studies from Sweden apply a methodology based on the comparison of data from the JA-YE alumni database and official databases on labour market activities and enterprise information. These two studies include very big samples, of 387,726 and 224,838, including both treatment and control groups. The rest of the studies have used more modest sample sizes that better adjust to the running of individual questionnaires or surveys. In the studies that include a control group, the experimental groups included from 371 to 500 individuals. In the studies that do not include a control group, the smaller sample consisted of 336 participants and the biggest 2,943.

Table 2.3 Methodology used in JA-YE impact measurement studies⁴¹

Title of the study	Commissioned by	Carried out by	Methodology used
1. Making an impact. Assessing Junior Achievement of Canada's valued creation (2011)	Junior Achievement of Canada	Boston Consulting Group James Tucker	Sample: 500 'Achievers' and 4,500 Canadian without a JA experience (control group) Methodological tools: Qualitative interviews and quantitative survey: qualitative interviews with stakeholders were used to test emerging hypotheses; after this, a quantitative survey was executed. Descriptive statistics: analysis of percentages. A specific methodology is used to measure the 'value creation' and 'return on investment.'
2. Practice makes perfect? A longitudinal investigation of Junior Achievement Sweden alumni and their entrepreneurial careers, 1990-2007	Junior Achievement Sweden-	Karl Wennberg. Centre for Entrepreneurship and Business Creation at Stockholm School of Economics	Sample: 166,606 persons who participated in the 'JA company programme' during high school 1980-2009; control group of 221,120 individuals. Methodological tools: The study compares Junior Achievement Sweden's anonymous register of alumni with Statistics Sweden's register on individual's labour market activities and enterprise information.
3. The effects of education and training in entrepreneurship – A long-term study of JA Sweden alumni labour potential and business enterprise	Junior Achievement Sweden	Karl Wennberg & Niklas Elert. RATIO.	Sample: 10,103 alumni from 1994, 1995 and 1996; control group: 214,735 non-alumni Methodological tools: The study uses data from the Statistic Sweden's database LISA, the Statistic Sweden's database Enterprises and Employees, and the JA Sweden's anonymous database. It applies a matching procedure (propensity score matching) to remove the bias due to self-selection (matching JA Sweden alumni with comparable people who are not JA Sweden alumni to be able to make a correct inference).
4. <i>Giovani, economia e spirito imprenditoriale</i> [Youth, economy and entrepreneurial spirit]	Junior Achievement Italia	Istituto IARD	Sample: 471 upper secondary students who had participated in the programme 'Companies in action' and 452 students who had not (control group). Methodological tools: Structured questionnaire. Descriptive statistics were used to compare percentages of participants and the control group.
5. Impact. 50 Years of Young Enterprise	Young Enterprise UK	Kingston University London – Business School. Team led by Rosemary Athayde.	Sample: 371 Young Enterprise alumni and 202 people in a comparable control group. Methodological tools: Three on-line surveys; focus group meetings; face-to-face and telephone interviews. Quantitative and qualitative techniques used.

⁴¹ The information in this table is based on the documents referred. Several of these documents only present simple statistical information, e.g. percentages. It is possible that further analyses were carried out by the authors but not included in the reports since most of these are not academic articles, but rather more disseminative in nature.

6. Junior Achievement Ireland. Enterprise Challenge programme 2010/2011. National Evaluation Report (2011)	Pobal (organisation with charitable status)	Junior Achievement Ireland	<p>Sample: 336 participants (pre-programme) and 341 (post-programme) from a total population of 369.</p> <p>Methodological tools: Short questionnaire comprising a series of multiple choice questions and opinion or comment questions. A combination of qualitative and quantitative information was gathered pre- and post-programme.</p>
7. Experiences from participation in JA-YE Company Programmes. What experience did participants in Company Programmes have during their time as company founders – and what happened next? (2007)	Junior Achievement – Young Enterprise Europe	Vegard Johansen Eastern Norway Research Institute	<p>Sample: former programme participants from six European countries (BE, DK, EE, FI, RO and SK). Due to low rates of response in DK and RO, the analysis only includes BE, EE, FI and SK, with a net sample of 675. The analysis also includes 563 participants in two Norwegian studies conducted in 2005 and 2006.</p> <p>Methodological tools: Quantitative study. Internet-based questionnaires were used. Analysis of percentages: compared to data available on the general population. Statistics are used to analyse what is affecting participants' perceived usefulness and satisfaction with the programme. When assessing the likeliness to become an entrepreneur, a control mechanism is used to control for self-selection bias (based on a variable on the motivation to take part in the programme). Explanatory factors are sought regarding entrepreneurial activity (gender, age, reason for participation, educational attainment, and countries).</p>
8. Business skills. A survey of JA-YE Participants	Junior Achievement – Young Enterprise Europe	Junior Achievement – Young Enterprise Europe	<p>Sample: 2,335 secondary school students from 15 European countries.</p> <p>Methodological tools: Survey with two parts: (1) test with questions about business concepts, business skills, economic concepts; and (2) questions measuring the perceptions about the programmes and the effects and impact of the programmes on them. Descriptive statistics and analysis of percentages included.</p>
9. Financial literacy. A survey of JA-YE participants	Junior Achievement – Young Enterprise Europe and Citi Foundation	Junior Achievement – Young Enterprise Europe	<p>Sample: 2,943 secondary school students from 12 European countries.</p> <p>Methodological tools: Survey with two parts: (1) test with questions about financial concepts and skills; and (2) perceptions about the programmes</p> <p>Descriptive statistics. Analysis of percentages.</p>
10. Junior Achievement USA: a solution to increasing graduation rates	Junior Achievement USA	Junior Achievement USA	<p>Methodology: literature review</p> <p>It refers to the results of: 'Program content & instruction survey,' 'Junior Achievement creates alumni success,' 'Synthesis of independent evaluation findings from 2000-2009,' and '2001-2003 Longitudinal findings.' From the examples given, it is not clear if these studies included control groups or other control mechanisms.</p>
11. JA Graduation Pathways	Junior Achievement USA	Bridgespan Group	<p>Methodology: In-depth, meta-analysis of research studies to identify the indicators more closely linked to graduation from high school; review of JA's programme portfolio (in the USA); and interviews with volunteers, JA staff, board members, and educators.</p>

As reflected in the previous table, seven out of the eleven studies use questionnaires or surveys. From these, four collected data from participants' self-assessment:

- ➔ In the Canadian study, 'Making an impact,' respondents were asked about outcomes, but also about the effect of JA programmes on their actions and decisions. The following questions are presented as examples:
 - Do you own your own business?
 - Was JA critical in developing your ability and desire to open your own business?
- ➔ In the Italian study, 'Youth, economy and entrepreneurial spirit,' the questionnaire used looked into the respondents' views on school, their values, trust in others and in institutions, personal and professional future perspectives, representations of the labour market and entrepreneurial initiative, the propensity for self-employment, and their evaluation of the Company Programme (for those who took part in it). The following are some examples of the questions posed:
 - On the skills learned: learning the ability to work in a team, understanding how a company works, improve communication skills, etc.
 - Thinking in a few years' time, by when you will have finished your studies and entered the labour market, how do you imagine yourself? Examples of proposed responses: I will be a self-employed person (entrepreneur free professional, craftsman...), I will be an employee, I will get a permanent job, I will be a flexible worker, etc.
- ➔ In the UK study, 'Impact. 50 Years of Young Enterprise,' respondents were asked about demographic characteristics, their current occupations, the type of business they run (legal status, sector, number of employees, and turnover) and their perceptions of the impact of Young Enterprise programmes. For instance, a one-to-five scale was used to ask respondents if the programmes had had an impact on the following business knowledge and skills:
 - improved my ability to achieve my objectives,
 - business start-up,
 - opportunity identification,
 - etc.
- ➔ In the study, 'Experiences from participation in JA-YE Company Programmes,' former participants were asked to evaluate what the Company Programme they took part in had meant for their own development. For instance, among other questions, they were asked:
 - What is your attitude to the following statements? Participation in the Company Programme: Strengthened my problem solving qualities, (Had) no impact on my ability to make decisions', 'Made me qualified to run a business', etc.
 - Have you started your own business after completing the company programmes? No, and I have no plan of setting up a company; No, but I would like to set up a company within three years; No, but I am in the process of setting up a company right now; and Yes, I have set up a company.

Three of the studies directly addressed skills assessment:

- ➔ In the study, 'Junior Achievement Ireland. Enterprise Challenge programme 2010/2011. National Evaluation Report,' the questionnaire measured the recall of key concepts relating to business and

employment, included questions to measure attitudes towards careers and a question seeking feedback on the programme. The following can be considered as examples:

- How best would you let customers know about your new business? Ask all your employees to work late/create an advertisement/buy new computers for the office/tell all the people on your street (primary level).
- What is the best way to achieve a long term goal? By just focusing on achieving that one goal/only after a number of short term goals have been set and achieved/by not setting any goals and hoping that opportunities will arise (secondary level).
- ➔ Both the studies, 'Business skills. A survey of JA-YE Participants' and 'Financial literacy. A survey of JA-YE participants,' included a test with questions about concepts and skills. In the first study, the test contained 21 questions in relation to business concepts, economic concepts and business skills, and in the second study it included 23 questions related to financial literacy. However, the reports do not include examples of these questions.

One of the most common critiques about impact measurement studies concerns the *self-selection bias*, i.e. it is reasonable to expect that students who choose to participate in a JA programme are more likely to become entrepreneurs, and therefore it would not be possible to attribute the change in knowledge and attitudes to the programmes. Some of the studies specifically address this limitation, for instance:

- ➔ The Canadian study, 'Making an impact,' tackles this issue by asking participants about how JA affected their outcomes. According to the report and in effort to overcome the self-selection issue, the analysis links JA programmes and outcomes only when alumni state that the programmes had an influence on their choices.
- ➔ The Swedish study, 'The effects of education and training in entrepreneurship,' applies a matching procedure to remove the bias due to self-selection, through a quasi-experimental approach called propensity score matching. It matches JA Sweden alumni with comparable individuals who are not JA Sweden alumni, using a number of background variables: sex, age, immigrant status, cohort, study business administration in upper secondary school, parents who are business owners, etc.
- ➔ The method allows finding a 'twin' for each individual that has participated in the programme. The more similar these people are with respect to characteristics that affected the probability of participating in the programme, the less of a problem there would be as regards self-selection in the estimation results.

Assessing the quality of the methodologies used, it can be supported that studies 1 to 5 (Table 1 of this case study) can be considered of high quality, as control groups are used and treatment and control groups are matched on key variables. The lack of control groups in other studies (such as studies 6 and 7) can be considered as an area for improvement. However, study 6 includes pre- and post-programme measurements, and study 7 applies control mechanisms in the analysis of the data. The results of studies 8 and 9 could be further strengthened if control groups or any other control mechanisms were included.

In the other two studies, there is not enough information in the reports to assess the methodology used. The report, 'Junior Achievement USA: a solution to increasing graduation rates,' mentions the results of other studies that assessed the impact of JA programmes, but does not give details on the methodologies used. From the information given, control groups or other control mechanisms

are not included. Findings seem to be based on self-report of the beliefs of participants about the impact of the programmes⁴².

Driven by the issue of school drop-outs, the study 'JA Graduation Pathways' regards a meta-analysis of research studies that aimed at identifying the indicators more closely linked to supporting the graduation of students from high school. At the same time, the JA programmes available in the USA were reviewed, to identify those programmes that could have the most significant impact on those indicators. As it does not assess the effects of a specific programme, this study is not an evaluation and so is not expected to include methodological elements of evaluations. More information could have been provided though, regarding the specific JA programmes analysed and the research studies that were reviewed, the criteria based on which these studies were selected, etc.

The methodologies used in the studies bear differences: some are more advanced and complicated than others and some include larger samples and regard different age groups. Areas of improvement could be stressed for most of them. However, it should be noted that not all studies offer detailed information on the methodologies used, how control groups were constructed, if and how they were matched with participants, etc. More evidence would offer more in-depth information on the methodology, clarify the processes used to gain results and make the results more robust.

Using the above mentioned methodologies, the surveys aim and succeed in proving the positive effects of the JA-YE programmes on participants. But besides the impact on individuals, some studies also try to prove the impact on the economy and society.

2.4 Using the results of the impact measurement

The JA-YE impact studies that are analysed in this report offer significant evidence of the positive impact of various JA-YE programmes on participants. Since these studies are publicly available, it can be expected that the results have increased the visibility of JA-YE's work, the effects of its programmes and overall highlight the benefits of entrepreneurship education regarding business creation and the development of skills that promote employability.

JA-YE representatives stress that impact measurement not only provides useful information to the organisation and allows for the improvement of the programmes, but also supports JA-YE's outreach to policy makers and private investors: especially in countries where JA-YE programmes are not well-embedded in the school curricula or supported by governmental/semi-governmental organisations, where JA-YE has to convince education authorities and schools to agree in implementing the programmes. At the same time, JA-YE has to engage the private sector in terms of funding, but also in participating in their programmes- given that entrepreneurs and other private sector representatives have an active role in many JA-YE programmes. Having impact measurements offers data-based evidence on the effectiveness and advantages of JA-YE programmes and thus, facilitates to convince authorities/schools and the business world about the importance of entrepreneurship education. Interestingly enough, impact measurement studies have brought about developments and improvements in delivered programmes and approaches.

⁴² For instance, the report indicates that, 'in recent high school program evaluations, an average of 8 out of 10 students report that Junior Achievement programs helped reinforce the importance of staying in school.'

Young Enterprise, UK: The effect of the 'Impact 50 years of Young Enterprise' study on developments in the organisation⁴³

Young Enterprise (the Charity) had identified the need for an impact measurement survey about their programmes. Budgetary and other resources constraints delayed the launch of the study. The impact report is considered a catalyst in demonstrating the importance of the Charity's work. The timing was also favourable: the report was published at the time of the financial crisis, when investors became more demanding about understanding the allocation of resources and asked for proof of success.

The impact report has also offered evidence to support the promotion of entrepreneurship education overall. Currently, the Charity is collaborating with policy consultants to push the agenda about the importance of enterprise education towards policy makers, education authorities, the media, etc. It is emphasised that entrepreneurship education does not only concern start-ups, but also skills that increase employability.

Indirectly, the results of the impact report have also contributed to other developments, as described in the following paragraphs.

The Charity is collaborating with the Confederation of British Industry (CBI)⁴⁴: CBI runs an annual Education and Skills survey⁴⁵ regarding the skills and attitudes that employers regard as important or that young people lack. The Charity collaborates with the CBI to align the content of its programmes with employers' needs and views.

Most importantly, the impact report results underlined the need to collect systematised data over time. Therefore, it indirectly triggered a longitudinal survey on the Company Programme participants: presently underway, the survey targets current Company Programme participants. The short-term impact will be measured and participants will be contacted one year after the programme. A pre- and mid-point questionnaire has already been launched and it is estimated that individuals will be tracked again in about two to three years to examine their *destination* (whether they are in employment, started a company, in further education or elsewhere) and in three to five years, to measure their contribution to the economy. The latter is defined as business start-ups, but also the employability of former participants, as entrepreneurship education is believed to contribute to both.

The longitudinal survey bears the challenge of tracking participants in the long run (e.g. consent may be needed, depending on their age; some may change e-mail addresses; etc). An Alumni Strategy is in progress, aiming at offering alumni incentives (e.g. networking possibilities) to keep in contact with the Charity, but also to develop tools that will allow for keeping in touch/tracking alumni.

Moreover, the impact report also indirectly led to the rationalisation of a number of programmes offered by the Charity: the numerous and often overlapping programmes offered across the UK from different providers were audited and the most suitable ones were selected to run in 2014-15.

⁴³ As stated in an interview by a representative of Young Enterprise, UK.

⁴⁴ [online] Available at: <http://www.cbi.org.uk/>

⁴⁵ [online] Available at: <http://www.cbi.org.uk/business-issues/education-and-skills/in-focus/education-and-skills-survey/>

2.5 Conclusions

The studies included in this case study offer significant proof of the positive impact of entrepreneurship education programmes. The studies examine and offer proof mainly of the impact on individuals, but the effects on the economy and society are also examined. Impact on individuals includes participants' perceptions of entrepreneurship, business knowledge, attitudes towards further education, etc., so they do not only consider the business element of entrepreneurship. The wide range of individual impact types examined in these studies allows policy makers and researchers to address entrepreneurship education programmes with different objectives, viewing entrepreneurship both as business creation and as a key competence. Regarding the impact on the economy and society, it is interesting to note the definitions attributed by the relevant studies. For example, the 'Impact 50 years of Young Enterprise' study defines societal impact as the direction that participants took, i.e. whether they pursued further studies, employment or entrepreneurship. Therefore, it could be claimed that this indirectly assesses the benefits for the society of lowering the rates of young people not in employment, education and training (NEETs).

Also, the studies examine different groups; the impact of participants is tested either immediately after the programme or even several years after. The two longitudinal studies offer, in their turn, an interesting impact measurement approach regarding individuals who participated, even decades ago.

The wealth of information and different approaches of the studies included can therefore be inspirational for a variety of stakeholders, such as:

- ➔ JA-YE providers that plan to run impact measurement studies for their programmes;
- ➔ schools and universities that are thinking about running a JA-YE programme. Institutions could also be inspired by the content and teaching styles used in JA-YE programmes and enrich the teaching and educational programmes they offer;
- ➔ education authorities and policy makers that can use these results as evidence of the benefits of entrepreneurship education; and
- ➔ policy makers in other fields, such as enterprise/business policies: as analysed earlier in this report, some of the studies examine the characteristics of the alumni-founded companies. Significant differences are found in some cases between these firms and those founded by control groups. Such information can support planning and decisions in enterprise policies, regarding the support of such schemes, but also companies that bear characteristics that can promote the competitiveness of the economy (for example, companies in innovative sectors, that offer more jobs than the average and/or make more turnover).

The methodologies used in these surveys can also prove to be useful for education policies, as well as schools and universities. Given the complex nature of entrepreneurship and the multiple factors that influence an individual's decision to start a business, make career choices, have positive views on entrepreneurship, etc., areas of improvement could be identified in the methodologies used for impact measurement.

Nonetheless, most of the JA-YE studies included in this report can be used as a blueprint for future impact measurements: especially the approaches towards economic and societal impact (such as the 'Making an impact. Assessing Junior Achievement of Canada's valued creation' study), which provide an interesting way to tackle an often debatable area of impact measurement in entrepreneurship education. The calculations per se, particularly in the study from Canada, strongly underline the diffusion of the results of entrepreneurship education on figures of the 'real' economy and the social security sphere; and

the importance of indirect links that can be created, benefiting a broader number of people than just the participants. Such calculations (or similar ones, depending on the country/region and goals aimed at) can guide the development of entrepreneurship education programmes that can be expected to yield (an approximation of) tangible financial returns. This is increasingly important in times of tight state and private budgets.

2.6 References

Making an impact. Assessing Junior Achievement of Canada's valued creation (2011).

Practice makes perfect? A longitudinal investigation of Junior Achievement Sweden alumni and their entrepreneurial careers, 1990-2007.

The effects of education and training in entrepreneurship – A long-term study of JA Sweden alumni labour potential and business enterprise.

Giovani, economia e spirito imprenditoriale [Youth, economy and entrepreneurial spirit].

Impact. 50 Years of Young Enterprise.

Junior Achievement Ireland. Enterprise Challenge programme 2010/2011. National Evaluation Report (2011).

Experiences from participation in JA-YE Company Programmes. What experience did participants in Company Programmes have during their time as company founders – and what happened next? (2007).

Business skills. A survey of JA-YE Participants.

Financial literacy. A survey of JA-YE participants.

Junior Achievement USA: a solution to increasing graduation rates.

JA Graduation Pathways.

2.7 European initiatives⁴⁶

The project, '**The Entrepreneurial School**',⁴⁷ will produce a **Virtual Guide to Entrepreneurial Learning**⁴⁸, which will include 75-100 entrepreneurial tools and methods organised in 35 teacher-friendly packages. The materials will be for primary, secondary, upper secondary and vocational schools. In addition to the tools and methods, initial teacher training and continuous professional development is an important part of the project. The intent is to make it easy for teachers to apply entrepreneurial learning in any subject area and for any age group. Schools will have access to a quality framework and assessment tool, which helps educators set milestones and assess progress.

'The Entrepreneurial School' won co-funding from the European Community, Competitiveness and Innovation Programme (CIP). The aim of the CIP programme is to promote projects with a high-added value at the European level in education for entrepreneurship.

The Entrepreneurial Skills Pass@⁴⁹ (ESP) is a unique and new qualification which certifies that students (16-18 years old) have had a real entrepreneurship experience and have the necessary knowledge, skills and competences to start a business or be successfully employed.

⁴⁶ [online] Available at: <http://ja-ye.org/programmes/european-initiatives>

⁴⁷ [online] Available at: <http://www.entrepreneurialschool.eu>

⁴⁸ [online] Available at: <http://www.tesquide.eu/>

⁴⁹ [online] Available at: <http://www.entrepreneurialskillspass.eu>

The ESP is built on three main pillars:

- ➔ the entrepreneurship experience – through the Company Programme students gain a real, hands-on entrepreneurial experience by setting up their own mini-companies at school;
- ➔ the international written exam – students will take an exam that tests their entrepreneurial acumen in economic knowledge and business skills; and
- ➔ further opportunities – the ESP is endorsed by SMEs, large businesses, higher education institutions, international organisations and the EU. Students with an ESP will find multiple avenues to pursue their business ideas, develop their career or further learning opportunities through these organisations.

Enterprise without Borders@ (EWB)⁵⁰ is a secondary school and/or college programme that teaches the value and importance of international trade and the practical skills necessary to do business across borders. The EWB website matches student companies interested in participating in joint ventures or importing-exporting.

The programme was developed with support from European Commission, Accenture and Nokia and it is running in 32 countries globally.

The Global Enterprise Project⁵¹ was created in partnership with the European Roundtable of Industrialists (ERT) and JA-YE Europe with the support of 18 leading European industrial companies. The project teaches business and entrepreneurship skills in the context of globalisation to students aged 15-18. Over the last three years, the project has taught 15,000 students with 1,000 employee volunteers participating from the 18 corporate partners. Twelve countries were involved in the academic year 2013-2014.

Sci-Tech Challenge⁵² motivates students, aged 15-18, to consider science, technology, engineering and maths (STEM) oriented careers and raise their awareness on the importance of their STEM skills and how they can be applied in enterprising ways to tackle the challenges of tomorrow. In 2014, the programme is running in nine countries.

The Social Enterprise Programme⁵³ is a pan-European programme which aims to increase the pool of potential social entrepreneurs by providing access to education in social enterprise to young people. Students aged 15-19 take a social business idea from concept to reality. They will form their own real social enterprise, based on a new business model. In 2014, 12 European countries are participating.

The Social Innovation Relay⁵⁴ aims to encourage students aged 15-18 to develop concepts that are socially innovative and could have a significant positive social impact. Nineteen countries worldwide are participating in the Social Innovation Relay. After 3 years of implementation, 75,479 students from 3,067 schools benefited from the programme with the assistance of 852 business volunteers.

⁵⁰ [online] Available at: <http://www.jaewb.org>

⁵¹ [online] Available at: <http://www.globalenterpriseproject.eu/>

⁵² [online] Available at: <http://scitech.ja-ye.org/>

⁵³ [online] Available at: <http://www.sep.ja-ye.org>

⁵⁴ [online] Available at: <http://www.sir.ja-ye.org>

3 Case Study 3: Youth Entrepreneurship Strategy (YES) and Action Plan

This case study report discusses the Youth Entrepreneurship Strategy Action Plan (2010-2015) in Wales. It provides the results of the approach used to measure the impact of the strategy to date: as well as discussion on the methods used to collect this data, how the approach to impact measurement has been used and updated, as well as some concluding remarks.

3.1 Description of the strategy

Wales has a population of 3 million and approximately 210,700 businesses, 98 per cent of which employ less than 50 people and 94 per cent employ less than 10 people (micro businesses). Data from 2013 suggests there is a strong reliance on public sector employment (25.7 per cent compared to 19.2 per cent in the UK), compounded by high numbers of businesses in other low value-added sectors. Wales has the lowest GVA⁵⁵ per head in UK (74 per cent), youth/graduate unemployment is high (23.6 per cent), and there are continuing problems of under-employment and economic inactivity.

To help tackle some of the economic challenges regarding youth employment, the Youth Entrepreneurship Strategy (YES) Action Plan 2010-2015⁵⁶ was launched in November 2010. It is a joint strategy between the Welsh Government's Departments for Economy, Science and Transport and Education and Skills. The Action Plan builds on the results of the previous strategy⁵⁷, which included an increased share of under 25 year-olds with aspirations to work for themselves (compared to the 16-64 group) and higher levels of graduate entrepreneurship than in the UK as a whole. The 2010-2015 Strategy aims to equip young people aged 5-25 with entrepreneurial skills and attitudes to raise their aspirations and fulfil their potential. It builds on the One Wales coalition agreement by the Welsh Assembly Government (WAG in 2010) to 'create and develop links between entrepreneurship and education.'⁵⁸ Alongside the strategy, WAG launched a website and a campaign to drive the plan forward and provide students with inspiration, access to information and enable partners to share information about the YES campaign.

The vision for the YES Action Plan is to '*develop and nurture self-sufficient, entrepreneurial young people in all communities across Wales, who will contribute positively to economic and social success.*'⁵⁹ This vision will be achieved through three priority themes:

- ➔ Engaging: promoting the value of entrepreneurship to create opportunities and develop young people;
- ➔ Empowering: providing young people with entrepreneurial learning opportunities; and
- ➔ Equipping: supporting young people to create and grow businesses.

⁵⁵ Gross Value Added, which measures the value of goods and services produced in an industry/sector or a region an economy.

⁵⁶ [online] Available at: <http://ms.fs4b.wales.gov.uk/pdf/YES-%20An%20Action%20Plan%20for%20Wales%202010-15%20Eng.pdf>; accessed 12 May 2014.

⁵⁷ [online] Available at: <http://ms.fs4b.wales.gov.uk/pdf/YES%20Action%20Plan%202004.pdf>; accessed 12 May 2014.

⁵⁸ [online] Available at: http://news.bbc.co.uk/1/shared/bsp/hi/pdfs/27_06_07_oneyales.pdf; accessed 12 May 2014.

⁵⁹ [online] Available at: http://ms.fs4b.wales.gov.uk/sub_sites/yes/content/about_us/yes_strategy_for_wales.aspx; accessed 12 May 2014.

The Welsh Government is the lead implementation body which is guided by the YES Action Plan Panel. The Panel was established in 2011 to provide strategic guidance and expertise and to advise on how best to build on achievements. The Panel was appointed for a two-year term and during that period agreed a framework for evaluation and a route map for delivery. In addition to the Panel, strategic audiences from education, business and the community are involved in the design and delivery of the strategy.

The key actions linked to each of these themes, are listed below. These take place along other capacity-building, collaborative working and partnership development initiatives at the administrative, strategic and operational level:

- ➔ Engaging: promoting the value of entrepreneurship to create opportunities and develop young people:
 - launch Big Ideas Wales as a campaign to engage and enthuse young people and partners; and
 - targeted activities and events to stimulate interest and participation in entrepreneurship, particularly to those who are unemployed and/or economically inactive (including Big Ideas Wales Role models, workshops, and awareness events in Global Entrepreneurship Week).
- ➔ Empowering: Providing young people with entrepreneurial learning opportunities:
 - online guidance to schools and further education institutions on entrepreneurship learning and progression⁶⁰;
 - experiential learning opportunities available for young people to explore entrepreneurship at national, regional and local levels; and
 - promote excellence in entrepreneurial learning and leadership by sharing and benchmarking good practice locally, nationally and internationally.
- ➔ Equipping: Supporting young people to create and grow businesses:
 - prepare young people to take the next step towards starting a business;
 - support young people to become self-employed;
 - focus support services on high potential start-ups, especially in key priority sectors and amongst graduates; and
 - draw on the experience and expertise of the business community to support young entrepreneurs.

As such, it could be inferred that the aim of the Strategy is less about creating outputs for outputs' sake, but more about creating *a cultural shift* where young people are more entrepreneurial, 'intrapreneurial'⁶¹ and can take advantage of the opportunities available to them.

The renewed action plan has been developed upon key successes and learning points from the previous strategy, which had been identified through a wide evidence base, including internal evaluation. Entrepreneurs, key stakeholders and young people were consulted about the findings. Evaluation and monitoring of the successes / learning points of the current action plan are ongoing via individual projects and initiatives. They will have individual monitoring and evaluation processes in place which are expected to feed into the Panel as and when required.

⁶⁰ [online] Available at:

<http://wales.gov.uk/topics/educationandskills/schoolshome/curriculuminwales/arevisedcurriculumforwales/careersandtheworldofwork/learningandprogression/?lang=en>

⁶¹ 'Intrapreneurs' are taken to be employees that act entrepreneurial at their workplace

Under each of the themes outlined above, both outputs and the types of impacts expected from the strategy have been established. The focus for this case study is on the impact of entrepreneurship education activities – it is linked to each of the themes and is set out in Table 3.1 below.

Table 3.1 JA-YE studies reviewed in this case study report

Vision	YES theme	Impact expected
To develop and nurture self-sufficient, entrepreneurial young people in all communities across Wales, who will contribute positively to economic and social success	Engaging: Promoting the value of entrepreneurship to create opportunities and develop young people	Raise awareness of entrepreneurship
		Increase entrepreneurial mind-set
		Increase numbers considering being their own boss
	Empowering: Providing young people with entrepreneurial learning opportunities	Increase entrepreneurial capacity (skills, experience, confidence, knowledge)
	Equipping: Supporting young people to create and grow businesses	Increase numbers exploring entrepreneurship
		Increase numbers starting up and surviving
		Increase graduate start-ups and survivals

Source: Youth Entrepreneurship Strategy Action Plan (YES) 2010-2015

3.2 Results of the impact measurement

The types of impact expected to be created by the YES Action Plan are mostly at the individual, societal and economic level. These are further set out by theme in the following table. The impact is being measured using a range of surveys, questionnaires and assessments. The Strategy also sets out the targets which, if met (across Wales), provide an indication of the Strategy's success in meeting its aims (Table 3.2).

Table 3.2 Measuring the impact of YES

Theme	Impact expected	Impact measure and method to collect	Impact Target
Engage	Raise awareness of entrepreneurship (individual, society)	On line Enterprise Catalyst assessment Awareness of Enterprise	5% increase on baseline
		Children's' Omnibus Survey (7-18) Awareness of self-employment as a career	75%
	Increase entrepreneurial mind-set (individual)	Carnegie Trust Enterprising Minds Survey in Further Education Student entrepreneurial attitudes and intentions	Remain above UK average
	Increase the number of young people considering being their own boss (individual)	Children's' Omnibus survey (7-18) Desire to run a business	50%
		Annual Wales Omnibus Survey (18+) Desire to run a business	Increase from 50% to 55%
		Dynamo Role Model Project Post 16 Questionnaires Intent to start up in next 1-3 years	Increase by 5%
Empower	Increase the entrepreneurial capacity of young people (individual)	On line Enterprise Catalyst assessment Enterprise 'fuel'	Remain above UK average
		Young people developing entrepreneurial skills Welsh Baccalaureate Monitoring	Under development
		NCEE Higher Education Survey Student engagement in entrepreneurship	To remain above UK average
Equip	Increase the number of entrepreneurially active young people (individual, economic)	Global Entrepreneurship Monitor (GEM) - Profile of entrepreneurially active young people aged 18-24	To remain above UK average
	Increase graduate start-ups/survival (economic)	Higher education business and community interaction survey (HEBCIS) - Profile of graduate start-up companies and those surviving 3 years as % of UK population	To remain above UK average

Source: Adapted from Welsh Government Annual Report 2012-13

To date, the surveys as mentioned above have highlighted the progress of YES. The results of the YES Action Plan, as underlined by the Welsh Government,⁶² have been:

→ **Engage**

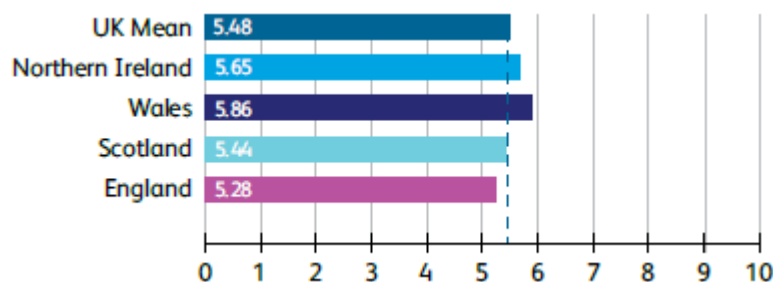
- Raise awareness of entrepreneurship

The Enterprise Catalyst data was used in YES as a measure of the awareness of enterprise. Data in 2011 showed a 16 per cent increase from the baseline and in 2012 a 12.6 per cent increase from the baseline. However, this data did not provide the Welsh Government with a clear measure of impact, due to the lack of participants and timings of the completion of the surveys. To address this issue, the question regarding the awareness of self-employment as a career has been asked in the Children's Omnibus survey (baseline target 75 per cent). No data was available on the achievement of this as of the last annual report (2012-13).

- Increase entrepreneurial mind-set

The Carnegie Trust Enterprising Minds Survey in Further Education provided a measure of how positively a respondent felt about the idea of working for themselves or starting a business or other form of enterprise, and how likely they might be to do so in their working life. The target to remain above the UK average has been achieved as Welsh respondents were rated highest by jurisdiction on the Carnegie Measure at 5.86, with English respondents the lowest at 5.28 (Figure 3.1).

Figure 3.1 Carnegie measure of student attitudes to entrepreneurship (2012)



- Increase the number of young people considering being their own boss

This measure of 'impact' is examined in three different ways. Firstly, the Annual Wales Omnibus Survey (for those aged 18-24, most recently conducted in 2013)⁶³ indicates that 53 per cent of young people under 25 in Wales have aspirations to work for themselves and be their own boss: an increase from 42 per cent in 2004 (target 55 per cent). Secondly, the Children's Omnibus survey (for those aged 7-18) now includes a question on their desire to run a business in the future (target 55 per cent, result 42 per cent in 2012). And thirdly, the Big Ideas Wales Role Model Project Post-16 questionnaires asks students' intent to start up a business in next one to three years (target: increase by 5 per cent across different levels of education – see Figure 3.2 following) directly following the activity.

While these are interesting insights into what respondents think at the specific point of questioning regarding self-employment, the 'impact' may well only be apparent where there is direct involvement of the same

⁶² [online] Available at: <http://wales.gov.uk/about/cabinet/cabinetstatements/2013/yesactionplan/?lang=en>

⁶³ Overall, the annual surveys grasp the opinion of the general population aged under 25 in Wales. Therefore, they are not explicitly relevant to this study which focuses on young people in education.

participants and where there is a direct attribution of this to the interventions (which is probably more apparent with the Big Ideas Wales Role Model responses). The impact of the Strategy should ideally be measured over time, so that the evidence substantiates that the opinions measured in the surveys persist into self-employment or business creation in the future.

→ **Empower**

- Increase the entrepreneurial capacity of young people

The Enterprise Catalyst data was used in YES as a measure of the awareness of enterprise. As stated above, this data did not provide the Welsh Government with a clear measure of impact, due to the lack of participants and timings of the completion of the surveys and it is therefore no longer used as an impact measure.

The examination of 'young people developing entrepreneurial skills' is currently under development through the monitoring of the Welsh Baccalaureate; so data is not yet available on this measure⁶⁴.

In terms of higher education students' engagement in entrepreneurship activities (SER), this is measured by the NCEE Higher Education Survey rate which rose from 23 per cent in 2010 to 26 per cent in 2012 (target to remain above the UK average). Data was not available to indicate if this was above the UK average, but in England the student engagement rate rose from 16 per cent to 18 per cent over the same period⁶⁵.

→ **Equip**

- Increase the number of entrepreneurially active young people

The Global Entrepreneurship Monitor (GEM) Report reported that 9.5 per cent of young Welsh people engaged in early-stage entrepreneurial activity in 2012. The UK rate is reported as 8.3 per cent in 2012. This does not provide causality of the impact and effectiveness of the YES Action Plan and this sub-sample (18-24 year-olds) may not be in education (as is the focus of this study); nonetheless, the rate of early-stage entrepreneurs may potentially reflect the level of exposure to these activities.

- Increase graduate start-ups and survival

The Higher education business and community interaction survey (HEBCIS) examines the profile of graduate start-up companies as a percentage of the UK population. In Wales this figure was 9.6 per cent compared to the UK at 5 per cent in 2011 (target to remain above the UK average).

- Increase graduate survival

Higher education business and community interaction survey (HEBCIS) examines the profile of graduate start-up companies surviving three years as a percentage of the UK population. In Wales this figure was 10.3 per cent compared to the UK at 5 per cent in 2011 (target to remain above the UK average). While these two figures do not provide definitive causality of the impact and effectiveness of the YES Action Plan, they do indicate that Welsh students are more likely to set up and sustain their own business than UK students in general.

The full facts and figures are set out in Figure 3.2.

⁶⁴ Welsh Government Annual Report 2012-13.

⁶⁵ NCEE Enterprise and Entrepreneurship in Higher Education 2012.

Figure 3.2 YES Impact measures overview

YES Action Plan Strategic Impact Measures Overview							
Theme	Impact	Impact Measure	Impact Target	Progress Sept 2010 - Aug 2011	Progress Sept 2011 - Aug 2012	Sample size	Data Segmentation
E n g a g e	Raise awareness of entrepreneurship	On line Enterprise Catalyst assessment Awareness of Enterprise	5% increase on baseline	+ 16% on UK benchmark	+ 12.6% on UK benchmark	3000	FE/HE Institutions Gender Ethnicity
		Childrens Omnibus Survey (7-18) Awareness of self employment as a career	75%	Commenced 2012	75% 2012	500	Gender Age Welsh speaking
	Increase entrepreneurial mindset	Carnegie Trust Enterprising Minds Survey in Further Education Student entrepreneurial attitudes and intentions	Remain above UK average	biennial survey	5.86% in Wales 5.48% UK mean	1602	Country Gender Age Course of Study
	Increase the number of young people considering being their own boss	Childrens Omnibus Survey (7-18) Desire to run a business	50%	Commenced 2012	48% 2012	500	Gender Age Welsh speaking
		Annual Wales Omnibus Survey (18+) Desire to run a business	Increase from 50% to 55%	52% March 2011 Annual Omnibus	55% March 2012 Annual Omnibus	1000	Gender Age Welsh speaking
		Dynamo Role Model Project Post 16 Questionnaires Intent to start up in next 1-3 years	Increase by 5%	Pilot (1657) Schools 44% (4% Yes 40% Maybe) FE 54% (13% Yes 41% Maybe) HE 69% (24% Yes 45% Maybe)	Schools 47% (6% Yes 41% Maybe) FE 56% (12% Yes 44% Maybe) HE 70% (22% Yes 48% Maybe)	9329	Region Gender Age Type of Institution
E m p o w e r	Increase the entrepreneurial capacity of young people	On line Enterprise Catalyst assessment Enterprise 'fuel'	Remain above UK average	+ 3% on UK benchmark	+ 0.3% on UK benchmark	3000	FE/HE Institutions Gender Ethnicity
		Young people developing entrepreneurial skills Welsh Baccalaureate Monitoring	tbc				
		NCEE Higher Education Survey Student engagement in entrepreneurship	To remain above UK average	23% in Wales 2010 16% in UK	biennial survey	100% HE in Wales 79% HE in England	HE Institution
E q u i p	Increase the number of entrepreneurially active young people	Global Entrepreneurship Monitor (GEM) - Profile of entrepreneurially active young people aged 18-24.	To remain above UK average	GEM 2010 UK 3.3% Wales 6.7%	GEM 2011 UK 6.2% Wales 10.4%	3000	Country Gender Age
	Increase graduate start ups	Higher Education Business and community interaction survey (HEBCIS) - Profile of graduate start up companies as % of UK population.	To remain above UK average	HEBCIS 2011 Wales 8.9% UK Population 5%	HEBCIS 2011 Wales 9.6% UK Population 5%	All UK HEIs	Institution in Wales Country
	Increase graduate start up survival	Higher Education Business and community interaction survey (HEBCIS) - Profile of graduate start up companies surviving 3 years as % of UK population.	To remain above UK average	HEBCIS 2011 Wales 10.6% UK Population 5%	HEBCIS 2011 Wales 10.26% UK Population 5%	All UK HEIs	Institution in Wales Country

Source: Adapted from Welsh Government Annual Report 2012-13

3.3 Methodology of the measurement

The results reported offer a clear indication of Wales achieving better results than the rest of the UK in many areas regarding entrepreneurship education. What is less clear is the direct causal link between the actions and initiatives undertaken as a part of the YES Action Plan and the results; this is due to the fact that some of the surveys mentioned above are nationwide surveys, data may not measure the same participants, and cohorts are not necessarily tracked over time. However, these surveys are used as measurement tools, because they are run annually or biennially (and can therefore be used to measure before and after results). They also allow the Welsh Government to benchmark Wales against other UK nations and the UK average.

According to interviewees, the most challenging area of measurement remains the attribution of the intervention to skills development (across all ages) and causality. It may prove difficult to measure against control groups from within Wales, as the actions under the YES Action Plan aim to be inclusive of all Welsh schools, colleges and universities. Exploring the counterfactual (e.g. 'if [you/student/organisation] had not taken part in this activity, what would have happened...') is also challenging given the lack of control groups or systematic 'cohort group' data; this is why the Welsh Government is trying to use public data which has been verified by external providers. More information on each of the methods is described below.

Online Enterprise Catalyst

As stated above, this dataset will not continue to be used to measure impact due to issues with the reliability of the data⁶⁶. However, the data is still being collected through an online questionnaire (self-selecting) run by a private company which measures entrepreneurial attitudes, aspirations, ability and behaviour. An individual report is provided to each person who completes the survey, which provides information on:

- enterprise fuel (motivation and drive, capacity to self-determine, willingness to learn);
- their personal enterprise style;
- what encourages them and barriers to enterprise;
- their preferred team role; and
- their personal learning and thinking style.

Wales Children's Omnibus survey

To supplement the Wales Omnibus survey, and to address the gap in the availability of robust data from the Enterprise Catalyst, from November 2012 the private provider that runs the Omnibus survey⁶⁷ has been commissioned to ask questions on its Children's Omnibus survey relating to the awareness of young people about self-employment as a career option. These include:

- Young people's awareness of self-employment as a career option – 'In thinking about jobs and careers, are you aware that you could be your own boss or start a business?'
- Young people's desire to be their own boss – 'When you finish school/college do you think you would like to run your own business if you had the chance? Is that definitely or probably?'

⁶⁶ As stated by an interviewee.

⁶⁷ Beaufort Research. [online] Available at:

http://www.beaufortresearch.co.uk/index.php/site/omnibussurveys/omnibus_surveys; accessed 7 July 2014.

The survey involves 500 interviews in 43 locations across Wales to a proportionally representative sample of children aged 7-18. Data is available by age, gender or Welsh speaking ability.

As stated above, this is an examination of what respondents think at the specific point of questioning regarding self-employment, rather than an explicit examination of the impact of an intervention.

Carnegie Trust Enterprising Minds Survey

'Enterprising Minds' is a UK survey into further education students' attitudes to enterprise, education and the future economy. The aim of the Carnegie Trust Enterprising Minds Survey in Further Education was to produce a composite measure result which showed, through the answers they had provided, how positively a respondent felt about the idea of working for themselves or starting a business or other form of enterprise, and how likely they might be to do so in their working life. The questions selected as components of the measure were chosen as previous research suggested that they were influential in determining students' attitudes. The measure drew together eight questions from the survey, covering four key areas:

- personal attitudes to enterprise and enterprising people;
- the importance of enterprise in selecting colleges and courses;
- enterprising work options; and
- interest in starting up a business.

The 2012 survey involved 1,600 students from 17 sample UK colleges (from all UK countries) and is planned to be biennial. Data is available by age, gender, subject studied and country.

Wales Omnibus

As stated above, the survey involves interviews with young adults 18-24 in 68 locations across Wales. As such, it is not relevant for this study which focuses on young people still in education. However, the respondents are a representative sample of the population and provide an overview of public opinion. Data is available by age, gender or Welsh speaking ability. The question examining whether people (aged 18-25 for the purposes of the YES Action Plan) desire to be their own boss is: 'Do you think you would like to work for yourself and be your own boss if you had the chance?'

Big Ideas Wales Role Model Questionnaires

Each year a survey of young people that participate in an activity with Big Ideas Wales Role Models and the Entrepreneurship Champions is undertaken.

In 2012, 9,329 questionnaires were analysed to provide a significant data set of young people's opinions, following a pilot of 1,657 questionnaires in 2011. Data can be analysed by gender, location and education status (pre / post 16 schools; further and higher education).

The post-activity survey captures several measures on the impact of the activity on the individual relating to each of the themes linked to the YES Action Plan and provides some activity performance measures. Impact on the individual gauges their view on whether the activity has inspired them, improved their skills and creativity, given them confidence, got them thinking of business ideas and helped them understand what it is like to run a business. This questionnaire takes place post-activity, so baseline levels are not assessed. There are also no follow-up questionnaires to measure the persistence of these effects.

NCEE Enterprise and Entrepreneurship in Higher Education Survey

The National Centre for Entrepreneurship in Education (NCEE) undertakes a biennial national survey of student engagement in enterprise and entrepreneurship education and support activity, covering 92 per cent of higher education in England and 100 per cent in Wales in 2010. The definition of 'engagement' in this context means taking part in enterprise activities which are curricular or extracurricular. The persistence effects of enterprise education activities may be noticeable further down the line. This survey enables comparisons to be made with the previous surveys undertaken since 2006 and between Wales and England. Data is available by country and gender.

Global Entrepreneurship Monitor

Since 2002, the GEM survey has been a key source for monitoring the trends in entrepreneurship (defined as rate of business creation), and provides a core benchmark for Wales on entrepreneurship against the other regions within the UK and globally. The current sample size is 3,000. Data is available by country, gender, and age. The GEM survey is used to measure progress, monitor trends and provide comparative international and regional analysis of the impact as well as to analyse the levels and nature of entrepreneurship including entrepreneurial attitudes, motivations and barriers. The specific questions of relevance in the questionnaire include:

- ➔ Participation in enterprise education (young people 18 – 29). A new question was introduced in 2010: 'Have you taken part in any activity in school, college or university that made you think about starting a business or being your own boss?'
- ➔ Entrepreneurially active young people 18-24 (and 18-29) in Wales and the UK - nascent entrepreneurs (active planning) or within 42 months of start-up.

GEM results offer insights about participants' current entrepreneurial activities and/or future aspirations. Results are available for age cohorts, but not for higher education students specifically. So, *the relevant results do not fall under the scope of this study*. The 2010 question that offered significant information in the context of this study, was not repeated in following years. The results on this question, along with the others that are relevant to entrepreneurship education, fed a special report: Global Perspective on Entrepreneurship Education and Training⁶⁸.

Higher Education – Business and Community Interaction Survey (HEBCIS)

Since 2001, the annual Higher education business and community interaction survey (HEBCIS) has examined the exchange of knowledge between universities and the wider world, and it informs the direction of innovation and engagement activity that funding bodies and universities in Wales undertake. The survey collects financial and output data every academic year. Results provide information on a range of activities, from the commercialisation of new knowledge, through to the delivery of professional training, consultancy and services, to activities intended to have direct social benefits. Data is available by institution in Wales and by UK country. Relevant questions for the assessment of the YES Action Plan include:

- ➔ graduate start-up companies in Wales as a percentage of total UK graduate start-ups compared to a percentage graduate population; and

⁶⁸ [online] Available at: <http://www.gemconsortium.org/docs/download/276>; accessed 14 May 2014.

- ➔ graduate start-up companies in Wales 3-year-survival rate as a percentage of total UK graduate 3-year survival, compared to the percentage of the graduate population.

As stated above, while the HEBICIS does not provide definitive causality of the impact and effectiveness of the YES Action Plan, it does indicate that Welsh students are more likely to set up and sustain their own business than UK students in general.

3.4 Using the results of the impact measurement

The results of the surveys and data used to measure the impact of the various interventions taking place under the YES themes have been presented in quarterly and annual reports to the Panel and to a Welsh Government cross departmental group. The annual reports are made available publically⁶⁹. In addition to this, there is an 'ongoing review' of the programmes, including internal evaluation and monitoring as well as external scrutiny. For instance, a recent National Assembly for Wales inquiry⁷⁰ into Youth Entrepreneurship was conducted by the Enterprise and Business Committee. It examined the effectiveness of the Welsh Government's approach to promoting youth entrepreneurship as well as the possible actions that could be taken (at policy and operational level) to improve young people's potential. Evidence was received from over 20 different stakeholders (businesses, community, delivery partners, young people, charities, enterprise champions, educational institutes and government representatives) and many different reports examining Welsh youth entrepreneurship. Recommendations arising from this inquiry were detailed in a report and included data collection and monitoring of impact:

- ➔ Work to improve the consistency of data on youth entrepreneurship and carry out rigorous monitoring and evaluation of progress achieved and comparison with other countries to be pursued. The aim should be to collect more outcome-related information such as the wider impact of youth entrepreneurship on the Welsh economy, and long-term tracking of young people's progress following enterprise education, including disaggregation according to gender.
- ➔ Investigate the disconnection between the level of interest and aspiration for youth entrepreneurship and the actual number of businesses that are being started by young people, and establish how best to bridge that gap.
- ➔ Monitor and review the impact of the change in Careers Wales's remit and the predicted short-term dip in the provision of entrepreneurship activities for young people, and publish its findings in a report on the first year of Career Wales's operations.⁷¹

Following on from this inquiry, an evaluation is set to take place on the youth entrepreneurship activities (which will feed into future policy direction). Other evidence is also being explored which sits alongside the monitoring of the framework.

Monitoring evidence is presented in the annual reports to the Panel, and a detailed exploration of the gaps in the activities is presented. For instance, a gap

⁶⁹ Annual Reports for 2010-11, 2011-12 and 2012-13. [online] Available at: http://ms.fs4b.wales.gov.uk/sub_sites/big_ideas_wales/content/about_us/yes_action_plan_2010/annual_report.aspx

⁷⁰ [online] Available at: <http://www.senedd.assemblywales.org/mgIssueHistoryHome.aspx?IID=6052>; accessed 12-14 May 2014.

⁷¹ [online] Available at: <http://www.assemblywales.org/bus-home/bus-business-fourth-assembly-laid-docs/cr-ld9553-e.pdf?langoption=3&ttl=CR-LD9553%20-%20Enterprise%20and%20Business%20Committee%20-%20Report%20on%20the%20Inquiry%20into%20the%20Youth%20Entrepreneurship>; accessed 12-14 May 2014.

was identified between the aspirational development of young people and then the subsequent application of this into start-ups. An identified gap included the need for more work to be done at the pre-start level for young people who were not yet ready to start up their own business (or old enough to be eligible for wider support). This was based on an internal review as well as the datasets presented above.

As stated by interviewees, there is much interest in the YES Action Plan from Member States and third countries⁷² (including presentations through the Education Training Foundation) which may indicate that this Action Plan is considered a benchmark of good practice. In addition, recommendations have been made (for instance in the Carnegie Trust review) that other countries in the UK could be doing more to follow the Welsh (and to some extent Northern Irish) examples regarding enterprise education activities. Part of this includes how enterprise education is embedded into existing education activities. For instance, projects have been developed in Wales on how to link skills programmes for young people (e.g. Jobs Growth Wales which provides work experience opportunities for six months to young people and a bursary for young entrepreneurs provided through the YES Action Plan [funded by the Welsh Government]). This would be a cross-departmental approach to supporting enterprise. Similarly, the Welsh Government is aligning its provision with nation-wide programmes (for instance, creating local support for young entrepreneurs to help them apply for the Start Up Loans Company which runs across the UK).

3.5 Conclusions

While the inquiry by the National Assembly for Wales states that data collection to provide evidence of the causality of enterprise education should be improved, the results of the Carnegie report speak for themselves:

'Welsh survey respondents indicated the highest levels of enterprise awareness and interest, the most personal and positive visualisations of what enterprise meant to them, and the strongest intentions to pursue self-employed and business start-up career paths. They were the most enthusiastic about their college experiences and the quality of their education. They rated highest on the Carnegie Measure of Student Attitudes to Enterprise.'⁷³

This report cannot be said to be directly linked to the activities of the YES Action Plan. However, since the Action Plan aims to affect all young people in Wales, then in some part, these achievements (i.e. above that of the UK average) could be attributable to the Action Plan. This strengthens the arguments about the impact that interventions in Wales have on the individual, and there are also some examples of societal/economic impacts through increased rates of business start-up and survival. Again, attribution of this to specific activities taking place in Wales under the YES Action Plan is challenging.

Designing the measures has been a very challenging process for the Welsh Government, not least because the methods of data collection to provide evidence of impact for some of these measures are patchy, and in some cases unreliable. Accommodating for this has involved researching internationally for best practice and learning from others.

The initial focus was to develop a set of targets which could be measured using existing data sets. These measures help young people and delivery partners to see where they fit in terms of progress towards being more 'entrepreneurial'; the data sources are publically available and they can be (and have been)

⁷² Those outside EU-28.

⁷³ Enterprising Minds Final Report, Carnegie Trust UK (2012).

scrutinised by the National Assembly for Wales' Enterprise and Business Committee and the public.

Therefore, the YES Action Plan in Wales could be inspirational for other countries, in the context of this study, although direct impact cannot be proved so far because:

- ➔ It is an entrepreneurship education strategy where evaluation and measurement goals are embedded in the strategy activities and goals.
- ➔ The measurement results are used to improve activities.
- ➔ Several measurement tools/surveys are used to grasp all cohorts of young people affected by the strategy activities.
- ➔ The challenge of attributing causality to the strategy's activities is recognised, but efforts are being made to understand the effectiveness of the activities to the extent possible.

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4 Case Study 4: EEP - The Entrepreneurship Education Project

This case study report looks at the Entrepreneurship Education Project (EEP) which is collecting data on the impact of entrepreneurship interventions on undergraduates over a 10-year longitudinal study. The project was set up to provide participants with a common framework/survey for measuring the impact of entrepreneurship education in a standard and systematic way, using a theoretical framework based on the Social Cognitive Career Theory (SCCT). This case study report focuses on the set up of the project, the underlying theoretical framework, the focus of impact measurement and the plans for the future.

4.1 Description of the strategy / initiative

The Entrepreneurship Education Project⁷⁴ is a global, longitudinal research initiative which collects data from university students who have taken part in an entrepreneurial course. The project is coordinated through the Means Center at Illinois State University, and the data is used and interpreted by the individual institutions contributing to the project.

The idea behind the EEP⁷⁵ was based on the fact that there has been a great deal of research conducted in different contexts around the globe to investigate the impact of entrepreneurship education. This data is collected in many different ways and provides both positive and negative results for the impacts of entrepreneurship education courses and programmes. The research team identified that a longitudinal approach that could explore many aspects of the impact on the individual in a comparable way was missing. A longitudinal survey allows for a better exploration of the pathways to becoming a long-term entrepreneur, including behavioural changes. These changes can be identified by following individuals. Following such a large cohort of students from education into their career, aims to provide a robust analysis of the impacts of entrepreneurship education. Through this research approach, the EEP study aims to isolate the effects of the entrepreneurship education programmes on the individual and provide data-driven insights into the relationship between entrepreneurial education and the critical incidences which impact on the decisions to become 'entrepreneurial'. Therefore, the research focuses on how entrepreneurship education experiences impact students' entrepreneurial motivations and on identifying changes from being a learner to becoming an entrepreneur. Over a period of ten years (the total length of time of the research), the study will examine the extent to which identified learning outcomes translate into a student's career decision and performance as an entrepreneur⁷⁶.

The EEP focuses on measuring two aspects of impact on the individuals (the students):

- ➔ The motivational processes underlying students' paths to entrepreneurship; and
- ➔ The process of identity transformation from student to entrepreneur.

The project was developed in order to fill the gap in the lack of data on the long-term impact of entrepreneurial education. The design of the survey tool and the interpretation of the results use a theoretical framework based on Social

⁷⁴ [online] Available at: <http://www.trepeducation.com>

⁷⁵ As stated by an interviewee.

⁷⁶ Vanevenhoven and Liguori (2013).

Cognitive Career Theory⁷⁷. The tool was developed collaboratively by Dr Jeff Vanevenhoven (University of Wisconsin), Dr Doan Winkel (Illinois State University) and Dr Eric Liguori (California State University). The EEP survey, based on the tool, has been adapted and translated into several languages over the course of the project to increase its take up.

The EEP began its development phase in 2009. The first round of phase 1 collected data from students at 80 universities globally. Following two additional rounds in phase 1, the EEP reached a total of approximately 400 universities, with around 18,000 students participating in the study. The high numbers involved in phase 1 of the study made EEP one of the largest, most comprehensive studies of individual entrepreneurship education data globally. To date, phase 1 and phase 2 data collection are complete (phase 2 data is being analysed). Phase 3 is planned to take place in the near future.

The original intention of EEP was to collect data on an annual basis for the duration of the 10-year project and provide robust comparable data on the long-term impact of entrepreneurship education on the individual. This goal has changed⁷⁸ due to the difficulties of running longitudinal surveys and the required commitment from collaborating universities.

Challenges during implementation⁷⁹

At the time of this case study, the project has already encountered difficulties with funding and generating enough data for phases 2 and 3. Ensuring the commitment from individuals to respond on a yearly basis over a period of time (in this case 10 years) is a challenge often encountered in longitudinal studies. The research team admits that keeping track of individuals can be difficult. Also, maintaining quality and up-to-date records is difficult for institutions. People may change locations and/or lose interest in responding to surveys, especially as the relevance of the effect of education programmes fades over time (at least the perception that individuals have of the effect). The global character of EEP makes it even more complex to keep track of individuals as they embark on their careers away from the higher education institutions. Another further challenge is also relevant to the methodology: the surveys in each phase need to take into consideration how to isolate the effects of different types of interventions on individuals on their career paths.

4.1.1 The Underlying theoretical framework - Social Cognitive Theory

Underpinning this study is the theoretical framework of Social Cognitive Career Theory (SCCT). The theory was first proposed by Alfred Bandura (1986) who developed two related theories: social cognitive theory and the theory of social learning. Both theories connect to the basic mechanisms of human motivation with regard to learning and behaviour (Bandura, 1989). Bandura theoretically established that the environment impacts human behaviour (which includes learning), but behaviour also impacts the environment.

Social Cognitive Career Theory (SCCT)⁸⁰ is supported by three core pillars:

- ➔ self-efficacy,
- ➔ outcome expectations, and
- ➔ goal-directed activity.

⁷⁷ Lent, Brown and Hackett (1994).

⁷⁸ As stated by an interviewee.

⁷⁹ According to interviewees.

⁸⁰ SCCT was developed in 2006 by Lent, Brown and Hackett, following the main guidelines of Bandura.

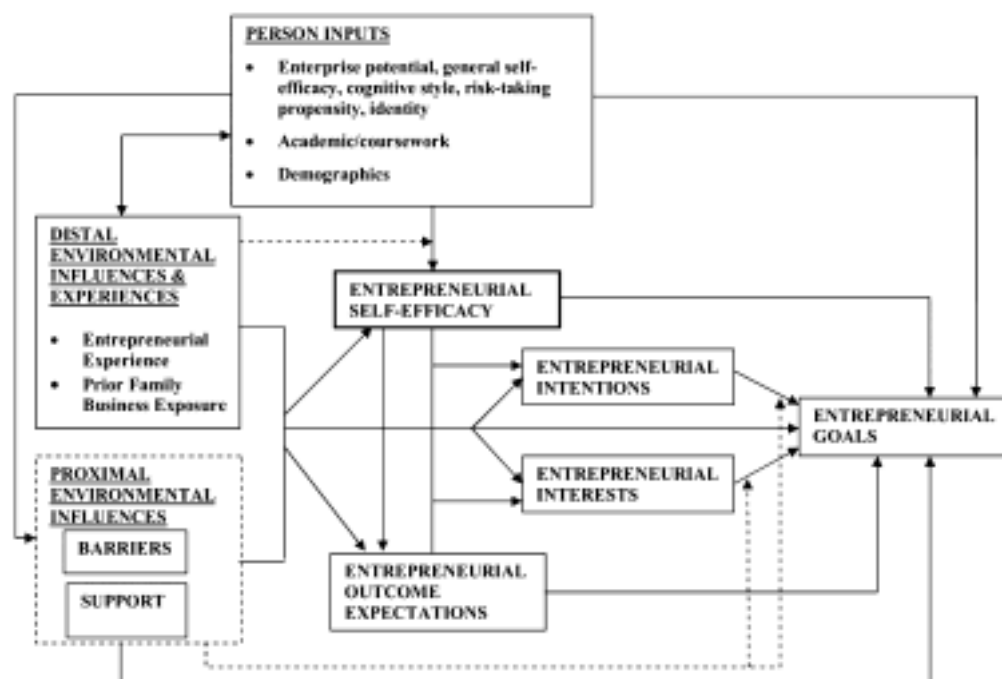
This theoretical framework is used as part of the EEP and the lead researchers hypothesise⁸¹ that 'these constructs act as mediators in the relationships between individual and environmental experiences and outcome behaviours.'

Self-efficacy, the first of the three core pillars, represents a belief in the application of one's skills in varied circumstances and environments. As such, the attention is shifted from what knowledge and skills one lacks and what is needed to acquire them – to what can be done with the knowledge and skills one already possesses. Efficacy significantly influences people's choices and can be crucial when it comes to deciding which type of education and career path they may take.

Closely connected to this, the second core pillar, the **outcome expectations**, is defined as 'the anticipation that certain outcomes would follow certain actions and include beliefs about extrinsic rewards, self-directed consequences such as pride in achievement, and social consequences such as approval.'⁸² Therefore, according to the authors, one will more happily engage in activities that provide prospects and benefits on a variety of levels. If individuals invest in these activities, then future entrepreneurial action should become more probable.

Finally, pillar three, **goal-directed activity**, gives meaning and direction as well as purpose to the activities that the individual undertakes. If activities undertaken link directly with a personal set of objectives, the probability of an entrepreneurial endeavour should also be greater. Figure 4.1 shows the EEP conceptual schema based on SCCT.

Figure 4.1 The EEP conceptual schema based on SCCT



Source: Vanevenhoven, J. and Liguori, E. (2013), p. 318

In summary, the three core pillars of SCCT theory: self-efficacy, outcome expectations and defined goals, should act as crucial indicators and mediate the transition from students' learning and input into their further entrepreneurial actions and outcomes. However, other factors such as demographics, individual

⁸¹ Vanevenhoven and Liguori (2013:317).

⁸² Vanevenhoven and Liguori (2013:317).

differences, predispositions, as well as background factors, as external environmental influences (e.g. previous exposure to entrepreneurship), also shape self-efficacy and outcome expectations⁸³.

4.2 Results of the impact measurement

The EEP is still in its early phases and the measurements of impact will only be available in subsequent years⁸⁴. Even in the first phases, due to the large amounts of data collected, analysis is still pending. Therefore, collaborating universities are being encouraged by the lead research team to analyse their data for their own purposes. Nevertheless, there are some early indications of impact stemming from the results from the first phases. These results have been published⁸⁵ and are presented below.

There are positive correlations between entrepreneurial intentions, entrepreneurial self-efficacy and entrepreneurial outcome expectations.

The results of the first phase show that entrepreneurial intentions, entrepreneurial self-efficacy and entrepreneurial outcome expectations are significantly positively correlated. Therefore, the higher the self-efficacy of an individual, the higher the outcome expectations are. This is also borne out by exploring correlations on a regional basis (North America, South America, Eastern Europe, Western Europe, Africa, Middle East and Asia and Pacific).

The total exposure of an individual to entrepreneurship education and entrepreneurial contextual factors positively correlate with all SCCT pillars.

The SCCT construct introduced also proves that the total exposure of an individual to entrepreneurship and the contextual factors correlate positively with entrepreneurial intentions, self-efficacy and entrepreneurial outcome expectations. There were regional variations regarding this result.

The number of courses offered by the universities is significantly positively correlated with all the SCCT pillars, but not extracurricular activities

The number of courses offered is significantly positively correlated with all the SCCT pillars: (1) self-efficacy, (2) outcome expectations and (3) goal-directed activity. The number of extra-curricular activities on offer did not positively correlate to any of the SCCT pillars.

The more a university collaborates with other institutions, the lower the motivation of students towards entrepreneurship (entrepreneurship is viewed, in this context, as being entrepreneurial and having 'entrepreneurial intent' and it is not just related to students' interest in starting up a company).

The wider environmental variables which were included in the analysis, led to the following data results: the more a university collaborates with other institutions, the lower their motivation towards the entrepreneurship of undergraduate students⁸⁶.

In parallel to the EEP, there are also examples of universities and regions which are building up their own studies based on EEP data. The University of Lisbon in Portugal uses EEP data to analyse its results in comparison to those from Portuguese students from other universities. The university is committed to

⁸³ Vanevenhoven and Liguori (2013).

⁸⁴ According to interviewees.

⁸⁵ Vanevenhoven and Liguori (2013).

⁸⁶ Vanevenhoven and Liguori, (2013, p. 322).

continue evaluating the impact of entrepreneurship education on students' entrepreneurial intentions over a period of time.

4.3 Methodology of the measurement

The EEP research programme is designed to empirically study the underlying phenomena of the transformation from student to entrepreneur. Therefore, the work of the EEP measures the effect of entrepreneurship education at the individual level. The EEP looks at the increased motivation of students to regard entrepreneurship as a career option or way to enhance employability. Therefore, the project attempts to isolate the outcomes and impact regarding the 'pathway' to becoming an entrepreneur.

In order to understand the impact at the individual level, the project also collects data on 'ecosystem variables' which give insight into how external factors affect the student. These ecosystem variables include factors such as relations with the external environment (stakeholders, access to funding, etc.).

4.3.1 Research questions

In its attempt to measure impact over a 10-year period, the EEP creators defined seven pathways of potential empirical research and corresponding potential research questions which were delivered through a survey:

- ➔ What are the relationships of an individual's inputs (individual factors) to the motivational processes underlying the pursuit of entrepreneurship?
- ➔ What are the relationships of environmental influences to the motivational processes underlying the pursuit of entrepreneurship?
- ➔ Will these expected relationships differ across cultures?
- ➔ Will these expected relationships differ for members of dominant and non-dominant groups?
- ➔ Will these expected relationships differ for students who are engaged in entrepreneurship education?
- ➔ What are the relative contributions of antecedents in explaining variance in entrepreneurial self-efficacy (ESE) and intentions?
- ➔ What sequence structures work and why do those structures work?

4.3.2 Sample of the study and data collection tools

The first phase of the study involved over 18,000 students from more than 400 institutions. No control group was included. The intention of the project was to collect data on an annual basis for the duration of the 10-year project and provide robust comparable data on the long-term impact of entrepreneurship education on the individual. This is now being modified, due to methodological challenges; phase 2 of the survey will closely assess additional individual inputs and career-related constructs that were not included in phase 1⁸⁷.

Phase 2 is currently underway, but there have been issues concerning collecting good response rates⁸⁸. This is attributed to the fact that researchers have to follow up with individuals who have left the universities (which means that contact details need to be found and verified) and the possibly declining motivation of respondents to continue participating in the study. According to researchers, the challenges to keep high response rates are common in longitudinal surveys: so, including a large cohort is important. The lower

⁸⁷ As stated by the lead researchers.

⁸⁸ However, satisfactory response rates are observed in Canada, Brazil and some countries in Africa.

response rate in phase 2, compared to phase 1, has led to some significant changes to the research methods used in phase 2; phase 2 data is being collected from the students that participated in phase 1, but also current students of the collaborating universities. This is effectively repeating phase 1 and will serve to develop a comparative longitudinal study.

Data for phase 1 was provided by the participating universities, so the study designers did not have any control over who responded to the survey. The phase 1 survey included 183 questions. Some of the values and questions included are presented in the table below.

Table 4.1 Selected values and associated questions included in the EEP survey

Values	Examples of questions
Altruistic values	People should be willing to help others who are less fortunate
Altruistic values	Those in need have to learn to take care of themselves and not depend on others
Altruistic values	Personally assisting people in trouble is very important to me
Entrepreneurial intent	Never search for business start-up opportunities
Entrepreneurial intent	Are saving money to start a new venture
Entrepreneurial intent	Do not read books on how to set up a venture
Entrepreneurial intent	Have no plans to launch your own venture
Empathy	I often have tender, concerned feelings for people less fortunate than me
Empathy	Sometimes I don't feel very sorry for other people when they are having problems
Self-efficacy	Come up with a new idea for a product or service on your own
Self-efficacy	Brainstorm with others to come up with a new idea for a product or service
Allocentricism/idiocentrism	I'd rather depend on myself than others
Allocentricism/idiocentrism	I rely on myself most of the time; I rarely rely on others
Entrepreneurial outcomes expectations	Financial rewards (personal wealth, increase personal income, etc)
Entrepreneurial outcomes	Independence/Autonomy (personal freedom, be your own boss, etc)
Entrepreneurial outcomes	Personal rewards (public recognition, personal growth, to prove I can do it, etc)

Source: Sample phase 1 survey provided by an interviewee

In order to engage respondents, the survey was advertised across universities, courses and different websites. As well as advertising the study, the project directors also contacted around 2,500 professors teaching entrepreneurship, 476 of which agreed to participate and 1,263 are still considering it⁸⁹.

⁸⁹ 2012 data.

The data gathered is not publicly available. After completing their own data collection and submitting the results, collaborators/points of contact at each participating institution can freely access the dataset and use and publish the data however they see fit⁹⁰. The central research team is also supported by about 300 additional researchers that actively collaborate on the project and provide time for data cleaning and data analysis.

The analysis is carefully designed in order to understand the entrepreneurial intentions in the most comprehensive way possible⁹¹. As such, the questions devised were based on the Social Cognitive Career Theory construct measuring several key aspects:

- entrepreneurial intentions,
- general self-efficacy,
- entrepreneurial self-efficacy,
- entrepreneurial outcome,
- prior exposure to entrepreneurship,
- subjective norm,
- strength of entrepreneurial identity, and
- entrepreneurial ecosystem.

All of the aspects were measured through various scales.

Entrepreneurial intentions were evaluated using a six-item scale⁹². Some of the sample statements involved, for example, *I never search for business start-up opportunities* and *I intend to set up a new venture in the future*.

The measurement of **general self-efficacy** was collected through a 10-item scale⁹³. Students were asked their opinions on statements such as, *I can always manage to solve difficult problems if I try hard enough* and *I can remain calm when facing difficulties because I can rely on my coping abilities*.

The section on **entrepreneurial self-efficacy** was approached with a modified 18-scale tool⁹⁴. The EEP research directors proposed to have a distinction between developing a venture idea on their own and by a collaborative effort through a brainstorming session with others. This was based on the assumption that ideas could appear through both activities, but in some cases, ideas could appear as a result of only one activity.

Entrepreneurial outcome expectations were measured using a four-item scale asking students to indicate the extent to which they think they would achieve financial reward, independence/autonomy, personal reward and family safety by starting their own venture.

In order to understand the relationship of students' confidence and entrepreneurial aspirations to their prior exposure to entrepreneurship, the research directors used a modified version of a scale⁹⁵. The respondents were asked whether their parents, siblings or grandparents had ever started a new company and whether they had held a paying or non-paying position in a new company. Furthermore, the students were asked to indicate their confidence in their ability to successfully start and run a business. A further scale was used to

⁹⁰ Subject to permission being granted from the other collaborators.

⁹¹ According to lead researchers.

⁹² Modified from the original that was developed and validated by Thompson (2009).

⁹³ Schwarzer and Jerusalem (1995).

⁹⁴ Originally developed by McGee et al. (2009).

⁹⁵ Developed by Carr and Sequeirira (2007).

see the relevance of their prior exposure to entrepreneurship in regards to their confidence towards starting their own venture.

The research directors included the measurement to indicate the subjective norm of the individual and this was implemented through a 16-scale tool that asked respondents about their opinions of various people in their life in relation to their choices. After this, the respondents needed to indicate the importance of these people.

The strength of respondents' entrepreneurial identity and aspiration was analysed through a six-item measure by asking students to rate their agreement on a five-point Likert scale. Examples of the rating items were: *I often think about becoming an entrepreneur* and *When I think about it, the term 'entrepreneur' fits me pretty well*.

Lastly, the results were put alongside measures of the entrepreneurship ecosystem. These measures regarded the university's inter-relations with external stakeholders on matters relevant to entrepreneurship. The measure includes an indication of collaborations between the university and local, state and federal agencies and institutions, as well as any relevant funding that might support the university. Additionally, the researchers looked at the existence of other extracurricular activities that might promote entrepreneurship in any way.

4.3.3 Assessing the methodology of measurement

The theoretical framework of Social Cognitive Career Theory underpins the development of this longitudinal study. The approach is very well founded in the theory used and tests a number of hypotheses. The questions used in the survey are also drawn from academic sources; this strengthens the soundness and validity of the tool.

The large sample, number of institutions involved and duration of the project provide enormous potential for a longitudinal study. However, annual follow-ups over a 10-year period can be considered ambitious, given the methodological challenges; indeed, there are already difficulties in following up after the first phase, as underlined earlier. The adjustments to the survey tool and/or the research approach that the project team may decide to use to tackle the methodological challenges can offer significant information and guidance to other institutions/stakeholders/countries that are interested in launching longitudinal surveys.

4.4 Using the results of the impact measurement

Each collaborating university has a contact person who is in direct communication with the research team. This 'university collaborator' supports the university in disseminating the survey among students. S/he also collects additional information when asked by the research team.

EEP results are not made publicly available, but each collaborator receives all of the data as soon as the collection at that respective phase is completed. Universities can use the EEP data to compare/benchmark their results to achieve internal goals. The research directors strongly encourage university collaborators to work with each other and use the EEP data to develop new research projects.

The data has therefore been used by collaborating universities, but also by national governments in some cases. For example, EEP data is used as a source for a government report on entrepreneurship education in Brazil. The Canadian universities that participate in EEP have replicated the form of the study, used a number of the questions and combined the EEP work with their priorities to understand what works best in their provinces regarding entrepreneurship

education. In Ecuador, the measurement tool is being adapted for the school sector⁹⁶.

Concerning the type of impact measured, the data is not being used to measure the effect on society and the economy at present, and the core research team is not intending to expand the research in this direction. However, links to the measurement of institutional/organisational impact could be made, even though this is not the focus of the research; members of the core research team believe that the collection of data and feedback can be expected to have an impact on the participating universities. In addition, the core research team is interested in the environmental influences at the institutional level and how they help or hinder entrepreneurial attitudes, without intending to benchmark it. This includes different aspects of the students' environment, such as the type of institution, accessibility to incubators, existence of scholarships and student support, additional courses, etc.

According to the lead researchers, the core research/project team is currently producing a new publication which will include phase 2 results and also provide new insights into the entrepreneurial activities of certain regions.

EEP is hosting its first conference in 2014, which will gather collaborators and all interested parties dealing with entrepreneurship education. The results produced up until this point will be presented and discussed in the conference.

In addition to the survey, the project includes a number of supporting activities which have been inspired by the EEP's work. One of these is a partnership with USABE (United States Association for Small Business and Entrepreneurship); the two parties have created USASBE 'Launch,' a national student business model competition. The partnership with USASBE also involves the support and sponsorship of other programmes across universities in the USA.

4.5 Conclusions

The EEP can be considered unique in many aspects; it is the first effort with the aim of measuring the impact of entrepreneurship education on undergraduates that involves a 10-year longitudinal approach on a global scale.

Given the longitudinal approach and the fact that the survey touches upon students from several countries/cultural backgrounds, the methodology used by EEP can inspire other similar efforts, especially those that include samples from more than one country and/or institution. The robustness of the data is guaranteed by the adherence to strict standards in social science research. The methodology is based on existing studies and critiqued approaches. The EEP also uses each phase to feed into the design and development of the next one. This includes a feedback loop from the collaborators into the process of research, which means that the process continuously improves. The characteristics of the project (long duration, great number of institutions and very large sample) also pose methodological challenges that have been identified even after phase 1. These challenges can offer guidance to parties that are interested in launching a similar project. The next steps taken in the EEP methodology may offer valuable examples on how to overcome such challenges.

However, the EEP is still in its early phases (phase 1 and 2). Results are only available for phase I (access to quantitative data is only available to participating universities), but in the long term, results are expected to provide evidence of the long-term impact of entrepreneurship education interventions on the undergraduates.

⁹⁶ Information provided by the interviewees.

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5 Case Study 5: ASE Teacher training activities

5.1 Description of the strategy / initiative

This case study is about the teacher training activities of the *Walloon Agency for Economic Stimulation* (ASE), in particular the *Entrepreneurship Spirit Programme*⁹⁷. In 2012 the ASE commissioned the 'Survey on Entrepreneurship Spirit in Education' in order to measure the impacts of the programme. Its objectives were to evaluate how teachers and heads of school in Wallonia understand and perceive entrepreneurship spirit and how they integrate it in their professional activities. The survey also aimed at assessing the effectiveness of the ASE's actions on their target groups. Impact was essentially measured at the individual level (teachers/heads of schools). To some extent, the results can be extrapolated to the level of pupils/students (individual) and schools (organisational).

The *Walloon Agency for Economic Stimulation*⁹⁸ (ASE) was created in 2006 by the Walloon Government in the framework of the Marshall Plan⁹⁹, to act as the umbrella organisation for boosting economic development and business creation in Wallonia. One of its target groups is (aspiring) entrepreneurs and business leaders. The ASE raises their awareness about business creation and business opportunities in Wallonia, and provides support throughout the business creation cycle.

The ASE also works with students and teachers – from all levels, but mainly secondary and higher education because, according to one interviewee from the ASE, these are the levels where the most significant impacts can be achieved. The ASE aims to develop entrepreneurship in Wallonia through, *inter alia*, awareness raising activities about entrepreneurship spirit and business creation. Entrepreneurship spirit has been defined by the ASE around six core competences¹⁰⁰, namely team spirit, self-confidence, creativity, spirit of initiative, sense of responsibility and perseverance. The *Entrepreneurship Spirit Programme* essentially targets teachers (at all levels), because they are considered by the ASE to be the best actors to transfer entrepreneurial behaviours to young people. The programme is focused around different axes:

- ➔ An operational team of 'awareness-raising agents', i.e. teachers sent on secondment¹⁰¹, who promote the ASE's activities, methods and tools in schools and monitor the actions set up by teachers and heads of schools in relation to entrepreneurship.
- ➔ A portfolio of actions ('animations') to develop the entrepreneurial attitudes of young people, in partnership with agreed organisations. At the level of entrepreneurship education, 10 transversal actions have been selected across Wallonia (two at primary level, five at secondary level and three at higher education level) targeting two main stakeholders (*Jeunes Entreprises* and *ICHEC PME*). At the level of business promotion and creation, six actions have been selected (two in the domain of 'entrepreneurship guidance', two actions to promote female entrepreneurship and two actions of rapid advice on the project).
- ➔ Annual calls to develop entrepreneurial projects at schools. The objective of these grants is to support teachers/heads of schools in setting up

⁹⁷ Programme Esprit d'Entreprendre.

⁹⁸ Agence de Stimulation Economique.

⁹⁹ Name given to the recovery plan launched by the Walloon Government in 2004.

¹⁰⁰ Guide de pédagogie entrepreneuriale, ASE, 2014.

¹⁰¹ 5 ½ full time staff in 2014.

innovative actions, developing their networks with other schools and helping their pupils/students to become more entrepreneurial. They also aim to develop certified 'entrepreneurial schools' (agreement signed by the school recognising the importance of entrepreneurship education and supporting teachers in implementing activities). One example of activity set up at higher education level thanks to an entrepreneurial grant, is provided in the following box.

- ➔ Awareness-raising workshops on entrepreneurship spirit, which are regularly organised in Wallonia and target teachers. The objective is to raise awareness, present the tools prepared by the ASE and test new ideas among teachers. Seven workshops have been organised since 2009.
- ➔ Pedagogical tools prepared by the ASE which were provided to teachers / future teachers. So far, eight pedagogical tools have been made available to teachers (paper and/or electronic version), e.g., on the business creation cycle, entrepreneurial pedagogy, and games to stimulate reflection and develop entrepreneurship spirit.
- ➔ Awareness-raising activities ('acculturation') for future teachers in the framework of the *Marshall Plan 2.vert.*
- ➔ Partnerships with Wallonia universities: University of Liège, Catholic University of Louvain, and the University of Mons (project *UMONS Entrepreneur 3.0*). Contacts are in place to develop a similar partnership with the University of Namur.
- ➔ Partnerships with student associations, junior enterprises and clubs of entrepreneur students. All the 18 student associations in the region were in contact with the ASE.
- ➔ Ad-hoc partnerships and pilot actions; the ASE regularly supports ad-hoc and punctual initiatives, e.g., internships for students in companies, Euroskills, development of entrepreneurship spirit in the environment sector, etc.

Example of activity set up with an entrepreneurial grant from the ASE

The *Gramme Confessional High School*¹⁰² in Liege is setting up a new course on entrepreneurship for engineering students in their second year of their master's degree, starting in September 2014. The course supervisor is a Walloon entrepreneur, who will be assisted by consultants from a Walloon incubator for engineering sciences. Based on real life examples, groups of students must develop potential business ideas and create their own company to commercialise the project. They will receive 10 coaching sessions with entrepreneurs guiding them throughout the project creation cycle (e.g., business plans, marketing, sales, etc). The course has been developed outside the 'classical' academic curriculum, in the sense that students are the main actors of their course and they can develop any idea they like. The assumption is that in this type of industrial engineering curriculum, potential entrepreneurs exist and need to be supported with appropriate tools and guidance. The objective is to help them develop 'soft' entrepreneurial skills (e.g. adaptability, team work, creativity, etc) and become more pro-active and flexible, thus more entrepreneurial.

Positive elements of this pilot action include: the introduction of an innovative

¹⁰² Haute Ecole Libre Gramme (HELMO Gramme).

course in a traditional curriculum; involvement of different stakeholders in the course management (e.g. entrepreneurs as supervisors, external consultants providing concrete advice, or teachers who followed a specific training course on entrepreneurship); the central role given to students (freedom of choice, opportunity to meet potential investors, possibility to create their own business); and the provision of tools and advice to help them think 'outside the box.'

The ASE uses several tools and indicators to implement activities and measure results. One of the key indicators is the 'penetration rate', i.e. the percentage of schools that have been 'visited' at least once by awareness-raising agents (agents went to a school, met the head of school or teacher[s] and presented their actions/tools to enhance entrepreneurship spirit). In 2014, 605 out of the 653 target schools (secondary/higher education) had contact with awareness-raising agents, hence a penetration rate of 93 per cent¹⁰³. Another indicator used by the ASE is the number of entrepreneurship-related actions set up in schools. In 2014, 414 out of the 653 target schools have implemented at some point at least one action to develop entrepreneurship spirit or one entrepreneurial project with an ASE grant (63 per cent). In addition, 354 out of the 1,479 primary schools (24 per cent) participated, within the last three years, in at least one action proposed by ASE partners (*LJE* or *ICHEC-PME*)¹⁰⁴.

The ASE developed software (*Pilot-ee*) that is shared with 'visited' schools, which can update it with information on the projects/activities set up at school-level. This database is updated three times a year by teachers/heads of schools, and on a regular basis by ASE agents, who can monitor the number and types of teachers and pupils/students reached by the activities. Based on this information, the ASE assessed that approximately 180,000 pupils/students (39 per cent at primary level, 38 per cent at secondary level and 22 per cent at higher education level) were reached – directly or indirectly – by ASE awareness raising activities over the 2007-2013 period. Among them, approximately 153,000 were reached by actions led by awareness-raising agents, around 24,000 were reached by grants for 'entrepreneurship projects', and approximately 3,500 were reached by other programmes (partnerships with universities, student associations, etc). Given the overall budget invested in actions targeting this group, the average investment is EUR 33 per pupil/student. Similarly, the ASE estimates that 4,900 teachers were reached overall¹⁰⁵ – mainly through participation in awareness-raising activities and trainings/workshops, meeting with awareness-raising agents or the implementation of entrepreneurial project(s) with the support of ASE.

In the framework of its awareness raising mission about entrepreneurship spirit, the ASE decided to launch a survey among teachers/heads of schools to evaluate the way they comprehend the concept of entrepreneurship and the extent to which they integrate it in a professional context. The drivers for measurement were mostly internal. Indeed, it is part of the ASE's culture to constantly monitor its activities and regularly evaluate their effects. They were not required to launch an evaluation, but felt that it was a good time to do it, because it coincided with the end of the first Marshall Plan. They initially launched a survey of teachers – followed two years later by a survey of pupils/students. The survey of teachers focused on assessing the impacts of all the above-mentioned measures conducted by the ASE to raise the awareness of teachers/heads of school about entrepreneurship spirit.

¹⁰³ Figures provided by the ASE on its website. [online] Available at: <http://www.as-e.be>

¹⁰⁴ Ibid.

¹⁰⁵ Ibid.

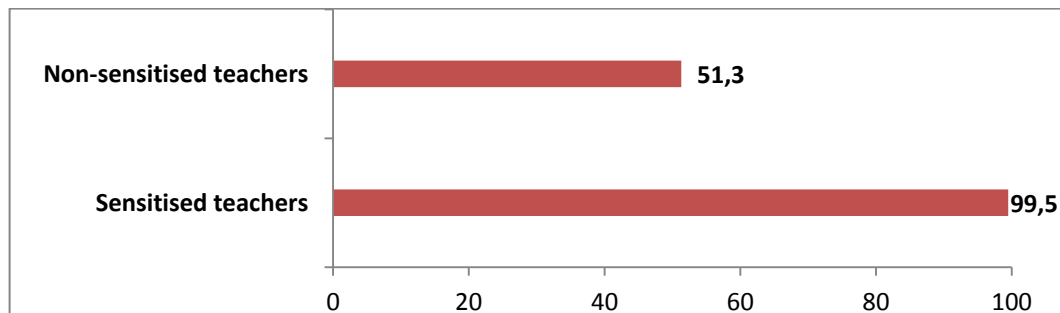
5.2 Results of the impact measurement

The survey was conducted by an external consultant (*Newcom*) who highlighted meaningful results by crossing variables between respondents in terms of gender, age, education level and previous knowledge/awareness about entrepreneurship spirit. The results notably show, through the comparison of teachers/heads of schools who were previously 'visited' by awareness-raising agents and teachers/heads of schools who were not (indirect control groups), that those who were already aware of entrepreneurship spirit have a better comprehension, more positive attitude and set up more actions related to entrepreneurship.

Some of the most meaningful results observed through the crossing of variables are presented below. They highlight relatively significant differences between 'sensitised' and 'non-sensitised' teachers/heads of schools – depending on their initial level of awareness. This in turn tends to show the positive impact of the ASE's activities for this target group.

As illustrated in the graph below, knowledge about entrepreneurship spirit is much higher among teachers/heads of schools who were previously visited by the ASE's awareness raising agents. Regarding the channels of awareness, the sensitised respondents are more likely to mention several information channels, notably through an awareness-raising agent (52 per cent), personal interest (27 per cent), awareness from colleagues (20 per cent) and awareness from school direction (20 per cent). However, less than half of the non-sensitised respondents were able to mention one information channel.

Figure 5.1 Have you ever heard of entrepreneurship spirit?

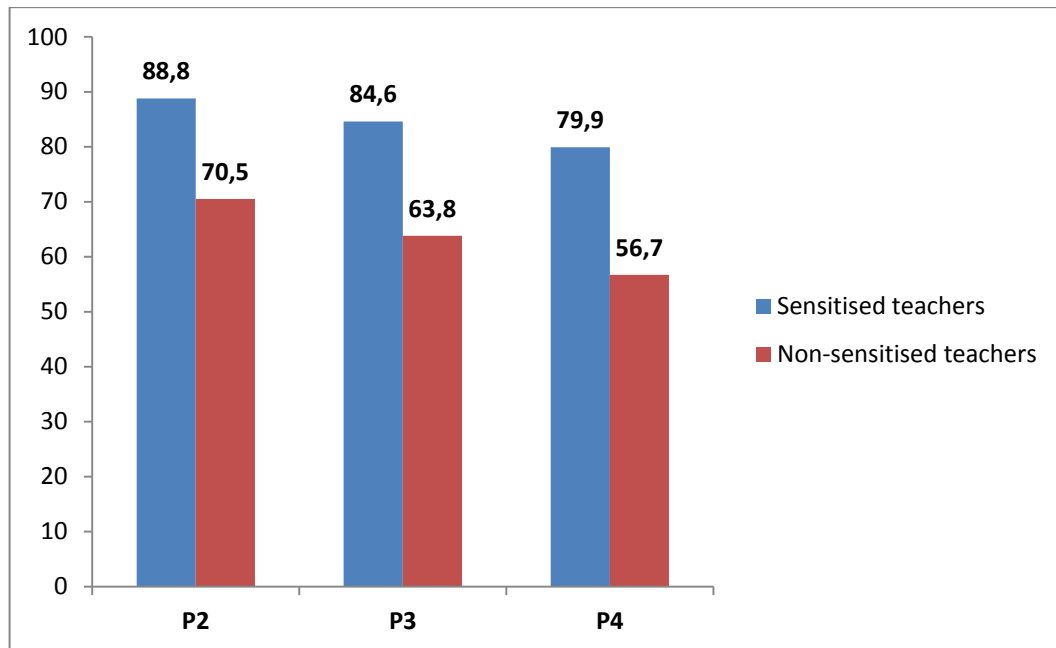


Source: Survey on Entrepreneurship spirit in education, ASE, June 2012

As illustrated in the following table, all the propositions upon which respondents agree are more widely accepted by the 'sensitised' respondents than the 'non-sensitised' ones. The results are relatively significant from a statistical point of view. The propositions included the following:

- ➔ P2: Entrepreneurship spirit is useful in the socio-educative sector;
- ➔ P3: Entrepreneurship spirit already starts at the primary level; and
- ➔ P4: Entrepreneurship spirit is a topic that concerns education/teaching.

Figure 5.2 Level of agreement of 'sensitised' and 'non-sensitised' teachers on different propositions

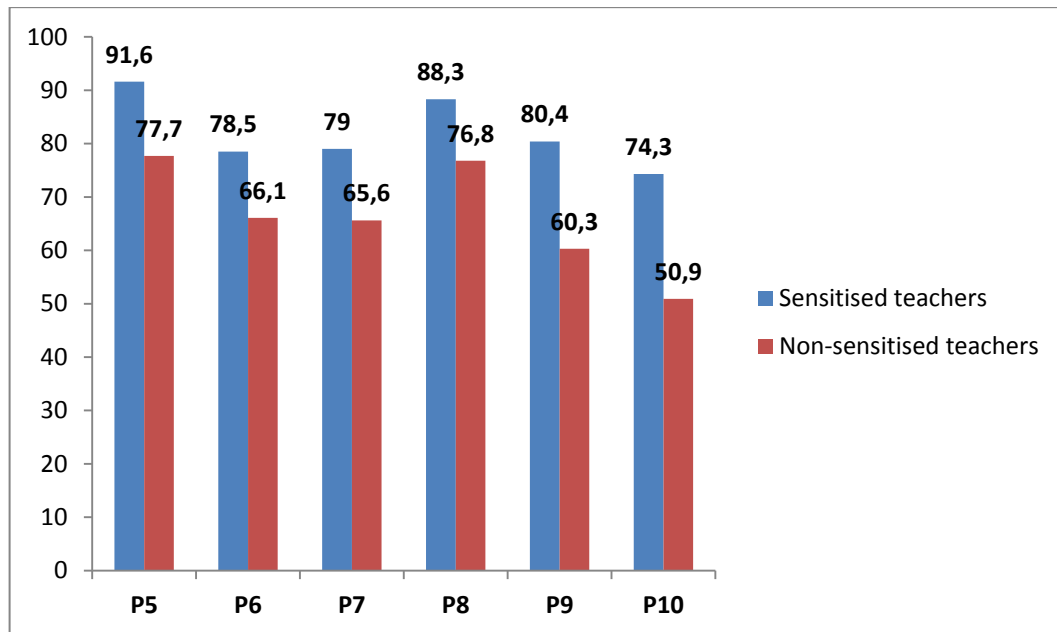


Source: Survey on Entrepreneurship spirit in education, ASE, June 2012

Similarly, as illustrated in the following table, for the propositions on which respondents disagree, the proportion of 'sensitised' respondents is higher than the proportion of 'non-sensitised' respondents. The results are relatively significant from a statistical point of view. The propositions included the following:

- P5: Entrepreneurship spirit is essentially composed of technical competences;
- P6: Entrepreneurship spirit essentially concerns the general education level;
- P7: Entrepreneurship spirit essentially concerns vocational education;
- P8: Entrepreneurship spirit essentially concerns technical /professional education;
- P9: Entrepreneurship spirit essentially targets those who want to create their own business or become independent; and
- P10: Entrepreneurship spirit is a trend.

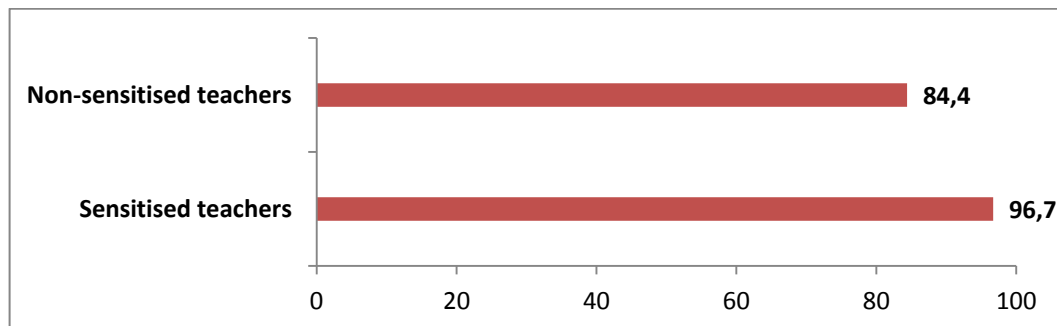
Figure 5.3 Level of disagreement of 'sensitised' and 'non-sensitised' teachers on different propositions



Source: Survey on Entrepreneurship spirit in education, ASE, June 2012

Regarding the agreement of teachers/heads of schools on the concept of entrepreneurship spirit, 'sensitised' respondents are more likely to agree with the principle of developing it in education.

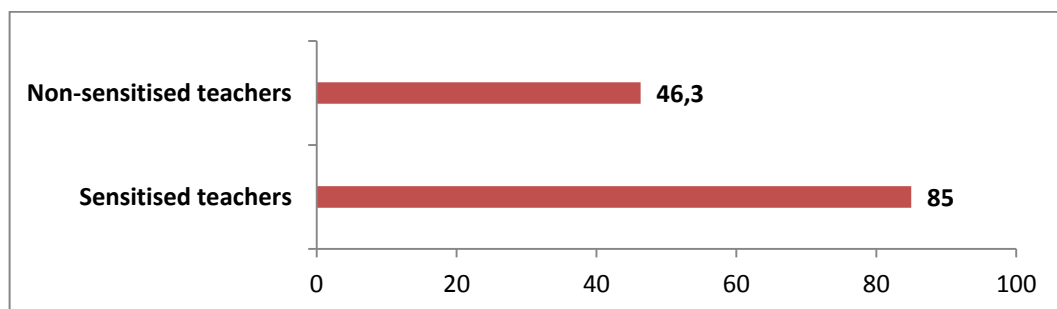
Figure 5.4 Do you agree with the principle of developing entrepreneurship spirit in education? (% of agreement)



Source: Survey on Entrepreneurship spirit in education, ASE, June 2012

As for implementation, 'sensitised' respondents are more likely to have participated in at least one concrete action. The result is statistically significant.

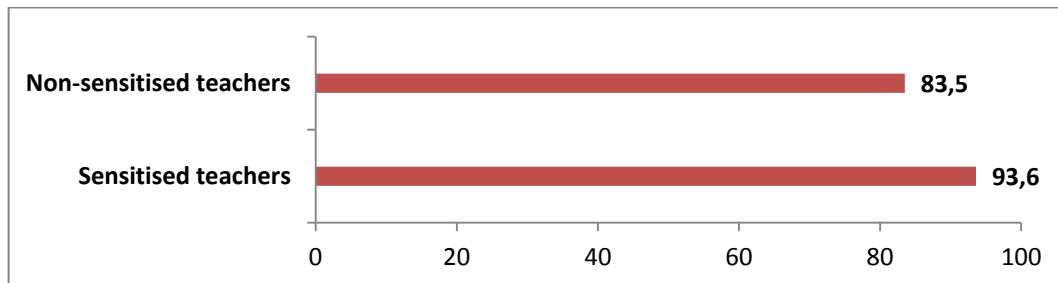
Figure 5.5 This year, have you participated in at least one concrete action (% of agreement)?



Source: Survey on Entrepreneurship spirit in education, ASE, June 2012

Eventually, 'sensitised' teachers/heads of schools are proportionally more likely to declare that they have observed effects on their pupils/students following the implementation of activities.

Figure 5.6 Have you observed effects on your pupils/students following actions (% of agreement)?



Source: Survey on Entrepreneurship spirit in education, ASE, June 2012

Other key evaluation results show that:

- ➔ Almost 100 per cent of the teachers who were previously visited by ASE's awareness raising agents know about the notion of 'entrepreneurship spirit'. This knowledge decreases to 51 per cent among teachers who were not visited by the ASE's agents at all.
- ➔ A large majority of teachers overall (92 per cent) understand the importance of entrepreneurship spirit and the need to develop it at school. This proportion is even stronger among teachers targeted by the ASE's awareness raising activities (97 per cent).
- ➔ The three main types of actions implemented by teachers include the following:
 - adaptation of courses,
 - organisation of special projects, and
 - testimony from external stakeholders.
- ➔ Overall, 89 per cent of the teachers who implement entrepreneurship actions in school observe effects on their pupils/students. This proportion is even higher (94 per cent) for the teachers who were previously targeted by the ASE's awareness raising activities. The main effects observed among pupils/students are: better acquisition of knowledge; positive evolution of behaviour in class; better understanding of the socio-economic environment; clearer vision on their future professional orientation; pupils/students talk more about becoming entrepreneurial; and they talk positively about 'business'.

In the short-term, the evaluation shows that the activities conducted by the ASE engendered increased interest and changes in attitudes among teachers/heads of schools (individual level); increased engagement of both teachers/heads of schools and pupils/students (individual level); and increased staff motivation to set up entrepreneurship-related activities and use new tools (organisational level).

In a more medium-term perspective, according to the ASE, the evaluation provides evidence of the positive attitudes of teachers/heads of schools about entrepreneurship. These encouraging signs are indirectly confirmed by the positive evolution of the 'Total Entrepreneurial Activity' indicator in Wallonia, which was measured as part of the Global Entrepreneurship Monitor¹⁰⁶, and by

¹⁰⁶ [online] Available at: <http://www.gemconsortium.org/>

the positive appreciation of foreign stakeholders who consider Wallonia as an inspiring region in terms of entrepreneurship.

It is more difficult to identify impacts in the long-term at societal or economic level, because the ASE activities have been in place only for a few years, and the evaluation was conducted recently (2012).

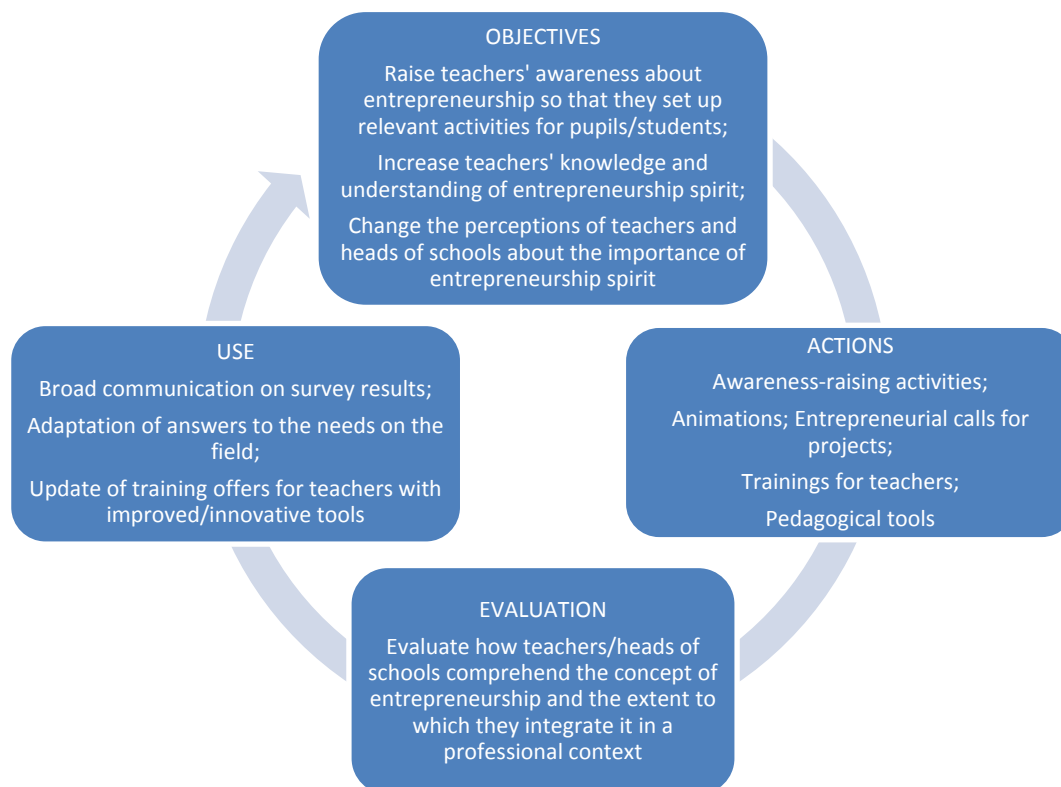
As mentioned above, the drivers for measurement were essentially internal to the ASE and linked to their monitoring and evaluation culture. The end of the first *Marshall Plan* and the launching of the *Marshall Plan 2.vert* provided good timing to conduct the evaluation. Other objectives for launching the evaluation included the willingness to raise awareness about the ASE in Wallonia, to show that their activities were useful and made sense, to be in a better position to conduct activities with new schools, and to show the Government that due to recent positive developments, investment needed to be (at least) kept at the same level for the next financing period.

5.3 Methodology of measurement

The survey of teachers/heads of schools was commissioned by the ASE itself. It consisted of a one-off impact measurement, conducted in parallel with the more frequent monitoring of awareness-raising activities implemented by the ASE. The objectives were to evaluate how teachers/heads of school understand and perceive entrepreneurship spirit, and how they integrate it in their professional activities, as well as to assess the effectiveness of the ASE's actions on influencing their target groups.

The general objective of the survey was to measure the teachers' perception/vision about entrepreneurship spirit. The specific objectives were to assess whether they understand the importance of entrepreneurship as a concept/notion, whether they set up actions to develop entrepreneurship spirit at school and whether they observed effects/impacts on their pupils/students. The ultimate objective of the survey was to evaluate the extent to which awareness raising actions set up by the ASE and the targeting of teachers/heads of school were effective, i.e. managed to change their perception about entrepreneurship spirit.

A chain of actions summing up the evaluation process is presented in the following diagram.



Following a call for proposals, the communication consultancy Newcom was selected to carry out the measurement. The questionnaire was prepared by the ASE and Newcom made suggestions to improve it. Due to data availability issues (data protection for teachers/heads of schools, refusal of the French Community authorities to share data), Newcom proposed alternative options to reach target groups, i.e. conducting telephone interviews with school directors and conducting face-to-face interviews with teachers in a sample of selected schools. The ASE disagreed with the two options proposed, while they eventually agreed to launch an online survey through two main channels on the one hand, the ASE contacted all the teachers/heads of schools of their internal database; on the other hand, Newcom contacted all school directors by mail (including a recommendation letter from the Ministry of Education), asking them to promote the survey internally with flyers and posters providing links to the survey. Newcom also reminded by telephone the schools which did not respond. The ASE was aware of the potential positive bias of teachers whom they contacted, and who may be more aware and positive about entrepreneurship spirit. The results of the survey were compiled in a report and published by the ASE on its website.

The survey covered all levels of education (primary, secondary and higher education) at regional level (Wallonia and the francophone part of Brussels). The number of teachers in the region was estimated by the ASE at 100,000 when the survey was launched. In total, 779 respondents participated in the survey: 76 per cent identified themselves as teachers and 19 per cent as heads of schools. According to Newcom, the results cannot be considered to be representative of the perceptions of the average teacher in Wallonia. The ASE believes however, that the sample is large enough to be considered significant and allows relevant conclusions to be made.

The online survey was administered through the Sphinx software. Respondents were provided with an introductory text presenting the survey and explaining the steps to follow to complete it. The visual identity used was the same as the one used in the flyers and posters promoting the survey in school. Newcom did not use a control group per se, notably since the budget was insufficient. However,

given that one of the objectives of the evaluation was to assess the extent to which the activities conducted by the ASE had an impact on the groups targeted, the results were analysed separately for two types of respondents:

- ➔ the respondents considered to be 'sensitised' (214), i.e. who had already heard of the ASE and its awareness-raising agents and who were invited to respond to the survey by an email from the ASE (and thus who were part of its database); and
- ➔ the respondents considered to be 'not-sensitised' (224), i.e. who had never heard either of the ASE or of its awareness-raising agents and who were not invited to respond to the survey by an email from the ASE (and thus who were not part of its database).

The analysis of these two groups separately can therefore be considered to be a type of control group.

The survey notably covered the following aspects:

- ➔ Teachers' knowledge about entrepreneurship spirit:
 - knowledge of the ASE,
 - knowledge about entrepreneurial pedagogy, and
 - knowledge about the awareness raising agents to entrepreneurship spirit (ASE).
- ➔ Teachers' understanding of entrepreneurship spirit: several propositions were presented to participants and they were required to give their opinion: 'agree / disagree / no opinion,', for example:
 - entrepreneurship spirit is useful in socio-educational sector, and
 - entrepreneurship spirit starts at primary school level, etc.
- ➔ The agreement of teachers / heads of schools with the remit to develop entrepreneurship spirit at school.
- ➔ The implementation of actions in schools, respondents' participation in these actions, the types of actions implemented and their motivation to implement them.
- ➔ Respondents' need for further training regarding entrepreneurship spirit: 'yes / no / no answer.'
- ➔ The assessment of the impact of these actions on pupils/students and the type of effects, i.e. (i) the competences to acquire are better acquired; (ii) behaviour in class evolves positively; (iii) their understanding of the socio-economic environment is better; (iv) their vision of their future professional orientation is clearer; (v) they talk more about being entrepreneurial; and (vi) they talk positively about 'enterprise.'

The methodology used mainly included a basic evaluation with some counterfactual analysis based on the analysis made for different types of respondents. Indeed, the fact that there were two types of respondents – a 'captive public' already sensitised about entrepreneurship (contacted via the ASE database) and a more general and less aware public (contacted through heads of schools) – was exploited in the analysis of the results as a kind of control group. This enabled the researchers to examine the differences in the responses analysed, which was used as evidence of the effectiveness of the ASE's awareness-raising activities.

The survey was conducted between 1 May and 15 June 2012 among teachers and heads of schools in Wallonia. In total, 779 teachers and heads of schools responded to the survey. All teaching levels (primary, secondary and higher-education; general and professional education) and all teaching networks

(private and public schools in the different provinces of Wallonia) are represented among respondents.

In terms of the profiles of respondents, the following data can be highlighted:

- ➔ In terms of gender, there is a relatively higher representation of female respondents (59 per cent) over male respondents (41 per cent).
- ➔ The most widely represented age-groups are 25-44 (43.4 per cent) and 44-54 (39.3 per cent).
- ➔ Teachers represent three-quarters of the respondents (76.6 per cent).
- ➔ In terms of educational level, half of the respondents work at the secondary level, either general (21.8 per cent), technical (17.3 per cent) or vocational (10.4 per cent); one-third work at the higher education level (31.1 per cent); and the remaining respondents come from the primary level (15.9 per cent) or social promotion (3.5 per cent).
- ➔ Regarding the network represented, respondents are relatively equally distributed between private (confessional) and public schools (province, city or commune).
- ➔ Geographic distribution indicates that more than two-thirds of the respondents come from two provinces, i.e. Hainaut (37 per cent) and Liege (31.3 per cent).
- ➔ In terms of representation by diploma, the majority of respondents (36.5 per cent) have the AESS¹⁰⁷, followed by AESI¹⁰⁸ (16.3 per cent), 'Diplôme d'instituteur primaire' (primary school - 16 per cent), CAPAES¹⁰⁹ (11.6 per cent), CAP¹¹⁰ (7.7 per cent) and other (11.9 per cent).

Impact has essentially been measured at the individual level (teachers/heads of schools). To a certain extent, impacts can be extrapolated to the level of pupils/students (individual) and schools (organisational). However, impacts cannot be extrapolated to the societal or economic level, since this exceeds the initial objectives of the programme.

One of the main limits to the methodology used is the over-representation of positive responses, since at least 52 per cent of the respondents were already sensitised by the ASE about entrepreneurship, and therefore may be more aware and more enthusiastic about developing entrepreneurship activities at school; responses are probably positively biased.

Another potential caveat is that the results may be considered significant (relatively high number of respondents), but the sample may not be fully representative of the overall population of teachers/heads of school in the region (the ratio number of respondents/overall teachers' population is about 0.78 per cent).

In terms of methodology, the use of control groups appears essential to compare, for instance, a group that was previously sensitised to entrepreneurship spirit/education with a group that was not. The method indeed helps to compare the effectiveness of the sensitisation/awareness-raising process. As suggested by Newcom, alternative methods could include the

¹⁰⁷ *Agrégation de l'Enseignement Secondaire Supérieur*: Diploma enabling to teach in the last three years of secondary education.

¹⁰⁸ *Agrégation de l'Enseignement Secondaire Inférieur*: Diploma enabling to teach in the first three years of secondary education.

¹⁰⁹ *Certificat d'Aptitude Pédagogique Approprié à l'Enseignement Supérieur*: Diploma enabling to teach in "Hautes Ecoles" and social promotion institutes.

¹¹⁰ *Certificat d'Aptitudes Pédagogiques*: Diploma enabling to teach only technical courses or a professional practice.

organisation of two focus groups – one with a ‘sensitised’ group and one with a ‘non-sensitised’ group. This would be a more qualitative approach to understand both enabling and hindering factors to entrepreneurship education. Eventually, post-measurement could also be a credible way to measure the impact of entrepreneurship education (at least at the individual level). This could be done by surveying a group whose awareness about entrepreneurship was raised (e.g. through training, awareness-raising activities, etc) at a specific date, and surveying the same group five or 10 years later to measure the evolution of their perceptions and see which actions have been influenced in class.

5.4 Using the results of the impact measurement

The survey results were used in multiple ways. First of all, a report was published by the ASE, which summarised all important outcomes of the survey conducted. This report was used as a selling point by awareness-raising agents when visiting schools and meeting teachers, to highlight the effectiveness of the activities previously implemented by the ASE. Internally, it was also gratifying to observe that their actions made sense, hence leading to additional motivation among staff. The results of the survey were widely disseminated, notably on the website of the ASE directly, the website of the Wallonia Ministry of Education and the education portal of the Wallonia-Brussels Federation. They were also used to increase the visibility of and the awareness about the ASE in the region.

Based on the results of this evaluation, combined with the results of another evaluation targeting the 17-30 age group¹¹¹, the ASE prepared a comprehensive *Entrepreneurship 3.15* report¹¹² presenting the following information:

- ➔ assessment of the activities conducted over the 2007-2013 period (programme, activities, results, number of teachers/heads of school reached, penetration rate, results of the two surveys, etc);
- ➔ a proposal for the programme for the 2014-2020 period, based on three main axes (support entrepreneurship education; invest on the future entrepreneurs; enhance concrete business creation);
- ➔ proposed transversal actions as key factors for the successful achievement of the three axes (e.g. monitoring and evaluation, international openness, focus on transversal topics such as creativity, innovation and sustainable development, etc).

Through this report, the ASE wanted to show that, given the results achieved in the 2007-2013 period and the potential of the entrepreneurship sector in general, it would be wise for the Walloon Government to maintain at least the same level of funding for the 2014-2020 period.

Other uses of the survey conducted include a reorganisation of the training offer for teachers/heads of schools. Based on the results observed, the ASE developed a new framework of trainings for teachers/heads of schools, including the *Integrated Training on Entrepreneurship*¹¹³, which enables teachers to acquire new competences to be more innovative and better able to respond to the emerging needs of the current socio-economic context. In partnership with other stakeholders (*Impulse.Brussels*, *Adisif Enterprises*, *Indutec* and *Wallonia*

¹¹¹ The vision of 17-30 on entrepreneurship, May 2013, ASE. [online] Available at: <http://www.as-e.be>; the survey was managed by Ipsos and focused on two main topics: entrepreneurship education and business creation. In total, 531 young people between 17 and 30 were surveyed in the first trimester of 2013 through an online questionnaire (265 students and 266 graduates) and 104 through face-to-face interviews (46 students and 58 graduates).

¹¹² *Entrepreneurship 3.15*, 3 axes, 15 levers for entrepreneur generations, ASE, October 2013. [online] Available at: <http://www.as-e.be>

¹¹³ Formation Intégrée en Entrepreneuriat.

government), the ASE proposed tailored trainings and provided coaches to teachers so that they could become more entrepreneurial in their teaching methods and approaches.

Ultimately, the survey conducted with teachers/heads of schools also played a role in increasing the overall awareness of the positive impact of entrepreneurship education in general, and more particularly on the positive impact of the activities led by the ASE in this domain. While initially, the activities conducted were rather top-down (i.e. awareness-raising agents visiting schools to convince teachers that entrepreneurship education is important), they are currently observing a shift in mentalities, since more and more schools are directly requesting their support for entrepreneurship-related activities (bottom-up). Entrepreneurship is becoming more and more important in Wallonia, and many new initiatives are taking place. In this respect, the ASE plays a role in observing and monitoring the project, making sure that there are no overlaps with existing initiatives, and/or that new operators focus on responding to existing gaps.

5.5 Conclusions

- ➔ The measurement shows that the awareness-raising activities conducted by the ASE and the targeting of teachers/heads of schools had positive effects on: (i) understanding the concept of entrepreneurship spirit among targeted groups; (ii) the willingness of these groups to set up actions and/or use tools to develop entrepreneurship spirit among their pupils/students; and (iii) pupils/students themselves, who develop a more entrepreneurial attitude (developing their soft skills).
- ➔ The example also illustrates the fact that, if teachers' awareness is raised, they will be more likely to implement activities and use innovative tools and methods (teaching) to develop entrepreneurship spirit among their pupils/students. Indeed, the analysis of responses from both 'sensitised' and 'non-sensitised' teachers/heads of schools shows that those who were already aware of their entrepreneurship spirit had a better understanding, more positive attitude towards, and set up more actions related to entrepreneurship.
- ➔ Knowledge about entrepreneurship spirit is much higher among teachers/heads of schools who were previously visited by the ASE's awareness raising agents. In addition, 'sensitised' teachers/heads of schools were always more likely to agree or disagree with different propositions, while the responses from 'non-sensitised' teachers/heads of schools were less cohesive – which may indicate that 'sensitised' teachers have a more coherent view of entrepreneurship. A greater number of 'sensitised' respondents agreed with the principle of developing entrepreneurship spirit in education, and indicated they would participate in concrete actions and observe effects on their pupils/students. The differences between groups of respondents according to their previous 'sensitisation' were statistically significant.
- ➔ The evaluation highlights the positive effects of the activities conducted by the ASE in the short-term: increased interest and change in attitude among teachers/heads of schools; increased engagement of both teachers/heads of schools and pupils/students; and increased staff motivation to set up entrepreneurship-related activities and use innovative tools. In a more medium-term perspective, the results of the evaluation seem to be confirmed by the growing importance of entrepreneurship in Wallonia, characterised by the emergence of new initiatives and new actors in the sector.

- ➔ However, given the nature of the activities conducted, the example does not prove that they will have an effect in the long-term, notably at social/societal and economic level. As a matter of fact, the effects are more likely to be observed on teachers and heads of schools and, to a lesser extent, on pupils/students.

5.6 References

Entrepreneurship 3.15, 3 axes, 15 levers for entrepreneur generations, ASE, October 2013. [online] Available at: <http://www.as-e.be>

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6 Case Study 6: UPI-Creativity and innovation in primary school

The Slovenian Government funded and implemented a pilot extracurricular course - a creativity, innovation and entrepreneurship club (UPI courses = **U**stvarjalnost, **P**odjetnost, **I**novativnost) in primary schools. The course was held over two consecutive school years between 2010 and 2012. The courses were part of a broader programme to promote creativity, innovation and entrepreneurship among youth, initiated and financed by the Ministry of the Economy.

The present case study gives a brief overview of the broader programme, however it focuses in detail on the activities and especially the impact measurement of UPI courses implemented in primary schools.

The measurement provides evidence that UPI courses and entrepreneurship education clubs had an impact on students':

- creativity,
- flexibility,
- knowledge and management of the innovation process,
- entrepreneurship knowledge, and
- enhanced awareness on high school and career opportunities.

6.1 Description of the strategy / initiative:

UPI courses in primary schools were one of the activities implemented through the 'Comprehensive programme to promote creativity, innovation and entrepreneurship of young people through the integration of the activities of the local community in the years 2010, 2011 and 2012' (the Programme)¹¹⁴.

The Programme aimed to develop a long-term sustainable model for training young people in the field of creativity, innovation and entrepreneurship at primary and secondary level¹¹⁵. It was initiated and financed by the Ministry of the Economy of Slovenia and managed by the Public Agency of the Republic of Slovenia for Entrepreneurship and Foreign Investment (JAPTI which later became SPIRIT)¹¹⁶. SPIRIT has a longstanding commitment to develop entrepreneurship spirit in Slovenia. At the same time, the National Education Institute of the Republic of Slovenia has been trying for several years to develop a systematic approach towards innovation and entrepreneurship education. The Programme in 2009 presented the first coordinated step of Slovenian policy makers and stakeholders towards these goals. The European Year of Creativity and Innovation in 2009 potentially also served as a final push towards the realisation of the programme¹¹⁷.

¹¹⁴ Interviews with UPI stakeholders, April 2014.

¹¹⁵ Obrtno-Podjetniška zbornica Slovenije: 7. Vmesno poročilo o izvajanju javnega naročila št. 23/2010-4302. [online] Available at: <http://www.ozs.si/Portals/0/Media/Dokumenti/ZA%20CLANE/Izobrazevalni%20center/UPI/Poro%C4%8Dilo%20o%20izvajanju%20Projekta%20UPI.pdf>

¹¹⁶ The agency was later renamed the Public Agency of the Republic of Slovenia to promote entrepreneurship, innovation, development, investment and tourism (SPIRIT).

¹¹⁷ Interview with the Institute for Innovation and Technology, April 2014.

The Programme was divided into several parts:

- implementation of extracurricular UPI courses (creativity, entrepreneurship, innovation) in primary and secondary schools;
- development of a model to measure levels of innovativeness among young people;
- analysis of existing tools and activities to promote creativity among young people; and
- development and testing of a sustainable long term model for training in the field of creativity and innovation.

Through calls for proposals, JAPTI selected partners to carry out the programme activities.

The implementation of the extracurricular UPI courses was carried out by two partners:

- In primary schools UPI courses were implemented by the Slovenian Chamber of Craft and Small Businesses (OZS).
- In secondary schools UPI courses were implemented by the higher and vocational business education centre Gea College.

The table below outlines the expected and achieved outputs of the extracurricular UPI courses in both primary and secondary schools.

Table 6.1 Outreach of extracurricular UPI courses in 2010 - 2012

	Primary schools		Secondary schools	
	Planned	Actual	Planned	Actual
Nr. of courses offered	76	92	50	52
Nr. of schools	-	35	-	19
Nr. of pupils	780	1135	350	965
Nr. of mentors	-	150	-	60
Nr. of regions	8/12	8/12	8/12	8/12

Source: SPIRIT

The aim of the overall Programme was to support the development of the entrepreneurship spirit in the education system in Slovenia.

According to interviewees, the current school system in Slovenia does not encourage creativity and innovation, but rather limits it with its rigid structure. In general, primary school teachers value obedience more, than constant streams of questions and ideas.

Hence, the UPI courses aimed to encourage students to explore creativity, innovation and entrepreneurship in school by raising their awareness and knowledge about entrepreneurship. The programme was based on assumption that creativity and innovation can be taught¹¹⁸.

The concepts of creativity, innovation and entrepreneurial attitudes were based on the key competences approach. Whereas a definition of each of the three competences was not specifically described in the reviewed official documentation of the project, one stakeholder described his/her understanding of each of the competences in the following way:

- creativity: using something for a different purpose than initially planned;

¹¹⁸ Likar et al. (2014).

- ➔ innovation: improving an existing/established thing; and
- ➔ entrepreneurial attitude: attitude, form of operation. Trait of courage, trying out new things, being able to predict caveats.

The main target group of UPI courses in primary schools was pupils and teachers. Between 2010 and 2012, 1,135 primary school pupils participated in the courses. Thirty-five primary schools participated in the project from 8 different regions of Slovenia (out of 12 regions in total)¹¹⁹. Overall, 84 business plans were developed¹²⁰.

The development of teaching materials and the complementary analysis within the programme activities for primary schools was facilitated by an expert group. The group involved a wide range of partner institutions¹²¹:

- ➔ the National Education Institute of the Republic of Slovenia, which has an important role in shaping the Slovenian education system at pre-university level and curriculum development;
- ➔ SUN d.o.o., a private company that was among the first to start offering extracurricular entrepreneurship courses in primary schools in Slovenia in 1994. That course programme was based on an enterprise manual from Durham University Business School¹²²;
- ➔ the Chamber of Craft and Small Businesses (OZS), an umbrella organisation comprised of the craft and small businesses chamber system with 62 regional chambers;
- ➔ The Institute of the Republic of Slovenia for Vocational Education and Training,, a public institution established by the Government and the co-founders of the Chamber of Commerce (GZS) and the Chamber of Craft and Small Business of Slovenia (OZS). Among other activities, the centre develops methodologies and prepares modern modular-based educational programs of lower and secondary, along with secondary and higher professional education¹²³.
- ➔ the Institute for Innovation and Technology's main area of work is to encourage creativity, innovation and entrepreneurship in schools with the constant integration of youth and teachers and in cooperation with the economy.

Each school year UPI courses in primary schools consisted of 24¹²⁴ extracurricular hours. As noted by Cankar et al. (2012), the overall plan was based on the classic concept of innovation and entrepreneurial development. The work process focused on problem definition, observation, acquisition of ideas, prototype production and implementation. After their completion, the projects were presented in regional events attended by students, parents, teachers, mayors, entrepreneurs and the media¹²⁵.

Each of the courses were required to involve at least two local entrepreneurs (by visiting the school and giving a presentation about their business) as well as

¹¹⁹ SPIRIT internal documentation.

¹²⁰ Presentation by Chamber of craft and small business of UPI project for a conference in Brdo pri Kranju, 27 and 28 September 2012.

¹²¹ Obrtno-Podjetniška zbornica Slovenije: 1. Poročilo o izvajanju javnega naročila št. 23/2010-4302. 1. Sklop.

¹²² Halilović (2013), 97 and interview with reseracher, April 2014.

¹²³ [online] Available at: <http://www.rokodelska-akademija.si/en/node/95>

¹²⁴ Presentation by the Chamber of Craft and Small Business on the UPI project for a conference in Brdo pri Kranju, 27 and 28 September 2012.

¹²⁵ Presentation by the Chamber of Craft and Small Business on the UPI project for a conference in Brdo pri Kranju, 27 and 28 September 2012.

parents participating in the course. In addition, as part of the course, students visited at least one company and one researcher/scientist¹²⁶.

The Programme also included capacity building activities for teachers and mentors; 150 mentors for primary education received capacity building. Mentors included primary school teachers as well as people from the private sector. In general, each UPI course was led by two mentors: a primary school teacher and a mentor from the private sector¹²⁷.

Measuring the impact of the comprehensive program to promote the creativity, innovation and entrepreneurship of young people through the integration of activities in the local community in the years 2010, 2011 and 2012 was not part of the programme's initiative. However, Particija Halilović conducted an impact assessment of UPI courses in primary schools as part of her PhD research. The PhD thesis entitled, 'The impact of innovation-entrepreneurial education on development of innovation and sensibility of their inclusion into primary school system in Slovenia,' was published in September 2013.

Halilović conducted the research because of her personal interest and because the area of impact measurement of this kind of education in Slovenia was fairly undeveloped. Her PhD thesis is the first complete impact measurement of entrepreneurship education in Slovenia¹²⁸.

Apart from UPI courses described above, at the time of the research, 23 primary schools in Slovenia hosted entrepreneurship clubs, identical in structure and implementation to UPI courses. Entrepreneurship clubs were offered in collaboration with the Development Agency of Upper Carniola (SORA) and corporate center Slovenj Gradec¹²⁹.

The impact assessment included students participating in UPI courses and entrepreneurship club courses.

The aim of the basic research question of the thesis was twofold¹³⁰:

- ➔ to estimate the effects of entrepreneurship education on students in Slovenia, and
- ➔ to assess if it makes sense to implement entrepreneurship education in the primary school system in Slovenia on the basis of these effects.

The main results of the measurement and its methodology are presented in the next two sections of this case study.

6.2 Results of the impact measurement

The thesis evaluated the impact of the extracurricular UPI courses and the entrepreneurship clubs on the creativity and flexibility of pupils in primary schools. This impact was measured at the individual/student level.

The study also sought to address the impact at the organisational level. Specifically, it measured the extent to which UPI courses and entrepreneurship clubs manage to establish a creative climate in the classroom.

The results, based on comparing ex-post and ex-ante surveys among students regularly participating in the course, showed a positive impact on creativity, flexibility and the entrepreneurial skills of students. In addition, the results

¹²⁶ Obrtno-Podjetniška zbornica Slovenije: 7. Vmesno poročilo o izvajanju javnega naročila št. 23/2010-4302.

¹²⁷ Interview with Chamber of Crafts and Small Businesses, April 2014.

¹²⁸ Interview with researcher, April 2014.

¹²⁹ Halilović (2013) and interview with researcher, April 2014.

¹³⁰ Halilović (2013), 11.

suggest that UPI courses and entrepreneurship clubs affected students' decisions regarding their choice of secondary education.

A survey that ran among principals, mentors and students confirmed UPI courses and entrepreneurship clubs managed to establish a creative climate in the classroom.

Therefore, the measurement offers support to the argument that entrepreneurship education can have a positive impact both on the individual and at the institutional level.

More specifically, the results of the measurement relate to impact mapping in the following way:

- ➔ inputs/activities: entrepreneurial training for mentors, classes, and course modules;
- ➔ immediate results: entrepreneurial learning outcomes; and
- ➔ intermediate outcomes: enhanced awareness of career opportunities.

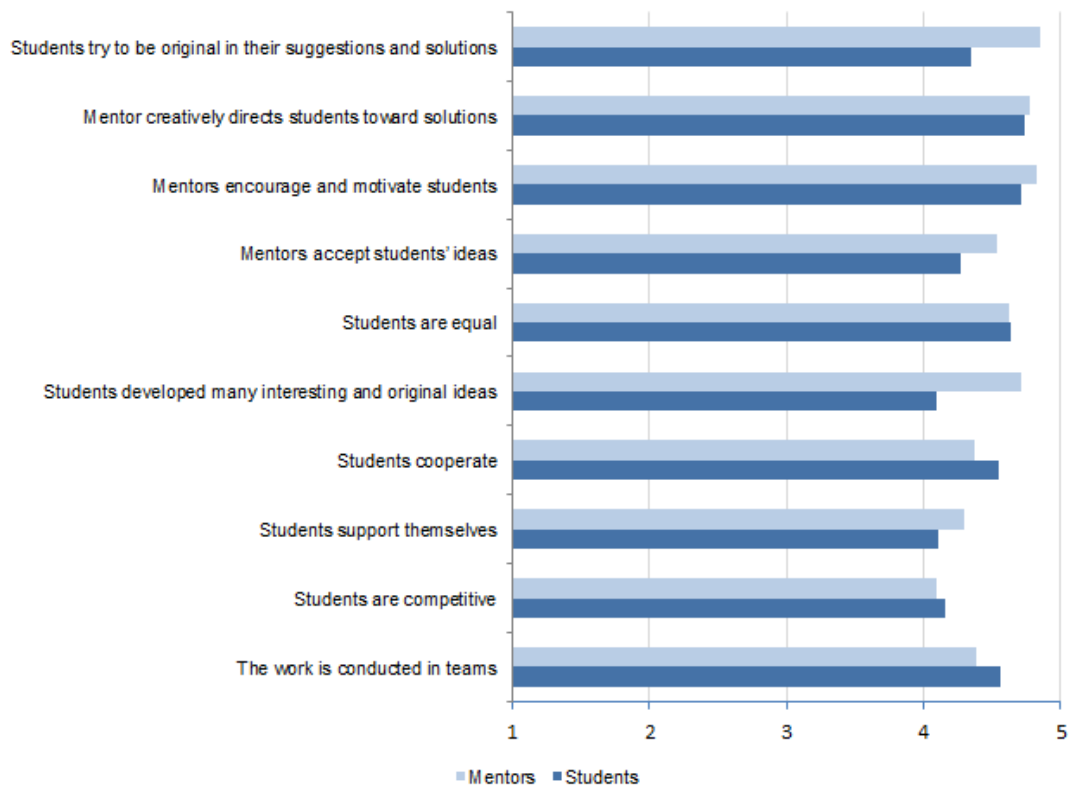
6.2.1 Results based on a one time survey with students, mentors and principals

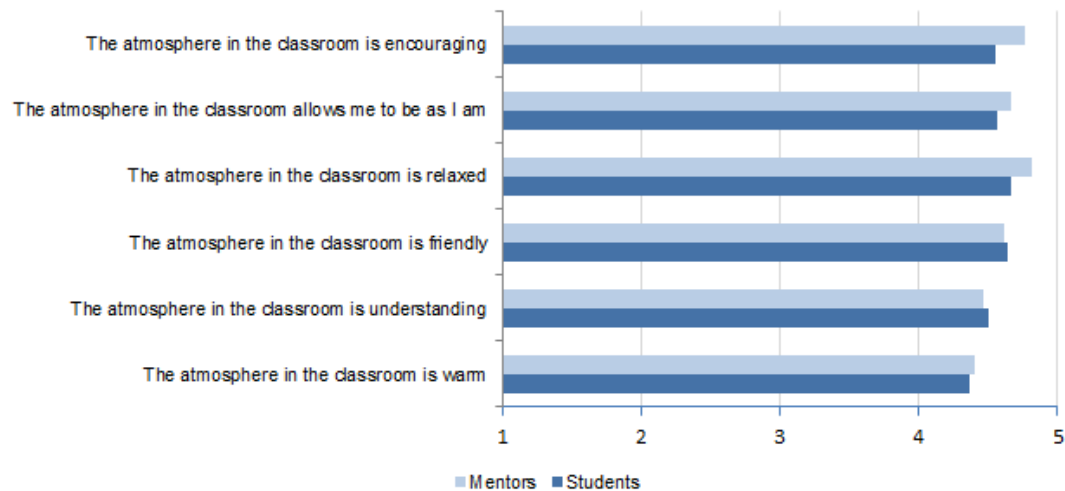
Based on the opinion of students and mentors, UPI courses and entrepreneurship clubs manage to establish a creative climate.

In addition, principals and mentors agreed that entrepreneurship education has a positive impact on flexibility, innovation, process management and the creativity of the students.

The results of the measurement activities together with the indicators (survey questions) are briefly presented in the figures below.

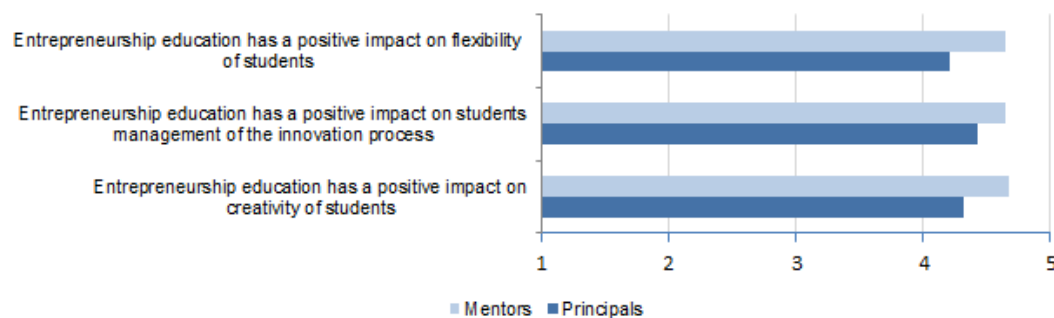
Figure 6.1 Measurement of the opinion of students and mentors regarding the creative climate in the classroom





Source: ICF presentation based on Halilović 2013, p.126-127

Figure 6.2 Measurement of the opinions of principles and mentors regarding the flexibility, innovation process management and creativity of the students attending UPI courses or entrepreneurship clubs



Source: ICF presentation based on Halilović 2013, p.142

6.2.2 Impact of entrepreneurship education on the development of students' flexibility, creativity and management of the innovation process based on ex-ante and ex-post measurement

The core of the study measured the impact of UPI and entrepreneurship education courses on students' flexibility, creativity and entrepreneurial attitudes.

Ex-post and ex-ante surveys were conducted with students regularly¹³¹ participating in UPI courses or entrepreneurship clubs. The impact was measured based on higher or lower average rates of disagreement/agreement of students with several statements (Table 6.2).

¹³¹ Students who have signed up, and attended the courses until the end of the school year.

Table 6.2 The indicators measuring the flexibility of students and the results of the impact on the flexibility of UPI courses and entrepreneurship clubs

Type of attitude measured	Indicators (the questions used to measure the attitude)	At the end of UPI courses or entrepreneurship clubs, students were more likely to
Ability to adapt	It is difficult for me to adjust to rapid changes	Disagree
	I can quickly become involved in the team or team work	Agree
	If I have troubles with understanding certain things, I ask for help	Agree
	I do not like work based on experiments, field work, round tables, role plays...	Disagree
Attitude towards diversity	If it seems my classmate has reacted differently, I do not try to understand him	Disagree
	If others do not agree with me, I do not insist, I give up	Disagree
	I never consider the proposal of the individual, with whom I disagree	Disagree
	I like to impose my opinion on my classmates and other people around me	Disagree
	In the class I like to take account of all suggestions my classmates make	Agree
	Criticism doesn't hurt me	Agree

Source: ICF presentation based on Halilović 2013, p.132-133

In the control group there were no differences observed between the ex-ante and ex-post measurement of level of disagreement/agreement.

Hence, the study concluded that the observed changes in students' perceptions about their ability to adapt and their attitudes towards diversity (described in Table 6.2) are caused by UPI courses or entrepreneurship clubs.

Changes in creativity were measured with several indicators. The results of the measurement are presented in table 6.3 below.

Table 6.3 Indicators measuring the creativity of students and the results of the impact on the creativity of UPI courses and entrepreneurship clubs

Type of ability/attitude measured	Indicators (the questions used to measure the attitude)	At the end of UPI courses or entrepreneurship clubs, students were more likely to
Ability for creative work	I do not know the definition of creativity	Disagree
	I know at least two creative methods	Agree
	I can use an object, such as paper clip, in at least four different ways	Agree

Attitude towards creativity	I acknowledge my creativity and can use it as an advantage	Agree
	Even if I do not have time, I always seek to be creative	Agree
	I make birthday presents for friends and family on my own	Agree
	I do not like creative solutions to problems	Disagree
	I like to criticise the work that was done badly	Disagree

Source: ICF presentation based on Halilović 2013, p.132 - 133

There were no differences observed in the control group of students.

Based on the above observed differences in ability for creative work (greater) and changed attitudes towards creativity, the study concluded that UPI courses and entrepreneurship clubs have a positive impact on students' creativity.

Finally, the impact measurement addressed changes in the management of the innovation process of students participating in UPI courses and entrepreneurship clubs. The indicators for measurement and the results are presented in Table 6.4 below.

Table 6.4 Indicators measuring the creativity of students and the results of the impact on the creativity of UPI courses and entrepreneurship clubs

Type of ability/attitude measured	Indicators (the questions used to measure the attitude)	At the end of UPI courses or entrepreneurship clubs, students were more likely to
Attitude towards novelty and innovation	Creativity and innovation are strongly connected	Agree
	I know at least three innovative companies in Slovenia	Agree
	I like to try out new things, those that I haven't tried before and in doing so I am not afraid	Agree
Ability to create new ideas	I am never satisfied with my first solution; I always try to find a better one	Agree
	I can impress others by presenting my ideas	Agree
	I do not openly accept every idea that is new	Disagree
	I can find much better solutions to problems than my classmates	Agree
Ability for the realisation of ideas	I regularly realise my ideas	Agree
	I know how the process, from formation of the idea to its realisation works	Agree

Source: ICF presentation based on Halilović 2013, p.136

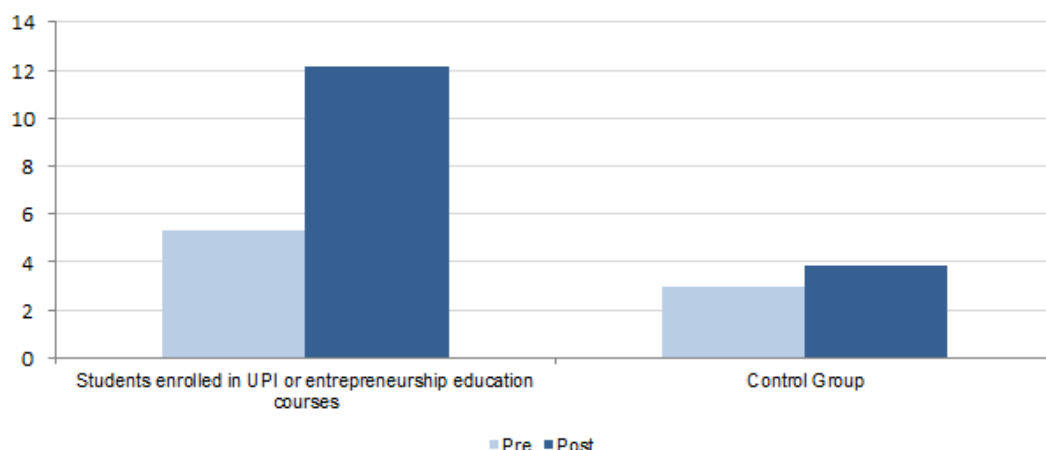
The study concluded that students regularly attending UPI courses and entrepreneurship clubs become more familiar with the innovation process, from forming an idea to its realisation. Students' attitudes towards novelty and innovation became more positive, their ability to create new ideas increased and they became more prone to the realisation of ideas.

The control group also recorded the increased knowledge of at least three innovative companies in Slovenia. Students in the control group disagreed more strongly that they can impress others by presenting their ideas. All others indicators have not changed between the first and second measurements¹³².

In addition to the ex-ante and ex-post survey results of the impact measurement presented above, the students agreed that UPI or entrepreneurship courses increased their visionary attitude, determination, persistence, dedication and commitment to making decisions. They linked these changes to increased optimism, communication skills, courage and self-confidence¹³³.

The study also provides evidence that the students increased their knowledge of entrepreneurship. The knowledge of entrepreneurship was measured through questions such as: define entrepreneurship, describe an entrepreneur, what is brainstorming, what is a business opportunity, list three legal forms of enterprises, why do we need surveys, etc. The figure below presents the number of correct answers in the test on entrepreneurship before and after regularly attending UPI courses or entrepreneurship clubs.

Figure 6.3 Number of correct answers in an entrepreneurship test before and after attending UPI courses and entrepreneurship clubs



Source: Halilović 2013, p.155

Finally, the study showed that 5 per cent of the students (7 out of 146 students) included in the sample changed their desired direction in higher education after the completion of UPI courses and entrepreneurship clubs. Twenty-seven students indicated they wanted to create their own enterprise in the future¹³⁴.

A survey with mentors and principals showed that in general mentors are aware of the impact of entrepreneurship education on students' decisions about the direction of higher education (61 per cent agreed with this statement). However, the majority of principals surveyed (59 per cent) did not know if such impacts exist.

¹³² Halilović (2013), 136 – 138.

¹³³ Halilović (2013), 149.

¹³⁴ Halilović (2013), 156.

6.2.3 Other observed impacts of UPI courses and entrepreneurship clubs and additional observations

UPI courses in primary schools had two main purposes¹³⁵:

- To encourage young people towards creativity, innovativeness and entrepreneurship at all levels of primary school.
- To raise awareness and knowledge of entrepreneurship by involving various stakeholders (teachers, entrepreneurs, associations, artists, innovators, scientists, media and faculties, etc.).

The results of the study provide evidence for the achievement of the first goal.

Despite the fact that the study was external to the Programme, the researcher cooperated with the main stakeholders to follow the definitions and objectives set by UPI courses and entrepreneurship clubs. The study measurement was hence aligned with the first main purpose of the Programme.

Some stakeholders noted that results of the UPI courses were better than expected. Certain business ideas survived beyond the scope of the course¹³⁶:

- A postcard depicting the home town of Nova Gorica was printed by the municipality and used for promotion purposes.
- A UPI course project from the primary school Ob Dravinji resulted in placing an application to the Bauhaus competition for best business plan. As a result, the project was awarded financing which contributed to the rearrangement of the school foyer into a reading corner.

Some stakeholders showed concerns over the ability to sustain the impact of a 24 hour extracurricular course. They believed the exposure was not long enough to make longer term impact. They noted the added value of UPI courses was primarily in the large degree of mobilisation of schools and students, in creating and strengthening partnerships between schools and local communities and parents as well as strengthening the business environment.

On the negative side, stakeholders noted, that there was no evaluation of the UPI courses. These courses still follow a traditional model of entrepreneurship education which focuses on the development of a business plan – a more mixed or key competence approach should be followed.

A current follow up study which was commissioned by the Ministry of the Economy and SPIRIT is building on the experience of UPI courses and trying to improve the teaching methods. It is also conducting impact measurement in 10 pilot schools.

6.3 Methodology of measurement

Four separate samples were developed for the purpose of the study. The samples consisted of:

- 91 principals who completed the survey which was sent to 145 schools which were contacted randomly based on the database of Slovenian primary schools. The survey response rate was 62.7 per cent.
- 89 trained mentors who completed the survey. The survey was randomly sent to 92 trained mentors.

¹³⁵ Presentation by the Chamber of Craft and Small Business about the UPI project for a conference in Brdo pri Kranju, 27 and 28 September 2012.

¹³⁶ Interview with the Chamber of Crafts and Small Businesses, April 2014.

- 146 students who regularly attended UPI or entrepreneurship clubs between 2010 and 2012. The randomisation was conducted at school level with 22 participating schools that were selected randomly.
- 12 students who had not attended UPI or entrepreneurship courses were part of the control group.

Principles and mentors completed the survey once. Students attending the UPI courses or entrepreneurship clubs as well as students from the control group filled in the survey twice, before the beginning of the course in 2010 and after the end of the course in 2012.

The survey questionnaires, which are also the basic indicators of the measurements, are listed in the tables and figures presented in Section 1.2 of this report. The measure was used as intermediate level analysis – basic counterfactuals allowing evidence to be attributed to the measures.

Some ideas are presented below, which might further improve the robustness of a similar study in the future:

- selecting equal sized treatment (students attending entrepreneurship courses) and control groups (students not attending entrepreneurship courses);
- ensuring that treatment and control groups are equally comparable with certain confounding variables (variables that could influence the fact that entrepreneurial education has a more significant impact on certain profiles of students, i.e. those that come from entrepreneurial families, age and gender structure, socioeconomic background, etc.). This would mitigate against self-selection bias; and
- comparing the measurement of a creative atmosphere in the classroom during entrepreneurship courses with the measurement of a creative atmosphere in other courses in order to determine the differences.

The researcher noted that formulating questionnaires was one of the most difficult tasks when designing the impact measurement. Translating the ideas into something that is understandable for children was difficult. The questions were first tested on a small group of students in order to achieve their comprehensiveness. The questions were revised several times before finalising the form¹³⁷.

In light of these challenges, it might be useful if similar research on primary school students in the future involves an expert in communication with children.

Based on the opinion of experts consulted as part of the framework for the present study, the methodology of measurement is robust.

6.4 Using the results of the impact measurement

The results of the measurement have not yet been used for policy making purposes. Several factors contributed to this outcome¹³⁸:

- The policy review and development of the current support mechanisms financed by the Ministry of the Economy and implemented by SPIRIT were concluded before the impact assessment was published.
- The impact assessment was not initiated as part of the framework of the programme, but separately, in the framework of a PhD research project;

¹³⁷ Interview with researcher, April 2014.

¹³⁸ Interviews with stakeholders involved in the implementation of UPI courses and the follow-up programmes, April 2014.

as such, it was not part of the policy cycle. There were no policy decisions awaiting the results of the impact assessment.

- The thesis was published in September 2013. Based on the thesis, the first scientific article was only published in December 2013 in the Slovenian Journal of Management issued by the Faculty of Primorska¹³⁹. The first article in the English language will be published in the summer of 2014. Because there are few opportunities to disseminate the findings, the impact assessment has not reached the wider public and not yet yielded its potential results.

However, the measurement results prove that entrepreneurship education has an impact¹⁴⁰. This could in the long run, together with other measurements, help the National Education Institute of the Republic of Slovenia to advocate for change in the primary school curricula.

6.5 Conclusions

The example of the measurement presented in this case study supports the idea that entrepreneurship education offered through entrepreneurship clubs in primary schools can have a positive impact on creativity, flexibility and the entrepreneurship attitudes of students.

The measurement results provide evidence and support the thesis that entrepreneurial education should be offered to primary school students.

Initiatives in the form of pilot projects can serve as a first step towards the more regular inclusion of entrepreneurship education in the curricula¹⁴¹.

However, consulted stakeholders advocate for a more comprehensive model of entrepreneurship education which would tackle all levels of education from primary school to higher education. Within the UPI courses and the programmes financed by the Ministry of Economy, following the pilot programme, a theoretical model has now been developed in Slovenia.

One of the limitations of UPI courses was that the courses were implemented in schools where principals acknowledged its usefulness¹⁴². On the contrary, there are certain regions which never want to cooperate in this kind of project¹⁴³. The other limitation of the UPI courses was that principles were not included in the Programme¹⁴⁴. Principals' limited awareness about the impact of entrepreneurship education is also supported by the results of the research presented. The policy lesson for the future programmes could be that entrepreneurship education programmes and strategies need to target not only teachers and students, but also principals.

The other obstacle to integrate entrepreneurship education into primary school curricula is the poor cooperation or/and low interest from the Ministry of Education¹⁴⁵. Hence, when developing the programmes or strategies, partnerships and commitment from all relevant stakeholders should be considered a priority.

¹³⁹ The article can be accessed (in Slovenian) [online] at: http://www.fm-kp.si/zalozba/ISSN/1854-4231/8_4.htm

¹⁴⁰ Interview with stakeholders, April 2014.

¹⁴¹ Interview with stakeholders, April 2014.

¹⁴² Interview with stakeholders, April 2014.

¹⁴³ Interview with SPIRIT Slovenia, April 2014.

¹⁴⁴ Interviews with stakeholders, April 2014.

¹⁴⁵ Interviews with stakeholders involved in UPI courses, April 2014.

Based on their positive experience of UPI courses and research conducted in the framework of the *Comprehensive programme to promote creativity, innovation and entrepreneurship of young people through the integration of the activities of the local community in the years 2010, 2011 and 2012*, the Ministry of Economy through SPIRIT continues to promote entrepreneurship education in the Slovenian school system. The programme was expanded from primary and secondary education to also include higher education.

As part of the current initiative a curriculum for an elective course in primary schools is being developed and is expected to be implemented in the future. As part of the curriculum development a pilot phase is currently underway in 10 primary schools in Slovenia. The curriculum builds on the experience of the UPI courses, however it is also incorporating new approaches to entrepreneurship education which includes 'creative thinking' and 'design thinking' concepts. A rigorous impact assessment is now part of the pilot phase. Since the pilot testing is currently ongoing, the results of the measurement are still not available¹⁴⁶.

The significance of the impact measurements in the pilot projects is currently not evident, however it is expected to play an important role in advocating for future change in the education system in Slovenia.

6.6 References

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Obrtno-podjetniška zbornica Slovenije (2012) Presentation of UPI projects in a conference in Brdo pri Kranju, 27 and 28 September 2012.

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¹⁴⁶ Interview with The National Education Institute of the Republic of Slovenia, April 2014.

7 Case Study 7: Misgav elementary school

7.1 Description of the strategy/initiative

This case study discusses the changes in the environment of the Misgav elementary school, an 'entrepreneurial school' in Israel and the impact of entrepreneurship education on its pupils in comparison to pupils in a non-entrepreneurial elementary school. In particular, the case study reviews the evidence on the importance of the 'entrepreneurial' culture and the enhanced level of teachers' innovativeness, in addition to the level of pupils' proactive disposition, preference for innovation, self-efficacy, achievement motivation and non-conformity amongst those that participated in the initiative.

7.1.1 Promotion of entrepreneurship in Israel

Israel has shown significant economic development over the last two decades. Government policies have supported entrepreneurship at individual, business and national levels since the 1990s. In 1991, the Government set up a technological incubator that provided skilled Jewish migrants with funding and know-how to become successful entrepreneurs. Around the same time, Israel's government also made a decision to establish a venture capital industry.¹⁴⁷

Interestingly enough, Israel's entrepreneurial accomplishments are seen as contributing to the development of the country's robust economy and have facilitated facing the 2008 global economic crisis.¹⁴⁸

7.1.2 Description of the initiative



Misgav elementary school was founded in 1975 and it is located in Emek Hefer (highlighted in the map). In 2007, the school had about 550 pupils from grade 1 to 6 and 33 teachers.

In 2004, the school principal began a development process aiming to transform the school into an experimental entrepreneurial school. The Experimental Department of the Ministry of Education has a programme in place for schools that want to implement an innovative approach in teaching. These schools are considered to be experimental. The concept of experimental schools is based upon the idea that alongside the conventional curriculum, the school chooses to focus on a subject such as arts, music, or ecology.¹⁴⁹ To become 'experimental' a school has to be approved by the Ministry. As an experimental school, it receives additional funding and a mentor is appointed by the Experimental Department. The mentor assists the school with the changes in the curricula and the implementation of the entire

programme over a five-year period. During the implementation and at the end of the five-year programme, the Ministry carries out an assessment and evaluation. Schools are required to 'spread' their innovative ideas to other schools after four years of running the programme.

Misgav elementary school received the status of an experimental school in 2005. A mentor from the Experimental Department of the Ministry of Education joined

¹⁴⁷ Moss, I. (2011) *Start-up nation: An innovation story* OECD Observer No 285, Q2 2011. [online] Available at: http://www.oecdobserver.org/news/fullstory.php/aid/3546/Start-up_nation:_An_innovation_story.html

¹⁴⁸ Almor, T., Heilbrunn, S. (2013) *Entrepreneurship in Israel: Theory and Practice*.

¹⁴⁹ Heilbrunn, S. (2010), *Advancing Entrepreneurship in an Elementary School: a Case Study* International Education Studies, Vol.3, No.3; May 2010.

the school team to develop the five-year implementation programme. The programme included activities such as training teachers (through lectures and workshops) and gradually involving local stakeholders – parents, the local municipality and representatives of industry.

In its third year (in 2007) the programme offered the following entrepreneurial activities:

- ➔ Every week all pupils participated in a two-hour course on entrepreneurship as part of the framework of the 'entrepreneurial centre'¹⁵⁰.
- ➔ Pupils could choose which 'entrepreneurial centre' they would be part of. Centres were developed in subjects such as: English, mathematics, science, ecology, arts, improving the school environment and community involvement.
- ➔ The activities in all centres were developed based on the same concepts, such as brain-storming, team building, the feasibility of the idea and the resources needed to implement the idea.
- ➔ Children often approached external partners to implement their ideas (for example, companies where their parents are employed).
- ➔ Pupils of 5th and 6th grades were involved in mentoring younger pupils.
- ➔ Second grade pupils had an additional lesson every week on developing an innovative and alternative way of thinking.
- ➔ As a result of these entrepreneurial centres, pupils developed products as: placemats with mathematical games, 'Talk to Me' for improving English language skills, a cushion stuffed with herbs, user-friendly garbage cans for paper, herbal ice-cream and others. At the end of the school year these products were presented and sold at an annual fair.

In 2007, independent impact measurement ¹⁵¹ was conducted to assess the impact of the transformation from a conventional into an entrepreneurial school. This included investigating the: organisational culture, innovativeness of the school, principal's proactivity and pupils' entrepreneurial drive. There is no information about whether any other impact measurements have taken place as part of the initiative.

For the purpose of this case study, entrepreneurs are defined as persons who formulate new ideas, recognise opportunities and translate these into added value to society by assuming the risk of starting a business. They are a major source of economic growth and social development.¹⁵²

7.2 Results of the impact measurement

The results underline the importance of the organisation's environment in the process of transformation from a conventional to an 'entrepreneurial environment.' The impact measurement also proves that pupils exposed to entrepreneurial education achieve higher rates of proactivity, innovation and achievement motivation than pupils who are not exposed.

It is worth mentioning that the parents of those pupils who were following the regular curricula without any difficulty were reportedly more supportive of the

¹⁵⁰ The entrepreneurial centre as a concept is similar to a small enterprise. Within these centres, pupils were taught about entrepreneurship, developed their innovative skills and worked on several topics enhancing their entrepreneurial thinking. In these 'centres' pupils were also developing products that were presented and sold at an annual school fair at the end of the school year.

¹⁵¹ Heilbrunn, S. (2010), *Advancing Entrepreneurship in an Elementary School: a Case Study*.

¹⁵² Definition used in Heilbrunn, S. (2010), *Advancing Entrepreneurship in an Elementary School: a Case Study*.

'entrepreneurship centres' initiative than parents whose children faced challenges with following the regular activities¹⁵³. This observation highlights the need for additional research on the possible differences in the impact of entrepreneurial education on pupils with different learning capabilities.

7.2.1 Investigating the organisational culture at Misgav

Interviews were conducted with teachers (please see the methodology for more details) to explore their trust in the school management, the reward system in place and the workload (detailed results are provided in Table 7.1). Most interviewees (94 per cent) fully agreed that they can trust the principal and that the reward system in place in the school encouraged them to act innovatively. Most of the teachers agreed that they felt highly rewarded, especially for their work in the entrepreneurial centres. Several teachers¹⁵⁴ also highlighted the importance of intangible rewards, such as appraisal, feeling of belongingness to the school and pride for participating in the programme.

Also, teachers highlighted that they can address the principal in a non-formal way and that the principal assisted and encouraged them when needed. When asked about the workload, almost half of teachers felt that it was not acceptable. Teachers have to deal with a double workload, because in addition to preparing for the entrepreneurial centres, they still needed to prepare for the regular curriculum classes as well. It was also discovered that several teachers were not comfortable enough with the pedagogical form and curricular content to lead their entrepreneurial centres.

7.2.2 Investigating the entrepreneurial profile of Misgav

In 2003, a research study¹⁵⁵ was conducted in Israel regarding entrepreneurship education in schools. The study developed a model of the entrepreneurial profiles of schools (conservative school; calculated entrepreneurship; initiating entrepreneurship and vigorous entrepreneurship). These profiles were used as a benchmark to assess the impact of the entrepreneurial process upon the organisational setting. To measure the latter, questions were introduced regarding school innovativeness (10 questions) and principals' proactivity (4 questions) (see **Error! Reference source not found.** 7.2).

The entrepreneurial profile of Misgav was measured using Eyal and Inbar's results as a benchmark (Table 7.3). The teachers in Misgav rated the principal's proactivity as high and the school's innovativeness as moderate. Therefore, the entrepreneurial profile of Misgav is 'calculated entrepreneurship' due to the high scores of the principal's proactivity.

7.2.3 Assessing the impact of entrepreneurial education on Misgav pupils

Sixth graders from Misgav and Haifa (the non-entrepreneurial school) elementary schools were asked questions concerning proactive disposition, preference for innovation, self-efficacy, achievement motivation and non-conformity (the full questionnaire is provided in **Error! Reference source not found.**). The answers on these questionnaires were collected from the sample (pupils exposed to entrepreneurial education) and the control group (pupils not exposed). Data presented in Section 7.7 illustrates that Misgav pupils rated significantly higher on proactive disposition, preference for innovation and achievement motivation, whilst there was almost no difference between the two

¹⁵³ As stated by the interviewee.

¹⁵⁴ No quantitative data available.

¹⁵⁵ Eyal, O. and Inbar, D.E (2003) *Developing a public school entrepreneurship inventory: Theoretical conceptualization and empirical examination*.

groups regarding self-efficacy. Misgav pupils achieved a low rate on non-conformity that, according to the main researcher¹⁵⁶, could be explained by the fact that these pupils were very much involved in extra-curricular and curricular entrepreneurial activities, which could have led them to identify with school regulations and procedures.

7.3 Methodology of measurement

The initiative at Misgav Elementary was aiming to provide entrepreneurial education to pupils through an undergoing process of organisational change from a conventional school to an entrepreneurial school.¹⁵⁷ The initiative strongly linked entrepreneurship education with having in place an innovative environment. According to the main researcher of the impact measurement, the environment is affected by trust in management and the level of support received, whilst also the reward system, is seen as a critical factor in fostering or hindering the innovativeness of employees. These conditions hold not only for teachers, but for employees overall.

Therefore, the methodology of assessing the initiative was developed to measure the impact of entrepreneurship education on pupils, but also to assess the organisational culture, as part of the entrepreneurial profile of the school.

7.3.1 Investigating the organisational culture at Misgav

To investigate the organisational culture, 16 teachers (15 female and 1 male), the project organiser from the Experimental Department of the Ministry of Education and the school principal were interviewed. Each interview included 11 questions focusing on 3 main issues that were seen to be important in fostering or hindering innovativeness: trusting the school management (4 questions), existence of a reward system (4 questions) and workload (3 questions).

7.3.2 Investigating the entrepreneurial profile of Misgav

To investigate the entrepreneurial profile a questionnaire was distributed to all teachers. The questionnaire was focused on assessing the school climate regarding the principal's proactivity and the school's innovativeness. **Error! Reference source not found.** provides the full set of statements presented to teachers. Participants rated their agreement with the statements/questions. Results were considered to be low (average score lower than 4), moderate (between 4 and 5.5) or high (above 5.5). The teachers were asked to evaluate each statement according to the seven-point Likert scale ranging from 1 (disagree very strongly) to 7 (agree very strongly). In total, 26 out of 33 teachers responded to the questionnaire (79 per cent).

7.3.3 Assessing the impact of entrepreneurial education on Misgav pupils

A questionnaire was used to assess the impact of entrepreneurship education on Misgav pupils. The questionnaire contained 42 statements and used a five-point Likert scale¹⁵⁸. The questionnaire was in simple language, appropriate for school children. The questions covered five different dimensions of 'entrepreneurial drive': proactive disposition, preference for innovation, self-efficacy, achievement motivation and non-conformity (**Error! Reference source not found.**).

¹⁵⁶ Sibylle Heilbrunn.

¹⁵⁷ Heilbrunn, S. (2010), *Advancing Entrepreneurship in an Elementary School: a Case Study* International Education Studies, Vol.3, No.3; May 2010.

¹⁵⁸ Strongly agree, agree, undecided, disagree and strongly disagree.

The questionnaire was distributed to pupils from 6th grade. Therefore, the average age of respondents was 11 years. Two groups of children were questioned: 90 pupils from Misgav and 86 pupils from a 'conventional' elementary school in Haifa; 57 per cent of all pupils were girls and 43 per cent boys. According to the researcher of the impact measurement, the school in Haifa was selected due to its geographical proximity to Misgav and the socio-demographic similarities of the pupils in the two schools.¹⁵⁹

7.3.4 Challenges

The methodology used had some limitations and challenges:¹⁶⁰

- ➔ For the distribution of questionnaires to the control group, there were no specific arrangements with the management of the Haifa school, so questionnaires had to be distributed through the parents of pupils.
- ➔ The questionnaire was not distributed before the initiative took place. It would have been useful to have pre and post measurements to observe any changes in pupils' responses after the transition to an 'entrepreneurial school.'
- ➔ The questionnaire was distributed to 6th grade pupils only and not to all pupils who took part at the initiative (grades 1 to 6). According to the researcher, including more pupils would have allowed the development of a more holistic overview of the impact of the initiative across grades/pupils' ages.

7.4 Using the results of the impact measurement

The results of this measurement were included in an academic paper¹⁶¹ that was shared with the Misgav elementary school. However, there is no indication that the results were used by the school to implement any changes/improvements to the implemented programme.

According to the principal of the school, the initiative is still on-going and there is significant awareness of its results: several teachers and students visit the school to experience how the initiative is being implemented. The results and the initiative overall have also been presented by the principal at Hebrew University. However, the Experimental Department of the Ministry of Education did not measure the programme in any way (effectiveness, impact, etc.).

7.5 Conclusions

The Misgav elementary school is an example that highlights the importance of organisational change. According to the researcher and the methodology, in order to teach children to be entrepreneurial and become entrepreneurs, it is beneficial to have teachers who trust the school management and are rewarded for their innovative approaches.

The impact measurement found that the school environment and processes can change pupils' beliefs, values and attitudes: make them focus more on achievement motivation, preference for innovation and proactive disposition. These are seen by the measurement researcher as particularly important preconditions for entrepreneurial intentions and actions.

¹⁵⁹ Interview with Sibylle Heilbrunn conducted by ICF on 24 April 2014.

¹⁶⁰ Limitations were highlighted by the impact measurement researcher, during an interview that ICF conducted on 24 April 2014.

¹⁶¹ Heilbrunn, S. (2010), *Advancing Entrepreneurship in an Elementary School: a Case Study* International Education Studies, Vol.3, No.3; May 2010.

The Misgav elementary school has continued reinforcing the programme by helping another school that is interested in the 'entrepreneurial school' concept to adopt it. However, no further information was found on the process followed by the other school.¹⁶²

The qualitative data collected for this case study also highlighted a possible link between parents and the engagement of pupils in entrepreneurial activities- therefore influencing the impact of entrepreneurship education on these pupils. The importance of parents' support, especially at the elementary school level, should not be underestimated. For pupils aged 6 to 11, many entrepreneurial activities require not only the additional involvement of teachers, but also their parents; for example, participation in developing products that will later be for sale, participation in afterschool activities, etc. The support of the parents may be relevant to their children's level of school achievements; but it could also be supported that the parents' background may also be critical in their engagement with the entrepreneurial activities taking place within the school, extra-curricular or not.

7.6 References

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7.7 Data tables

Table 7.1 Summary of results of interviews

	Trust in management (Q 1,2,3,4)	Reward system encouraging innovative actions (Q 5,6,7,8)	Acceptable workload (Q 9,10,11)
Teacher 1	Yes	Yes	Yes
Teacher 2	Yes	Yes	No
Teacher 3	Yes	Yes	No
Teacher 4	Yes	No	Yes
Teacher 5	Yes	Yes	No
Teacher 6	Yes	Yes	Yes
Teacher 7	Yes	Yes	Yes
Teacher 8	No	No	No
Teacher 9	Yes	Yes	Yes
Teacher 10	Yes	Yes	No

¹⁶² Ibid.

Teacher 11	Yes	Yes	Yes
Teacher 12	Yes	Yes	Yes
Teacher 13	Yes	Yes	Yes
Teacher 14	Yes	Yes	No
Teacher 15	Yes	Yes	Yes
Teacher 16	Yes	Yes	No
Project-organiser	Yes	Yes	No
School principal	Yes	Yes	No
Percentage of positive answers	17/18 (94.44%)	16/18 (88.89%)	9/18 (50.00%)
<i>Yes = all the questions were answered positively; no = at least one of the questions was answered negatively</i>			

Source: Heilbrunn, S. (2010) Advancing Entrepreneurship in an Elementary School: A Case Study

Table 7.2 Mean of items indicating the innovativeness and proactivity of a school principal (developed based on Eyal & Enbar, 2002:243-244)

The entrepreneurial aspect	The item in the questionnaire	The average score in Misgav
Innovativeness	A great number of innovations were implemented in our school in the last two years.	5.84
	The innovations implemented in the last two years have caused a turnaround in our school's courses of action.	5.61
	In the last two years, our school implemented many activities that had not been tried previously.	5.57
	The innovations that have been implemented during the last two years have led to an overall, system-wide change in our school.	5.46
	In the last two years our school has implemented a great number of activities that did not exist previously.	5.42
	Innovations are a central factor in the life of our school.	5.30
	The innovations implemented in the last two years have led to a significant and substantial change in the guiding assumptions of our school.	5.11
	In the last two years a great many innovations have been implemented in our school.	4.88
	In our school there is a tendency to implement new courses of action.	4.61
	The innovations implemented in the last two years have radically changed the school.	4.34
	<i>Mean innovativeness</i>	<i>5.21</i>
Principal's proactivity	The school principal has shown great initiative in the development of ideas and activities in our school.	6.42
	Our school principal exhibits great initiative qualities.	6.34

	Many of the activities that characterise our school are the direct result of the principal's initiative.	5.76
	The school principal exhibits no initiative quality in her action*.	6.46
	<i>Mean principal's proactivity</i>	6.25
	<i>Mean innovations and principal's proactivity</i>	5.73
*Note: This question is stated negatively to prevent interviewers from responding in a socially desirable manner. Therefore, for statistical analysis the scores were reversed		
A 7-point Likert scale was used, with 1 = very strongly disagree; 2 = strongly disagree; 3 = disagree; 4 = sometimes agree and sometimes disagree; 5 = agree; 6 = strongly agree; 7 = very strongly agree		

Source: Heilbrunn, S. (2010) Advancing Entrepreneurship in an Elementary School: A Case Study

Table 7.3 Comparing Misgav's scores with the benchmark

	Misgav's Average	Benchmark (Eyal & Enbar, 2002)	Misgav's Score
Principal's proactivity	6.25	>4 = low 4-5.5 = moderate <5.5 = high	High
School innovativeness	5.219	>4 = low 4-5.5 = moderate <5.5 = high	Moderate
<i>Total average</i>	<i>5.734</i>		

Source: Heilbrunn, S. (2010) Advancing Entrepreneurship in an Elementary School: A Case Study

Table 7.4 Comparing pupils' entrepreneurial drive: Misgav versus Haifa

	Misgav Pupils (N=90)		Haifa Pupils (N=84)		T-test Results	
	Mean	SD	Mean	SD	t	sig.
Proactive disposition	3.91	.582	3.09	.705	8.303	.000
Preference for innovation	3.71	.636	3.22	.465	5.771	.000
Self-efficacy	3.44	.787	3.32	.548	1.2224	.223 (NS)
Achievement motivation	4.12	.627	3.40	.578	7.914	.000
Non-conformity	1.98	.704	3.19	.658	-11.65	.000

Source: Heilbrunn, S. (2010) Advancing Entrepreneurship in an Elementary School: A Case Study

Table 7.5 The questionnaire of Florian, J., Karri, R. and Rossiter, N. (2007)

Description
Proactive disposition (A)
I am always looking for better ways to do things.
I excel at identifying opportunities.
No matter what the odds, if I believe in something I will make it happen.
I can spot a good opportunity long before others can.
I love being a champion for my ideas, even against others' opposition.
If I see something I don't like, I fix it.

Nothing is more exciting than seeing my ideas turn into reality.

I am constantly on the lookout for new ways to improve my life.

I get a thrill out of doing new, unusual things at school or work.

Preference for Innovation (B)

I believe it is important to approach opportunities in unique ways.

I enjoy being the catalyst for change in school or work affairs.

I usually seek out colleges who are excited about exploring new ways of doing things.

I get very excited when I think of new ideas to stimulate my group performance in a school assignment.

I believe it is important to continually look for new ways to do things at school or work.

I get excited when I am able to approach tasks in unusual ways.

I enjoy being able to do things in new ways.

I often approach school tasks in unique ways.

I believe that to be successful one must sometimes do things in ways that could seem unusual at first glance.

I usually have control in unstructured situations.

I enjoy finding good solutions to problems that nobody has looked at yet.

I believe that to arrive at a good solution to a problem, it is important to question the assumptions made in defining the problem.

I believe that when pursuing goals or objectives, the final result is far more important than following the accepted procedure.

Self-efficacy (C)

I feel inferior to most people I work with.

I often feel badly about quality of work I do.

I never persist very long with a difficult job before giving up.

I often put on a show to impress the people I work with.

I feel self-conscious when I am with very successful people.

I feel uncomfortable when I am unsure of what my team members think of me.

I seem to spend a lot of time looking for someone who can tell me how to solve all my school problems.

I feel very self-conscious when making a school presentation.

Achievement Motivation (D)

To be successful, I believe it is important to use your time wisely.

I feel proud when I look at the results I have achieved in my school activities.

I do every job as thoroughly as possible.

I believe it is important to analyse your own weaknesses.

I make a conscientious effort to get the most out of my available resources.

I feel good when I have worked hard to improve my assignments.

I believe that to be successful a person must spend time planning the future.

Non-conformity (E)

I always follow accepted practices in the dealings I have with others.

I rarely question the value of established procedures.

I believe that currently accepted regulations at school were established for a good reason.

I feel best about my work when I know I have followed acceptable procedures.

I believe that in order to succeed, one must conform to acceptable practice.

The questionnaire uses a 5-point Likert scale with SA = strongly agree, A = agree, U = undecided, D = disagree, SD = strongly disagree

Source: Heilbrunn, S. (2010) Advancing Entrepreneurship in an Elementary School: A Case Study

8 Case Study 8: E-Vitamin entrepreneurship education programme

This report discusses an impact measurement study of the course called 'Entrepreneurial Initiative,' implemented in secondary education in the Spanish region of Castilla y León, when combined with the 'E-Vitamin' programme. The latter consists of the application of certain activities, materials and teaching methodology and was initially implemented in a limited number of schools in the region.

8.1 Description of the strategy / initiative:

In 2002, the regional government of Castilla y León in Spain launched a strategy for the promotion of entrepreneurship education, involving the Department of Education and the Department of Economy and Employment. The regional strategy is called 'Educate for Entrepreneurship' (*Educar para emprender*) and was developed and implemented with the cooperation of the 'European Centres of Enterprises and Innovation of Castilla y León' (CEEI), a public company of which the regional government was a shareholder. The CEEI has been recently dissolved because of lack of sufficient public funding.¹⁶³

Castilla y León regional strategy for the promotion of entrepreneurship education includes actions for school education, vocational education and training (the programme 'Learn how to be an entrepreneur' [*Aprender a emprender*]) and higher education [*Campus entrepreneur* (*Campus Emprende*)].

In school education, entrepreneurship was introduced through a double approach:

- the inclusion of entrepreneurship education in the curriculum; and
- the launching of the 'E-Vitamin' programme that consists of the development and implementation of certain activities, materials and a teaching methodology for entrepreneurship education, adapted to the different education levels (primary, lower secondary and upper secondary).¹⁶⁴

The inclusion of entrepreneurship education in the curriculum began with the creation of an optional subject called 'Entrepreneurial Initiative' in lower secondary education in 2004/2005. This subject was designed with the support of CEEI experts, and the regional government, as well as secondary education teachers of the course entitled the 'Economy'. After a first pilot year, the Government decided to extend entrepreneurship education to primary and upper secondary levels. In primary education it was introduced as a transversal topic and in upper secondary education it was included in the economy course.

Entrepreneurship education is introduced gradually from primary to upper secondary education, beginning with general skills (creativity, teamwork, initiative) to later include more specific competences related to business entrepreneurship. For instance, primary level students are involved in the management of a school project, e.g. the organisation of a day of peace or environment week; lower secondary level students are involved in business projects within the school environment, e.g. organising the end of year school trip, or organising paid private lessons for younger students. In upper secondary education students develop a complete business project.

¹⁶³ [online] Available at: <http://www.ceei.jcyl.es/>; information about the dissolution of the company in the press, e.g., [online] Available at: <http://www.elmundo.es/elmundo/2012/12/30/castillayleon/1356897085.html>

¹⁶⁴ [online] Available at: <http://www.educa.jcyl.es/VitaminaE/es>

The E-Vitamin programme was developed simultaneously with the CEEI training for school teachers who volunteered to participate in the programme.

In lower secondary education, the E-Vitamin programme responds to the curriculum requirements established by legislation for the optional course 'Entrepreneurial Initiative'.¹⁶⁵ This subject is taught in the fourth grade (pupils aged 15 to 16) and its goal is to 'develop the entrepreneurial spirit of students, and relate them to the reality of their socioeconomic and productive surroundings.' The specific **objectives** of this subject include the following:¹⁶⁶

- to understand the concept of entrepreneur and its evolution in time;
- to recognise the figure of the entrepreneur as an agent of social change, development and innovation;
- to know the traits that characterise an entrepreneurial person and how they materialise in concrete skills and attitudes;
- to develop entrepreneurial spirit through the promotion of attitudes, and social and management skills;
- to use information and communication technologies as a basic instrument in entrepreneurial initiatives;
- to identify their own capacities and interests so as to make decisions on personal strategies concerning training and social and labour insertion, accounting for the characteristics of the environment;
- to develop negotiation and problem solving skills;
- to define the general aspects and the elements that make up an entrepreneurial project;
- to know the roles and responsibilities of the people participating in the different aspects of the project;
- to obtain, select and interpret information on the relevant socioeconomic and financial aspects that affect the project;
- to develop communication skills and attitudes that allow students to integrate acquired knowledge in the reality of the project;
- to develop, plan and execute a project; and
- to analyse conclusions and proposals for improvement.

The document regulating the curriculum of this subject does not provide a definition of entrepreneurial spirit. However, it does refer to the Commission Green Paper of 21 January 2003 on Entrepreneurship in Europe, where entrepreneurship is defined as 'an individual's creative capacity, independently or within an organisation, to identify an opportunity and to pursue it in order to produce new value or economic success.'¹⁶⁷

The E-Vitamin materials are adapted to the structure of the subject which is organised in two main areas (see Table 8.1).

¹⁶⁵ Order EDU/1170/2004, of July 13 (*Castilla y León Official Gazette* 22-7-2004). [online] Available in Spanish at: <http://www.educa.jcyl.es/es/resumenbocyl/edu-1170-2004-13-07-establece-asignatura-optativa-educacion>. The methodology has been further developed in a Resolution from August 30, 2013 (*Castilla y León Official Gazette* 11-9-2013). [online] Available in Spanish at: <http://www.educa.jcyl.es/es/resumenbocyl/resolucion-30-agosto-2013-direccion-general-politica-educ-1>

¹⁶⁶ Source: Order EDU/1170/2004, of July 13 (*Castilla y León Official Gazette* 22-7-2004) (see footnote 3).

¹⁶⁷ COM (2003) 27 final - Not published in the Official Journal.

Table 8.1 E-Vitamin materials used in the course 'Entrepreneurship Initiative'

'Entrepreneurship Initiative' areas of content	E-Vitamin materials
I. 'The entrepreneurial spirit. The concept of entrepreneur' The entrepreneurial spirit; personal qualities; social skills; directive skills; the entrepreneur in society	Handbooks 'Qualities and skills of the entrepreneur' and 'Path to an entrepreneurial society'
II. 'The entrepreneurial project. Development of a project' Generation and formulation of the idea; development of the project; analysis of the feasibility of the project; planning; implementation; and conclusion	Handbooks 'Idea generation' and 'Project management'

Source: Order EDU/1170/2004, of July 13 (Castilla y León Official Gazette 22-7-2004) and Barredo (2010)

Apart from the students' handbooks, there are materials for teachers and a computer application for project management.

Schools and teachers in the region can freely access the materials and the computer application.

The **activities** in the E-Vitamin programme include:¹⁶⁸

- ➔ the basic teachings of accounting, finance, marketing, and management, adapted to students' ages;
- ➔ teaching and practice in competencies such as self-efficacy, pro-activeness, and risk taking;
- ➔ business planning; and
- ➔ an 'interaction with practice' component, which includes talks from practitioners and networking events.

These activities are implemented by the regular teachers of the subject. These are preferably teachers specialised in teaching about the economy, or else in the areas of business administration, labour training and guidance, or commercial organisation and management.

8.1.2 Evaluation and impact measurement

The evaluation of the course subject called 'Entrepreneurial Initiative' and of the methodology proposed by the 'E-Vitamin' programme was not initially part of the policy strategy. The idea emerged from the cooperation between the 'European Centres of Enterprises and Innovation' and the Chair of Entrepreneurs at the University of Salamanca¹⁶⁹ and was presented to the regional government that agreed to fund it.¹⁷⁰ The Government facilitated the access to schools and teachers' cooperation.

A questionnaire on entrepreneurial attitude and intention was completed by students from 2005 up to 2012/2013.¹⁷¹ An initial analysis of the results of these questionnaires was carried out in 2007/2008. After this, an impact

¹⁶⁸ Sanchez (2013).

¹⁶⁹ [online] Available at: <http://psi.usal.es/emprendedores/default.asp>

¹⁷⁰ According to Sanchez, interviewed by ICF International, the regional government contributed with around 5,000 to 6,000 Euros.

¹⁷¹ According to a representative from the regional government of Castilla y León interviewed by ICF International. There is no information on whether the measurement will be performed in 2013/2014 since the programme is now in a transition phase. It is expected to be fully transferred to the regional government due to the closing down of the 'European Centres of Enterprises and Innovation of Castilla y León.'

measurement, using a larger sample (students from consecutive years)¹⁷², took place. The main findings of this study and the methodology used are explained in the following sections.

8.2 Results of the impact measurement

The evaluation of the course called 'Entrepreneurial Initiative' and of the methodology proposed by the 'E-Vitamin' programme was undertaken in two steps:

- ➔ An initial report with data from students that attended the course in 2007/2008 was developed. This report includes descriptive data and an analysis based on the differences in the percentages between the students that participated in the programme (treatment group) and those who did not (control group).¹⁷³
- ➔ A more sophisticated analysis that measures the impact of the subject based on data from several years: from 2007/2008 to 2010/2011. This research addresses the individual impact of the programme E-Vitamin in lower secondary education students, focusing on immediate results.

The questionnaire used to collect the data referred to the following variables which are depicted in the following table.

Table 8.2 Variables considered in the questionnaire

Variables	Definition	Examples of items in the questionnaire*
Locus of control	Individuals' perception on the level of control they have on the events that affect them. - Internal locus of control: the individual has the perception that events mostly occur as a result of his or her actions. He or she attributes value to personal effort, ability and responsibility. - External locus of control: the individual has the perception that the events occur as a result of chance, fate or the power or decisions of others.	<ul style="list-style-type: none"> ➔ What I will achieve in my life depends on the effort I put into it ➔ I believe I am capable of facing problems ➔ What will happen to me has to do with chance ➔ I believe chance has a lot of influence ➔ Connections are what really matters
Self-efficacy	Belief that one can act appropriately in a given situation.	<ul style="list-style-type: none"> ➔ I consider myself capable of commercialising my products
Pro-activeness and risk	Attitude according to which the individual assumes full control of his or her behaviour in life. It implies taking the initiative in the development of creative and audacious actions to bring improvements; free choice prevails over life circumstances.	<ul style="list-style-type: none"> ➔ I constantly look for ways to improve my life ➔ I stand out when it comes to identifying opportunities ➔ I take control in unstructured situations

¹⁷² Sánchez, J. (2013). The impact of an Entrepreneurship Education Program on Entrepreneurial Competencies and Intention. *Journal of Small Business Management*, 51(3), p. 447-465.

¹⁷³ [online] Available at: <http://www.educa.jcyl.es/vitaminaESO/es/test-actitud-emprededora>

Motivations	Motivations when making a decision to open a company.	<ul style="list-style-type: none"> ➔ Novelties or changes in life ➔ To have more independence ➔ To reach personal success
Resources	Resources taken into account when creating a company.	<ul style="list-style-type: none"> ➔ Education ➔ Personal financial resources ➔ Initiative ➔ Creativity ➔ To be able to identify and profit from opportunities
Difficulties	Obstacles that have more influence when making a decision on whether to create a company.	<ul style="list-style-type: none"> ➔ Lack of financial support ➔ Lack of professional experience ➔ Bureaucracy
Importance	Variables that influence the creation of a company.	<ul style="list-style-type: none"> ➔ Family responsibilities ➔ Social value placed on self-employment ➔ Close or distant examples of entrepreneurial success
Entrepreneurial intention	Intention regarding future employment.	<ul style="list-style-type: none"> ➔ Intend to work in a public or private company ➔ Want to be a civil servant ➔ Create own company

**The items in the questionnaire are not fully listed in the report. The information in the table is based on the examples mentioned.*

Source: Report on the results in the test on entrepreneurial attitude in Castilla y León. Original in Spanish. Translation by ICF International

According to the initial report, it was observed that, after taking the course, participants had a higher level of internal locus of control, self-efficacy and pro-activeness, than the students who did not take the course.

Following this initial report, in 2013 Sánchez undertook an impact measurement. According to the author, it is the first impact measurement in Spain of a course on entrepreneurship education that meets the following criteria: it addresses pre-post treatment differences between control and treatment groups using a sample of secondary school students.

Based on the findings of previous research on the topic, the impact measurement addresses the following aspects:

- ➔ self-efficacy: 'individuals' belief in their personal capability to accomplish a job or a specific set of tasks' (Bandura, 1977);
- ➔ pro-activeness: 'Proactive personality refers to the tendency to initiate and maintain actions that directly alter the surrounding context.' (Bateman and Crant, 1993);
- ➔ risk taking: taken to be a personality trait that determines the tendency and willingness of an individual to take on risk; and
- ➔ the intention to become self-employed.

The analysis focuses on two different issues: (1) the relation of self-efficacy, pro-activeness and risk taking (with respect to self-employment), with the intention to become self-employed; and (2) the impact of the course ('Entrepreneurial Initiative' combined with the E-Vitamin programme) on self-efficacy, pro-activeness, risk-taking propensity and the intention to become self-employed.

The author performed different analyses (see the section on methodology for details on scales) reaching the following findings:

- ➔ There were no statistically significant differences between the control and the treatment group before starting the course (pre-test), in self-efficacy, pro-activeness, risk-taking and intention to pursue self-employment.
- ➔ After the course (post-test), the treatment group performed better and the differences with the control group were statistically significant in all the previous variables.

Table 8.3 Mean values in the scales before (pre-treatment) and after the course (post-treatment)

	Before the course		After the course	
	Control	Treatment	Control	Treatment
Self-efficacy	4.80	4.72	4.79	6.05
Pro-activeness	3.11	3.35	3.12	3.94
Risk taking	2.62	2.70	2.61	3.25
Intention to pursue self-employment	1.86	1.98	1.85	3.23

Source: Sanchez, 2013

- ➔ The students with higher initial scores in the scales (before the course) have less margin for improvement in all variables.
- ➔ The differences found between before and after the course in participants' replies could not be attributed to¹⁷⁴ their family background (whether the parents were self-employed, worked for someone else, or were government employees) or school of origin.
- ➔ Both before and after the course, the intention to pursue self-employment was positively related to self-efficacy, pro-activeness and risk taking, both for the group of students that took the course and for those who did not (this was statistically significant).
- ➔ For the students who took the course, there was a statistically significant difference in their performance before and after the course, in self-efficacy, pro-activeness, risk taking, and their intention to pursue self-employment. In the control group, there were no statistically significant differences in performance in the two measurements (pre and post-test).

Therefore, the study proves that the course had a positive impact on participants' entrepreneurial competences and intention.

However, the measurement does not prove that the course 'Entrepreneurial Initiative' implemented with the methodology proposed by the E-Vitamin programme, meets all the specific objectives established in the curriculum. It mainly addresses one of them: *To develop the entrepreneurial spirit through the promotion of attitudes, skills, social and management skills*. More specifically, it focuses on two immediate results: change in attitudes and intention to start businesses.

¹⁷⁴ No statistically significant correlation was found.

8.3 Methodology of measurement

The measurement was carried out by a team from the 'European Centres of Enterprises and Innovation' of Castilla y León' supported by the Chair of Entrepreneurship¹⁷⁵, and the Department of Education of the regional government. The aim of the research was to answer the question of whether entrepreneurial training programmes improve students' competences and intentions to undertake a business venture.

The researchers assessed the competences and the intention to pursue self-employment in a group of students who took the course 'Entrepreneurial Initiative,' combined with the E-Vitamin programme (experimental group), and a group of students who did not take the course (control group).

The initial sample included 729 students from consecutive years (from 2007/2008 to 2010/2011). After the elimination of the questionnaires with missing values or those that repeatedly had identical responses, the final sample consisted of 710 secondary school students: 347 had attended the course (experimental group) and 363 had not (control group). Competences and their intention to pursue self-employment were measured both before (pre-test) and after the course (post-test). The Questionnaire on Entrepreneurial Orientation (Sánchez, 2010)¹⁷⁶ contained the following scales:

- ➔ Self-efficacy: Scale composed of 20 items. Respondents were asked if they feel capable of doing what is indicated in the item. Scores range from 1 (completely incapable) to 10 (perfectly capable). An overall score in the scale was obtained by averaging the answers given to the items.¹⁷⁷
- ➔ Pro-activeness: This scale includes 10 items. Respondents assessed to what extent they undertake significant actions to influence their surroundings, on a zero to five Likert-type scale. An overall score was also obtained.¹⁷⁸
- ➔ Risk taking: This scale includes eight items regarding one's inclination toward and avoidance of risky situations. The answers are categorised on a zero to five Likert-type scale.¹⁷⁹

Some examples of items from the previous scales are provided in Table 8.4.

Students also responded to a scale on their intention to pursue self-employment.¹⁸⁰ This measure includes three items on the intention of an individual to start a business as opposed to pursuing a career being employed by organisations (see Table 8.4).

¹⁷⁵ The Chair of Entrepreneurship is under the sponsorship of Banco Santander.

¹⁷⁶ The validity of this questionnaire was tested with a sample of 1,810 university students from Spain, Portugal, Mexico, Brazil and Argentina.

¹⁷⁷ Based on a scale proposed by De Noble, Jung and Ehrlich (1999).

¹⁷⁸ Based on the studies by Seibert, Kraimer and Crant (2001).

¹⁷⁹ Scale proposed by Rohrmann (1997, unpublished data).

¹⁸⁰ Kolvereid, 1996.

Table 8.4 Measure on the intention to pursue self-employment

Question	Scale	
	Lower value	Higher value
If you were to choose between running your own business and being employed by someone, what would you prefer?	0 = Would prefer to be employed by someone	5 = Would prefer to be self-employed
How likely is it that you will pursue a career being self-employed?	0 = unlikely	5 = likely
How likely is it that you will pursue a career as an employee in an organisation?	0 = unlikely	5 = likely

Source: Sanchez (2013)

The methodology used in this research can be considered to be appropriate because it took into consideration the research in the field and the type of initiative addressed. The researchers measured the impact of an optional subject. This allows for the inclusion of a group of students who took the subject (experimental group) and a group of students who chose not to take it (control group), from the same school level and with similar ages. Nonetheless, this does not necessarily mean that these groups are comparable, i.e. that they are similar in various characteristics, that according to research could affect their competences and intention to pursue self-employment. So, another strong point of the methodology is that researchers checked that the experimental group and the control group were comparable, by including what is known as control variables. They selected a number of variables that according to research may have an influence on the competences measured and the intention to pursue self-employment: family background (whether the parents were self-employed, worked for someone else or were government employees); school of origin; and the level of competences and intention before the course. According to the analyses performed, there are no statistically significant differences between the experimental and the control group in the previous variables. Thus, it is possible to conclude that the changes observed in the level of competences and intention to pursue self-employment after the course between the two groups are due to the course itself and not to other characteristics of the students. This is a methodological tool that makes results more robust.

In regards to future steps, because the assessment was performed just after the course was over, future research could explore the evidence of the medium and long term effects of the course. The author also points out that the study addresses only part of the competences developed by the course, specific personality traits and their influence on their intentions to pursue self-employment; it does not address the impact of entrepreneurial knowledge, skills and abilities on the intention to become self-employed.

8.4 Using the results of the impact measurement

The results of the study were expected to help improve the E-Vitamin programme implemented in the course 'Entrepreneurial Initiative' before extending it to other schools and provinces in the region of Castilla y León. Also, it was intended to test a research methodology that could be further used in medium-term and long-term measurements of impact and in other similar courses on entrepreneurship education (e.g. in other levels of education).

However, due to budgetary constraints, the 'European Centres of Enterprises and Innovation of Castilla y León', a major actor in the development and implementation of the E-Vitamin programme and its evaluation, was dissolved in early 2014. The programme is expected to be fully transferred under the

responsibility of the regional government, but is still in a transition phase and it is not known yet whether the evaluations will still be carried out.¹⁸¹

At the moment, there is no evidence of the measurement results being used by public authorities in improving the programme or as a benchmark for other programmes. The regional government is more closely involved in the academic aspects of the course. Still, the impact measurement performed and the results obtained so far through the questionnaires could be important inputs into the introduction of changes in the curriculum of the subject.¹⁸²

The curriculum of the course 'Entrepreneurial Initiative' will soon have to be modified and so will the E-Vitamin programme, so as to comply with new requirements in national-level legislation. The recently approved Organic Act 8/2013 on education, introduces the course 'Initiation to Entrepreneurial and Business Activity' in lower secondary education at the national level (students will have to opt between this and other subjects).¹⁸³ It also establishes that entrepreneurship should be a transversal topic in primary education. The new legislation requires Autonomous Communities to include the modifications in the curriculum by 2014/2015, 2015/2016 or 2016/2017, depending on the level and grades.

In Castilla y León, the results of the impact assessment are expected to be a relevant input for the team of experts in charge of the curricular development of the new course 'Initiation to Entrepreneurial and Business Activity.'

Lastly, it can be said that the results of the research have already been used as a means to increase awareness about the positive impact of entrepreneurship education in the academic world, by the publication of the article by Sánchez in 2013.

8.5 Conclusions

Many entrepreneurship education programmes are being implemented at the moment in Spain both in schools and universities, however there were not any previous studies that measured their impact on the development of entrepreneurial competences. The study analysed in this report aims at filling this gap in the context of secondary education. The methodology used can be considered to be high quality and it is easily transferrable to other types of programmes for entrepreneurial education, in different education levels and contexts. Its main features are as follows:

- ➔ the inclusion of a control group;
- ➔ the use of a pre-test and post-test;
- ➔ the inclusion of control variables to ensure that the experimental group and the control group are similar in terms of characteristics that can affect entrepreneurial competences and the intention to pursue self-employment according to existing evidence; and
- ➔ the focus on competences rather than contents.

Including a control group, pre-test/post-test and control variables, allows researchers to claim that the results observed in students' performance can be attributed to the course. Therefore, it can be said that the methodology of this

¹⁸¹ According to a representative from the regional government of Castilla y León interviewed by ICF International.

¹⁸² According to a representative from the regional government of Castilla y León interviewed by ICF International.

¹⁸³ Spanish Official Gazette 10/12/2013. [online] Available at: https://www.boe.es/diario_boe/txt.php?id=BOE-A-2013-12886

study is in itself a contribution to research on the impact of entrepreneurial education.

According to the author, focusing the impact measurement on competences and attitudes is more adequate than focusing on contents and, as proved by this study, is more likely to produce positive results.

There is a need for further research to measure the impact on other competences, such as entrepreneurial knowledge or skills. Future research should also address medium and long-term outcomes, as well as test the impact in different settings.

Sánchez (2013) has carried out a transversal study and it could be argued that the findings would benefit from a longitudinal approach. However, longitudinal studies require significant investments. At the moment, the regional government does not foresee further investment in the evaluation of the course. In fact, the evaluation of the course may have been put on hold after the closure of the entity responsible for it, the 'European Centres of Enterprises and Innovation of Castilla y León.' The E-Vitamin programme has also been implemented in Antioquia (Colombia) and a first evaluation has been performed, but the results have not been published.

According to the author, one of the main difficulties in the implementation of the course and the E-Vitamin programme is the resistance of some educational sectors, including many teachers, and also from some families, to the teaching of entrepreneurship in school education, especially in lower levels.¹⁸⁴ So, this case study also offers support for the importance of involving and engaging teachers in the whole process of development, implementation and evaluation of entrepreneurial education programmes.

8.6 References

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E-Vitamine programme webpage. [online] Available at: <http://www.educa.jcyl.es/VitaminaE/es>

¹⁸⁴ This was underlined both by the author of the article and the representative of the regional government of Castilla y León.

9 Case Study 9: EE Courses in 27 VET-schools

This case study presents the results of a subsequent evaluation of three of the main entrepreneurship programmes implemented in Switzerland at the upper-secondary education level¹⁸⁵. The study was commissioned by the Swiss State Secretariat for Education, Research and Innovation and aimed to evaluate whether entrepreneurship programmes have an influence on entrepreneurial competencies, entrepreneurial knowledge, attitudes towards entrepreneurship and students' intention to create a company.

Since all major programmes in entrepreneurship at the upper-secondary level in Switzerland were considered, this study provides a representative and comprehensive picture of entrepreneurship education in vocational, technical, and commercial schools. While it cannot be excluded that other small, sporadic courses in entrepreneurship were offered by other schools, it is nevertheless estimated that the sample in the study covered 80 per cent to 90 per cent of the overall target population (students who were attending an entrepreneurship course at upper secondary level).

9.1 Description of the evaluated programmes

The scope of the study covered the following entrepreneurship programmes:

- ➔ 'Initiative for the Future' implemented in some schools under the supervision of the State Secretariat for Education, Research and Innovation;
- ➔ 'The Company Programme' of Young Enterprise Switzerland; and
- ➔ the 'Apprendre à Entreprendre' programme, implemented in some of the schools of the French speaking cantons.

9.1.1 The 'Initiative for the Future' Programme (Initiative Zukunft)

Objectives of the programme

The objective of the programme is to develop entrepreneurial skills and to increase entrepreneurial knowledge amongst students. The content of the programme aims to help students to make more informed choices when considering the opportunity to create their own business. The programme also introduces key tools that normally pave the way to the launch of a new company.

Skills development includes among other things, self-efficacy, risk bearing and locus of control¹⁸⁶. Knowledge building is related to the understanding and use of classic business tools such as the development and implementation of a business plan, the design and implementation of a marketing strategy and the setting up of a finance plan.

¹⁸⁵ The Results of the study *Entrepreneurship Programm: Initiative Zukunft* Eine Interventionsstudie zur *Erhöhung des unternehmerischen Kompetenzprofils bei Lernenden der Sekundarstufe II* are presented in the following paper: *The Impact of Entrepreneurship Education on Human Capital at Upper-Secondary Level*, by Thierry Volery, Susan Müller, Fritz Oser, Catherine Naepflin, and Nuria del Rey.

¹⁸⁶ Closely consistent with McClelland's theory of needs for achievement, is the belief of the internal locus of control. According to Rotter's locus of control theory, an individual perceives the outcome of an event as being either within or beyond his personal control. Entrepreneurs believe in their own ability to control the consequences of their endeavour by influencing their socio-economic environment rather than leave everything to luck. They strongly believe that they can control and shape their own destiny. Sources: In McClelland, D. (1965). Achievement and Entrepreneurship: A Longitudinal Study, *Journal of Personality and Social Psychology* 1(4), 389–392; Rotter, J. B. (1966). Generalized expectancies for internal versus external control of reinforcement: Psychological Monographs: General & Applied 80(1) 1966, 1-28.

Content of the programme

The programme consists of four modules which combine theoretical courses, field visits and workshops. In most of the schools, the duration of the programme is about 5 to 10 months. Students work in groups to develop and run a small company during the school year. The programme can be compulsory or optional, depending on the college.

The first module is an introduction to entrepreneurship and it presents the main steps leading to the creation of a company. At the end of the module, students develop their business concept and design a business plan. The second module is mostly based on field visits to small companies and interviews with entrepreneurs. They are opportunities for the students to question and discuss their business concept and to further elaborate their project.

The third module is mostly focused on teaching essential business tools and the fourth module is a combination of coaching sessions and time dedicated to the development and running of the small company. These two modules are strongly linked, so that students could immediately use in Module 4 what they learned in Module 3. At the end of the programme, each group must present their business plan in front of a jury. The final grade is mostly based on the quality of the business plan (up to 70 per cent of the grade) as well as on the final presentation and on students' individual contribution to the work of the group.

Overall, time is almost equally spent between theoretical (29) and practical courses (21) as shown in Table 9.1 below.

Table 9.1 Structure of the 'Initiative for the Future' programme

Module	Structure	Content
Module 1 - From the idea of it to the creation of your own company	8 lessons of 45 min	Comprehensive overview of the different steps leading to the creation of a company, from the shaping of the business idea to the writing up of a business plan
Module 2 - 'Finding Inspiration'	4 lessons of 45 min	Field visits to local companies Meetings and interviews with entrepreneurs to share ideas and experience
Module 3 - 'Toolbox'	7 courses 3 lessons of 45 min per course	Focus on specific business aspects such as marketing, finance and law
Module 4 - ' Develop your Business Plan'	21 lessons of 45 min Coaching sessions : 2-4 x 45-90 min	Concrete opportunity for students to develop their own business case Coaching sessions are an integral part of the module

Source: Entrepreneurship Programm: Initiative ZukunftEine Interventionsstudie zur Erhöhung des unternehmerischen Kompetenzprofils bei Lernenden der Sekundarstufe II' by Thierry Volery, Susan Müller, Fritz Oser, Catherine Naepflin, and Nuria del Rey

9.1.2 The Young Enterprise 'Company Programme'

Young Enterprise Switzerland (YES) was founded in 2006 and it is a non-profit organisation which develops and supports practice-oriented business training programmes for students, with the aim of interlinking the economy with schools.

Objectives of the programme

Among all programmes conducted by Young Enterprise Switzerland, the study focused on the 'Company Programme' for high school students. This programme aims to develop key qualifications such as the ability to work as part of a team, personal responsibility and self-reliance and to provide guidance in choosing the right career through practical experiences and insights into the way the social market economy works.

The Company Programme enables students from grammar schools, commercial colleges and training colleges to set up and run a real mini-enterprise for one school year.¹⁸⁷ The programme mostly targets high school students, business school students as well as vocational students.

Content of the programme

Each participating team has to create and develop a product or a service, as well as promote and sell it over the year. Students allocate their functions (executive director, marketing director, finance director, etc.) amongst each other and agree on a product idea, that they have to develop, promote and sell over the year. An opening event is organised for students to have the opportunity to present their mini-enterprise to prospective customers and to generate a starting capital by selling participation certificates (max. CHF 3,000). Workshops and seminars are organised throughout the year to provide background knowledge and a more theoretical approach to key business concepts. Trade fairs are also organised to provide opportunities for selling products. The young entrepreneurs are supported by teachers as well as by YES team members and external sponsors.

Students are required to present a business plan and business reports throughout the year. They also take part in a national competition and successful companies can attend an international fair trade. The project ends with the complete liquidation of the mini-enterprise.

9.1.3 The 'Learn to undertake' programme ('Apprendre à Entreprendre')

Objectives of the programme

The canton of Valais launched the 'Learn to undertake' programme in 2004. A pilot project was conducted in a business school and expanded over time to include several schools in the canton. The programme target business schools and vocational college students between 15 and 19 years old. It aims to stimulate entrepreneurial skills such as a spirit of initiative, dynamism and risk bearing and offers insights into the way the social market economy works.

Every school involved in the programme should submit an evaluation report. Comprehensive evaluation guidelines have been developed to collect feedback from students and teachers in addition to a general evaluation of the knowledge of the students at the end of the programme.

¹⁸⁷ Source: *Young Enterprise Switzerland Factsheet, the Company Programme*. [online] Available at: http://www.young-enterprise.ch/images/stories/yes/documente/yes_company_programme.pdf

Content of the programme

In 2012-2013, the programme was implemented in 20 classes. Over one school year, students in their second year of studies attend two to four hour courses per week.

An exploratory phase aims to identify a business opportunity and students benefit from financial support of 3000 CHF per class to develop and commercialise their project. Coaching sessions are organised to support the group in the development of their business plan. More theoretical modules on marketing and communication complete the programme, together with a special course on sustainable development. A yearly competition offers the most successful projects an opportunity to be promoted in the media. At the end of the year, students have the possibility to further develop the project and may receive up to 2,000 CHF financial support¹⁸⁸.

9.2 Results of the impact measurement

This section presents the main findings of the study. As indicated below, the evaluation aimed to evaluate whether entrepreneurship programmes have an influence on entrepreneurial competencies, entrepreneurial knowledge, attitudes towards entrepreneurship and students' intention to create a company.

The study was commissioned to support policy design on entrepreneurship studies. The projects 'Initiative for the Future' and 'Learn to undertake' were pilot projects and the State Secretariat for Education, Research and Innovation commissioned the study to investigate whether such projects could be developed at a larger scale.

The impact of entrepreneurship programmes, in particular in regards to the intention to create or take over a company, was all the more important to federal authorities, because about 90 per cent of the companies in Switzerland are small and medium size companies. One of the project managers of an entrepreneurship programme indicated for instance, that the local economy was mostly composed of very small companies of less than 10 employees. He also indicated that company owners who are retired often have difficulties in finding a person to take over their business. Therefore, some vocational colleges initially developed entrepreneurship programmes with the aim to stimulate students to create or take over small or very small businesses. Entrepreneurship programmes are also considered to be a way to train future employees to better understand their overall business environment.

9.2.1 Findings of the study

The study provided results on two aspects: the influence of entrepreneurship programmes on the intention to create a company in the coming years, but also the influence of entrepreneurship programmes on variables that are known to be positively related to entrepreneurship.

As regards the impact of entrepreneurship programmes, the main results of the study are the following:

- ➔ **Entrepreneurship programmes do not significantly affect the intention to create a company.** The most surprising result of the study is that researchers did not find a significant impact with regard to the intention to start one's own company within the next five years, which

¹⁸⁸ Source: *Entrepreneurship Programm: Initiative Zukunft, Eine Interventionsstudie zur Erhöhung des unternehmerischen Kompetenzprofils bei Lernenden der Sekundarstufe II*, by Thierry Volery, Susan Müller, Fritz Oser, Catherine Naepflin, and Nuria del Rey.

suggest that the programmes did not have a significant influence on entrepreneurial intention.

- **Entrepreneurship programmes do not affect entrepreneurial personality traits.** Less surprisingly, results also suggest that 'personality traits' were the least impacted by the programmes. These traits are relatively stable over time and they are the least likely to change in the short term. The duration of the intervention (6 months maximum) was not long enough to influence such variables.
- **Entrepreneurship programmes have a statistically significant effect on the attitude and beliefs about entrepreneurship.** The results of the study show that entrepreneurship programmes have a significant influence on some of the beliefs related to entrepreneurship. Students attending the programmes are more likely to consider entrepreneurship as a valid career option (perceived desirability). They also tend to feel more capable of starting and running a company (perceived feasibility).
- **Entrepreneurship programmes have a positive impact on students' entrepreneurial competencies.** Results indicate the positive impact of the programmes on competencies. In particular, the results of the study suggested that such programmes have an influence on the capacity to exploit an opportunity. Results also show that students have improved their capacity to develop business ideas. For instance, all participants developed a more or less mature business plan. Groups were challenged to critically review their work and/or their concept. Results of the study also show that students participating in the programmes develop soft skills such as persuasiveness or leadership. They increase their capability to work in a team and learn not to lose sight of the final goal. They also learn how to organise themselves and work within a group, how to delegate tasks and meet deadlines and how to deal with problems and find solutions.
- **Entrepreneurship programmes lead to entrepreneurial knowledge transfer.** A comprehensive set of tests enabled the evaluation of students' knowledge at the end of the 'Initiative for the Future' programme. Results of the evaluation show that the students who attended the programme have a sound knowledge of the tools presented in Module 3¹⁸⁹.

In addition to the evaluation of the entrepreneurship programmes, the study also measured the influence of certain variables on entrepreneurial intention. The results show that some personality traits such as the need for autonomy and risk bearing, as well as some beliefs on entrepreneurship such as perceived feasibility¹⁹⁰, perceived desirability¹⁹¹ and personal benefit¹⁹², have a positive influence on entrepreneurial intention. In addition, the results suggest that older individuals and individuals with previous entrepreneurial exposure show a higher entrepreneurial intention.

¹⁸⁹ Results related to knowledge transfer were only measured in the framework of the 'Initiative for the Future' programme.

¹⁹⁰ Perceived feasibility is the degree to which one feels personally capable of starting a business.

¹⁹¹ Perceived desirability can be considered as 'the extent to which entrepreneurship is a valid career option for the individual' (Dimov, 2006).

¹⁹² Personal benefit was measured based on three items adapted from Shapero (1982) capturing the general advantages, career rewards, and personal satisfaction of being an entrepreneur.

9.2.2 Discussion

Overall, the findings of the study suggest that the programmes lead to a 'demystification' of entrepreneurship and self-employment.

Entrepreneurial knowledge for instance, was found to have a slightly negative effect on students' intention to create a company. According to the research team, this may be explained by the fact that many students come to realise how difficult it is to get a project off the ground, and that failure is a prevalent feature of entrepreneurship. When they become more informed about the reality of 'entrepreneurship' as a career choice, some students do not consider it as the best option for them.

The programmes followed an experiential learning approach that encompassed a combination of lectures, business idea development, field trips, and testimonies from entrepreneurs. The research team commented that this pedagogy probably increased failure anxiety and diminished students' intentions to become entrepreneurs.

9.3 Methodology of measurement

The study was commissioned by the Swiss State Secretariat for Education, Research and Innovation. The results of the study were used to support the development of entrepreneurship studies at the upper-secondary level and to identify the outcomes of entrepreneurship programmes.

More specifically, the study aimed to evaluate the impact of such programmes on students' 'intention to create a company.' The results of the study were initially planned to feed into policy design to further support the development of entrepreneurship programmes at upper-secondary level.

9.3.1 Theoretical framework and research hypothesis

The method is based on numerous studies and theories establishing that 'human capital' is a key factor in entrepreneurship. The 'human capital' is understood as a combination of several variables, with some of them being positively related to entrepreneurship. Such variables seem to influence not only the intention to create a company, but the capability to identify and develop business opportunities as well as the capacity to successfully run a company over time. If entrepreneurship programmes have an impact on such variables, it could be thus expected that entrepreneurship programmes would tend to increase students' intentions to become entrepreneurs.

Theoretical framework

The study focused on four types of entrepreneurship-related human-capital assets, which have been thoroughly discussed in entrepreneurship literature and are known to be related to: entrepreneurship behaviours, entrepreneurship-related personality traits, beliefs, entrepreneurial knowledge and entrepreneurial competencies. For each of these five areas, key variables were identified and measured by drawing from a variety of established instruments from the entrepreneurship literature:

- ➔ **Entrepreneurial personality traits** (six variables): Relationships between personality traits and entrepreneurial behaviour have been frequently addressed in the entrepreneurship literature and the impact of the three programmes was measured through the evolution of five variables: need for achievement, entrepreneurial self-efficiency, need for autonomy, risk propensity and innovation propensity.
- ➔ **Beliefs** (three variables): The three main 'beliefs' affecting entrepreneurial intentions, namely perceived desirability, perceived

feasibility and perceived personal benefits, were all evaluated before and after the programmes.

- ➔ **Competencies** (two variables): Two main competencies were evaluated: the opportunity recognition and the opportunity exploitation.
- ➔ **Knowledge transfer:** Knowledge transfer is defined as the accumulation of factual information and it was evaluated via a comprehensive set of tests based on the theoretical content of the 'Initiative for the Future' programme.

Entrepreneurial intention was also evaluated to capture the intention to start a business in the next five years.

To complement the data collected in the different areas mentioned above, information related to the socio-demographic characteristics of the population was also collected such as: age, sex, and previous exposure to entrepreneurship. These were used as control variables.

Research questions and research hypothesis

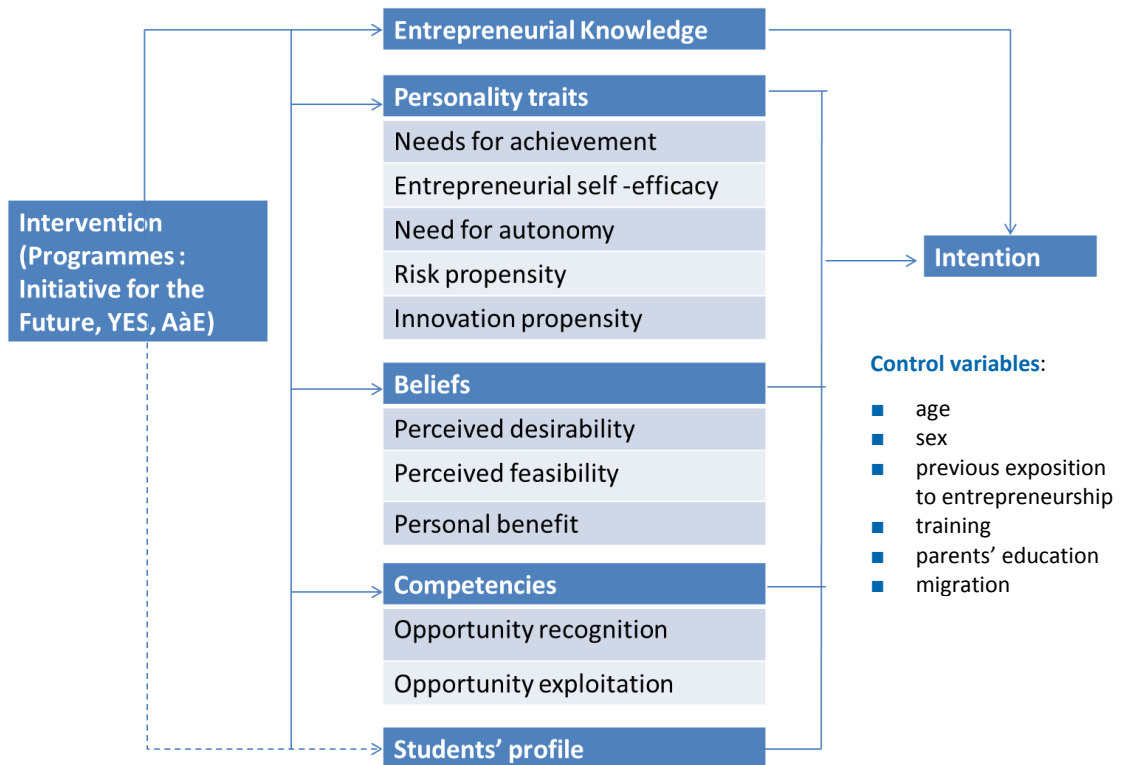
The study aimed to inform two research questions: Do personality traits, beliefs, and entrepreneurial knowledge and competencies influence entrepreneurial intention? And, does entrepreneurship education affect personality traits and raise beliefs, entrepreneurial knowledge and intention?

To answer the research questions, the following hypothesis were formulated:

- ➔ Hypothesis 1: There is a positive relationship between entrepreneurship-related personality traits and entrepreneurial intention.
- ➔ Hypothesis 2: There is a positive relationship between beliefs and entrepreneurial intention.
- ➔ Hypothesis 3: There is a positive relationship between knowledge and entrepreneurial intention.
- ➔ Hypothesis 4: There is a positive relationship between competencies and entrepreneurial intention.
- ➔ Hypothesis 5: Entrepreneurship education will be positively associated with entrepreneurship related human-capital assets.

The table following presents the theoretical model of the impact of entrepreneurship programmes on entrepreneurial intention used to design and develop the study.

Table 9.2 Theoretical model of the impact of entrepreneurship programmes on entrepreneurial intention



Source: translated from Entrepreneurship Programm: Initiative Zukunft. Eine Interventionsstudie zur Erhöhung des unternehmerischen Kompetenzprofils bei Lernenden der Sekundarstufe II by Thierry Volery, Susan Müller, Fritz Oser, Catherine Naepflin, and Nuria del Rey

9.3.2 The study's measurement and data collection tools

The methodology of the study was discussed with and approved by the Swiss State Secretariat for Education, Research and Innovation.

Study sample

Measurement was conducted at the individual level, on an initial sample of 494 students who took entrepreneurship as a compulsory or elective course in 27 Swiss vocational, commercial and technical schools. The sample was divided as follows among the three evaluated programmes:

- ➔ 'Initiative for the Future programme': 107 students in 5 schools;
- ➔ 'the Company Programme' of Young Enterprise in Switzerland: 181 participants in 12 schools; and
- ➔ the 'Learn to undertake' programme: 206 participants in 10 schools.

In addition, the study included a control group of 238 students from comparable schools. Therefore, the total initial sample size was comprised of 732 students¹⁹³.

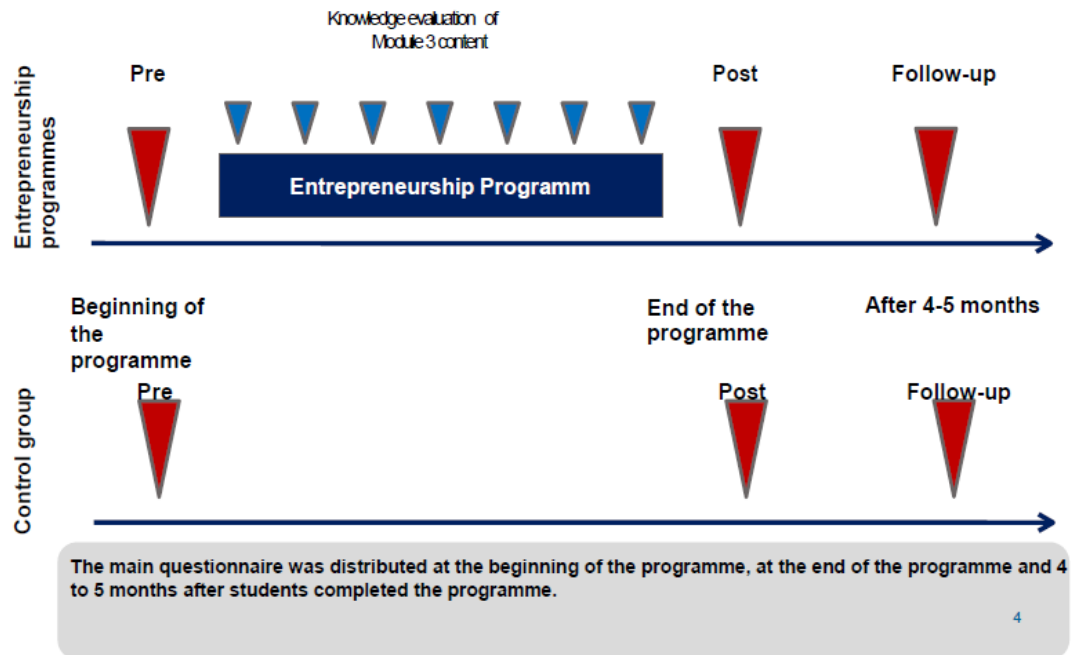
Time of measurement

A pre, post and post-post-test control group design was adopted. A questionnaire of over 100 questions was developed and distributed before the beginning of the programme, at the end of the programme and after 4 to 5 months after the completion of the programme. Questionnaires were distributed

¹⁹³ The size of the samples decreased at the second (t2) and third (t3) measurement, but remained significantly large: t2= 478 attributed questionnaires and t3= 363 attributed questionnaires.

to both the students attending the entrepreneurship programmes and 'control group students' as indicated in Table 9.3

Table 9.3 Data collection process (pre, post and post-post-test measurement)



Source: translated from Entrepreneurship Programm: Initiative Zukunft Eine Interventionsstudie zur Erhöhung des unternehmerischen Kompetenzprofils bei Lernenden der Sekundarstufe II by Thierry Volery, Susan Müller, Fritz Oser, Catherine Naepflin, and Nuria del Rey

Data collection tools

A partnership was established between the research team and the pedagogical teams involved in the intervention programmes, which facilitated the collection of data. With the exception of entrepreneurial knowledge, all variables were captured by multiple self-reported items measured on a five-point Likert scale i.e. answers were rated on a scale of 1 to 5.

Knowledge transfer was evaluated only for the 'Initiative for the Future' programme through specific tests based on the content of the third module of the programme, which focused on key business tools.

Pre and post intervention test questionnaires were distributed to students in the classrooms. For the follow-up tests, questionnaires were sent by email to participants.

The table below shows a sample of questions and their related variables measured.

Table 9.4 Sample of questions and variables measured

Areas	Variable	Example of question
Entrepreneurial personality traits	Need for achievement	To create my own business, I am ready to make mountains move
	Entrepreneurial self-efficiency	If some difficulties arise when I create my own company, I will find solutions
	Need for autonomy	I prefer to be my own boss than to work as an employee
	Risk propensity	My motto: to be a winner you must take risks!
	Innovation propensity	With the creation of my own company, I want to do something that has never been done before
Beliefs	Perceived desirability	I dream of creating my own company
	Perceived feasibility	I have the basic knowledge to create my own company
	Perceived personal benefits	I will get strong benefits if I create my own company within 5 years
Competencies	Opportunity recognition	I can develop a business concept to improve a product or a service
	Opportunity exploitation	I can define within deadlines a tasks list to turn an idea into a product
Entrepreneurial intention	Entrepreneurial Intention	I will try to create my own company within five years

Source: Translated from Encouragement de l'entrepreneuriat dans la formation professionnelle initiale presentation by the Federal Office for Professional Education and Technology, May 2012

9.3.3 Comments on the methodology of measurement

The study used a robust methodology and combined elements that can be used to improve the impact measurement of entrepreneurship education programmes as indicated below:

- ➔ **Theory-driven research:** The design of the research was strongly theory-driven and based on concepts that have been thoroughly explored by entrepreneurship literature. The theoretical framework of the study was based on clearly defined concepts and on a testable hypothesis.

- ➔ **Large sample:** The initial sample consisted of representative groups of students from the three main entrepreneurship programmes in Switzerland and was thus representative of the targeted population. The size of the sample remained significantly large (over 100 students) at all measurement points in time, which increases the reliability of the results.
- ➔ **Use of a control group:** The process of influencing entrepreneurial intention is very complex and affected by many variables. The use of a control group is one of the key assets of the method, as it helps to isolate the impact of the entrepreneurship programme in itself.
- ➔ **Three-point in time measurement:** Measurement was conducted at three points in time, which also allows for better isolation of the impact of the intervention. Using an ex-ante and ex-post measurement strengthens the explanatory power of the research, as information can be more easily attributed to the influence of the programme. Furthermore, the last measurement was conducted only a few months after the completion of the programme. Such a time frame was long enough to evaluate the stability of the impact of the programme and short enough to limit the potential influence of too many external factors on the measured variables.
- ➔ **Use of statistical procedures:** The study used variance, correlation and regression analysis which allows for the measurement of possible interdependencies between measured variables.

9.4 Using the results of the impact measurement

The findings of the study were published in scientific reviews, as the study contributes to the growing field of entrepreneurship education by focusing on students in vocational, technical and commercial schools at upper-secondary level, but also by using a robust methodology relying on a three-point measurement.

The study also led to further research on entrepreneurship course characteristics that positively influence entrepreneurship intention. Results show that course elements such as business planning activities, role models, student-oriented teaching and feedback processes are efficient components to increase entrepreneurial intention through its antecedents¹⁹⁴.

The research team published a book¹⁹⁵ on entrepreneurship studies at the upper-secondary level which aims to support teachers in the development of entrepreneurship programmes.

The results of the study were also communicated to the Swiss State Secretariat for Education, Research and Innovation, but interviews suggest that the results of the study were not used further to promote entrepreneurship studies at the upper-secondary level. The findings of the study may have been considered to be slightly disappointing, as the main expectation of the Swiss Government was that entrepreneurship studies would lead to an increase in entrepreneurial intention. A change in the policy agenda also occurred in the years following the beginning of the study and the policy focus on entrepreneurship studies shifted towards other levels of the educational system and adult learning policies.

¹⁹⁴ Mueller, S. (2011) Increasing entrepreneurial intention: effective entrepreneurship course characteristics, *Int. J. Entrepreneurship and Small Business*, Vol. 13, No. 1, pp.55-74.

¹⁹⁵ Mueller, S., Oser, F., Volery, T., & del Rey, N. (2014). *Entrepreneurship in der Sekundarstufe II: Handbuch und Arbeitsmaterialien, Ein Programm zur Erhöhung der unternehmerischen Kompetenzen*. Bern: hep. - ISBN 978-3-03905-974-4.

9.5 Conclusions

The results of the study showed that an entrepreneurship programme can have an influence at the individual level on certain beliefs related to entrepreneurship. Entrepreneurship programmes also lead to knowledge transfer, but do not necessarily influence the intention to create a company.

Overall, the study showed that students attending entrepreneurship programmes can make a more informed choice when considering entrepreneurship as a career option. Researchers highlighted that the pedagogies used have probably led to a demystification of entrepreneurship and self-employment, but also increased failure anxiety and diminished students' intentions to become entrepreneurs. Therefore, the study may further lead to in-depth reflexion not only about the content of the programmes, but also about the pedagogies used. As an example, the research team investigated which types of pedagogies may positively influence the intention to create a company and published a book describing entrepreneurship programmes at the upper-secondary level.

At a more political level however, the study did not feed into policy making and was not used further to develop entrepreneurship studies at the upper-secondary level.

9.6 References

*Entrepreneurship Programm: „Initiative ZukunftEine Interventionsstudie zur Erhöhung des unternehmerischen Kompetenzprofils bei Lernenden der Sekundarstufe II*by Thierry Volery, Susan Müller, Fritz Oser, Catherine Naepflin, and Nuria del Rey.

Entrepreneurship Education: A Systematic Review of the Methods in Impact Studies, Michael Lorz, Susan Mueller and Thierry Volery, *Journal of Enterprising Culture* (JEC), 2013, vol. 21, issue 02, pages 123-151.

The Impact of Entrepreneurship Education on Human Capital at Upper-Secondary Level by Thierry Volery, Susan Müller, Fritz Oser, Catherine Naepflin, and Nuria del Rey, *Journal of Small Business Management* 2013 51(3), pp. 429–446.

10 Case Study 10: Entrepreneurship Education National Action Plan 2007-2012 (The Netherlands)

10.1 Description of the initiative

The Netherlands is one of the countries which, throughout the last decade, has put a great deal of emphasis on implementing entrepreneurship education across all levels of the educational system – from primary to higher education. The Ministry of Economic Affairs took the lead in the Entrepreneurship Education Agenda, in cooperation with the Dutch Ministries of Education, Culture and Science, and Agriculture, Nature and Food Quality. The 'National Office for Entrepreneurial Netherlands' (Rijksdienst voor Ondernemend Nederland) implemented the Action Programme for Entrepreneurship and Education as a joint assignment on behalf of the Ministries of Economic Affairs and Education.

Following an exploratory phase, a comprehensive Action Programme was launched in 2007 and consecutively adapted and updated. The Action Programme was carried out in three phases:

- 2005-2006: Exploratory Phase (Programme Partnership Learning Enterprise);
- 2007-2009 and 2010-2011: Implementation Phase (e.g. Education and Entrepreneurship Action Programme 2007, Education Networks Enterprise 2009); and
- 2012-2013: Mainstreaming Phase.¹⁹⁶

The implementation phase and the mainstreaming phase were accompanied by a series of commissioned surveys and independent evaluations, which aimed to describe the success of specific projects and activities related to the Action Programme, and to depict the development of implementing entrepreneurship education in the Netherlands as of 2007.

At the time of writing this case study (2014), the Action Programme was finalised. The results of the measurements activities report significant progress against the two goals of the programme (see the section on results). The Dutch Government will continue to support entrepreneurship education as a transversal activity, embedded in other programmes. Through providing subsidies to networks of co-operation between schools, businesses and social organisations, the hope is that these will become self-sustaining. In addition, a foundation addressing teachers (Stichting 'Grijp de Buitenkans')¹⁹⁷ seeks to ensure that teachers at primary, secondary and mid-vocational levels have the necessary skills to support students participating in entrepreneurship education. There will also be further funding to enable the Centres for Entrepreneurship Education to continue their work in supporting students in higher education.

10.2 Target groups and objectives

As stated above, the programme addressed all levels of education and was designed to support two main goals:

- **Goal 1:** An increasing number of educational institutions in the Netherlands with entrepreneurship education integrated into their policy, their organisation and their curriculum; and

¹⁹⁶ Onderwijs in ondernemerschap – Kamerbief. Kenmerk: 20120134/1044. Onderwijsraad, The Hague, 27 June 2013.

¹⁹⁷ [online] Available at: <http://www.grijpdebuitenkans.nl/>

- **Goal 2:** A growing number of students and pupils showing more entrepreneurial behaviour and starting up their own business within a period of five years after completing their education.¹⁹⁸

Entrepreneurship was seen as **a key competence for life**. It was understood as a set of knowledge, skills and competences that are a precondition to generic entrepreneurial attitudes and behaviour as well as to founding a company; hence they are a key competence for lifelong learning.¹⁹⁹

The design of the Action Programme was based on basic assumptions that were derived from studies and literature and from the observations of previous projects.²⁰⁰

1. One of the success factors for entrepreneurs and employees that can be influenced is education:

- an entrepreneur's success is clearly linked to his or her education; and
- the success rate of an extra year of education for entrepreneurs is on average considerably higher than an extra year for employees.²⁰¹

2. Entrepreneurial qualities such as creativity, the ability to do things independently, perseverance, a positive attitude towards risk-taking and an open mind to the outside world **are best developed at a young age**. Formative education in particular, can play a significant role in developing these qualities.²⁰²

3. Entrepreneurial qualities in general help people to manage independently in a changing world.²⁰³

4. The effectiveness of study programmes increases if they begin in primary and secondary schools.²⁰⁴ Hence, entrepreneurial qualities must be developed primarily at a young age, i.e. in formative education. It should even be given priority in primary education.

5. In the Netherlands there is a lack of appropriate and readily available teaching aids for entrepreneurship education in the wider sense that interested teachers and students can refer to and use at their own discretion.²⁰⁵

6. Entrepreneurship education heightens the degree of a person's willingness to take risks and establish a new company. It increases an individual's chances of becoming involved in a new company by 25 per cent

¹⁹⁸ *Progress Report on the Education and Entrepreneurship Programme*; The Hague, 2008. [online] Available at: http://www.onderwijsonderneemt.nl/download/229_progress_report_on_the_entrepreneurship_and_education_programme_nov_2008

¹⁹⁹ The document refers repeatedly to the 'EU definition' – meaning that it follows the definition presented in the European 'Key competences for lifelong learning' framework; notably the key competence 'sense of innovation and entrepreneurship'. [online] Available at: http://europa.eu/legislation_summaries/education_training_youth/lifelong_learning/c11090_en.htm

²⁰⁰ Cf. *Progress Report on the Education and Entrepreneurship Programme*; The Hague, 2008.

²⁰¹ Van der Sluis J., Van Praag C.M., Vijverberg W., 2003, *Entrepreneurship selection and performance: a meta-analysis of the impact of education in industrialized countries*, Discussion Paper, Tinbergen Institute, University of Amsterdam; Entrepreneurship update - Onderwijs en ondernemerschap in Nederland - Mirjam van Praag, ACE, 2007.

²⁰² A) Rushing, F.W., *Economics and entrepreneurship in the elementary grades*, in C.A. Kent (ed.), *Entrepreneurship Education: Current Developments, Future Directions*, New York: Quorum Books, 153-164, 1990. B) Peterman, Nicole and Jessica Kennedy. Enterprise Education: influencing students' perceptions of entrepreneurship, *Entrepreneurship Theory and Practice*, 129-144, 2003 c) 6 Bal, José et al., *Ondernemerschap in het primair en voortgezet onderwijs*, EIM, 2007.

²⁰³ Hytti, Ulla, *State-of-art of enterprise education in Europe; Results from the Entrededu project*, Small Business Institute, Turku School of Economics, [online] Available at: <http://www.dntredu.com>

²⁰⁴ *Early development of entrepreneurial qualities: the role of initial education*, EIM, 2003.

²⁰⁵ Bal, José et al., *Ondernemerschap in het primair en voortgezet onderwijs*, EIM, 2007.

compared to persons who have completed their study with no entrepreneurship education. Entrepreneurship education suggests an 11 per cent higher chance that after completing his or her studies a young person will become self-employed compared with those who have not followed entrepreneurship education.²⁰⁶

- 7. Entrepreneurship education offers teachers the opportunity to give stimulating lessons, and offers pupils and students the opportunity to develop new talents and important skills for the future. This contributes to the quality of education** and can, for instance, give a boost to subjects such as mathematics and language in classes at all levels of education, from primary education (PO) to higher education (HO).

Through the different tracks, the Dutch Government provided subsidies to projects which aimed to develop entrepreneurship education ('Onderwijs in Ondernemerschap, ONO') across all levels of education. The subsidy scheme 'Ondernemerschap en onderwijs 2007' (Entrepreneurship and Education 2007), was developed to enable educational institutions to develop projects in association with the business community. A call for proposals (for € 17 million) was put out in 2007. It concerned two tracks:

- **Track One (Spoor 1):** The development of entrepreneurship projects in primary education (PO), secondary education (VO) and secondary vocational education (MBO). These projects focus on creating and encouraging a modern-day teaching environment; teaching aids and teaching methods for entrepreneurship; the further professionalisation of teachers in entrepreneurship; and reinforcement of the collaboration between students, entrepreneurs and teachers in the field of entrepreneurship.
- **Track Two (Spoor 2):** The further development of the (regional) Centres of Entrepreneurship (CoE) in higher education (HBO and WO). A Centre of Entrepreneurship focuses on directing, organising and facilitating multidisciplinary, institution-wide entrepreneurship education with the goal of encouraging entrepreneurship across all educational institutions and between individual educational institutions.²⁰⁷

In response to the call of 2007, 28 projects were selected and launched:

- 6 projects concerned Centres of Entrepreneurship in the higher education (Track Two);²⁰⁸
- 22 projects were divided as follows between primary education, secondary education and secondary vocational education (Track One):
 - 9 projects in primary education;
 - 8 projects in secondary education; and
 - 5 projects in secondary vocational education.²⁰⁹

²⁰⁶ *The Impact of Entrepreneurship Education: An Evaluation of the Berger Entrepreneurship Program at the University of Arizona 1985-1999*, A. Charney et al., 2000.

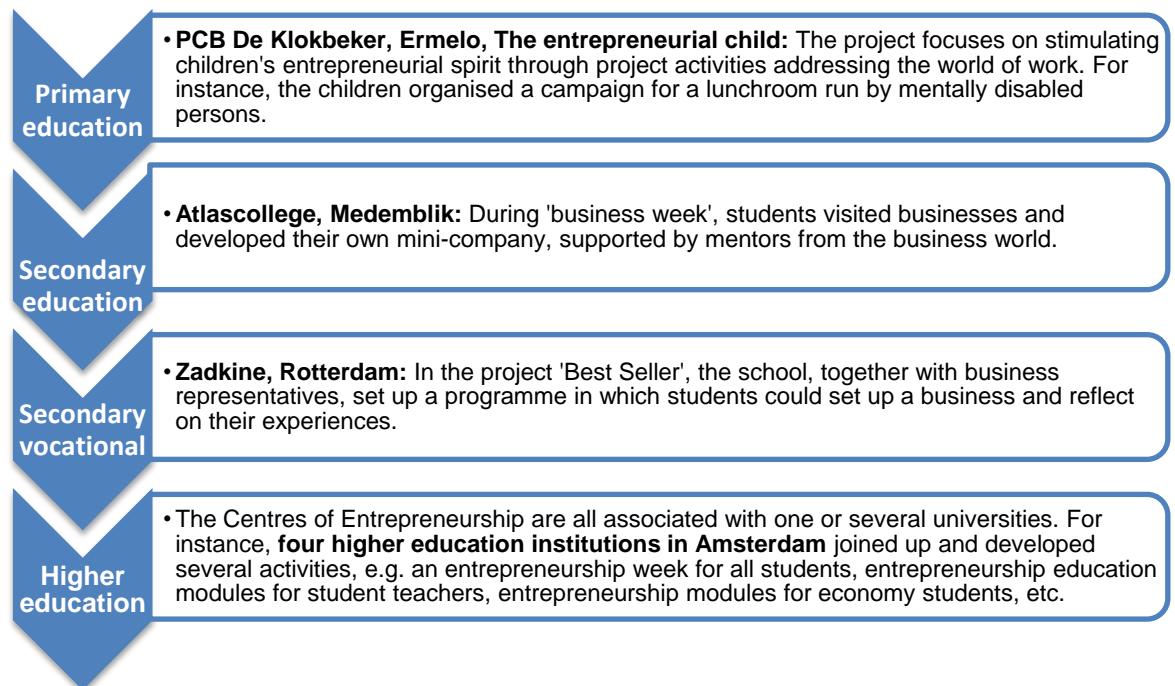
²⁰⁷ *Progress Report on the Education and Entrepreneurship Programme*; 2008.

²⁰⁸ [online] Available at: http://www.onderwijsonderneemt.nl/hogeronderwijs/centres_for_entrepreneurship

²⁰⁹ *Progress Report on the Education and Entrepreneurship Programme*; 2008. An overview of the assigned projects is included in Section 10.8.

The figure below presents an example of a project for each educational level.

Figure 10.1 Examples of entrepreneurship education projects funded in the period 2007-2011



In addition to the Track One and Track Two projects, through the 'Education Networks Enterprise 2009' (Onderwijs Netwerk Ondernemen, ONO 2009), the Netherlands provided a specific subsidy scheme to help educational institutions to integrate entrepreneurship education into their policies, organisation and curricula.²¹⁰

Through this subsidy scheme, in 2009 and 2010, 88²¹¹ additional projects were launched:

- 26 projects in primary education;
- 28 projects in secondary education; and
- 34 projects in secondary vocational education.

In 2012, eight additional 'good practice' projects were funded in schools that already participated in the subsidy scheme, but asked for additional time to roll out their practice (two in primary education, three in secondary education, and three in secondary vocational education).

10.3 Evaluation and impact measurement

In line with the evidence-driven approach in the development of the Action Programme, the Track One and Two projects were accompanied by a set of research activities from the beginning.

Two strands were followed:

- Specific independent evaluations were set up in relation to the two tracks. The final evaluation report of the 28 projects related to Track One ²¹²was published in 2013, following an interim evaluation from 2009. Equally, for

²¹⁰ After 2010, the ONO subsidy scheme was extended for two more years (until 2012).

²¹¹ This figure includes projects from the first phase which were extended or continued with a new focus.

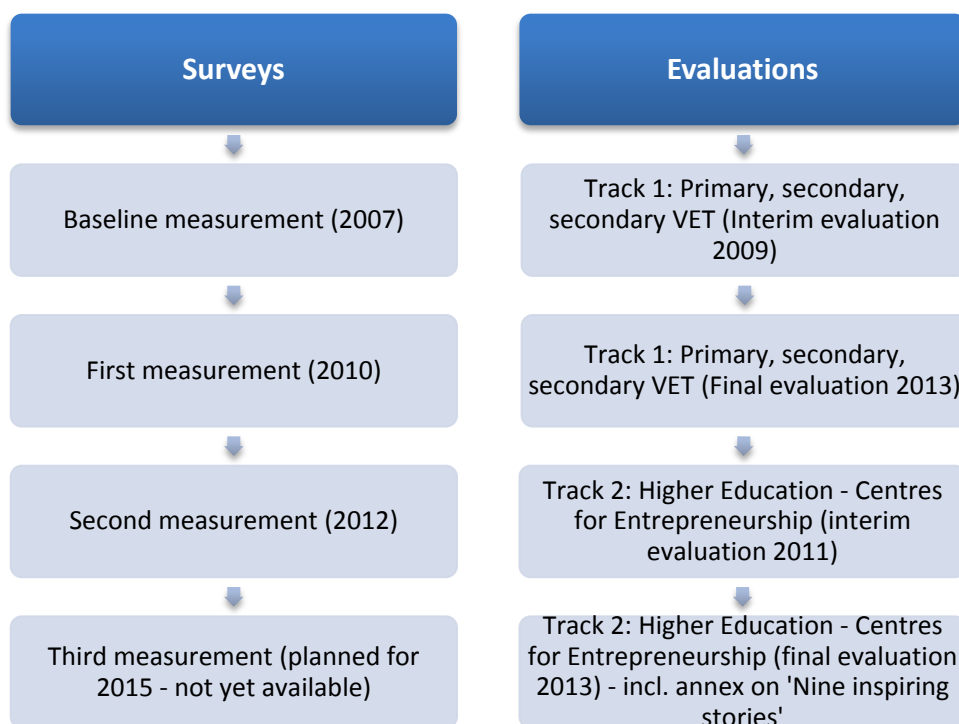
²¹² Please note: the evaluations covered only the first generation of projects launched in 2007. The programmes funded through the ONO scheme were not included in the evaluation.

Track Two, an interim evaluation (2011) and a final evaluation (2013) were carried out. These were accompanied by 'nine inspiring stories' based on qualitative interviews.

- ➔ In addition, surveys were commissioned to measure progress against the two main goals of the Action Programme on a two-year cycle. A baseline measurement was carried out in 2007 to map the status quo of implementation across educational institutions against a set of indicators. In 2010, a second measurement was undertaken to provide an update on the progress made through the 2007 and 2009 subsidy schemes. The study undertook an e-survey and in-depth interviews across educational institutions and an e-survey solely for students. The exercise was repeated in 2012. A third measurement is planned for 2015.

Figure 10.2 below gives an overview.

Figure 10.2 Research undertaken in relation to the Action Programme



The following sections describe the results of the two types of measurements and present the research methodologies applied.

10.4 Results of the impact measurement

10.4.1 Surveys

Baseline study

In 2007, the Dutch Government commissioned a baseline study²¹³, serving two purposes: on one hand, the study aimed to give an overview on the state of play of implementation. On the other hand, it aimed to develop a set of methodological instruments: setting the ground for further measurement on a two-year cycle (see the following section on methods).

To provide an overview on the state of play regarding implementation, the baseline measurement aimed to answer the following main research questions:

²¹³ Nulmeting Onderwijs en ondernemerschap. B&A Consulting, Den Haag 2008.

- ➔ In what way should schools and universities be given attention to stimulate entrepreneurship and entrepreneurial behaviour?
- ➔ How does this take form in:
 - the curricula,
 - the relationship of the school or university with its (business) environment, and
 - the relationship between school and teaching staff?

The baseline measurement showed that in 2007, entrepreneurship education was a budding theme. It was known and implemented to a certain extent in schools' mission statements and educational practice. This was however, not based on a shared definition and/or methodology. Images and ideas about what it is and how it can be used in education varied greatly. Differences were observed between schools within sectors as well as between different sectors.

In all sectors, a number of institutions could be identified, which included 'entrepreneurship' in their mission statement to a certain extent. This number was much larger than the number of institutions who had an actual programme on offer; or had entrepreneurship education implemented in the curriculum. The differences are shown in Table 10.1 below. The baseline measurement draws the conclusion that at the time of measuring (2007), entrepreneurship education happened more on paper than it did in practice.

Table 10.1 Enterprise education in mission statements and in programmes/curricula

	Primary	Secondary	MBO	HBO	WO
Emphasised in mission statement (pretty much or very much)	26%	23%	64%	73%	83%
Implemented in programmes and curricula (pretty much or very much)	12%	27% VMBO, 6% HAVO, VWO	50%	47%	0%

Source: Nulmeting, Den Haag 2008

Other **key observations** include:

- ➔ In all sectors, the majority of schools had a form of collaboration with the business community established. To a varying degree, the business community was found to be involved in educational activities (in the form of visiting lectures, active partnerships, etc). This was:
 - more common in secondary education and VET (secondary [MBO] as well as universities of applied sciences [HBO]); and
 - less common in primary education, university higher education (WO) and the more academic tracks of upper secondary education (HAVO, VWO).
- ➔ Only a minority of the programs allowed for entrepreneurial competencies to be assessed as part of the examination schedule. Clear exceptions to this were the sectors 'economy' and 'trade' in secondary VET (MBO), where entrepreneurial skills were found to be examined in a majority of courses.
- ➔ Entrepreneurship education did not play a significant role in the competency profiles of teachers.
- ➔ The student survey showed that about one third of students in upper secondary or higher education (representative sample of total student population across educational sectors) have a wish to become an

entrepreneur. Students from MBO scored the highest results here: about 35 per cent reported they wish to become an entrepreneur 'very strongly' or 'fairly strongly' and students in HBO follow with 29 per cent.

- ➔ A large majority of students think they do not learn anything or just a small amount in school/university that stimulates their entrepreneurial skills and competences (73 per cent MBO, 71 per cent HBO and 81 per cent WO).
- ➔ Data in relation to the number of students who start up their own business within a period of five years after completing their education were not collected.

First and second measurement

The first and second measurements followed the same approach as the baseline measurement, but to ensure representativeness, it addressed a larger sample of educational institutions (see the following section). Data were collected which illustrated progress against the two main goals of the Action Plan.

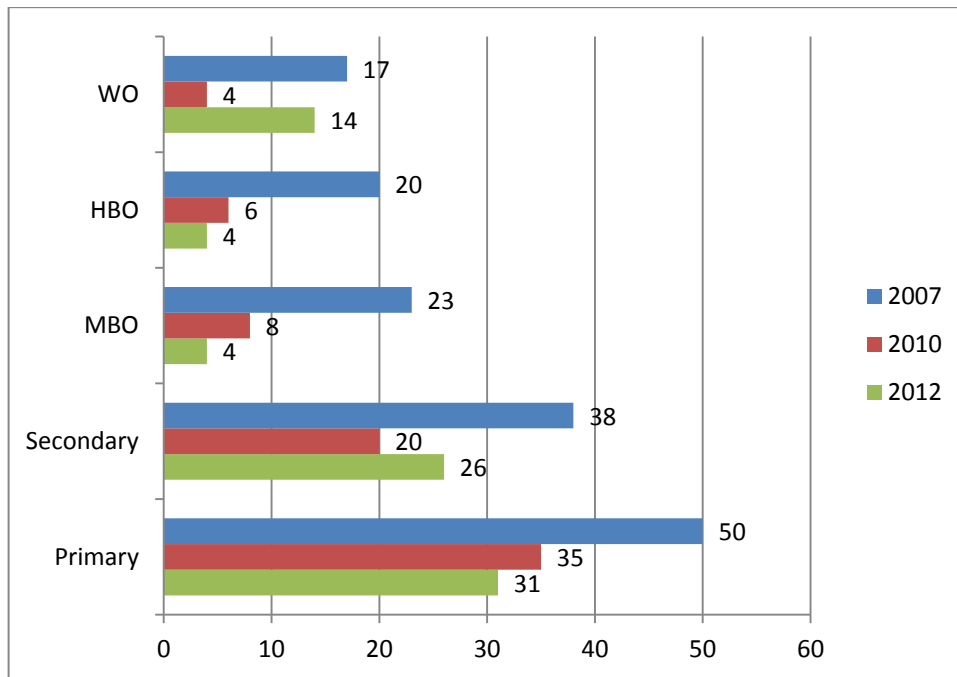
Goal 1: Increase the number of educational institutions with entrepreneurship education integrated into their policy, their organisation and their curriculum

The measurements show that between 2007 and 2012, entrepreneurship became more deeply embedded in the mission statements, programmes and curricula of educational institutions in all sectors. Entrepreneurship in education has become a more permanent feature in the organisations, and courses are offered by a growing number of education institutions. As reported in the first measurement, the number of institutions across sectors that have entrepreneurship included in their mission statements grew between 2007 and 2010: From 27 per cent (2007) to one third (2010).²¹⁴ The second measurement reports that in 2012, educational institutions from all sectors were found to give entrepreneurship more attention than in 2010. However, the report does not give a concrete figure for the average across sectors.

The baseline measurement of 2007 showed a large difference between the number of institutions that reference entrepreneurship in their mission statements and the number of those that actually address entrepreneurship in programmes and curricula. For 2010 and 2012, this picture did not improve significantly when looking at those institutions that indicate they have implemented it 'pretty much' or 'very much.' It does however change, when looking at the percentage of institutions that have implemented it 'a bit' or 'not at all.' Regarding the latter, the percentage of institutions who do not offer anything about entrepreneurship became significantly smaller in all sectors between 2007 and 2012. Yet, this cannot be seen as a process of continuous development. While there was a significant leap between 2007 and 2010, further progress towards 2012 was rather gradual. In the sector of university education (WO), there is even a backlash (see Figure 10.3).

²¹⁴ Cf. Eenmeting, page 23.

Figure 10.3 % of institutions where entrepreneurship is NOT AT ALL implemented in programmes and curricula (2007-2012)



Source: Tweemeting, Den Haag 2013

This can be interpreted as evidence that entrepreneurship is starting to gain momentum, as there is a broader basis of institutions that have started addressing it.

Yet differences between educational sectors should be noted:

- ➔ The largest shift from not having enshrined entrepreneurship in the curriculum 'at all' (50 per cent in 2007) to schools that had done so 'a bit' (59 per cent in 2012) took place in **primary education**. As to involving the business community, primary schools score relatively low (50 per cent in 2010, 56 per cent in 2012). However, they score the highest rates of all sectors when it comes to the commitment shown by parents. They helped with implementing the entrepreneurship curriculum in more than half of the schools (51 per cent in 2012).
- ➔ **Secondary education** has improved regarding all indicators: The percentage of schools with entrepreneurship in their mission and vision statements has grown (from 62 per cent in 2007 to 74 per cent in 2012). In 2012, 70 per cent of secondary schools organised specific entrepreneurial activities and in 81 per cent of the schools invited guest teachers from the business community were to give lessons. The number of secondary school teachers receiving additional training in entrepreneurship grew (to 22 per cent in 2012 compared to 17 per cent in 2010).
- ➔ The sector of **upper secondary vocational education** (MBO) showed lower growth rates. However, this sector started from an already high level of implementation, and in 2012, 96 per cent of institutions offered programmes or curricular content.
- ➔ **Universities of applied sciences**, compared to other educational sectors, made the greatest progress between 2010 and 2012 with regard to several indicators:
 - The degree to which institutional management is involved in promoting entrepreneurial education increased by over 18 per cent, and enthusiasm

is not limited to management: department and faculty heads indicate more often than before that they see themselves as entrepreneurs.

- Entrepreneurship is becoming part of teachers' competency profiles ('very strong' +11 per cent). In recent years, contacts between universities and the business community have become more intensive.
- The business community has started playing a much greater role in defining the content and organisation of entrepreneurial education (more demand-driven).
- ➔ Compared to the 2007 and 2010 measurements, entrepreneurship in 2012 had become a more important part of the curriculum at **universities** and more Centres of Entrepreneurship were established. Entrepreneurs give more guest lectures and teachers have more opportunities to gain practical experience in businesses.

Regarding **teachers**, across the sectors, the 2012 measurement shows that entrepreneurship is to some extent part of a teacher's competence profile in all sectors. This is the strongest in senior secondary vocational education, universities of applied sciences and the least well reflected in primary and secondary schools. The number of institutions offering their teaching staff courses and training sessions on this subject has increased in secondary, senior secondary vocational institutions and universities of applied sciences.

The **contacts between education institutions and the business community** became more intensive in all educational sectors, except primary schools. This is reflected among other things, in an increase in the number of visits of entrepreneurs to education institutions and a higher frequency of entrepreneurs engaged as guest teachers. This is particularly the case in universities of applied sciences, where the business community has started playing a bigger part in defining the content and organisation of entrepreneurial education.

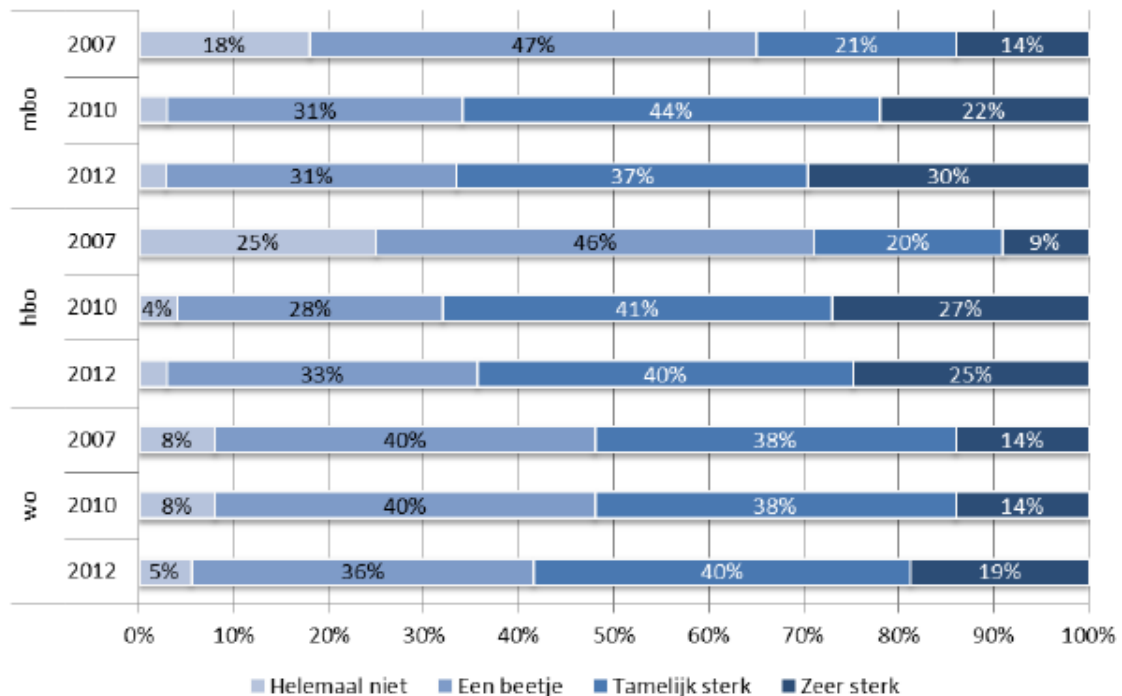
Goal 2: Growing numbers of students and pupils showing more entrepreneurial behaviour and starting up their own business within a period of five years after completing their education

The data show an increase in entrepreneurial ambitions among students. The numbers of students who state that they consider entrepreneurship as career choice increased significantly between 2007 and 2010, and then stayed relatively stable (39 per cent in 2007, 62 per cent in 2010, and 63 per cent in 2012).

Students in secondary vocational and higher vocational education caught up with university students in this regard; while they were significantly less interested in entrepreneurship in 2007 (MBO: 35 per cent, HBO: 29 per cent, WO: 52 per cent) they now score even higher than university students (MBO: 67 per cent, HBO: 65 per cent, WO: per cent). In general, all three sectors differ only slightly in the degree to which entrepreneurship contributes to their career aspirations.

Figure 10.4 gives an overview on the development of the key results regarding students' perceptions over the three measurements.

Figure 10.4 Number of students considering entrepreneurship as a career choice – compiled from the three measurements



fbo: n=281, hbo: n=508, wo: n=438

iron: B&A Consulting, 2007; EIM, 2010 en Ecorys, 2012

Source: Tweemeting, Den Haag 2012²¹⁵

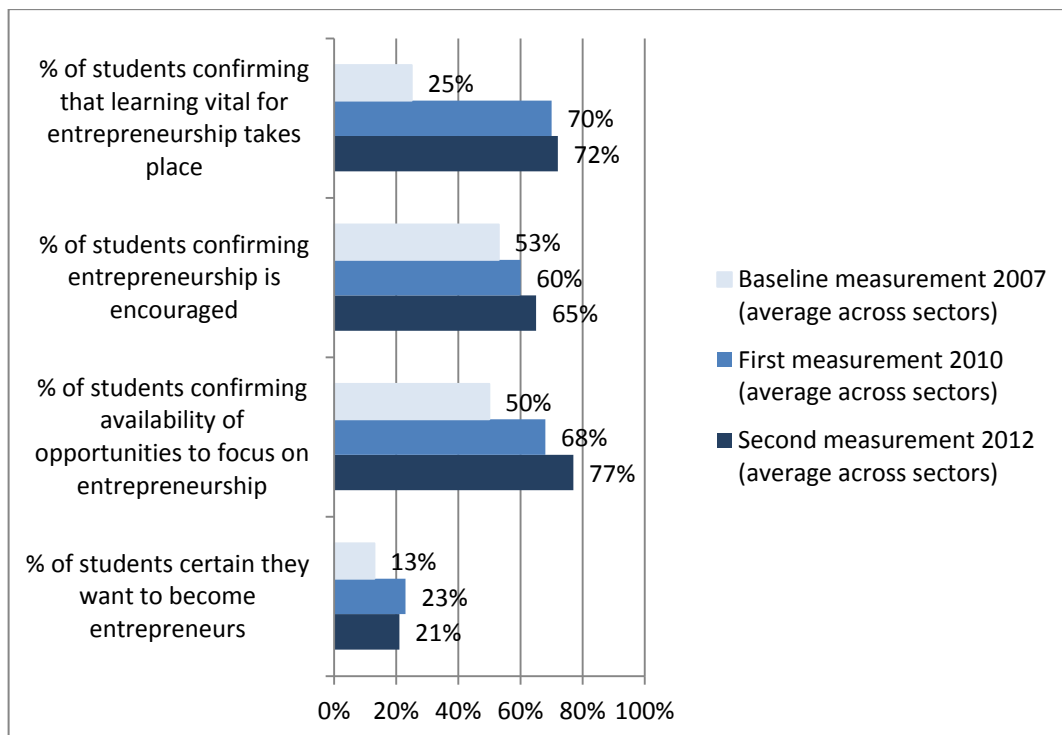
For universities of applied sciences, the 2012 measurement shows that students are aware to a much higher degree that their university is encouraging their entrepreneurial ambitions. More students are seeking to gain credits in entrepreneurship (64 per cent in 2012 compared to 50 per cent in 2010).

University students were found to gain more credits in entrepreneurship and more experience as entrepreneurs during their courses as well in 2012, compared to previous years. Without being able to establish a causal link, the researchers find it striking that more academic students want to become entrepreneurs after graduating (compared to 2010, +2 per cent most certainly, +3 per cent possibly). Hence, entrepreneurship has overall become more popular with students.

The development of other selected key findings between 2007 and 2012 are shown in Figure 10.5. It is visible that after a large quantitative leap between 2007 and 2010, the results stayed relatively stable between 2010 and 2012.

²¹⁵ Light blue: Not at all, sky blue: a little, dark blue: pretty strong, navy blue: very strong.

Figure 10.5 Other key findings of the students' survey



Source: Twee meeting, Den Haag 2012²¹⁶

The figure shows that with regard to the selected indicators, the figures increased between 2007 and 2012. Higher numbers of students:

- ➔ indicated that entrepreneurship is encouraged in their educational institution and saw opportunities to focus on entrepreneurship, both inside and outside the curriculum;
- ➔ said that their study programme teaches them elements that are vital to entrepreneurship;
- ➔ indicated that the educational institutions they visit try to encourage entrepreneurship;
- ➔ were certain they want to become an entrepreneur once they have finished their education.

There is one exception to the overall very positive findings; according to the students' survey of 2012, the number of company visits undertaken by schools dropped in relation to 2010. The number of students whose courses did not include any company visits at all increased at all levels (MBO, HBO, WO). So, despite the above-mentioned intensification of the contacts between education institutions and the business community, company visits featured less often in courses.

Figures in relation to the numbers of students setting up their own business five years after graduation – one of the main aims of the Action Programme – were not provided. This is due to the fact that the Action Plan was launched in 2007 and at the time of the latest measurement (2012), not enough time had passed to allow for a measurement in relation to the five-year period.

A third measurement is planned for 2015. It should be expected that this measurement would contain data as to students' and alumni foundation rates

²¹⁶ Light blue: Not at all, sky blue: a little, dark blue: pretty strong, navy blue: very strong.

five years after finalising their education. At the time of writing this report, the results from the third measurement were not available yet.

10.4.2 Evaluations

The three consecutive measurements aimed to show how the situation in educational educations changed in relation to several indicators, and how this was perceived by students. In parallel, three evaluations were commissioned. These rather aimed to measure the success of concrete programmes and actions related to the Action Plan – divided by educational sectors. As stated earlier, the Action Plan consisted of 2 'tracks' and 28 projects:

- **Track One (Spoor 1):** 22 projects in primary education (PO), secondary education (VO) and secondary vocational education (MBO)²¹⁷; and
- **Track Two (Spoor 2):** 6 (regional) Centres of Entrepreneurship (CoE) in higher education (HO).²¹⁸

The two tracks were evaluated separately.

Track One: primary education, general secondary education and secondary vocational Education (PO, VO, MBO)

As mentioned above, under Track One, a variety of projects was funded which focused on creating and encouraging a modern-day teaching environment; developing teaching aids and teaching methods for entrepreneurship; the further professionalisation of teachers in entrepreneurship; and reinforcement of the collaboration between students, entrepreneurs and teachers in the field of entrepreneurship. The project activities were always based on a combination of concrete practical experiences with entrepreneurship and experiential education in the classroom.

The evaluation focused on the following questions;

- Did the projects achieve their objectives?
- What is the quantitative and qualitative output of the projects?
- How much did the projects help to implement entrepreneurship in the institution?

The projects and their results were analysed sector by sector. The results provide information that is additional to the findings from the surveys.

Primary education

The 9 projects in primary education were implemented across the Netherlands and targeted both teachers and students. In total, about 21,000 pupils and 1,000 teachers were reached:

- Six of the nine projects aimed to encourage the entrepreneurial attitudes of both teachers and students: with teachers as the main target group - based on the assumption that teachers act as role models for students and pass on their own entrepreneurial attitude.
- In three projects, students were the main target group. These projects aimed to encourage primary students' entrepreneurial skills and spirits by bringing them into contact with entrepreneurship.

²¹⁷ As mentioned in Section 1, a large number of additional projects in primary, secondary and secondary vocational education were funded through the ONO subsidy scheme (2009-2012). These projects were not evaluated. Hence, the findings cover a limited number of (first generation) projects.

²¹⁸ *Progress Report on the Education and Entrepreneurship Programme*; 2008.

The evaluation²¹⁹ presents the following key results:

- **Question 1:** Most projects were managed successfully and, according to the evaluation, can be regarded as having achieved their objectives. Only one project was stopped prematurely.
- **Question 2:** The majority of pupils rated the projects as educational, fun and useful. About one in three students surveyed said s/he became 'more enterprising' (self-assessment). After completing the project, students' awareness of entrepreneurship has increased (about two out three state they now know what an entrepreneur is), and one out of four students even indicate they plan to become entrepreneurs themselves.

Enthusiasm among teachers varies. Some of the teachers were passionate about enterprise at the project's start: others do not see the benefits of entrepreneurial education. Members of this group could be motivated quite often by seeing the positive impact on students. In general, the entrepreneurial attitude of teachers has changed in a positive way. As a side effect, the positive influence of teachers' motivation to become involved in the design of curricula was observed.²²⁰

- **Question 3:** For primary schools, participating in the projects meant a leap forward towards a positive impetus to entrepreneurship education.

Secondary education (VO) and secondary vocational education (MBO)

In secondary education, all 13 projects aimed to stimulate entrepreneurial attitudes and behaviours among both students and teachers. The projects are practical and are often carried out by groups of students. As a trend, it was found that the projects in secondary vocational education include a stronger focus on concrete knowledge related to founding a company, in comparison to the projects in general secondary.²²¹

- **Question 1:** All projects were carried out successfully. During the implementation, reluctance from teacher side was observed and it hindered the projects from unfolding their full potential in some cases. The report links this to the assumption that teachers are not used to thinking and acting entrepreneurially. Yet, it was found that they tend to change their minds and attitudes when they see the effects the projects have on their students. Hence, it can be concluded that successful projects have an impact on teachers as well.²²²
- **Question 2:** About half of the pupils / students in secondary and vocational education were excited about the projects and indicate that they had an impact on them. Across both sectors, 40 per cent of students found that after the project, they showed more entrepreneurial behaviour, and 45 per cent indicated they think more positively about entrepreneurship or entrepreneurs. When students were asked to rate how seriously they think about founding a business (on a scale of 1-7), the average value was 4.7. A score of 1 indicates the project has encouraged them to do so and enhanced their motivation.

Regarding the compliance and motivation of teachers, the projects related to Track Two had to overcome some reluctance; teachers were not immediately convinced that the changes required from them (e.g. regarding teaching methods) were worthwhile. The evaluation report presents examples where

²¹⁹ Spoor I: eindbestemming bereikt? Eindevaluatie 'spoor 1' projecten Ondernemerschap en Onderwijs. Panteia, 2013.

²²⁰ Ibid, page 37 – no concrete figures are provided.

²²¹ Ibid, page 7.

²²² The report presents anecdotal evidence, page 56.

teachers could be convinced of the value of entrepreneurship education once they saw the effect on students.

- **Question 3:** Before the start of the projects, most of the participating educational institutions were already to some extent engaged in entrepreneurial education. Through the projects, entrepreneurship education gained additional momentum in both sectors.

Note: The evaluation of Track One pays attention to two of the main indicators of the surveys (percentage of schools with entrepreneurship in their mission and vision, and percentage of schools with entrepreneurship in their curriculum).

It finds that, six projects succeeded in implementing entrepreneurship to a full extent in the participating schools (hence into the school curriculum and the mission statement of the school). These schools continued the activities, or strengthened the measures. For instance, some of these schools were also found to use entrepreneurial learning methods in basic subjects such as math and language. Another 11 projects entailed partial implementation in the participating schools (either in the curriculum or in the school plan or vision). Five projects were found to have no effect on the participating schools regarding implementation beyond project duration. Hence, **17 of the 22 participating projects sustained a continuation of entrepreneurial education beyond the grant period in the participating schools. The tendency to establish entrepreneurship permanently is stronger in secondary than in primary education.**

Track Two: Centres of Entrepreneurship (CoE) in higher education

Track Two concerns the funding of six (regional) Centres of Entrepreneurship (CoE) in higher education (HBO and WO). In 4 CoEs, several institutions work together, hence the 6 CoEs serve in total 16 higher education institutions (8 universities – WO, and 8 universities of applied sciences - HBO):

- HOPE in Rotterdam (EUR), Delft (TU) and Leiden (RU);
- ACE in Amsterdam (VU, UvA, HvA, Hogeschool InHolland Diemen);
- Go! in Arnhem-Nijmegen (ArtEZ, HAN, Radboud Universiteit);
- DAFNE in Wageningen (WUR), Leeuwarden (HvL), Den Bosch (HAS) en Dronten (CAH);
- MC4E (University of Maastricht); and
- COCI (Arts College Utrecht).

The CoEs focus on directing, organising and facilitating multidisciplinary, institution-wide entrepreneurship education with the goal of encouraging entrepreneurship across the educational institutions and between individual educational institutions.²²³ They address students as well as the projects of the universities.

The evaluation of the CoEs looks at the effects of all centres combined. No judgment is made about individual CoEs. The conclusions are based on the data collected in relation to four main questions:

- **Question 1: Effectiveness:** Do students who took part in CoE activities now have a more positive attitude towards entrepreneurship and are more enterprising than before?

²²³ *Progress Report on the Education and Entrepreneurship Programme; 2008.*

The effect of CoE activities on students cannot be proven, but must be assumed to be very likely, given the range and scope of activities carried out. More than 300 activities were organised to make the students aware of the possibilities of entrepreneurship, to help them acquire the necessary knowledge and skills and support them in starting their own business. However, at the time of measurement (2012) large groups of students were still not aware of the services and learning opportunities the CoEs have on offer.²²⁴

Tens of thousands of students were reached, but the impact on students is unclear. No measurement has taken place that can prove whether and how the attitude of students has changed under the influence of the CoE activities, nor has it been tested whether students have gained new knowledge and skills through the courses they followed. The final evaluation sees this as a missed opportunity, which makes it difficult to identify 'best practices' and learn from 'mistakes.. The evaluation report also states that the intended effects of 'more entrepreneurial behaviour' and 'more students starting a business within five years after graduation' will be visible only with years of delay.²²⁵

→ **Question 2 - Additionality:** Would the level of integrating entrepreneurship and related actions be the same without the CoE grant?

Mostly positive - without subsidies, the level of progress would not have been achieved – or would have been achieved much more slowly. The subsidies enabled the centres to develop new curricular courses and a range of extra-curricular activities. However, five of the seven rejected grant applicants were still able to form their own Centre of Entrepreneurship, despite the rejection of grants. It is not known whether these CoEs received grants from counties or municipalities, nor is it known whether these CoEs have an offer that is similar to that of the subsidised CoEs. However, the evaluation committee noted that the mere existence of the grant scheme has worked as a catalyst for developing concrete plans to establish a CoE - regardless of whether the centres received grants or not.

→ **Question 3 – Continuity:** What remains of the CoE organisation? Will activities be continued when the grant period has ended?

By the end of the grant period (2012), continuity was not assured for all activities. Some entrepreneurship education activities have found their place in the curriculum, usually in the form of compulsory minors. In this case, they may be paid from regular educational resources. Other (extra-curricular) activities - especially awareness activities (workshops, 'boot camps', lecture series, etc), have not yet secured future funding. The activities directly aimed at business start-up and growth seem safe, since they are also promoted through other programmes.

→ **Question 4 – Efficiency:** Is the scheme implemented efficiently?

The evaluation found that the grant scheme was indeed implemented efficiently. The costs for the implementation were found to amount to 3.8 per cent of the total grant sum. This is reasonable since the costs for similar schemes in the Netherlands range from 3 per cent to 5 per cent.

²²⁴ At the same time it was noted that the visibility of the CoEs is not ideal – some of them do not advertise their provisions to an optimal extent (e.g. insufficient information on websites, not clear how students can get access to services).

²²⁵ *Evaluatie Centres of Entrepreneurship, Evaluatiecommissie Centres of Entrepreneurship – Den Haag 2012, page 5.*

10.5 Methodology of measurement

In the following section, the research methods applied in the surveys and evaluations are briefly summarised.

10.5.1 Surveys

As stated above, the baseline measurement was carried out in 2007. The study comprised seven steps:

- Step 1: Defining and operationalising the terms 'entrepreneurship' and 'entrepreneurial competences';
- Step 2: Development of a set of indicators, on the basis of which the baseline measurement could be undertaken;
- Step 3: Development of a list of questions for the survey (specific questions per educational sector);
- Step 4: Carrying out an internet (e-)survey among a representative samples of all schools and educational institutions from primary to higher education: and among students in secondary, secondary VET and higher education;
- Step 5: In-depth interviews with experts and representatives of all educational sectors;
- Step 6: Analysis of the data and reporting;
- Step 7: Development of an implementation plan to ensure the availability of data for the planned subsequent measurements - in cooperation with the participating schools and higher education institutions.

The definition of the terms resulting from Step 1 was presented above. During Step 2, through desk research and interviews with three stakeholders per sector, a series of indicators was developed in relation to three levels:

- 1. Input:** Schools' policies and concepts (key educational objectives, programmes, content of exams);
- 2. Throughput:** Educational process and teaching methods; and
- 3. Output:** The results for the students (different forms of entrepreneurial actions and behaviour).

By combining these three types of indicators, the researchers aimed to establish a link between policy (mostly inputs), activities at school level (throughput) and results (output). To allow for sector specific recommendations and conclusions, the indicators were adapted to each educational sector concerned (primary, secondary, secondary VET, higher education).

Examples of indicators are presented in Table 10.2.

Table 10.2 Indicators for measurement (examples)

Educational Sector	Input	Throughput	Output
Split & specified by sector -primary, secondary, secondary vocational and HEI	<p>% of educational institutions where entrepreneurial behaviour is part of the competency profiles of teachers;</p> <p>% of educational institutions where entrepreneurship or enterprising behaviour is being anchored in the curriculum (learning outcomes);</p> <p>% of educational institutions where e-entrepreneurship is part of the exam;</p> <p>% of educational institutions who take account of entrepreneurship or enterprising behaviour in their mission or vision;</p> <p>Etc.</p>	<p>% of educational institutions where students actively take over responsibility for the organisation of learning;</p> <p>% of educational institutions with specific projects aimed at stimulating entrepreneurship and entrepreneurial behaviour;</p> <p>% of educational institutions with a high level of direct interaction between entrepreneurs and students (entrepreneurs in the school or students in companies);</p> <p>% of educational institutions who maintain an active partnership between the school and one or more companies;</p> <p>Etc.</p>	<p>% of educational institutions where entrepreneurial behaviour is one aspect of describing the characteristics of a student (for example for the advice to further education);</p> <p>% of educational institutions who hope to be trendsetting in relation to EE between now and three years' time;</p> <p>Etc.</p>

Source: Nulmeting, Den Haag 2008

The first and second measurement followed the same approach. Whilst the basic design was kept: for each measurement the set of indicators was reviewed, and some of the indicators were slightly revised. Indicators were added, e.g. about the budget for entrepreneurial learning activities. To find out to what extent and in what way schools and universities give attention to stimulating entrepreneurship and entrepreneurial behaviour and how this takes form, all three measurements are based on surveys among educational institutions and students. The indicators above were used to design questionnaires for the different target groups. As with the indicators, the sets of questions were more or less the same for every measurement undertaken.

In parallel to the measurement undertaken every two years, the Action Programme was rolled out, hence, many activities were undertaken which should be assumed to enhance the values measured in relation to the above indicators (which, as shown earlier, was actually the case). However, although it is logical to suggest that there is a link between the two events, the design of the study does not allow the establishment of clear links or logical chains. For instance, this is due to the fact that the measurements does not use control groups and/or controls for other (external) factors, e.g. the economic climate, communication campaigns on entrepreneurship, etc.

To measure the penetration rate in **educational institutions**, an e-survey and in-depth interviews across all educational institutions in the four mentioned

sectors were undertaken. For each sector, a representative sample of schools and educational institutions was selected. Participation in the sample was voluntary. The table below (Table 10.3) gives an overview of sample sizes and response rates.

Table 10.3 Sample size and response rate to the three measurements (educational institutions)

Sector	Gross Sample			Net Sample			Response rate		
	Basic	First	Second	Basic	First	Second	Basic	First	Second
Primary	2000	2000	2000	607	463	333	30.4%	23%	17%
Secondary	664	1.289	1.339	135	294	155	20.3%	23%	12%
Secondary Vocational	60	682	621	28	130	116	47.0%	19%	19%
Universities of Applied Sciences	65	252	214	15	78	65	23.1%	30%	31%
University Education	13	95	93	6	27	37	46.2%	28%	40%
Teacher education	57	./.	./.	22	./.	./.	38.6%	./.	./.

Source: Compilation of data from Nulmeting (2007) / Eenmeting (2010) / Tweemeting (2012)

The table shows large differences in sample sizes between the basic and the first /second measurement for all sectors, apart from primary education. The samples from the basic measurement were found to be too small to ensure representativeness. Hence, sample sizes were scaled up; all schools from the four sectors (secondary, secondary vocational, universities of applied sciences, university education) were included.

However, response rates were not always satisfying. Despite researchers taking several measures (e.g. additional phone surveys following – up the e-surveys), response rates decreased significantly between basic and second measurements in all sectors, apart from universities of applied sciences (HBO), where it increased. In university education (WO), a decrease can be observed from the baseline to the first measurement; whilst for the second measurement the response increased again. During the phone survey, the first measurement inquired about the reasons for non-responses and found out that schools tend to be unable to find time and available staff; 62 per cent of the schools with no response stated that they regard data collection as being of minor importance and, consequently, prioritise their resources differently.²²⁶

Decreasing response rates entail a negative effect on the representativeness of the results. Variance²²⁷ differs from sector to sector. In the basic measurement, variance was very low for primary and secondary education (2.0 per cent /3.1 per cent), but quite high for university education (27.1 per cent) and teacher education (12.6 per cent). First and second measurements do not present variance rates. However, since the response rates dropped even further, it must be assumed that variance did not improve.

To deal with this issue, the researchers responsible for the second measurement²²⁸ undertook a specific follow-up phone survey among the non-responding schools and gave them the opportunity to respond to the three most

²²⁶ Onderwijs en Ondernemerschap, Eenmeting 2010, Petra Gibcus, Maarten Overweel, Sita Tan, Michel Winnubst, Zoetermeer, May 2010 - page 90.

²²⁷ 'Sample variance' indicates how far the net sample size affects the representativeness of the results.

²²⁸ Ondernemerschap in het onderwijs, Tweemeting, Eindrapport, Ruud van der Aa, Susan van Geel, Etienne van Nuland, Rotterdam, November 2012 – page 22.

important questions. It turned out that those who responded on average gave an even more optimistic picture about the stage of implementation. Hence, non-responsiveness cannot be attributed to a lower degree of engagement.

To measure the experiences of students, an e-survey was conducted with students (secondary VET, universities of applied sciences and university education). The focus of the questionnaire was slightly different. The students were asked to what degree they had the opportunity for entrepreneurial learning and entrepreneurship education and to what degree they used it. Moreover, they were asked to what degree entrepreneurship education links in with their interests.

For each sector, a representative sample was addressed. Participation in the sample was voluntary.

The table below (Table 10.4) gives an overview on sample sizes and response rates

Table 10.4 Sample size and response rate to the three measurements (students)

Sector	Gross Sample			Net Sample			Response rate		
	Basic	First	Second	Basic	First	Second	Basic	First	Second
Secondary Vocational	758	1508	1775	234	319	286	31%	21%	16%
Universities of Applied Sciences	1750	2436	2600	626	377	511	36%	15%	20%
University Education	750	1856	1775	286	372	444	38%	20%	25%

Source: Compilation of data from Nulmeting / Eenmeeting / Tweemeting

Similar to the survey among schools, response rates were rather low and dropped over time, which has a negative effect on representativeness. However, during the second measurement, efforts were taken to achieve higher response rates, e.g. by distributing six iPads among the respondents. A slight increase in response rates for universities of applied sciences and university education was observed.

10.5.2 Evaluations

Following the completion of projects, the evaluations were carried out by independent research institutions. Data were collected and analysed; based on the conclusions, recommendations were given.

Track One: Primary and Secondary Education (incl. vocational)

The data collection and analysis for the evaluation was carried out in five steps:

1. desk research: analysis of project reports, concepts and data;
2. interviews: face-to-face or phone interviews with the 22 project representatives and several²²⁹ stakeholders (schools, teachers, business representatives and parents);
3. surveys among students (primary school: 4 schools, 164 students, secondary: seven schools, 137 students);
4. group discussions in primary schools (in four schools with groups of six boys and six girls each);

²²⁹ No concrete figures are presented, but it can be assumed that in total, ca. 30 interviews were conducted (incl. the 22 project representatives).

5. analysis, reporting and factsheets (based on an 'eclectic' approach, hence all data sources mentioned above were used for the analysis).

Track Two: Higher Education

The interim evaluation of the Centres for Entrepreneurship was carried out in six steps:

1. desk research: analysis of project reports, concepts and data;
2. interviews with 17 project representatives;
3. a survey on project data among the centres (service offer, number of participants, etc);
4. Internet-survey among students (605 respondents);
5. phone survey among stakeholders (64 stakeholders); and
6. analysis and reporting.

The final evaluation is based on the work of an evaluation commission which used:

- ➔ the data and report of the interim evaluation and the first measurement;
- ➔ material from desk research;
- ➔ the final report of the CoEs;
- ➔ reports of the implementing agency (RVO); and
- ➔ interviews with 25 persons involved in the implementation (project representatives and other stakeholders).

Robustness of the findings

Both evaluations seem robust. The methodology is transparent and appropriate. Interesting methods were developed and used (group discussions) to collect data on the effects of the projects on the group of primary school students.

No control group was used, though – comparing the results of the schools and students that took part in projects with groups of schools and students that did not would have been interesting and would have enhanced the validity of results. It should also be noted that project representatives might be biased when it comes to critically discussing the work they are responsible for in interviews.

10.6 Using the results of the impact measurement

The surveys and evaluations were regarded to be a very comprehensive approach to monitoring the progress and the results of the Action Programme. While the surveys provided data about the results and impact of the entire package of measures, the evaluations allowed having a more detailed look into the development and impact of specific actions and projects.

The first survey (baseline measurement) conducted in 2007 played an important role in compiling a baseline against which progress with the measures related to the Action Programme can be compared. Moreover, it helped to understand the differences in the current state of play of implementation in the different educational sectors. This knowledge was used to refine the programmes and actions planned. For instance, it was understood that in secondary vocational education a broad basis of activities and infrastructure is already in place, which should be considered and further developed.

All other surveys and evaluations served two purposes:

- ➔ **Monitoring:** Report to the Ministries of Education and Economy about the progress of the Action Programme (general impact data and data on concrete projects and actions); and
- ➔ **Review:** Provide data and recommendations on how to refine the implementation plan.

Regarding the first purpose, the ministries used the evaluations and the surveys to collect data from concrete projects and – as shown in the section on results – data which monitored progress against the two main goals of the programme. Hence, the financing bodies were regularly updated about the results of the actions.

Moreover, the results were used to improve the ministries' understanding about the conducive factors, challenges and obstacles which have an influence on the success of the Action Programme. For instance, both the surveys and the evaluations showed that teachers were an important target group and have a decisive influence on the success of the Action Programme.²³⁰ Additional actions to support the preparation of teachers (initial and continuous training) for entrepreneurship education were taken (Stichting 'Grijp de Buitenkans').²³¹

Upon finalisation of the programme, the ministries used the results of the studies to report about the positive impact of entrepreneurship education to the Educational Council. The Educational Council drafted a letter to Parliament²³² in which they summarised the key conclusions and recommendations of the measurements.

The Parliament reacted to the letter²³³ with the following key recommendations:

- ➔ entrepreneurship and entrepreneurial skills are key competences to prepare students for the 21st century labour market;
- ➔ entrepreneurship needs to have a place in the educational system at all levels and sectors;
- ➔ in the sector of secondary vocational education, schools and VET-providers need to be given room to develop their own programmes and provisions;
- ➔ in the sector of higher education, attention should be given to entrepreneurial excellence; and
- ➔ entrepreneurship education should make use of the knowledge and know-how of business representatives.

In general, the Action Programme and the funding scheme connected to it were seen as successful and reaching their aims. The projects and pilot actions will not be continued, but ministries, the Educational Council and Parliament state that further attention will be given to the topic (e.g. through promoting its implementation in all educational sectors and through supporting cooperation and networking between the educational sector and the business sector). The data collected in the various measurements must be regarded to be the evidence base that led to this decision.

²³⁰ As stated in interviews with ICF International in April 2014.

²³¹ [online] Available at: <http://www.grijpdebuitenkans.nl/>

²³² Onderwijs in Ondernemerschap, Onderwijsraad, 27 Juni 2013.

²³³ Kabinetsreactie op het onderwijsraadadvies 'Onderwijs in ondernemerschap', Den Haag, 29 Oktober 2013.

10.7 Conclusions

The Dutch Action Programme on Entrepreneurship Education pursued two goals. The first goal was focused on the **level of input and activities**; it aimed to increase the number of educational institutions in the Netherlands with entrepreneurship education integrated into their policy, their organisation and their curriculum.

When looking at the studies and surveys carried out, it can be stated that programme led to a certain amount of change at the following levels:

→ Input/activities:

- The results of the second measurement suggest that entrepreneurship in education has become a more permanent feature in the mission and vision of educational organisations.
- It is implemented in the curricula of a higher percentage of educational institutions, and courses and modules are on offer at a growing number of schools and universities. The greatest progress in this regard was observed in secondary and higher professional education. Compared to senior secondary vocational and higher professional education, entrepreneurial education occupies a less central position at universities, but progress was found here as well. The situation in primary education is fairly stable, a decline in the numbers of institutions implementing entrepreneurship in education was observed at senior secondary vocational level, although here, entrepreneurship did already occupy a prominent position and progress is hence more difficult to achieve.
- The intensity of contacts between education institutions and the business community has increased, although there is an overall drop in company visits by students.
- Entrepreneurship was included in teacher's competency profiles across the sectors and more training was on offer to prepare teachers for entrepreneurship education. However, teachers are reluctant to adapt to the requirements of entrepreneurship education. Pilot projects showing the positive effect of entrepreneurship education on students are a good way of motivating them.²³⁴

The second goal pursued by the Action Programme was to achieve a growing number of students and pupils showing more entrepreneurial behaviour and starting up their own business within a period of five years after completing their education. This goal belongs to the level of **immediate results** (change in behaviour) and **intermediate outcomes** (higher foundation rates). The data collected by the studies and surveys show that a certain amount of change is measurable at this level as well. Yet, possible limitations presented as well.

→ Immediate results:

- The second measurement shows that entrepreneurship features in the career aspirations of approximately two thirds of students (at senior secondary vocational, higher professional and academic levels).
- The evaluation of Track One shows that change was achieved among students at the primary level as well; through self-assessment, they stated they became more entrepreneurial after the course.
- The final evaluation of Track Two highlights that tens of thousands of students were reached, but the impact on students is unclear. No measurement (in addition to the self-assessment carried out in the three

²³⁴ Tweemeting, Den Haag 2012.

surveys) has taken place that can prove whether and how the attitude of students has changed under the influence of the CoE activities, nor has it been tested whether students have gained new knowledge and skills through the courses they followed. The final evaluation sees that as a missed opportunity.

- Moreover, a large group of students is still not familiar with the entrepreneurial facilities offered by the education institutions (in particular the Centres of Entrepreneurship at higher education institutions).

➔ **Intermediate outcomes:**

- No data on the development of foundation rates of students were provided through the studies. However, not enough time has yet passed between the activities and the measurement to allow for data about increased foundation rates five years after graduation.

Consequently, it can be concluded that the Dutch Action Programme reached its first goal and led to a higher amount of input and activities regarding entrepreneurship education. Hence, **impact at the organisational level (the educational institution as well as teachers and staff) was shown.**

As to the second goal (immediate results on the individual level and intermediate outcomes), students rate themselves as more entrepreneurial across all levels of education (self-assessment). The methods chosen however, did not include objective tests. Moreover, the effects have not yet been monitored over time. Especially on the level of intermediate outcomes, effects will only show with much delay. In this regard, it would be interesting to undertake such monitoring to see how the effects of the training on students will develop.

Given the time frame set in the Action Programme (foundation rates five years after finalising studies), not enough time has passed yet to undertake a measurement with regard to increasing foundation rates.

10.8 Projects funded 2007-2011

10.8.1 Assigned Centres of Entrepreneurship (Track Two):

1. Hogeschool van Arnhem en Nijmegen: Gelderland Onderneemt! (GO!). A collaboration between HAN University of Applied Sciences, hogeschool ArteZ and Radboud University.
2. Erasmus University: Holland Program on Entrepreneurship (HOPE). HOPE is a partnership between Erasmus University, Delft University of Technology and Leiden University.
3. Maastricht University: UM Centre of Entrepreneurship.
4. University of Amsterdam - Hogeschool van Amsterdam: Cooperatie Amsterdamse scholen voor Entrepreneurship (CASE). The University of Amsterdam, the Free University Amsterdam, Hogeschool van Amsterdam and INHOLLAND participate in CASE.
5. Utrecht School of the Arts: Centre for Entrepreneurship in the Creative Industry.
6. Wageningen University: Dutch agro-food Network of Entrepreneurship (DAFNE). The DAFNE consortium is a partnership between Wageningen University, Van Hall Larensteijn University of Applied Sciences, HAS Den Bosch University of Applied Sciences and CAH Dronten University of Applied Sciences.

10.8.2 Assigned entrepreneurship projects (Track One and ONO):²³⁵

Middle Vocational Education (MBO)

2007 (Track One)

1. ROC Midden Brabant, Tilburg Startpunt
2. Zadkine, Rotterdam, Best Seller
3. ROC ID College, Zoetermeer Ondernemen = Doen!
4. ROC Nijmegen middle vocational education entrepreneurship certificate
5. ROC Albada College, Rotterdam, Ambachtelijk ondernemen

2009 (ONO)

1. ROC Gilde Opleidingen, Onderwijs Netwerk Ondernemen MBONderneemt Limburg
2. ROC Rijn IJssel College, Onderwijs Netwerk Ondernemen Kom over de brug!
3. ROC Nijmegen Onderwijs, Netwerk Onderneemt: Leerondernemingen
4. ROC Flevoland, Onderwijs Netwerk Ondernemen ONO-Flevoland
5. ROC A12, Beestachtig ondernemen
6. Stichting ROC Zuid-Holland Zuid, Da Vinci College, Ondernemen en leren in Dordrecht
7. ROC Tilburg, ONO MATCH
8. ROC Nova College, Een ondernemershuis voor de regio KAM
9. Albada College, Small Business Teams
10. ROC Westerschelde, Onderwijs Netwerk Ondernemen Zeeuws-Vlaanderen
11. Sintermeertencollege, Onderwijs Netwerk Ondernemen Denk, Durf, Doe!
12. Mondial College, Micro Managers
13. Purmerendse Scholengemeenschap, Purmerend
14. AOC-Oost, Green presents

2010 (ONO)

1. Regio College, Onderwijs Netwerk Ondernemen Business in Food
2. Graafschap College, Onderwijs Netwerk Ondernemen 'groen ondernemerschap in de Achterhoek'
3. Team Academie Nederland, Ondernemen voor een Goede Zaak
4. ROC Rijn IJssel College, Interconnectie
5. ROC Eindhoven, Onderwijs Netwerk Ondernemen Hart voor de Zaak
6. ROC Leiden, Onderwijs Netwerk Ondernemen Leiden
7. Vitalis College, Knipperend Ondernemen!
8. Noorderpoortcollege Training en Advies B.V., Onderwijs Netwerk Ondernemen JLO-Netwek
9. Stichting Christelijk Regionaal Opleidingen Centrum Noord, Alfa-teams
10. ROC ASA Abstede College Utrecht, International Leren Ondernemen

²³⁵ Please note: Only the projects from the funding round 2007 (and in some cases their renewals) were evaluated.

- 11.** Helicon Opleidingen, Onderwijs Netwerk Ondernemen 'Be in Business'
- 12.** ROC West-Brabant, ONO RiskIt
- 13.** ROC Eindhoven, ONO Meetingpoint Geldrop-Mierlo
- 14.** ROC ID College, Ondernemend Zoetermeers Onderwijs Netwerk (OZON)
- 15.** ROC Nijmegen e.o., Onderwijs Netwerk Ondernemen - De Helden van ICT
- 16.** ROC Mondriaan, Mondriaan Expertisecentrum Ondernemerschap
- 17.** ROC Twente, Ondernemerslab Twente
- 18.** Albeda College, Onderwijs Netwerk Internationaal Ondernemen
- 19.** Albeda College, MY BUSINESS - MIJN ZORG
- 20.** ROC Friese Poort, Wegwijs in Ondernemen

2012 (ONO good practice)

- 1.** ROC Flevoland, Best Practise doorlopende stimuleringslijn ondernemerschap vmbo-mbo
- 2.** ROC Rijn IJssel, Ondernemend Onderwijs, vast en zeker!
- 3.** Scalda, ONO Best Practices 2012 in Zeeland "Ondernemen kan je leren"

Secondary Education (VO)

2007 (Track One)

- 1.** Codename Future, Den Haag Ondernemend Onderwijs, een duurzame onderneming
- 2.** Stichting Lava Legato, Rotterdam, De bijenkorf van de kenniskring leren ondernemen
- 3.** VSO de Velddijk REC4, Venlo, Ondernemend aan de slag in het Voortgezet speciaal onderwijs
- 4.** SSONML, Twents Carmel College, Oldenzaal, Onderneem het
- 5.** IJburg College, Amsterdam, Het Grand Café als proeftuin!
- 6.** Minkema College, Woerden, Intenationaal ondernemen
- 7.** Nova College, Amsterdam, De docent als ondernemer: dromen, doen en doorzetten
- 8.** Atlascollege De Dijk, Medemblik, Deelgenoot zijn in ondernemend leren; praktijkleren & ondernemersweek van Medemblik

2009-2010 (ONO)

- 1.** Da Vinci College, Roosendaal praktijkleerlingen als maatschappelijk betrokken buurtondernemers
- 2.** Oostwende College Meerwegen Scholengroep, Gezond en duurzaam ondernemen met een couleur locale
- 3.** Da Vinci College Leiden, ONO Willie Wortel Wedstrijd
- 4.** De Einder - School voor Praktijkonderwijs, ONO Transvaal - de Ondernemende Buurt
- 5.** Agnietencollege locatie Carolus Clusius, ONO 2010: GENE - global educational network for entrepreneurs
- 6.** Newmancollege, ONO 'ondernemend talent Breda'
- 7.** Willem van Oranje College, Netwerk Ondernemend Onderwijs in het Land van Heusden en Altena

8. Burgemeester Harmsmaschool, Onderwijs Netwerk Ondernemen 'Pompebléd onderneemt'
9. Stichting voor Samenwerkend Vo Houten en Nieuwegein, Houten in Motion
10. Dominicus College Nijmegen West, Onderwijs Netwerk Ondernemen S-Productions
11. Bernardinus College, Onderwijs Netwerk Ondernemen Creaminds, colour your future!
12. Hoenderloo College, Van Fiets tot Ondernemer
13. Stichting Trevianum Scholengroep, Onderwijs Netwerk Ondernemen Businessklass
14. Blariacum College, Onderwijs Netwerk Ondernemen Beveiliging
15. Christelijke Scholengemeenschap Comenius, Business Class
16. ROC Nijmegen e.o., Onderwijs Netwerk Ondernemen - De Helden van ICT
17. Dominicus College Nijmegen West, Onderwijs Netwerk Ondernemen S-Productions
18. Praktijkschool West Friesland, (We Want) More
19. Mondial College, Onderwijs Netwerk Ondernemen Micro Managers
20. Willem van Oranje College, IBC Ondernemend Onderwijs
21. Het Hogeland College, Ondernemende jongeren en Local Identity Noord Groningen
22. Openbare Scholengemeenschap De Driemark, NO2 (Ondernemend Onderwijs)-Oost Achterhoek
23. Nijmeegse Scholengemeenschap Groenewoud (NSG), Onderwijs Netwerk Ondernemen Nijmegen
24. Scholengroep Voortgezet Onderwijs Best-Oirschot, Onderwijs Netwerk Ondernemen Heerbeek Transfer
25. Op e Hichte, Onderwijs Netwerk Ondernemen Techniek en ondernemen in Friesland
26. Sintermeertencollege, Onderwijs Netwerk Ondernemen Denk, Durf, Doe!
27. Purmerendse Scholengroep, Onderwijs Netwerk Ondernemen Purmerend

2012 (ONO Good Practice)

1. Willem van Oranje college, IBC...Innovation en Education
2. St. Hondsrug college, Entreprenasium - ondernemend onderwijs voor havo & vwo
3. Oost Achterhoek, NO2 Oost-Achterhoek

Primary Education (PO)

2007 (Track One)

1. OBS Willespoort, Wilnis, Thematisch en spelenderwijs ondernemerschap voor het kind
2. OBS De Vogels, Oegstgeest, Ondernemen in Talenten
3. Stichting Agora, Zaandam, Coordinatoren voor ondernemend leren in het basisonderwijs
4. OBS De Vlaamse Reus, Amsterdam Reuzeplan

5. Stichting Openbaar Primair Onderwijs Almelo, 4-Dimensionaal ondernemend onderwijs
6. PCB De Klokbeker, Ermelo, Het ondernemende kind
7. Stichting Katholiek Basisonderwijs Gelderland, Go for a change
8. Stichting ABCG, Groningen, Leren ondernemen in Drenthe
9. Stichting Onderwijs Campus, Terneuzen, Een POP voor leerkracht en leerling.

2009 (ONO)

1. PCO Tsjûkemar, Joure ambachtsstad - Ambachtelijk ondernemen in Skarsterlân
2. Openbare Daltonbasisschool Pierre Bayle, ONO Ondernemers in de dop
3. ODS De Starter, Creatief Ondernemen
4. Op E Hichte, Onderwijs Netwerk Ondernemen Techniek en ondernemen in Friesland
5. Basisschool 't Holdersnest, Onderwijs Netwerk Ondernemen Kids & Company
6. Nijmeegse Scholengemeenschap Groenewoud, Onderwijs Netwerk Ondernemen Nijmegen
7. PCBO De Vuurvogel, Onderwijs Netwerk Ondernemen Samen sterker
8. Praktijkschool Westfriesland, locatie Stedebroek, (we want) MORE
9. Openbare Basisschool De Tandem/Openbaar Po Noordenveld, Onderwijs Netwerk Ondernemen De Torteltuinen BV
10. Purmerendse Scholengemeenschap, Purmerend

2010 (ONO)

1. Spil Basisscholen, Onderwijs Netwerk Ondernemen Educatief Centrum Biddinghuizen
2. Mosalira Stichting voor Leren, Onderwijs en Opvoeding, ONO VWN: 'Verdorie, why not?'
3. Burgemeester Harmsmaschool, Onderwijs Netwerk Ondernemen 'Pompeblêd onderneemt'
4. De Mienskip, Onderwijs Netwerk Ondernemen Kids Enterprise
5. PCPO Leeuwarden, Onderwijs Netwerk Ondernemen Duurzame Watertechnologie Friesland. Excellent Ondernemen.
6. Stichting BOOR, Schoolondernemers.nl
7. Interconfessionele scholengemeenschap het Westland, De ondernemende school - Westland.
8. PCB Het Kompas, Ondernemende Leonardo's
9. CNS Ommerkanaal, Talent floreert door: Ondernemen in het landelijk gebied!
10. Dominicus College Nijmegen West, Onderwijs Netwerk Ondernemen S-Productions
11. Stichting H3O, Onderwijs Netwerk Ondernemen Drechtsteden
12. Hogeschool van Arnhem en Nijmegen, Ondernemerschap in de dop
13. CBS Het Krijt, Onderwijs Netwerk Ondernemen Brede School Assen
14. Stichting Trevianum Scholengroep, Onderwijs Netwerk Ondernemen Businessklass

15.De Amstelmeerschool, Ondernemen in de Buurt

16.OBS De Mussenacker, ONO Bijzondernemen

2012 (ONO Best Practice)

1. PCO Tjukemar, Joure Ambachtstad, Techniek & Ondernemen

2. OBS De Tandem, Meesterlijk Ondernemen

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11 Case Study 11: Impact of Entrepreneurship Education in Denmark

The Danish Foundation for Entrepreneurship - Young Enterprise (FFE-YE) is a knowledge centre that disseminates and communicates results from research about entrepreneurship education. Through annual surveys and analyses the Foundation also helps generate new knowledge about the expansion and impact of entrepreneurship education in all levels of education. This case study report discusses the 2012 and 2013 studies regarding their results and their implementation.

11.1 Description of the strategy/initiative

The Foundation for Entrepreneurship – Young Enterprises

The Danish Government believes that the future challenges of the country can be partly solved by innovative and entrepreneurial individuals. FFE-YE (the Foundation) was established in 2010 by an inter-ministerial partnership. The governmental innovation strategy states that the Foundation's purpose is to establish a continuous and comprehensive national effort that secures the integration of entrepreneurship and innovation into all levels of the Danish education system. The organisation acts under the non-profit organisation Young Enterprise Denmark.²³⁶

FFE-YE works to strengthen and ensure that teaching about entrepreneurial abilities is included in the curriculum at all educational levels. The Foundation also develops and issues its own educational material, provides funding to educational initiatives on entrepreneurship and innovation, advises on the implementation of entrepreneurship in teaching, and facilitates the cooperation and networking relevant to entrepreneurship education.

11.1.1 Objectives and definitions

One of the Foundation's fundamental principles is that entrepreneurship can be taught. The Foundation works on developing, spreading and generating new knowledge on entrepreneurial education under the overarching objective that entrepreneurship and innovation will be important elements in all educational levels.

The Foundation defines entrepreneurship as *when one acts upon opportunities and ideas and transforms them into value for others. The value that is created can be financial, cultural, or social*. FFE-YE further perceives entrepreneurship as having an innovative mind-set, to have knowledge about innovation and entrepreneurship and the competence to act in an entrepreneurial way.

One of the Foundation's responsibilities is to investigate and analyse the development of entrepreneurship education and the impact of its measures. These activities include several different studies and approaches depending on the measure's characteristics and the level of education targeted. The results are published in an annual impact assessment report covering impact in primary, secondary and higher education. FFE-YE also studies the development and dissemination of entrepreneurship education in recurring mapping activities; these are more descriptive and provide information on what kind of entrepreneurial programmes are implemented in schools and higher education institutions.

²³⁶ It should be noted that FFE-YE is a member of the European JA-YE network (see case study 2). However, given the scope and significance of the measurement, it is presented as a separate case study.

11.1.2 Target groups, activities and implementation of the strategy

FFE-YE is supporting the implementation of entrepreneurial education at all educational levels. Consequently, relevant target groups include actors within the entire educational system, from primary and secondary school to higher education.

FFE-YE develops recommendations and guidelines for the teaching of entrepreneurship and issues its own teaching material. The Foundation functions as a knowledge centre and communicates research results about entrepreneurship education; however it also conducts its own research, primarily concerning the impact of entrepreneurship education in Denmark.

Since June 2013 entrepreneurship education has been a mandatory part of the curriculum for grades four to seven (primary education). In addition, entrepreneurship has become a defined learning outcome for all courses taught in primary school. This means all primary school students in Denmark will be taught entrepreneurship and innovation sometime during their time in primary education studies.

Apart from supporting education providers to make entrepreneurship education an integral part of all education and training, FFE-YE also supports specific entrepreneurial programmes, such as:

- **The Company Programme** which focuses on the upper secondary education level. It is a learning-by-doing oriented programme; the pupils develop, test and realise their ideas, which can range from social innovation to technical products. The programme is relevant to all educational fields and includes different tracks based on the subject areas. Company Programmes are supplied in many countries on behalf of the Junior Achievement Young Enterprise Network.
- **Project Edison**, targeting grades six and seven and aiming at increasing pupils' interest in working creatively and innovatively.
- **NextLevel**, which focuses on students from grades eight to ten. In this programme participants are required to come up with an idea as well as put it into practice. This includes creating a project plan. The programme ends with students participating in a national competition with a financial prize.
- **The Start-up Programme** which aims to inspire entrepreneurship educators to involve communities and local business networks in education, as well as investors, experts and experienced entrepreneurs.

FFE-YE has divided Denmark into 13 regions. Each region is responsible for maintaining communications with local schools (this includes informing, supporting and educating teachers) and involving local businesses and the community.

11.2 Results of the impact measurement

Impact measurement is annually reported by FFE-YE and so far four impact measurement reports have been published (from 2010 to 2013). Impact is measured in all levels of education from primary school to higher education at the end of the school year.

The focus areas of the impact measurements are adjusted to each education level. More specifically, at the primary and lower secondary level²³⁷, the impact

²³⁷ In Denmark, the two levels are grouped together in the national education system, forming the 'grundskole.' [online] Available at: <https://webgate.ec.europa.eu/fpfis/mwikis/eurydice/index.php/Denmark:Overview>. The

measurement focuses on the effects of entrepreneurship education on education-related characteristics such as pupils' level of connectedness to education and their self-image. At the upper secondary education level and in higher education the main focus lies on outcomes that show the impact of entrepreneurship-related skills on students participating in entrepreneurship education. FFE-YE has therefore chosen *entrepreneurial self-efficacy* (presented below) as the main indicator for the latter levels. *Entrepreneurial self-efficacy* is believed to be connected with the educational goals at these levels and indicate whether entrepreneurship education equips students with entrepreneurial skills and knowledge.

11.2.1 Lower secondary education

In 2011 and 2012, FFE-YE started following groups of 2,000 randomly selected pupils that were, at the time, attending the ninth grade. FFE-YE will continue to follow these pupils throughout their future education and career. Because pupils are randomly selected (chosen regardless if they participate in entrepreneurship education or not), this study does not provide evidence of the impact of any specific measure or entrepreneurship programme, but of entrepreneurship education in Denmark in general. In order to determine the causal effects of entrepreneurship education, test and control groups were created (see the methodology section for more details).

So far, the studies have measured and provided evidence of immediate impact. The analysis from 2012 and 2013 both confirm that the level of entrepreneurial behaviour over time has increased considerably more for pupils who had experienced entrepreneurship education than for pupils in the control group; many more pupils who have participated in entrepreneurship education in school have become leaders and founders of activities outside school.

Pupils who have participated in entrepreneurship education at the lower secondary level have higher ambitions for jobs and further education than the non-participating pupils. Pupils' intentions to start up their own business are affected positively by entrepreneurial education and even more for those who have friends and relatives that are self-employed.

The varying approaches to entrepreneurship education seem to have different effects on pupils. More specifically, FFE-YE differentiates between two approaches to entrepreneurship education at primary and secondary level: 'entrepreneurship as a method', which perceives entrepreneurship as a didactic method rather than a discipline; and 'traditional' entrepreneurship education where the pupils are taught how to become self-employed. 'Entrepreneurship as a method' is the most common approach in the lower secondary level.

Using entrepreneurship as a didactic method and focusing on strengthening non-cognitive entrepreneurial competences seems to have many positive effects on the pupils at this level. The studies from 2012 and 2013 both conclude that pupils who have experienced an increase in this type of teaching have also increased their level of connectedness to school, classmates, and teachers. They become more self-motivating in the learning process and they claim to engage more out of a desire for learning.

11.2.2 Upper secondary education

In the 2012 impact measurement FFE-YE published a study on participants in the Company Programme with the purpose of measuring the immediate impact of the programme on students' entrepreneurial intentions, attitudes and behaviours. FFE-YE developed a multidimensional model for entrepreneurial

content of entrepreneurship education in the two levels is very similar. Therefore, results of the two levels are grouped together.

skills, which measures different aspects of pupils' *self-efficacy in entrepreneurship*. The entrepreneurial self-efficacy scale refers to how much a person perceives that s/he will succeed with entrepreneurial tasks. Entrepreneurial self-efficacy has proven to be a useful measurement, when it comes to the likelihood for individuals to act in an entrepreneurial way in the future.²³⁸

The five dimensions/constructs included in the scale cover several competences that are necessary in order to be able to act in an entrepreneurial way, either through being self-employed or as an innovative employee. More specifically:

- ➔ in the construct *planning*, the students' ability to organise their ideas and projects is measured;
- ➔ *financial literacy* measures the students' level of economic understanding;
- ➔ the construct *marshalling of resources*, contains questions which measure the students' ability to act on their ideas and carry out their projects;
- ➔ in the construct *managing ambiguity*, the students' perception of their own ability to cope with ambiguity and risk is measured; and
- ➔ in the construct *creativity*, the focus is on students' level of ingenuity and imagination.

In the model there is a distinction between constructs that are associated with traditional management skills (planning and financial literacy) and constructs that are deemed to reduce barriers (managing ambiguity and marshalling resources). According to FFE-YE (2012), this makes it possible to determine which teaching method is most effective in strengthening students' entrepreneurial skills.

Students state that their participation in the Company Programme has improved their skills on all five entrepreneurial self-efficacy dimensions. However, notable gender differences occur. Boys have consistently higher values on all dimensions, but girls have improved the most. Girls have especially enhanced their creative, planning and marshalling skills. Boys and girls also seem to respond differently to different approaches to entrepreneurship education. Boys seem to prefer traditional education, whereas girls seem to benefit more from entrepreneurship education based on developing their abilities to assemble resources and manage ambiguity.

The study from 2012 finds that entrepreneurial attitude functions as a moderator, which means that the more students like entrepreneurship the more likely it is they will consider becoming an entrepreneur later in life. According to FFE-YE, this result is comparable to studies performed on the Company Programme in other countries, which have shown that students who participated in Company Programme out of desire and interest performed better than those who participated because it was mandatory. There is, however, a positive effect on entrepreneurial intentions, even for the students who did not participate in the Company Programme voluntarily.

11.2.3 Higher education

Part of the Foundation's project about impact measurement focuses on university students in entrepreneurship education. In the 2012 report a variation of the entrepreneurial self-efficacy model (presented in the previous section) is used to study the relationship between the students' level of self-efficacy, intentions, attitude and entrepreneurial behaviour. So far, students have

²³⁸ FFE-YE, 2013, *Impact of Entrepreneurship Education in Denmark – 2012*.

completed their first year of study, and therefore certain short-term effects can be observed.

The 2012 study shows that students who had participated in entrepreneurship education ('entrepreneurship students') considerably increased their levels on the entrepreneurial self-efficacy construct²³⁹ on all dimensions except financial literacy, after one year of entrepreneurship education. Compared to the control group, 'entrepreneurship students' had a statistically significant increase in creativity and managing ambiguity.

In the same study the 'entrepreneurship students' increased their level of entrepreneurial attitudes compared to the control group for whom it decreased. Moreover, several 'entrepreneurship students' have participated in extracurricular activities related to entrepreneurship education, which could demonstrate that entrepreneurship education has an effect on students' behaviour outside their studies.

Perhaps the most illustrative effect is that more 'entrepreneurship students' ran a business at the second round of data collection than in the first one²⁴⁰, whereas in the control group fewer students did so. The difference between the two groups regarding the number of students that launched a company in the first and second data collection is statistically significant. Thus, the survey shows that entrepreneurship education results in more students starting their own business.

11.3 Methodology of measurement

FFE-YE monitors the impact of entrepreneurship education at all educational levels. And since the learning goals are quite different depending on the level of education, the methods of investigation have been adjusted accordingly. A survey designed for pupils differs considerably from those used for students at universities, for example how questions are phrased. However, FFE-YE finds it important to be able to analyse the development from level to level, therefore some elements, such as entrepreneurial attitude and entrepreneurial intentions, are included throughout all research designs.

When two measuring time points are available, a differences-in-differences (DID) technique is used to analyse causal effects. In DID analysis the unit which is analysed is the change in a variable (e.g. entrepreneurial intentions) which one group experiences compared with the change in the same variable which another group experiences. This allows for controlling whether the respondent was already at a high level on the variable and therefore less likely to observe an increase after the programme took place.

11.3.1 Lower secondary education

Impact measurement in primary school is based on surveys conducted in 2011, 2012 and 2013. The measurement is not targeted at any specific educational programme. Instead it gives a general indication of how different approaches to entrepreneurship education influence the entrepreneurial spirit of pupils. The studies are longitudinal which means that FFE-YE will continue to follow the same individuals through their education and future career. The current plan is to follow the pupils over a ten-year period.

In 2011 questionnaires were sent to 2,000 randomly selected ninth-graders from across the country born in 1996 and 938 responses were received. In 2012, a follow-up questionnaire was sent to the respondents from 2011 that resulted in 576 responses. Also, surveys were sent to a new cohort of 2,000 randomly

²³⁹ The same construct is used for upper secondary education students.

²⁴⁰ See the section on methodology for details on data collection.

selected ninth-graders born in 1997 which resulted in 801 responses. This was repeated again in 2013 with a new round of questionnaires to the two cohorts, and a new cohort of 2,000 students born in 1998 was included in the survey, which resulted in 747 responses.

When two rounds of data are available it is possible to investigate the causal effects of entrepreneurship education. There are many other factors that may influence the differences observed between the two measurements of the pupils. Therefore, respondents were controlled for demographic variables (the pupil's gender and the parents' educational level).

The methodology used by FFE-YE²⁴¹ allows for the isolation of the effects of entrepreneurship education. The question 'have you been taught how to create a business?', is used to determine whether the pupils have received entrepreneurship education (at least in the traditional way), and only pupils who had not experienced entrepreneurship education before were included in a control group. The test group comprises pupils that have experienced entrepreneurship education- which, when taught, is generally mandatory.

The design of the analysis allows for the assessment of impact on both business-related entrepreneurial skills (cognitive competences) and the entrepreneurial spirit (non-cognitive competences). The first type of competency is often associated with teaching entrepreneurship as an occupation and the latter with using entrepreneurship as a method.

To analyse the effects which these two approaches have on pupils, the latter have been asked to assess to which extent the teaching has focused on educating them in cognitive entrepreneurial competences: how to create a business; the role of the entrepreneur in society; how to evaluate a business idea; and how to pursue a career as self-employed. Apart from this, they were also asked about non-cognitive entrepreneurial competences: how to think creatively; how to come up with new ideas; how to translate ideas into action; and how to start new activities.

11.3.2 Upper secondary education

In the 2012 impact measurement report the FFE-YE published results from a study specifically on the Company Programme. A survey was carried out in 2012 on pupils who participated in the Company Programme shortly after they had finished the programme. This survey focused on the impact of the programme on the students' interest in entrepreneurship, their perceived barriers to entrepreneurship and their attitudes, intentions and behaviours; 2,600 surveys were sent out and 330 responses were received. Respondents were controlled for sociological factors including parents' employment and level of education.

For FFE-YE the main purpose of these surveys was to validate the concept of a model that the organisation developed. The model addressed the mapping of entrepreneurial skills, which can be used for future studies on the impact of the Company Programme. The model uses the entrepreneurial self-efficacy scale, which builds on experiences from prior impact studies on Company Programmes undertaken in other countries. FFE-YE used these studies to develop a holistic measurement of different entrepreneurial outputs and overall entrepreneurial intentions.

11.3.3 Higher education

FFE-YE launched a longitudinal impact measurement project in 2012 at the higher education level. The study includes a pre-test as well as several post-tests. Twelve educational programmes were selected to be included in the study:

²⁴¹ Quasi-experiment.

eight programmes focused on entrepreneurship and innovation, and four programmes were used as a control group. In 2012, six additional programmes were added. The project follows students in the selected programmes through their educational career with annual surveys. Each year a new cohort is included. In 2011, 556 students received a survey and in 2012 an additional 591 students were included in the study. Students in the control groups are matched with students in the test groups, so that the main difference between the groups is whether the students have chosen to participate in entrepreneurship education or not.

In 2012, the 2011 cohort of students completed their first year of studies. A second round of data collection took place with only 192 responses received (out of 556 initial responses). The hefty decline in the response rate was partly due to technical issues that prevented a considerable amount of responses from being identified and linked to the survey results from 2011. Therefore, surveys now are identified by the students' social security number, which also makes it possible to track individual students after graduation.

The purpose of the surveys is twofold. First, they allow an estimation of the short-term impact of entrepreneurship education on entrepreneurial attitudes and intentions at the tertiary educational level, as this coincides with the measurement goals for the lower education levels. Consequently, some survey questions are similar to those asked in surveys at the lower and upper secondary levels.

However, the main purpose is to allow for the analysis of the impact of entrepreneurship education on students' entrepreneurial self-efficacy, which is defined as a combination of competences that affect entrepreneurial behaviour. Six dimensions have been identified by FFE-YE that together form the multi-dimensional variable 'entrepreneurial self-efficacy': creativity, planning, marshalling of resources, coping with ambiguity, financial literacy and human resource management.

In 2011, a pilot survey was conducted at three different university courses (one course in entrepreneurship, one in management and one in accounting) to test the validity of the entrepreneurial self-efficacy construct. The survey indicated that the construct had a high degree of predictive validity, as the entrepreneurship students turned out to have statistically significant higher levels on all dimensions, compared with the students in the management course.

11.3.4 Strengths and weaknesses

FFE-YE uses robust research designs to measure the impact of entrepreneurship education and it has taken many different factors into consideration when constructing survey questions and analysis models. The large sample sizes, the longitudinal data and the use of control groups make the study's methodology particularly strong, according to the researchers at FFE-YE. This enables the analysis to establish causal effects and comparative studies between different approaches to entrepreneurship education. The fact that surveys recur, gives the researchers the opportunity to make incremental improvements to strengthen the validity and learn from mistakes. The methodology is well-documented. There is also the intention to use and further develop the methodology by other users/organisations, thus contributing to the collective knowledge about impact assessment, specifically regarding entrepreneurship.

However, some areas of improvement can be identified. Since the analyses emphasise quantitative data, they often lack supplementing qualitative data, which in turn limits the understanding of the mechanisms behind the effects. For example, the quality of education as well as teachers' competence and understanding of entrepreneurship are not taken into consideration in these studies. Another limitation that is difficult to avoid when investigating attitudes and intentions is the dependence on self-reported data. A problem at university

level is that the students themselves choose their educational programmes; this regards the methodological challenge of self-selection, inasmuch as students with an interest in entrepreneurship will choose an education in this subject, whereas students with an interest in pursuing a career as employees in established organisations will choose another type of education. Researchers at FFE-YE wish to address self-selection in future studies.

11.4 Using the results of the impact measurement

FFE-YE is one of the primary users of the impact assessments. Information from the impact measurements supports the implementation of the Foundation's activities regarding entrepreneurship programmes and initiatives in schools and higher education institutions. One example is that the strong correlation between entrepreneurial education as a didactic method and its impact on pupils' connectedness to school and increased motivation (as proved by the measurements so far) has provided strong arguments to introduce this kind of pedagogy to pupils that face learning challenges or lack motivation. In addition, the annual impact measurement reports give external stakeholders elaborate information on the different effects that entrepreneurship education can have at the individual level.

Moreover, the results of the impact measurement are used by the Government; the mapping and impact measurement of entrepreneurship programmes at higher education institutions that are conducted by FFE-YE provides the Government with input regarding the performance-based state funding of Danish universities. Through this type of funding, the Government can further stimulate a more wide-spread and diverse selection of entrepreneurship initiatives in higher education.

The impact studies were also used as background information for the National Innovation Strategy that was developed and launched in December 2012.²⁴² Results from the studies were mentioned in the strategy as means to further strengthen and promote the entrepreneurship education agenda and the specific initiatives related to this. Following the Innovation Strategy, the Ministry of Higher Education and Science published in January 2014 an inspirational catalogue where the models from FFE-YE were mentioned.²⁴³

In order to increase knowledge about the effects of entrepreneurship education the Foundation believes that studies and measurements should not only be conducted at the national level and by one organisation. The models that the Foundation has developed for studying impact are constructed so that it is possible for others to use. The ambition is to continuously increase the user-friendliness of the models so that not only trained researchers, but also universities, schools and individual teachers can perform local impact studies. This can be expected to further highlight the positive effects of entrepreneurship education and increase its legitimacy and motivation among teachers and education providers. One example is CIEL – Copenhagen Innovation and Entrepreneurship Lab, an alliance between three Danish universities. To evaluate the effect of CIEL's innovation courses the evaluators adapted methods originally developed by FFE-YE.²⁴⁴

FFE-YE is also a partner in the EU funded research project ASTEE²⁴⁵ that seeks to develop a set of common European tools for measuring the impact of entrepreneurship education on students' entrepreneurial competences across all

²⁴² The Danish Government, 2012, *Denmark – A Nation of Solutions*.

²⁴³ The Ministry of Higher Education and Science, 2014, *Bedre dokumentation af videninstitutionernes bidrag til innovation*.

²⁴⁴ DAMVAD, 2013, *Evaluation of Entrepreneurship and Innovation Education*.

²⁴⁵ Assessment Tools and Indicators for Entrepreneurship Education.

educational levels. The tools developed in ASTEE are to a significant extent based on the models used in the FFE-YE impact assessment.

11.5 Conclusions

The impact measurements conducted by FFE-YE have so far been focused on the results and effects at the individual level and on specific outcomes from different approaches to entrepreneurship education. The results show that many implementations of entrepreneurship education actually do lead to the desired effects. Entrepreneurship education seems to raise the interest among pupils and students in becoming entrepreneurs and entrepreneurship taught at one educational level will spread to other levels. Entrepreneurship education seems to also impact pupils' and students' entrepreneurial behaviour outside of school and studies.

The results further show that regardless of the educational level, teaching methods and content make a difference. For example, there is clear evidence that 'traditional' entrepreneurship education in primary and secondary education has a positive effect on pupils' intentions to start up their own business. When entrepreneurship is used as a method and influences general pedagogy it is proven to have positive effects on pupils' relationship with school, their connectedness to classmates and teachers. However, in altered settings, these approaches can have other effects. This implies that evidence-based knowledge should be used to avoid implementing programmes that may be less effective or in specific educational contexts²⁴⁶.

Although most of the results regard the individual level, the studies in lower secondary education and higher education have been designed so that long-term longitudinal studies will be feasible. Thus, the assessment of intermediate impact can be expected in the future.

It can be expected, however, that these future studies on the intermediate impact could face some challenges, such as sufficient financial resources and tracking down individuals long after they have graduated from school or university. It should be underlined though, that Denmark (along with the other Scandinavian countries) has a comparative advantage, in the sense that public records are often quite ample and researchers are able to use individuals' social security numbers. However, the effect of other events upon individuals' choices should be taken into consideration, in order for example, to study the impact of entrepreneurship education on job positions and income.

The impact measurements carried out by FFE-YE emerge as a rather successful tool for expanding the knowledge about the impacts of entrepreneurship education. The models developed by FFE-YE have already been picked up and used in other evaluations, and seem well-supported to continue to do so. The Danish Government supports that the continuous measurement of the impact of entrepreneurship is an important input into the strategic work expanding and defining entrepreneurship education in all levels of the education system and in formulating relevant learning outcomes.

Furthermore, the impact measurement has contributed to putting entrepreneurship high on the national agenda. The Innovation Strategy states that education is a means to increase innovation capacity, and according to the Government, a change of culture in the education system is needed with more focus on innovation and value creation, with innovation and entrepreneurship fundamental elements of all education.

²⁴⁶ FFE-YE (2012).

11.6 References

DAMVAD, 2013, *Evaluation of Entrepreneurship and Innovation Education*.

The Danish Government, 2012, *Denmark – A Nation of Solutions*.

FFE-YE, 2013, *Impact of Entrepreneurship Education in Denmark – 2012*.

FFE-YE, 2014, *Impact of Entrepreneurship Education in Denmark – 2013*.

The Ministry of Higher Education and Science, 2014, *Bedre documentation af videninstitutionernes bidrag til innovation*.

12 Case Study 12: National Action Plan 2010-2014 in Norway

Following the launch of the Norwegian National Action Plan for entrepreneurship education, the Government commissioned an ongoing evaluation of its implementation. The evaluation project comprises several impact assessments covering all levels of education. The project started in the fall of 2010, and is scheduled to continue until the end of 2014. The following sections discuss some of the results that are already available.

12.1 Description of the strategy / initiative:

The Action Plan 'Entrepreneurship in Education and Training – from compulsory school to higher education 2009–2014' (the Action Plan) conveys the Government's intention to further implement entrepreneurship education throughout the whole education system.²⁴⁷ It is an attempt to ensure that today's pupils and students receive a well-qualified, preparatory and practical education to meet the demands of their future working life. The Action Plan was developed by a cross-ministerial collaboration, between the Ministry of Education and Research, the Ministry of Trade and Industry and the Ministry of Local Government and Regional Development and it expands the Government's efforts in this field.

12.1.1 Objectives and definitions

The objective of the Action Plan is to strengthen the quality and scope of entrepreneurship education in all areas of the educational system. The Government intends to make education more realistic and practical to ensure the population is flexible and well-qualified for working life. Strengthening a culture for entrepreneurship and collaboration between education and training and working life are seen as essential measures to achieve this end. Internationally Norway shall be a leading force when it comes to entrepreneurship education and training.

In the Action Plan entrepreneurship is defined as establishing new activities and raising the ability and skills to be able to perceive new opportunities and making them work in a number of social areas. In addition, entrepreneurship is seen as a dynamic and social process where individuals, alone or in collaboration, identify opportunities for innovation and act upon these by transforming ideas into practical and targeted activities, whether in a social, cultural or economic context.

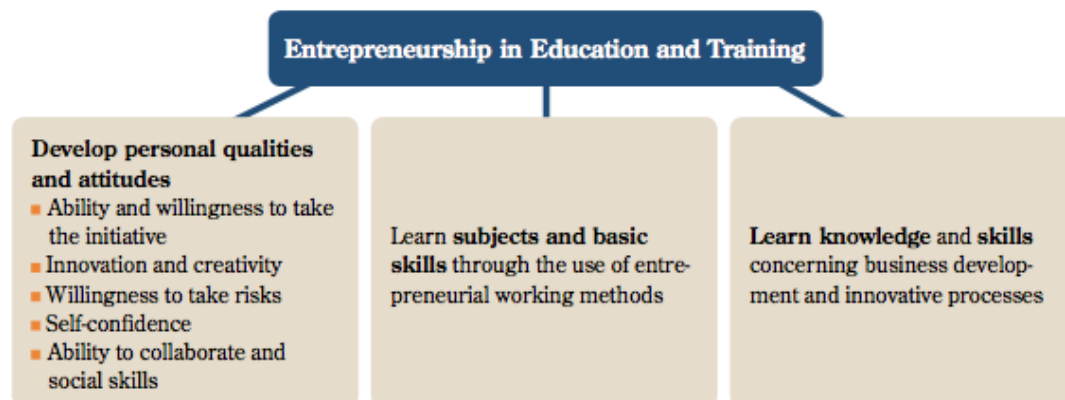
The Action Plan suggests different approaches towards implementing entrepreneurship in education and training. It may be both theoretically and practically oriented. Training in entrepreneurship can be organised as a separate subject or integrated into other subjects. Entrepreneurship can be a tool and a working method to stimulate learning in different subjects and basic skills. Entrepreneurship in education and training may also further develop personal characteristics and attitudes. The training may focus on imparting knowledge about how to start one's own business and about innovative and ground-breaking processes in existing enterprises.

The Action Plan presents different learning goals for entrepreneurship education (illustrated in Figure 12.1). Through entrepreneurship education students can: develop personal qualities and attitudes; learn subjects and basic skills; and

²⁴⁷ The Norwegian Government, 2009, *Entrepreneurship in Education and Training – from compulsory school to higher education 2009–2014*.

learn knowledge and skills concerning business development and innovation processes.

Figure 12.1 The Government's learning goals for entrepreneurship education



12.1.2 Target groups, activities and implementation

The target groups for the Action Plan are leaders of educational institutions, teaching staff, as well as pupils and students. The Action Plan deals with the entire educational system, in contrast to the previous strategic plan titled 'See the opportunities and act upon them!' (2004–2008) which was primarily targeted towards primary and secondary education. The current plan sustained the efforts in primary and secondary education and introduced new measures primarily within the higher education system.

The Action Plan also covers a wide range of different fields (from business to art to social work). The plan introduced a number of measures which were adapted to different types of stakeholders, where responsible actors can pick out measures at the relevant level and adapt them to local conditions. The following measures were introduced in higher education:

- ➔ implement the qualifications framework;
- ➔ establish places for entrepreneurship and innovation;
- ➔ invite applications for funds for:
 - developing programmes of study in entrepreneurship and innovation at universities and university colleges;
 - new programmes of study in intellectual property rights;
 - continuing education in entrepreneurship for teachers.
- ➔ follow up the evaluation of engineering education and revision of the National Curriculum for engineering subjects;
- ➔ make entrepreneurship in the business PhD scheme more visible;
- ➔ review the report indicators for entrepreneurship and innovation from universities and university colleges;
- ➔ follow up the Knowledge Promotion Reform;
- ➔ measures targeted towards primary and secondary education;
- ➔ establish a website for digital teaching aids for entrepreneurship in primary and secondary education and training;
- ➔ continue to allocate funds to JA-YE Norway;
- ➔ strengthen research on and start evaluations concerning entrepreneurship in education and training;

- ➔ organise conferences and contribute to the establishment of meeting places for entrepreneurship in education and training;
- ➔ strengthening efforts for young entrepreneurs in Innovation Norway.

12.1.3 The evaluation process

As one of the measures, the Government commissioned the Nordic Institute for Studies in Innovation, Research and Education (NIFU) and Eastern Norway Research Institute to conduct an ongoing evaluation of the Action Plan. The project has several objectives, in addition to measuring the impact of entrepreneurship education; the project also investigates the possible operationalisation of the concept of entrepreneurship education and provides status reports on the implementation at different educational levels.

This approach of evaluating varies from how the prior strategy was followed up. Whilst the strategy from 2004–2008, was primarily targeted at primary and secondary education (and subject to a more traditional evaluation), the current Action Plan is more comprehensive and thus demands a more diverse set of monitoring activities (policy studies, mappings and impact assessments) which combines quantitative and qualitative approaches to form a broader picture of the Action Plan's effects on different levels of education and society as well.

The project has so far published nine reports including the results from impact assessments from specific implementations of entrepreneurship education and an assessment of societal impacts. The project has also investigated the propagation of different types of entrepreneurship programmes and initiatives in the wake of the Action Plan. These mappings are primarily descriptive and do not deal with issues of impact. In 2012 a mid-term evaluation report assessed the status of each specific measure of the Action Plan, and by the end of 2014 the project will culminate in a concluding evaluation report. So, although many results have already been published, the evaluation process is still in progress.

12.2 Results of the impact measurement

As mentioned above, several reports were published covering different aspects of the results and impact of the Action Plan. Two studies deal with the effects on different levels of education and a third assesses societal impact by combining the results from several sub-projects. The results from these three studies will be presented in brief in the following section.

12.2.1 Impact of entrepreneurship education in lower and upper secondary education

One of the project's sub-tasks concerns the impact of different forms of entrepreneurship programmes in lower and upper secondary education.²⁴⁸ The study uses the learning objectives from the Action Plan (Figure 12.1) as a starting point and investigates the possible relationships between participation in different forms of entrepreneurship education and the positive effects on entrepreneurial skills and academic achievement.

The study comprises the most widespread entrepreneurship programmes offered in primary and secondary education, Company Programmes (Ungdomsbedrift) and Pupils' Enterprise (Elevbedrift), that are either organised by or under the auspices of JA-YE Norway. Other common entrepreneurship programmes are also included, such as interdisciplinary projects and business collaborations.

In order to determine the effects on personal qualities and attitudes the study measures pupils' own assessment of their creativity, ability to take initiative,

²⁴⁸ V. Johansen et al., 2012, *Entreprenørskap i utdanningen og oppnåelse av læringsmål*.

problem solving abilities, willingness to take risks, academic self-confidence and collaboration skills. In both lower and upper secondary school, there are indications that several entrepreneurship programmes have positive effects on pupils' collaboration skills, creativity and problem solving. However, the study provides little evidence that the prevalent Company Programme and Pupils' Enterprise has a significant effect on pupils' personal qualities and attitudes, regardless if organised by JA-YE Norway or by the school themselves.

Entrepreneurship education has effects on pupils' entrepreneurial intention and skills. The participants in Company Programmes and other entrepreneurship programmes in upper secondary education have more intentions of being self-employed in comparison to others. They indicate more often than others that they have the necessary knowledge and skills for business development. The study also shows that they are in general more likely to start their own business. Pupils participating in entrepreneurship education in lower secondary level more often have entrepreneurial desires and find it more feasible to become self-employed than others.

The study also measures pupils' assessment of their ability to use digital tools, to read and count and to express themselves in writing and verbally. In general, the study finds that there are weak links, with entrepreneurship training influencing better learning outcomes in basic skills, regarding both lower and upper secondary education. However, participating in Company Programmes organised by JA-YE Norway has a positive effect on verbal skills in lower secondary and writing skills in upper secondary education. Also, when looking at academic achievement in specific subjects (pupils' grades in Norwegian, English and mathematics), there is again weak evidence of participation in entrepreneurship education having positive effects on increased learning outcomes in specific subjects.

The study concludes that there is a causal link between participation in entrepreneurship education and developing entrepreneurial intentions and skills. Personal characteristics and attitudes are affected to some extent, but the study suggests that entrepreneurship education does not impact on enhanced learning outcomes in basic skills and specific subjects.

12.2.2 Impact on higher education

Another sub-project deals with the effects of entrepreneurship education on newly graduated higher education students.²⁴⁹ This investigation is based on participants in an annual national survey studying their transition into the labour market and recent graduates' satisfaction with their education. In 2012 some questions about entrepreneurial skills and intentions were added.

Graduates with entrepreneurship as part of their education indicate more frequently than others that their education has contributed to the development of entrepreneurial skills and attitudes. Entrepreneurship education also appears to contribute to enhanced creativity and increased knowledge about innovation processes, especially if the courses are of a certain scope, and if it is education through (rather than about) entrepreneurship. The employment rates of entrepreneurship graduates are affected positively, as they are less likely to be unemployed and to have a higher degree of steady employment.

However, graduates that have participated in entrepreneurship education are not found to be self-employed to a higher degree compared to other graduates. There were also relatively few who responded that they intended to start their own business during the coming five years.

²⁴⁹ L. A. Støren, 2012, *Entreprenørskap i høyere utdanning – erfaringer blant nyutdannede*.

Interestingly enough, graduates with entrepreneurship as a major part of their education highlight certain obstacles for becoming self-employed more often than others. Thus, it seems to be those who have the most experience and interest in entrepreneurship, who most often point to such obstacles as reasons to remain employed rather than self-employed.

Consequently, the students' responses to questions about the specific benefits of entrepreneurship education give fairly moderate indications of positive effects in terms of entrepreneurial intentions and business creation. The study also indicates that there is less interest among Norwegian entrepreneurship graduates in becoming self-employed than what is found by studies in other countries. However, for many graduates, entrepreneurship represents only a small part of their overall education; also, the perceived benefits seem to increase with a larger share of entrepreneurship in education.

12.2.3 Societal impact

A third sub-project studied societal impacts in relation to the measures of the Action Plan and the propagation of entrepreneurship education.²⁵⁰ The third sub-project study is based on results from the other quantitative studies and mappings made within the evaluation project, including the studies presented above, and two smaller qualitative interview studies. The study focuses on what is deemed to be the key rationale for expanding entrepreneurship education, business creation and employment growth.

Business development and the establishment of new companies are important aspects in many approaches to entrepreneurship education, and often the dominant perspective in higher education. A key priority of the Action Plan is to stimulate development and growth in all parts of the country, but the research suggests significant regional differences in establishment rates, and rates are declining with decreasing centrality.

The study compares the dissemination of entrepreneurship education in different parts of Norway and the results show major differences between regions in terms of the percentage of students who have started a Pupils' Company. The differences for Company Programmes are less significant. Regions with a large proportion of students starting these 'mini-companies' also scores low on business development. This is not necessarily evidence of entrepreneurship education being ineffective, but instead may support the hypothesis that measures are somewhat concentrated on regions with already low business establishment rates. Also, the results do not provide answers on whether Pupils' Companies and Company Programmes impact on firm creation rates in the long-term.

The study suggests a weak positive correlation between both the students' entrepreneurial capacity and firm creation rates, and the students' desire to be self-employed and firm creation rates.

12.3 Methodology of measurement

12.3.1 Study on impact in secondary education

The basis for this study was a post-intervention survey taken by pupils in the tenth grade in lower secondary education and in the second year in upper secondary. In total, 3,670 pupils were invited to participate and 2,020 pupils responded.

In order to establish a causal linkage between the measures taken by the Action Plan and the results in the study, the researchers tried to isolate the impact of

²⁵⁰ S. E. Hagen et al., 2012, *Entreprenørskap i utdanningen – samfunnseffekter*.

the intervention (entrepreneurship programmes) by introducing a counterfactual element to the research design. In addition to the test group, a control group was created with pupils without experience of any entrepreneurship programmes. The groups were also controlled for different variables that are deemed relevant in connection to academic achievement and entrepreneurial skills.

In order to cope with self-selection, i.e. only pupils who are already interested in entrepreneurship participate in relevant programmes, the study also distinguished students who had participated voluntarily from the compulsory entrepreneurship courses and programmes.

In total, 67 schools participated in the survey, 37 of which were lower secondary schools and 30 upper secondary schools. Data collection was conducted at the point when the courses were in their final stages or had just been terminated. Questionnaires were developed by the researchers especially for this study and distributed in the schools.

The survey gathered information on several dependent variables; information on learning outcomes were collected in Norwegian, English and mathematics. In addition, pupils were asked to assess their own abilities, attitudes and intentions in different aspects. The survey measured basic skills, such as the pupils' ability to express themselves in writing and verbally, to read, to count and use digital tools. The survey also touched upon personal characteristics and attitudes, for example willingness to take initiatives and risks, creativity and self-confidence. Respondents were also asked to assess their desire and readiness to be self-employed.

Respondents were also controlled for a number of independent variables to further strengthen the comparison between the test and the control groups, so that the main difference was the provision of entrepreneurship education (or not). The study was designed to be a multivariate analysis where gender, ethnicity, parental entrepreneurial activity, parental education and previous grade point averages were included in order to establish strong causal links between entrepreneurship education and the results observed.

Established statistical methods were used and the study deals with a relatively large sample. Another strong point of this particular research design is the use of control groups. Although this study contains only one round of data collection and lacks a baseline, the relatively strong methodology enables the results to be attributed to the intervention. A general criticism towards this type of research design is that it is based on respondents' own assessments; this introduces a degree of uncertainty regarding bias and other possible measurement errors.

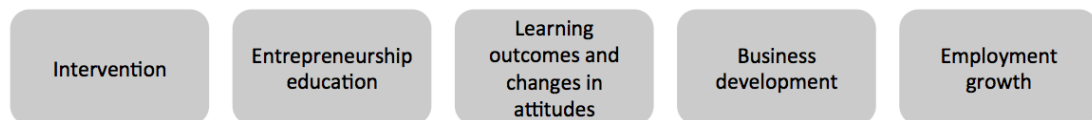
12.3.2 Measuring societal impact

This investigation was designed as a meta-study based on a compound of prior quantitative surveys and mappings on the one hand, and a qualitative interview study on the other. Two descriptive mappings examining the propagation of entrepreneurship education in both higher education and upper secondary school were included. Two large-scale surveys were used, one directed towards recent graduates from colleges and universities, and one towards participants of certain entrepreneurship programmes in upper secondary school. The survey on higher education graduates was part of an annual national survey that concerns the transition into the labour market. In 2012, some questions on entrepreneurship in education were added that made it possible to compare results from those who had and those who had not received entrepreneurship training.

To supplement the quantities, datasets were gathered from two smaller qualitative studies. The studies were based on basic desk research and interviews with representatives responsible for entrepreneurship education and training in 15 upper secondary schools and 3 higher education institutions.

The measures of the Action Plan are primarily directed towards achieving societal impact in a broad sense. Based on the objectives of the Action Plan, an impact model was created to determine the relationship between intervention, impact at the individual level and societal impact (Figure 12.2). The researchers however, noticed that the measures of the Action Plan were operationalised in a manner that makes it difficult to establish a clear link between individual effects and impact on society. Increased learning outcomes and changes in entrepreneurial attitudes were expected to have a societal impact at one point, but it is challenging to foresee the nature of this impact. Therefore, the study focused on what is considered to be the key rationale for expanding entrepreneurship education, business development and employment growth.

Figure 12.2 Impact model used for individual and societal impact



12.4 Conclusions

The evaluation of the Action Plan is still in progress. Nevertheless, some results have already been published on the effects that followed its implementation. The results so far suggest several policy implications that were touched upon by the evaluation project.

The evaluators use three different approaches to entrepreneurship education in their analysis:

- ➔ education about entrepreneurship, i.e. entrepreneurship as a societal phenomenon;
- ➔ education for entrepreneurship, i.e. education and training to develop knowledge and skills that provide the capacity for self-employment or businesses creation; and
- ➔ education through entrepreneurship, i.e. where entrepreneurship is used as a pedagogic method and uses entrepreneurial processes as a means to achieve specific learning goals.

However, the Action Plan is considered to have a more narrow understanding of entrepreneurship education as it has only adopted the 'for' and 'through' approaches and thus lack measures focused on educating about entrepreneurship. The evaluators recognise that it is important to include this dimension to expand knowledge of the role of entrepreneurship in society, especially within higher education.

The evaluation has also shown, through various studies and analyses, that different approaches to entrepreneurship have different outcomes and effects in terms of skills, abilities and attitudes. Education *through* entrepreneurship seems to be the most effective at lower secondary level, whilst education *for* entrepreneurship is considered to be more relevant in both upper secondary and higher education.

As discussed in previous sections, the studies do not provide sufficient evidence that entrepreneurship education significantly contributes to the overarching objectives of the Action Plan. The main conclusion from the survey conducted in lower and upper secondary education on the relationship between entrepreneurship education and general academic achievement, suggests that it is a challenge to develop pedagogic methods that stimulate general entrepreneurial skills; specific entrepreneurial skills; and learning in subjects and basic skills. The Action Plan's expectations of immediate results from entrepreneurship education are only met to some extent.

The overall impression from the study on entrepreneurship in higher education is that few systematic differences can be observed between graduates from entrepreneurship programmes and other graduates in relation to business creation and transition to the labour market. This result is also confirmed by the study that looks at societal impact.

The evaluators highlight that knowledge of the fundamental mechanisms behind the effects of entrepreneurship is still in its early stages and needs to be investigated further to better understand the different factors that lead to individuals becoming more entrepreneurial. Thus, an important conclusion is that there is a need to develop a better knowledge base on how different approaches affect learning outcomes, so to enhance current educational programmes and make way for new approaches. This would be an important step to access new knowledge and evidence about what works and how it can support the development of entrepreneurship education at all levels. A better understanding of the effects is also important for policy makers in order to set sound expectations of what can be achieved to help generate realistic goals. The evaluators are currently in discussion with the Government about how the last steps in the evaluation process should be organised in order to identify future challenges that need to be addressed.

12.5 References

Hagen S. E. et al., 2012, *Entreprenørskap i utdanningen – samfunnseffekter*.

Johansen V. et al., 2012, *Entreprenørskap i utdanningen og oppnåelse av læringsmål*.

The Norwegian Government, 2009, *Entrepreneurship in Education and Training – from compulsory school to higher education 2009–2014*.

Støren L. A., 2012, *'Entreprenørskap i høyere utdanning – erfaringer blant nyutdannede*.

13 Case Study 13: Entrepreneurial Impact: The Role of the MIT

13.1 Description of the strategy / initiative

This case study report discusses the results of a 2003 survey that targeted MIT alumni and explored the type of ventures created, the economic impact these ventures had especially on the local economy and the impact of MIT's entrepreneurial ecosystem on alumni entrepreneurs. Economic impact is defined as sales and employment provided by the alumni-created companies. The case study report is based on the 2009 publication 'Entrepreneurial Impact: The Role of MIT' by the Kauffman Foundation and interviews with researchers/MIT professors.

Entrepreneurship, defined as venture creation, has been promoted for several decades at MIT, although there is no official entrepreneurship education strategy as such. The motto of MIT ('Mens et Manus,' Latin for mind and hand) underlines the importance attributed to developing applicable knowledge. The closest that MIT got to an 'entrepreneurship strategy'²⁵¹ was about 1900, when new rules allowed the faculty to have activities 'outside their professional ones' in the university. Faculty was also encouraged to transmit knowledge to industry.

Although entrepreneurship has not been a formal institutional policy, MIT has **an entrepreneurial ecosystem in place**, to ensure that aspiring students, but also faculty, are supported in turning their business ideas into start-ups. The ecosystem comprises of academic courses²⁵², centres and programmes²⁵³ and student groups²⁵⁴. Aspiring entrepreneurs receive sufficient and continuous guidance, coaching, access to seed funding and networking opportunities.

According to interviewees, the entrepreneurial ecosystem was developed gradually, supported by:

- ➔ institutional policies and examples that encouraged faculty and staff to collaborate with industry;
- ➔ the influence of the external environment and eminent individuals:
 - socio-economic events are believed to have spurred MIT's focus on entrepreneurship: for example, World War II underlined the importance of applied science. This reportedly led to the shift of the focus of university research to a more applied approach;
 - innovative enterprises were formed by alumni already in the beginning of the 20th century.
- ➔ close ties were developed from the start with technology-based industries. This was further reinforced in the institutional culture by its embodiment in the 'Rules and Regulations of the Faculty.' According to these, faculty could invest part of their time in developing their own companies. This was later extended to research staff as well. So, entrepreneurship has been permitted for all actors in MIT for a very long time. According to researchers, several spin-offs were developed in this way, from faculty and research staff; and

²⁵¹ As stated in an interview.

²⁵² [online] Available at: <http://www.mitef.org/s/1314/interior-2-col.aspx?sid=1314&gid=5&pgid=468>; cited 31/3/2014

²⁵³ [online] Available at: <http://www.mitef.org/s/1314/interior-2-col.aspx?sid=1314&gid=5&pgid=470>; cited 31/3/2014

²⁵⁴ [online] Available at: <http://www.mitef.org/s/1314/interior-2-col.aspx?sid=1314&gid=5&pgid=471>; cited 31/3/2014

- ➔ making entrepreneurship the norm: the development of organisations such as the MIT Enterprise Forum, led to the visibility of MIT's work, increased the positive feedback received and promoted the gradual collaboration and interaction with investors.

So, the 2003 survey discussed in this report, was not part of a specific institutional strategy or initiative, but rather aimed at assessing the impact of the entrepreneurial ecosystem (See the methodology section for what triggered the measurement and how it was launched).

13.2 Results of the impact measurement

The survey results allowed mapping the type of companies developed (and were still active) by MIT alumni, and their economic impact on the local and US economy; and also estimating the trends of the key elements of these companies, so as to assess any time effects. Results support the researchers' views about the strong impact of MIT on its alumni regarding founding a new company, and the impact of those companies on the economy.

The key findings of the survey

Regarding characteristics of the alumni-founded companies:

- ➔ based on results, but also estimations, the annual revenues (\$2 trillion) and employment footprint (3.3. million employees) of the MIT alumni-founded firms reach the equivalent of the eleventh largest economy in the world²⁵⁵;
- ➔ new company formation by MIT graduates is accelerating: alumni start their companies younger and closer to their graduation year;
- ➔ the number of multiple companies founded per MIT entrepreneurial alumnus has been increasing, with dramatically increased economic impact per graduate;
- ➔ economic impact can be demonstrated for one-time entrepreneurs, but it is even stronger for 'serial' entrepreneurs²⁵⁶;
- ➔ the majority of the MIT alumni firms are founded in the US, but not only; for example, 790 MIT alumni firms have been created in Europe, mainly in England, France and Germany in the software and consulting sectors;
- ➔ about one third of employees in MIT alumni founded firms are in manufacturing, when in the USA, manufacturing firms represent less than 11 per cent of total employment;
- ➔ MIT alumni companies can be found in a wide range of sectors. Researchers highlight those in software, electronics (including instruments, semiconductors, and computers) and biotech. These companies are more likely to hold at least one patent and are more export-oriented than other companies. Therefore, they are considered more likely to have long-term economic growth than companies in other sectors/industries;
- ➔ many of the MIT alumni companies are knowledge-based, as they operate in sectors where patents and research are important.

Impact of alumni firms on the local economy: Massachusetts

²⁵⁵ As in 2006, year of measurement, (when the records on the companies were updated using Compustat and Dun & Bradstreet).

²⁵⁶ Those who have founded more than one company. To be included in the sample, all of the companies need to have been active when the survey took place.

MIT's support in entrepreneurship is identified by the researchers as the 'defining contribution to the Greater Boston entrepreneurial culture.' This is backed by data, such as that MIT alumni company sales constitute 26 per cent of all Massachusetts (MA) companies. These companies are high-tech, providing a substantial part of Massachusetts's high-tech environment, helping to attract highly skilled professional and other firms to the state.

So, researchers underline a *virtuous cycle*: founders stay in MA after graduation, and most of them start their business in this location. MIT alumni companies use cutting-edge technologies in their fields, therefore enforcing the high-tech 'cluster' that attracts more people with relevant profiles and relevant companies. This argument is fortified by the fact that less than 10 per cent of MIT undergraduates are from MA, but about one third of alumni companies are in MS. This is especially true for newly-founded knowledge-based companies (software, biotech, internet, electronics), almost two fifths (37 per cent) of which have been located in MA in the past five years. Other clusters have also been developed in the area (energy and biotechnology) that, according to the researchers, have been intrigued by MIT alumni companies.

It should be underlined that the importance of MIT and other Boston-based universities is recognised by respondents as more critical than low business cost in choosing a location. In every other USA region, business cost was more important than contact with universities.

Impact of MIT:

- ➔ Researchers explored the relationship between alumni being entrepreneurs and their course major. Some correlation was found, but no predictable connection was established. It is indicated that the other degrees held by the MIT alumni (from MIT or other institutions), as well as their backgrounds, have also influenced such developments. Regarding course majors, results show that:
 - 1/5 are electrical engineering and computer science programmes alumni (these are linked in the same department); and
 - a significant share of entrepreneurs are from management, mechanical, chemical and civil engineering; architecture; physics; and aeronautics.
- ➔ MIT's reputation seems to have significantly assisted alumni in their entrepreneurial efforts:
 - 85 per cent of alumni entrepreneurs identify a link with MIT as having helped boost their credibility with suppliers and customers;
 - 51 per cent believe MIT's reputation helped them acquire future funding;
 - researchers acknowledge a similar impact of the reputation for alumni of other institutions, such as Stanford University, Cal Tech or other research-intensive universities.
- ➔ Based on qualitative data, alumni highlight that MIT encouraged them to become risk-takers and entrepreneurial. The **entrepreneurial culture** has admittedly instilled confidence in graduates that problems can be solved by using high-calibre teams.
- ➔ The entrepreneurial culture is found to be supported by teaching methods and vice versa.
- ➔ MIT has also affected the decision of entrepreneurs about the **location where** to start their firm:
 - 15 per cent (of the 89 per cent who responded that they started the business in their residence location) reported they had chosen their residence location because they attended university there- often indicated to be MIT.

- ➔ From 1978 until 2009, about 700 companies were presented with and received business support/mentoring by the MIT Enterprise Forum of Cambridge.
- ➔ **Alumni-keeping links:** about 32 per cent of alumni entrepreneurs declare to have or expect to have an ongoing connection with the university (Table 13.2).

The 2003 survey also indicated that all MIT's centres, programmes and overall entrepreneurial ecosystem positively affected the development of start-ups from alumni.

Additional MIT Entrepreneurship Organisations ²⁵⁷

In addition to the centres/programmes that are mentioned and measured in the 2003 survey, MIT offers additional entrepreneurship-related assistance to organisations²⁵⁸. These programmes/centres were developed after the launch of the survey.

- ➔ Martin Trust Center of Entrepreneurship - this included the renaming and expansion of the MIT Entrepreneurship Center which was founded in 1990;
- ➔ Legatum Center for Developmental Entrepreneurship;
- ➔ Lemelson-MIT Program.

In addition to the development of start-ups overall, these programmes/centres can be expected to have an impact on the local societies of developing countries as well, given their focus on such economies²⁵⁹.

Researchers highlight that a significant share of the MIT alumni are also alumni of other universities. Therefore, the economic impact identified through the results should be viewed as the *impact of several higher education institutions*, especially in the fields of technology, science and management. This highlights that *the effect of other factors should not be neglected, regardless of how strong the impact of the institution under measurement is*.

Among others, the MIT example underlines that entrepreneurship (especially successful) brings about more entrepreneurship. However, entrepreneurial culture cannot be developed in a very short time, initiatives, planning and supporting entrepreneurship education in an institutional context can also be expected to attract entrepreneurially oriented students and staff (Table 13.1), creating more long term impact. According to interviewees, the involvement of faculty in entrepreneurial activities led to the creation of successful ventures. This highlights that senior academics have supported technical entrepreneurship and thus have fostered such future ventures. As more entrepreneurs flourish, the institution's entrepreneurial reputation grows, creating a virtuous cycle, as discussed earlier.

Table 13.1 Role of MIT's positive feedback loop in venture funding²⁶⁰

<i>Proportion of founders choosing MIT for the entrepreneurial environment (percentage)</i>					
Graduation decade	1950s (N=207)	1960s (N=313)	1970s (N=373)	1980s (N=315)	1990s (N=214)

²⁵⁷ Roberts and Eesley (2011). [online] Available at: <http://deshpande.mit.edu/>; cited 17/4/2014.

²⁵⁸ [online] Available at: <http://www.mitef.org/s/1314/interior-2-col.aspx?sid=1314&gid=5&pgid=470>; cited 31/3/2014.

²⁵⁹ As stated by an interviewee.

²⁶⁰ From a limited sample only.

Chose MIT for its Entrepreneurial Reputation	17%	12%	19%	26%	42%
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Source: Kauffman Foundation (2009)

Bolstering the entrepreneurial ecosystem is also expected to attract investors. Researchers underline the *impact* of MIT's entrepreneurial approach to the local/regional supporting infrastructure (technical, legal, banking, accounting etc.).

Overall, the survey examined the impact on the individual (alumni) of the whole MIT experience and the economic impact of the alumni-funded companies. Regarding causal chains, the survey did not examine if and how a specific activity (input) has led to immediate results or intermediate outcomes and global impacts. It examined the possible causal links between *an institutional approach to entrepreneurship*; including courses/programmes and teaching methods, but also the resources and support offered; collaboration with faculty and other students, etc. Under this lens, it could be argued that the **results prove the positive impact** of the entrepreneurial ecosystem on individuals and the local economy, given how these are defined by the survey.

13.3 Methodology of measurement

13.3.1 Launching the 2003 survey

The MIT Alumni Association updates its directory on alumni demography every 10 years. In 2001, a question was added 'Have you ever participated in starting-up a company?' The results from this question showed significant percentages of 'yes' responses. So, the Association decided to run a survey on those who replied positively and gain more insights. The survey was developed by the Association and was substantially changed by the researchers. The data was analysed by the publication authors/researchers.

Besides tracking information on the ventures that alumni had developed, the researchers decided to look at the economic impact that these ventures have influenced. The analysis on economic impact was triggered by MIT's president's interest in the topic at the time.

The goal of the survey was to describe the firms that alumni had created. The economic impact of these firms has been measured, but the direct causality of that impact on MIT is challenging to prove. Any impact should be attributed to the alumni, not MIT per se²⁶¹.

13.3.2 Survey sample

The goal of the measurement was to identify the living MIT alumni that have founded at least one company. In order to identify the sample, a survey was sent to all alumni (105,928) in 2001. About 35,000 alumni responded to the question about whether or not they had founded a company, with 23.5 per cent identifying themselves as entrepreneurs. The 2003 survey addressed these alumni in relation to information about the operation of their businesses; 2,111 complete surveys were collected. Duplicate responses on the same company were removed from the sample, to leave 2,059 respondents who had founded 4,611 companies. Information on revenue and employment that was provided by the alumni was further verified by the 2006 records of Compustat (for public

²⁶¹ As mentioned by an interviewee.

companies) and Dun & Bradstreet (for private companies). The survey tracked individuals that had graduated even in the 1950s.

It should be underlined that the researchers faced the challenge of non-respondents that is prevalent in all surveys. Also, all respondents did not provide data for all survey items and data was sometimes provided for only one of the several firms founded by the alumnus/a. In order to estimate the total impact of MIT alumni entrepreneurs, the research used estimation methods (a scale factor and multipliers) that could be used from other institutions in similar cases.

It should be noted that the results of the economic impact of MIT alumni regard only those who responded in the 2003 survey. This means that large corporations²⁶² that had been created by MIT alumni were not included in the survey/results, as their founders did not respond in 2003, even if the company was still active. Also, companies were not included in the sample, if they had been merged with or bought by other companies. The strict selection criteria for the companies to be included in the database fortify the researchers' claim that the final results are a conservative estimation of the overall economic footprint of MIT alumni.

13.3.3 Methodology

The survey aimed to measure the impact of the MIT alumni-founded firms at the local (Massachusetts) and national levels. This was achieved by the use of survey questions²⁶³ targeting the location of the headquarters; the reasons for choosing this location; and data from other sources regarding the firms' revenues, sales and employment levels. At the same time, the survey questionnaire provided information to compile the profile of these companies, and map their presence in various industries. The role of MIT was examined regarding:

- the location where co-founders met (if applicable);
- the source of the idea that led to the new company formation: specific sources within the MIT environment were sought after, touching upon elements of the curriculum (e.g. in class, graduate thesis), inspiration from faculty/other students or visitors (engineers, entrepreneurs, scientists), research, etc;
- the influence of faculty, other staff and fellow students;
- specific groups or activities held at the institution (such as entrepreneurship competitions, entrepreneurship-relevant centres and forums, network of entrepreneurs, etc);
- the overall entrepreneurial environment of MIT;
- supporting founding the company through MIT's reputation and its effect on alumnus credibility and the subsequent facilitation of finding funding, clients and suppliers' trust;
- its influence as a factor to determine the location and future expansion of the company.

13.3.4 Possible limitations

The approach to measuring the economic impact is based on robust databases, and touches upon the employment, revenues and sales of these companies.

²⁶² For example, Campbell Soup, Hewlett-Packard, Intel, AMP, etc.

²⁶³ The survey questionnaire is [online] available at:

http://www.kauffman.org/~media/kauffman_org/research%20reports%20and%20covers/2009/02/mit_founders_survey.pdf ; cited 28/3/14.

Nonetheless, one could argue that no matter the profound effect of MIT on the founders, the performance of the companies is impacted by several factors, as well. Likewise, the questionnaire tries to directly link the founders' decision to start a business, as well as other elements of the business's creation, to MIT. However, it does not allow isolating the influence from other factors, which literature has found to play significant role (for example, the family background of these alumni in respect to parents' relation to entrepreneurship). It should be stressed though, that the relevant information was not collected through the survey²⁶⁴.

Since the survey measured the impact on alumni, even from the 1950s, the measurement approach did not include pre- and post- tests, as is common in evaluations. This cannot be considered a weakness though for this specific survey.

A control group was also not used. However it should be noted, that it was not feasible given the focus of the study, which was MIT alumni only. This limitation has been avoided in the new survey, which has just been launched by the same principal researcher. MIT alumni who have not started companies have been included in the new survey, gathering much similar data from both groups.

Taking into consideration the aims of the survey and the large number of respondents in the sample, the overall methodological approach could be considered to be of high quality, although some areas could be improved in following surveys.

13.4 Using the results of the impact measurement

The survey offered important insights on the alumni-founded firms. It could be supported that the results provide a new metric to discuss entrepreneurship: as it linked alumni's firms to universities, and also addressed regional and global impacts. The survey also offered a benchmark for other universities to run similar surveys.

Since the survey took place, there have been significant developments regarding entrepreneurship in MIT. Interviewees stress that the developments cannot be directly linked to the survey results, as MIT continuously tries to promote its entrepreneurial environment and the programmes offered are not designed based on survey results. They could, however, have been indirectly affected by the 2003 survey publication.

The survey results had great visibility and have helped MIT to demonstrate its effect on the economy. The results were communicated to alumni and the wider public in events and through speeches, for example from the President of MIT²⁶⁵.

After the survey was launched, a Special Faculty Committee on Entrepreneurship and Innovation was developed. It is dominated by the Engineering School's faculty. There is also a sub-committee of Education²⁶⁶; among others, the sub-committee has gathered data on entrepreneurship and innovation in MIT, such as data on enrolments in courses, etc²⁶⁷.

Although the results did not trigger any school-specific developments, they stressed the importance and popularity of career paths, other than the 'traditional' ones and that entrepreneurship is not only relevant to the Business

²⁶⁴ As stated in an interview with the lead researcher of the 2009 publication.

²⁶⁵ According to interviewees.

²⁶⁶ This sub-committee is led by the lead researcher of the 2009 publication.

²⁶⁷ It is interesting to note that MIT has an open enrolment policy, i.e. any student can enrol in any course, as long as s/he fulfils the pre-requisites.

School. This increased the responsibility of MIT to offer more on entrepreneurship and provided perspectives on how to structure teaching.

13.4.1 Innovation Initiative

The Innovation Initiative was launched in late 2013. It aims at encouraging the institution's connections with the world by offering ventures of all types (for example, for profit or not), as long as they are useful to the society and have positive impact. One of the goals is to offer education suitable to tackle the challenges of a global economy, understand the challenges that faculty/students face and ensure that MIT can solve more of societies' problems. So, the Initiative aims at ensuring that MIT works on '*the problems that matter*'²⁶⁸ and **expand MIT's social and economic impact**.

Under the current Innovation Initiative, one of the four pillars/key messages regards fundraising to stimulate entrepreneurship and innovation. Two associate deans for innovation have been appointed, one from the Engineering School and the other from Sloan Business School. This is considered to be a very significant change.

The availability of entrepreneurship-related courses will also be strengthened; as part of the Innovation Initiative, MIT has a responsibility in making entrepreneurship education available to and offer support to post-docs, alumni, staff, faculty and undergraduates. It was acknowledged that the support provided to undergraduates could be improved. To tackle this, a task force has been put in place to create an undergraduate minor in entrepreneurship, which will be available from all schools/degrees at MIT.

In mid-May, the Innovation Initiative Report will be published.

Next steps after the 2003 survey

The 2003 survey was **updated in 2011**. The update regarded the inclusion of the latest developments in MIT entrepreneurship related centres. The role of technology in influencing the impact of the alumni companies was also examined. Researchers used data from the Kauffman Foundation to contrast MIT alumni companies with US firms overall. The results highlight that MIT alumni firms 'tend to be more likely to raise venture capital, employ more people and generate more revenues than the 'average' new US firm. Researchers conclude that at least some of this difference is likely due to the size of the founding teams at MIT alumni ventures (larger) in addition to the training and reputation gained from MIT.

A new survey has been launched in January 2014. The new study addresses the methodological limitations of the 2003 study. The basis of the sample has been broadened, so it will not only include alumni-entrepreneurs. The 2014 survey targets the overall contributions of MIT alumni, with questions such as 'what did you do after graduation? Did you develop any patents? Did you launch ventures/ran big projects within large companies,' etc.²⁶⁹

However, different questions will be used, from those the 2003 survey. Only one common question will be kept, regarding the level of impact of MIT's reputation with suppliers, clients, financing, etc. This limits the possibility of measuring the developments that have happened since 2003. But the study does cover all living alumni, so the data on earlier graduates will be available for comparison.

²⁶⁸ As stated by one of the interviewees.

²⁶⁹ As stated by interviewees.

Control groups will be defined and differences between them, as well as target groups, will be researched.

Interestingly, the 2003 study was conducted after the economic bubble and the 2014 study will be conducted after a severe economic crisis: so, the new survey is expected to examine reflections on the economic crisis.

Why a new survey?

According to the lead researcher, *the acceptance and impact of the 2003 survey/publication* led to the 2014 survey.

The new survey was also triggered by the need to further look into the following:

- ➔ the absence of 10 years of data (Stanford University ran a relevant study on the impact of their alumni²⁷⁰ in 2011);
- ➔ gender issues: female alumnae entrepreneurs were found to be far fewer than male;
- ➔ foreign students vs. US students: to better understand the differences between the two groups.

The goal is to update the process of how to use existing alumni data, to decide how to manage retaining the data, in order to create a database. Additionally, making the survey a regular occurrence could facilitate this, but the decision is yet to be made regarding if and how often the survey could take place. The 2003 survey was 'a point of pride' and a new survey is needed to keep in touch with alumni, 'the best product' of MIT²⁷¹. The 2014 survey will also allow a comparison with similar and recent studies from other universities. It will be possible to examine new interesting research areas as well, such as observing how entrepreneurial behaviour has changed during the past decade; the types of entrepreneurship that alumni engage in; the effect of the economic crisis, etc.

Overall, the survey was reportedly important for MIT to see 'where they stand.' However, as it was the first such survey of its kind, it is the first data-point and more results are needed to evaluate developments. However, any reshaping of MIT's way of teaching and overall approach to promoting innovation and entrepreneurship will not be affected by the results of next surveys: for example, if the next survey shows that alumni-founded companies could constitute the 9th or 20th economy in the world, the approach to teaching or overall support to students and faculty is not expected to be affected²⁷². It is MIT's continuous effort to provide society with useful applicable knowledge that drives developments. So, it can be inferred that it is the vision of MIT that drives changes and surveys, such as the 2003 one, which may be used to support the vision, but not to shape it.

It is also acknowledged that the earlier survey took place 10 years ago and the changes in that decade have been significant: the economy, demography, the needs of societies and even the new generation of students differ. For example, one of the interviewees estimates that about 15 per cent of students who currently join MIT declare that they have already started a company even before joining MIT. This clearly stresses the need to formulate the approach towards

²⁷⁰ [online] Available at:

https://engineering.stanford.edu/sites/default/files/Stanford_Alumni_Innovation_Survey_Report_102412_1.pdf
; cited 2 May 2014.

²⁷¹ As stated by an interviewee.

²⁷² According to an interviewee.

innovation and entrepreneurship and better respond to the cultural change that has taken place in the last decade, leading to the 'hybrid economy.'

13.5 Conclusions

The 2003 survey offers a rare example of an alumni-tracking survey that explored the impact of the whole institution on alumni's first steps as entrepreneurs, the types of ventures alumni have created and measured the economic impact that these companies had on the local community/state.

The most interesting element of this example is that it does not explore the impact of one programme/initiative of entrepreneurship education, but the impact of the whole institution: from infrastructure, faculty and colleagues to the reputation of supporting alumni to more easily attract funds for their business idea. So, despite its possible areas for improvement, the survey can provide guidance and inspiration to other institutions and policy makers, because it proves the importance and positive influence of a holistic approach towards entrepreneurship.

The survey tried to uncover not only whether MIT was influential to the development of new firms; but also which part of *the institution's entrepreneurial ecosystem* proved to be more useful for each particular alumni entrepreneur. This highlights the importance attributed to each element of the ecosystem, whether it is a part of the formal curriculum and other learning opportunities or even constitutes informal interaction with faculty and students.

The survey did not prove absolute causal links between MIT and economic impact, as there are so many factors that influence an individual's success in creating a venture. This is why some additional possible influences were explored (e.g. other learning institutions, work experience, etc) This could be viewed as a way to broaden the understanding of the key influential factors for MIT alumni, so as to further improve the entrepreneurial ecosystem.

Regarding measuring the economic impact, the methodology used does not completely isolate the effect of MIT on venture creation from other factors. Interviewees recognise that the reasons that influence a person to start-up a firm and the success of this start-up are several; controlling for all of them is challenging. Also, the survey did not initially aim at proving a causal link, but rather accumulate information on alumni's firms. Nonetheless, the methodology leads to hard evidence on alumni firms' performance and links the impact of the institution to economic factors, such as revenue, employment, etc.

The analysis underlines the effect of exogenous factors, such as location, timing, inspired pioneers and events such as World War II. This is true for any kind of development and stresses random favourable conditions, but most importantly, the significance of supporting measures, positively-related policies, infrastructure, legislation etc. towards entrepreneurship.

The fact that MIT's entrepreneurial ecosystem has been evolving for over 150 years does not mean that such a long period is necessary for other institutions to develop an entrepreneurial ecosystem. It does, however, stress the importance of time in order to create a culture and develop all necessary institutions. The approach and results of the 2003 survey can prove useful for higher education institutional policy-making on how to promote entrepreneurship (venture creation) and build an entrepreneurial ecosystem.

- ➔ **Engage the local community:** It is important for institutions to understand and remain in touch with the local community and market needs. In MIT, many of the faculty are entrepreneurs. At the same time, external entrepreneurs are invited to give lectures/classes. For students/aspiring entrepreneurs, having role models is also paramount

for networking and inspiration. So, connection to the community can be in the form of offering mentoring (there is such a service at MIT);

- ➔ **Think of entrepreneurship education in a cumulative way:** Efforts need to include the key actors. So, bringing entrepreneurs into the classroom is not enough: students and faculty need to be trained. Action learning approaches to teaching and mentoring are also important;
- ➔ **Facilitate funding of students/faculty business ideas:** The ability to fund one's idea is a significant stimulus to being able to realise it. The institutions should have relevant connections and offer advice on how to find funding;
- ➔ **Consider the impact on economy:** The impact on society should be a university's greatest goal²⁷³. In MIT, entrepreneurship is directly linked to innovation, which is considered 'a contact sport': the more you learn and interact, the more innovation can spur. So, even the way an institution is built matters: meeting areas should be offered to staff and students to meet and exchange ideas. This yields success in innovation. In MIT, even the buildings are connected, so students, faculty, and staff share toolsets and environments;
- ➔ **Supporting entrepreneurship will bring more entrepreneurship:** As the reputation of MIT as an entrepreneurship-promoting institution increased, more *entrepreneurial* individuals were attracted. This self-selection process significantly contributed to the creation of the entrepreneurial ecosystem.

13.6 References

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13.7 Results from the 2003 survey

Table 13.2 Economic Impact of one-time and repeat entrepreneurs (from a limited sample only)

Category of Entrepreneur	One-Time Entrepreneurs	Repeat/Serial Entrepreneurs
Total Sales (in thousands \$2006)	\$9,876,900	\$29,190,000

²⁷³ As noted by an interviewee.

Total Employment	111,915	344,208
Total # of firms founded	1,086	3,193
Total founders in the sample	1,086	981
% of entrepreneurs	52.2%	47.5%
% of firms	25.4%	74.6%
%of total revenues	25.3%	74.7%
% of total employment	24.5%	75.5%

Source: Kauffman Foundation (2009), p. 16

Table 13.3 Influence of Alumni Organisations, Entrepreneurship Clubs and Centres on Alumni Entrepreneurship²⁷⁴

<i>Proportion rating alumni factors as important in venture founding (percentage)*</i>					
Graduation decade	1950s (N=73)	1960s (N=111)	1970s (N=147)	1980s (N=144)	1990s (N=145)
Alumni Regional Clubs	5%	5%	3%	12%	3%
MIT Enterprise Forum	7%	16%	15%	22%	9%
MIT Business Plan Competition	0%	1%	0%	3%	30%
MIT Entrepreneurship Center	3%	1%	2%	1%	12%
MIT's Entrepreneurial Network	26%	25%	32%	40%	50%
Students	26%	24%	38%	50%	66%
Faculty	48%	42%	37%	28%	37%
Research	32%	32%	30%	26%	33%
Technology Licencing Office	1%	0%	2%	4%	11%
Venture Monitoring Service	0%	1%	0%	0%	1%

Source: Kauffman Foundation (2009); *Respondents could check all relevant categories

²⁷⁴ From a limited sample only.

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