



Impact of Entrepreneurship Education in Denmark – 2013



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The Danish Foundation for Entrepreneurship
– Young Enterprise
Ejlskovsgade 3D, 5000 Odense C
Denmark

Contact:

Lene Vestergaard, +45 2442 0675

Written and edited by:

Kåre Moberg, Lene Vestergaard

Research design:

Kåre Moberg

Data collection and analysis:

Simon Rasmussen, Casper Jørgensen

Translation and proofreading:

Susanne Kærn Christiansen

Photo:

Fonden for Entreprenørskab – Young
Enterprise

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Heidi Kunst, kunstdesign.dk

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Contents

Main results of the impact measurements made by FFE-YE	6	Upper secondary education	16
Preface	8	Higher education	16
Introduction	9	Basic Data	16
Primary school	9	Measurement of entrepreneurial competences	16
Basic Data	9	Exploration	16
Different approaches to entrepreneurship education	9	Evaluation	16
Survey design	10	Exploitation	17
Analysis	11	Analysis	18
Conclusion	14	Other effects of entrepreneurship education	20
The Moberg Entrepreneurial Spirit Indicator (MES)	14	Conclusion	22
A study of Project Edison	15	Summing up and concluding remarks	23
		Literature	24





Main results of the impact measurements made by FFE-YE

General conclusions:

- If entrepreneurship is taught in primary school, this kind of education will spread to other levels of education (2010).
- Entrepreneurship education increases the wish to become an entrepreneur among pupils and students.
- Entrepreneurship education has an impact on the entrepreneurial behaviour of pupils and students when they are outside school and studies.
- Entrepreneurship education leads to higher incomes later in life – for self-employed as well as for employees.

Primary school

- Pupils who have participated in entrepreneurship education have higher ambitions for job and further education than non-participants (2011). *Entrepreneurship as an occupation* has a positive effect on pupils' ambitions for the future (2013).
- 2,4% are already performing activities to start up a business (2011).
- Entrepreneurship education has a positive impact on pupils' intentions of and desire for starting up their own business (2012, 2013). In 2011 53% of the respondents wanted to become an entrepreneur. The proportion is higher (63%) for pupils who know other self-employed people (2011).
- The entrepreneurial behaviour of pupils outside school is increasing: Considerably more pupils are leaders and initiators of spare time activities after having received entrepreneurship education (2012).
- *Entrepreneurship as a method* has a positive impact on pupils' relation to school and education, that is, pupils enjoy going to school, feel connected to their classmates and supported by their teachers (2012, 2013).
- *Entrepreneurship as an occupation* in combination with *entrepreneurship as a method* achieves the highest impact (2013).

- A study of the Edison programme for the 6th and 7th grades shows that only pupils who have become more positive towards competition increase their willingness to take risks and become happier about school and classmates (2013).

Upper secondary education

- Barriers to entrepreneurship are reduced, especially for girls, who feel that they are better at managing ambiguity and marshalling resources after participating in Company Programme (2012).

Higher education

- FFE-YE's survey shows that three times as many entrepreneurship students as control group students are performing activities to start up a business (2011).
- Entrepreneurship students improve their creative skills and strengthen their attitude towards entrepreneurship considerably more than students who have not participated in this type of education (2012).
- Entrepreneurship education leads to more students starting their own business, whereas "normal" university education leads to fewer students doing so (2012).
- For students with experience in starting up a business or an entrepreneurial project there is a correlation between having been taught competences in implementing and exploiting possibilities and their intentions of starting their own as well as their desire to pursue a career as an entrepreneur (2013).
- For students without prior entrepreneurial experience it is important for their desire to become an entrepreneur that they are taught planning and financial skills (2013).
- It is important for the students' entrepreneurial behaviour that during their education they feel ownership of the projects they work with and that their prior contextual experience is included (2013). Students in this type of education have, in a 2013 survey, considerably increased their level of entrepreneurial activity.

After graduation:

- People who have been trained/educated in entrepreneurship have a considerably higher income than untrained. The more training and education, the higher the income, also when we take other factors into consideration, such as gender, age, other education, and employment (2010).
- Entrepreneurship education often increases the desire for and especially the competences in innovation and start-up activities. The desire for and the competence in starting up your own increases more often among men than among women (2010).

All of the above results are described in detail in FFE-YE's reports "The impact of entrepreneurship education in Denmark" which may be downloaded from www.ffe-ye.dk/vidcenter.



Preface

It is now more than 15 percent of the country's pupils and students who participate in some form of entrepreneurship education. Because entrepreneurship education takes different forms and has different contents. It has different effects as well. This is, among others, what impact measurements of the previous years have shown, and which is followed up by this year's analysis.

There is great interest in the long-term effects of entrepreneurship education. Will young people who participated in this kind of education start up more businesses and become more innovative employees? In other words, will they increase the innovative capacity of Denmark?

We still cannot answer these questions, but we can say something about whether the education gives young people the competences to be innovative in their own or others' companies. We have also measured whether the young people become more desirous of an entrepreneurial career.

The fact that we can now show effects of different kinds of entrepreneurship education is of great importance when it comes to how entrepreneurship education should be designed in terms of contents and methods. This documented evidence is useful to teachers and educational planners – and to us in our counselling of the educational system.

In the longer term we look forward to being able to contribute with knowledge about whether young people with entrepreneurship competences start up more companies, and companies that are more viable.

Christian Vintergaard

CEO

Danish Foundation for Entrepreneurship – Young Enterprise

Introduction

The surveys in this report are all part of a longitudinal project that measures the effects of entrepreneurship education. In the earlier years our task was first of all to establish a good and usable survey setup and look at constructs of questions. These have now been thoroughly tested and validated.

This report contains, in short versions, analyses and conclusions of surveys made in 2013. For more detailed information about the projects and for an elaboration about the theoretical background we refer to Kåre Moberg's PhD thesis (published in the spring of 2014).

Primary school

In the primary school survey we looked at how different approaches to entrepreneurship education influence the entrepreneurial spirit of pupils, that is, their attitude to entrepreneurship and their intentions of starting their own, both of which may again have an effect on whether or not they choose entrepreneurship as a career later in life. We have moreover looked at whether they are already now entrepreneurial in their spare time. Apart from that, we have studied whether or not the pupils feel connected to school and their teachers, and looked at their ambitions for the future.

Basic data

In 2012 we sent out questionnaires to 2,000 randomly selected ninth-grade pupils and received 801 fully completed responses (a response rate of 40%). In 2013 we followed up on these respondents and received 388 fully completed responses (a response rate of 48%). The analysis builds on data from these two questionnaire surveys.

Different approaches to entrepreneurship education

In primary school it is not very common to teach *entrepreneurship as an occupation*, among others because pupils are still far from the labour market. On a small scale, however, there are initiatives to teach this kind of cognitive-oriented entrepreneurship to pupils in order to increase their desire to become self-employed business owners. The teaching typically focuses on training the pupils how to estimate a business idea, become self-employed, and start a business.

Another far broader category within entrepreneurship education in primary school is teaching that strengthens pupils' non-cognitive entrepreneurial competences, such as creativity, generating new ideas, and how to translate ideas into actions. We call this approach *entrepreneurship as a method*. This type of education does not aim at increasing pupils' desire to become an entrepreneur, it rather aims to develop creative and proactive pupils who can manage the uncertainty and continuous change which is typical of today's world and labour market.

In order to analyse the effects which these two approaches have on pupils, we have in the questionnaires asked them to assess to which extent the teaching has focused on educating them in cognitive entrepreneurial competences: How to create a business; What is 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 we have 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.



Survey design

The analysis is based on several different constructs of questions: partly constructs from tested and validated scales and partly specially developed questions to measure the teaching in cognitive and non-cognitive competences as well as action-based pedagogy¹.

The four constructs about connectedness (connectedness to school, to classmates, to the self in the present, and to the self in the future) come from the Hemingway Measure of Adolescent Connectedness (Karcher, 2003). The questions, which concern the pupils' perceived support from their teachers, come from the Learning Climate Questionnaire (Williams et al., 1994). The questions about positive and negative self-perception come from the Core Self-Evaluation (Judge et al., 2002).

The measurement of the pupils' entrepreneurial spirit builds on questions about their attitude to entrepreneurship and their intentions of starting their own. The construct containing questions about attitude is inspired by the McGee et al.-scale (2009), while the questions about intentions are inspired by the Linan et al.-scale (2011).

We have moreover measured the pupils' entrepreneurial behaviour by asking them whether they have themselves started or led an activity outside school.

Finally, we have included the demographic variables: the pupil's gender and the parents' educational level. Table 1 presents the descriptive statistics for the constructs in the pre and post surveys as well as the number of questions in each construct and their internal consistency².

¹ See the forthcoming research paper from Moberg (2014).

² **internal consistency** is a measure based on the correlations between different items in a construct. It measures whether several items that propose to measure the same general construct produce similar scores. If the Cronbach's alpha test is above .70, then the internal consistency is viewed as being acceptable (DeVillis, 2012).

	Number	1997 _p1 (n=645)			vs	1997 _p2 (n=458)		
Variables	Items	Alpha	Avg.	SE		Alpha	Avg.	SE
Self	4	0,771	5,27	(0,047)		0,751	5,26	(0,052)
School	5	0,820	5,55	(0,038)		0,823	5,63	(0,042)
Classmates	4	0,800	5,62	(0,040)		0,774	5,63	(0,044)
Future	5	0,689	4,99	(0,042)	***	0,648	5,52	(0,047)
Leaders	1	-	0,43	(0,019)		-	0,35	(0,023)
Starters	1	-	0,36	(0,019)	***	-	0,28	(0,021)
Teacher support	4	0,842	5,05	(0,047)		0,822	5,12	(0,049)
Cognitive	4	0,835	2,40	(0,046)		0,877	2,42	(0,058)
Non-cognitive	4	0,858	3,94	(0,051)	**	0,885	4,11	(0,060)
Pos. Self-perc.	6	0,812	5,38	(0,034)		0,783	5,37	(0,039)
Neg. Self-perc.	6	0,812	3,37	(0,049)	***	0,849	3,58	(0,063)
Attitude	3	0,872	5,45	(0,046)	***	0,821	5,67	(0,052)
Intentions	3	0,904	3,90	(0,067)		0,929	4,04	(0,084)
Motivation (inner)	5	0,791	4,58	(0,046)		0,774	4,64	(0,051)
Motivation (outer)	3	0,767	5,13	(0,054)	**	0,821	4,94	(0,067)
Action-based pedagogy	6 (3 PS)	0,719	4,98	(0,033)		0,777	5,02	(0,041)

n = number; SE= Standard error; PS = parcelled construct

Table 1

As appears from table 1, all pupils have experienced a considerable increase in their ambitions for the future as well as in their attitude to entrepreneurship and their intentions of starting their own. We also see a considerable increase in negative self-perception. This is however no surprise, given the age of the pupils; it is not unusual for adolescents to feel insecure and to have a negative self-image.

Analysis

In order to determine whether the results are related to teaching in *entrepreneurship as an occupation* or teaching in *entrepreneurship as a method*, we have divided the responses according to whether the pupils have experienced a change in any of these categories. In 58 of the 388 pupils' responses the average value had increased by more than 1 in *entrepreneurship as an occupation*, and in 87 responses the average value had increased by more than 1 in *entrepreneurship as a method*. We then compared the two groups to see the effect which the two approaches had on the pupils' entrepreneurial spirit and on their connectedness to school, classmates, teachers as well as on their ambitions for the future.

We compared the groups by making a difference-in-difference (DID) test. In a DID test the difference in the changes on the variables is compared for the groups to see whether it is significant.

The test allows us to control for 'ceiling effects', that is, whether the respondent was already from the start on a high level on the variable and therefore less likely to increase on this variable. We also controlled for a range of demographic variables. Because we wanted to compare the effect of the two approaches to entrepreneurship education, we also included the respondents' change in *entrepreneurship as a method* in the analysis of the effect of *entrepreneurship as an occupation* and vice versa.

Table 2 presents the results of the analysis of *entrepreneurship as an occupation*.

Variables	Survey group (n=57)				Control group (324)				DID Without control group (381)		DID With control group (381)	
	t = 0	t = 1	diff_T	SE	t = 0	t = 1	diff_T	SE	DID	SE	DID	SE
Self	5,26	5,35	0,09	(0,135)	5,18	5,25	0,06	(0,054)	0,055	(0,123)	0,018	(0,125)
School	5,51	5,69	0,19	(0,111)	5,57	5,67	0,10	(0,039)	0,067	(0,094)	0,023	(0,095)
Classmates	5,61	5,76	0,15	(0,146)	5,60	5,58	-0,01	(0,056)	0,172	(0,123)	0,100	(0,124)
Future	4,97	5,37	0,40	(0,125)	5,02	5,13	0,11	(0,051)	0,268	(0,115)	0,261	(0,116)
Leaders	0,33	0,40	0,07	(0,061)	0,44	0,38	-0,05	(0,028)	0,069	(0,062)	0,057	(0,063)
Starters	0,32	0,25	-0,07	(0,075)	0,35	0,31	-0,04	(0,030)	-0,052	(0,063)	-0,063	(0,064)
Teacher support	4,97	5,36	0,39	(0,160)	5,05	5,07	0,02	(0,065)	0,316	(0,137)	0,216	(0,138)
Non-cognitive	3,96	4,84	0,88	(0,157)	3,86	3,95	0,09	(0,076)	0,846	(0,159)	0,846	(0,160)
Pos. Self-perc.	5,42	5,51	0,10	(0,100)	5,36	5,36	0,00	(0,042)	0,124	(0,094)	0,092	(0,096)
Neg. Self-perc.	3,17	3,64	0,49	(0,190)	3,44	3,61	0,17	(0,075)	0,196	(0,162)	0,149	(0,165)
Attitude	5,43	5,80	0,37	(0,188)	5,44	5,63	0,19	(0,073)	0,174	(0,153)	0,182	(0,156)
Intentions	4,09	4,36	0,27	(0,200)	3,73	4,03	0,30	(0,078)	0,071	(0,191)	-0,001	(0,197)
Motivation (inner)	4,38	4,69	0,31	(0,163)	4,65	4,67	0,02	(0,053)	0,177	(0,125)	0,142	(0,127)
Motivation (outer)	4,87	5,01	0,13	(0,192)	5,13	4,96	-0,17	(0,081)	0,173	(0,182)	0,182	(0,186)
Action-based pedagogy	4,93	5,70	0,77	(0,277)	4,95	4,97	0,01	(0,067)	0,752	(0,192)	0,537	(0,192)

Sig: * $<0,1$, ** $<0,05$, *** $0,01$

n = number; t = time; SE = standard error

Table 2

As we can see from table 2, *entrepreneurship as an occupation* has no important influence on the pupils' attitude to entrepreneurship, their intentions of starting their own, and their entrepreneurial behaviour. A reason for this may be that the actual effects of this type of teaching 'drown' in the general increase on these variables. We do, however, see that pupils who during the last year have received more of this kind of teaching experience a considerable increase in their ambitions for the future and in their perceived support from teachers. At the same time there is an increase in teaching in non-cognitive entrepreneurial competences (*entrepreneurship as a method*). Moreover, compared to pupils who have remained on the same level of *entrepreneurship as an occupation* or on a lower level, these pupils experience to a higher degree that the teaching has used action-based pedagogy.

It also appears from table 2 that the increase in perceived support from teachers is no longer significant for *entrepreneurship as an occupation*, when we control for the change in *entrepreneurship as a method* (by means of the demographic questions). This shows that what has an effect on perceived teacher support is teaching according to *entrepreneurship as a method*. The reason why, in the beginning, we saw an effect of *entrepreneurship as an occupation* on teacher support is that the two approaches to entrepreneurship education are closely interrelated. Thus we can conclude that teaching in *entrepreneurship as an occupation* has a positive effect on the pupils' ambitions for the future and that pupils whose level on this variable has increased also experience the teaching as more action-based.

The results of the difference-in-difference analysis for *entrepreneurship as a method* are presented in table 3.

Variables	Survey group (n=57)					Control group (324)					DID Without control group (381)		DID With control group (381)			
	t = 0	t = 1	diff_T		SE	t = 0	t = 1	diff_T		SE	DID		DID			
Self	5,14	5,33	0,19	*	(0,101)	5,24	5,24	0,03		(0,054)	0,129		(0,104)	0,112		(0,108)
School	5,61	5,88	0,27	***	(0,071)	5,55	5,61	0,64		(0,043)	0,224	***	(0,079)	0,223	***	(0,081)
Classmates	5,50	5,80	0,31	***	(0,110)	5,63	5,55	-0,08		(0,059)	0,311	***	(0,103)	0,290	***	(0,107)
Future	5,01	5,30	0,29	***	(0,092)	5,02	5,13	0,11	**	(0,055)	0,179	*	(0,097)	0,133		(0,100)
Leaders	0,38	0,37	-0,01		(0,052)	0,43	0,39	-0,04		(0,028)	0,002		(0,052)	-0,022		(0,053)
Starters	0,32	0,28	-0,05		(0,061)	0,35	0,30	-0,04		(0,032)	-0,020		(0,053)	-0,032		(0,055)
Teacher support	4,89	5,41	0,53	***	(0,140)	5,08	5,02	-0,05		(0,063)	0,470	***	(0,115)	0,434	***	(0,119)
Non-cognitive	1,97	2,55	0,58	***	(0,136)	2,46	2,33	-0,12		(0,072)	0,472	***	(0,138)	0,490	***	(0,138)
Pos. Self-perc.	5,35	5,46	0,11		(0,074)	5,38	5,36	-0,02		(0,045)	0,121		(0,079)	0,116		(0,083)
Neg. Self-perc.	3,34	3,66	0,32	**	(0,152)	3,41	3,60	0,19	***	(0,067)	0,106		(0,136)	0,083		(0,141)
Attitude	5,51	5,76	0,25		(0,156)	5,42	5,63	0,21	***	(0,075)	0,100		(0,130)	0,083		(0,134)
Intentions	3,82	4,24	0,42	***	(0,143)	3,78	4,04	0,26	***	(0,084)	0,172		(0,162)	0,115		(0,168)
Motivation (inner)	4,64	4,92	0,29		(0,109)	4,60	4,59	-0,01		(0,057)	0,309	***	(0,105)	0,325	***	(0,108)
Motivation (outer)	5,18	5,10	-0,08		(0,133)	5,07	4,93	-0,14		(0,089)	0,122		(0,155)	0,147		(0,160)
Action-based pedagogy	4,82	5,40	0,58	***	(0,104)	4,99	4,98	-0,01		(0,087)	0,527	***	(0,166)	0,385	**	(0,169)

Sig: * $<0,1$, ** $<0,05$, *** $0,01$

n = number; t = time; SE = standard error

Table 3

As we can see from table 3, an increase in *entrepreneurship as a method* has a positive effect on the pupils' level of connectedness to school, to classmates, and to teachers as well as on their inner motivation. We can moreover see that an increase in this type of teaching increases the pupils' perception of being taught cognitive entrepreneurship competences as well as of being taught through an action-based pedagogy. Earlier research (e. g. Battistich et al., 1995; Demanet & Van Houtte, 2012a, 2012b, Fredricks et al., 2004) has shown that the three variables, connectedness to school, to classmates and to teachers, are all important indicators of future success in education as well as in the labour market. An increase in these variables is thus a very important and positive result of the pedagogical approach. Moreover, the increase in the inner motivation of the pupils is very interesting, because it indicates that the pupils are increasingly driven by curiosity and self-motivation in their learning process. The effects of this type of teaching is significant, also when we take into consideration demographic variables such as ethnicity, whether parents are self-employed, and parents' education and work.



Conclusion

The analysis of the primary school survey shows that teaching in *entrepreneurship as a method* appears to be more important than *entrepreneurship as an occupation* at this level. It is interesting to see that *entrepreneurship as an occupation* has a positive influence on the pupils' ambitions for the future, because it indicates that during the ninth grade they have started to think more about and prepare for their future. It is also positive to see that teaching focusing on equipping the pupils with cognitive entrepreneurial competences (*entrepreneurship as an occupation*) goes hand in hand with a higher level of action-based pedagogy as well as with teaching focusing on strengthening non-cognitive entrepreneurial competences. Teaching in *entrepreneurship as a method*, which focuses on strengthening non-cognitive entrepreneurial competences, has many important and positive effects on the pupils. The pupils who have experienced an increase in this type of teaching have also increased their level of connectedness to school, to classmates, and to teachers. And we see that they become more and more self-motivating in their efforts in the learning process; that they engage more out of a desire for learning.

The Moberg Entrepreneurial Spirit Indicator (MES)

We have also tested and validated a measure for the entrepreneurial spirit of pupils at the primary school level. The construct (the Moberg Entrepreneurial Spirit Indicator (MES)) is a combination of questions about the pupils' attitudes to entrepreneurship (McGee et al., 2009) and intentions to start their own (Linan et al., 2011). The construct is based on validated scales, but adapted to the age group. The analysis is based on the responses from 1,493 pupils in the ninth grade, born in 1997 and 1998. The survey shows that the construct is reliable, inasmuch as the pupils translate and understand the questions in the same way. The tests which were made also show a high level of validity in relation to what was predicted, as pupils who have received entrepreneurship education have a considerably higher level of entrepreneurial spirit. Moreover, our measure for entrepreneurial behaviour, which is measured by whether the pupils have started or are leaders of an activity outside school, also shows a considerably higher level of entrepreneurial spirit. That is to say that the pupils who are entrepreneurial in their spare time also have a greater desire for and higher ambitions about becoming an entrepreneur.

A study of Project Edison

The Foundation has carried out a special study of Project Edison, which is an entrepreneurship programme for the sixth and seventh grades, which aims at increasing pupils' interest in working creatively and innovatively. Such a study of entrepreneurship education is rarely carried out with so young pupils and therefore contributes with new knowledge about entrepreneurship education at this age level. The study emphasizes two special aspects: the element of competition in relation with motivation and the effect on special types of pupils, for instance academically weak pupils.

The study is carried out in the autumn of 2013 and is based on both qualitative and quantitative data. The qualitative data have resulted from in-depth interviews with teachers who have completed a Project Edison programme with their pupils. The quantitative data have been collected through a questionnaire survey among pupils who have participated in the programme. The questionnaires build on our primary school survey, which is described above, and a Dutch survey by Rosendahl-Huber et al. (2012).

According to the analysis the interviewed teachers are of the opinion that the element of competition helps to motivate the pupils and strengthen their efforts.

The quantitative analysis shows that only those pupils who have become more positive towards competition increase their tolerance of risk and become happier about school and classmates. It is crucial that this special teaching method catches the pupils' interest, so that they engage themselves in the teaching. The analysis shows that all pupils perceive that the Edison programme has helped increase their experience of creativity and entrepreneurship in the teaching. This is very positive, in so far as we see a clear relation between entrepreneurship education and entrepreneurial competences already at this level of the education system.



Upper secondary education

The construct for measuring entrepreneurial spirit in primary school is also used in upper secondary education. This construct is a combination of questions about the pupils' attitude to entrepreneurship and their intentions of starting their own. We do not yet have any longitudinal data at this level, but we have tested the MES questions on a group of pupils (466), whom we have followed since they were in the ninth grade and who are now in upper secondary education. In the analysis we see a clear relation between entrepreneurial behaviour and a high level of entrepreneurial spirit. Future surveys will show how entrepreneurship at this level influences the entrepreneurial spirit of pupils.

Higher education

Part of the Foundation's longitudinal project about impact measurement focuses on university students in entrepreneurship educations. In this analysis we look at which entrepreneurial competences result from which type of teaching and the relation between the entrepreneurial competences and the entrepreneurial spirit of students.

Basic data

At tertiary level we have collected data on twelve master programmes since 2011. Eight of these programmes focus on entrepreneurship and innovation, and four are used as a control group. The eight programmes in the survey group include business management, engineering, and liberal arts students. In 2012 four further programmes were added to the survey group. The results of the analysis build on 970 initial responses from students in these programmes and on 220 responses from entrepreneurship students whom we have followed over a year.

Measurement of entrepreneurial competences

We have focused on entrepreneurial competences and developed a measure which includes five constructs for the measurement of students' cognitive and non-cognitive skills. The skills are needed in the different phases of an entrepreneurial venture, phases including exploration, evaluation, and exploitation, relevant in self-employment as well as within established organizations. In the following we present the dimensions in the Moberg Entrepreneurial Competences Indicator.

Exploration

Creative ability: the ability to think in new and imaginative ways. Numerous studies have demonstrated that creative ability is of great importance to entrepreneurs (see for example Baron, 2008; Elsbach, 2003; Lee, Florida & Acs, 2004).

Creativity is typically used during the exploration phase in order to identify and discover business opportunities (Foss & Klein, 2012; Kirzner, 1997; McGee et al., 2009).

Evaluation

Planning ability: the ability to plan and structure tasks. The focus on planning ability has a long-standing tradition within entrepreneurship education (Honig, 2004), and numerous studies show how important it is for entrepreneurs to have this ability (see for example Delmar & Shane, 2003; Matthews & Scott, 1995; McGrath & MacMillan, 2000; Stevenson, Roberts & Grousbeck, 1985; Timmons, Muzyka, Stevenson & Bygrave, 1987). It should, however, be noted that the concept of



entrepreneurial planning has been heavily criticized during the last decade (see for example: Alvarez & Barney, 2007, 2009; Karlsson & Honig, 2009; Sarasvathy, 2001, 2008).

Financial literacy: the ability to understand financial statements and budgets. This is an important ability in order to successfully engage in entrepreneurial activities. Even though issues such as return on investment, cash flow and liquidity may be delegated to experts, it is important that the entrepreneur has at least a basic understanding of the financial concept in order to be trustworthy to external and internal stakeholders (Castrogiovanni, 1996; Delmar & Shane, 2003; Stevenson et al., 1985).

Moberg (2013) categorizes *planning ability* and *financial literacy* as interrelated cognitively-oriented entrepreneurial skills which are important first of all during the preparation and evaluation phase in an entrepreneurial venture. As these skills are cognitively oriented, they are easy to codify and teach in an educational setting.

Exploitation

Marshalling of resources: the ability to assemble and organize resources in order to exploit a business opportunity. This ability is seen by many researchers as the essence of entrepreneurship (see for example Foss & Klein, 2012; Gartner & Carter, 2003; Sarasvathy, 2001, 2008). There is often a strong focus on the role which 'social capital'³ plays in this process (Davidsson & Honig, 2003; Karlsson & Honig, 2009). The process often takes place in a context characterized by high uncertainty (Foss & Klein, 2012).

Managing ambiguity: The ability to manage and cope with uncertainty and ambiguity in the process of implementing and exploiting a business idea. Entrepreneurship has more or less been synonymous with uncertainty ever since the field's pioneering researchers conceptualized entrepreneurship and the activities of entrepreneurs (see for example Cantillon, 1755; Knight, 1921; Schumpeter 1911), as entrepreneurial activities always unfold in a context characterized by uncertainty (Foss & Klein, 2012; Sarasvathy, 2001). In order to successfully perform entrepreneurial activities, it is thus important that the individual can manage and cope with uncertainty and ambiguity.

³ Social capital is understood as the ability to build and be part of social networks.



Moberg (2013) categorizes *marshalling of resources* and *managing ambiguity* as interrelated non-cognitive entrepreneurial skills which are important first of all during the execution and exploitation phase in an entrepreneurial venture. These skills which are of a non-cognitive character are difficult to teach, because they require practice and hands-on experience to be learnt.

Analysis

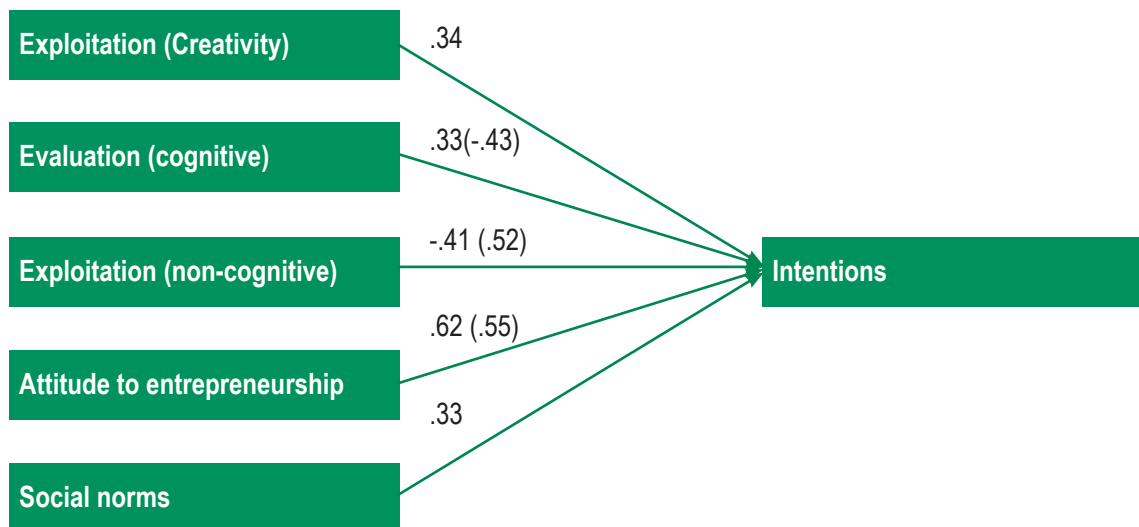
The statistical properties and the predictive validity of the Moberg Entrepreneurial Competences Indicator have been demonstrated in two separate student samples: students with entrepreneurial experience and students without prior entrepreneurial experience, a total of 970 students.

The analysis shows that students understand the questions in the same way, regardless of their educational and entrepreneurial background. Furthermore, it demonstrates that students with start-up experience have a higher perceived level of the skills sets included in the construct.

When analysing which of the skill sets explained the students' intentions of starting their own, we can see that their earlier experience with entrepreneurship plays an important role. For students with experience in starting an entrepreneurial project it is first and foremost the non-cognitive execution and exploitation skills that explain their level of entrepreneurial intentions and their commitment to an entrepreneurial career.

Students who lack this experience must rely on other sources of information to assess which skills are important in order to effectively perform entrepreneurial activities. For these students it is first and foremost their (perceived) level of the cognitively-oriented exploration and evaluation skills that influence their level of entrepreneurial intentions. This is not surprising, since traditionally within entrepreneurship educations there has been a strong focus on the business plan itself as being essential in connection with a business start-up.

The results of this analysis are presented in figure 1.



Note: Only results with a significance level of .05 or less are included (except from the relation between evaluation skills and intentions for students with entrepreneurial experience for whom sig = .052). All the results for pupils with entrepreneurial experience are presented within brackets.

Figure 1: the figure shows the relation between the five entrepreneurial competences (grouped as cognitive or non-cognitive), attitudes to entrepreneurship as well as social norms and intentions of starting their own for two groups of students (with and without entrepreneurial experience). The measuring of social norms (defined as persons in the student's network and those persons' attitudes to entrepreneurship) has been included in order to study whether these have an influence on the student's intentions.

This finding points to the importance of including more hands-on experience with entrepreneurial activities in educational initiatives in the field. However, the focus should also be on the cognitively-oriented skills such as planning and financial literacy, since, in our samples, students with entrepreneurial experience show higher levels in these skill sets. This implies that these skills are useful and important in the entrepreneurial process. The cognitive character of these skills makes them easy to codify and teach in an educational setting.

The finding that these skills are important to students who consider self-employment as a career also implies that students without entrepreneurial experience often perceive that they lack these skills and therefore don't view self-employment as a viable career option. It is therefore important that entrepreneurship educations focus both on conveying to the students which type of skills are important to entrepreneurs and on teaching these cognitive skills to the students. Students who do not have practical experience with entrepreneurship would thus feel better equipped for entrepreneurship and would more likely regard it as a possible career option. If they choose to become an entrepreneur they will eventually acquire the practical experience. The analysis thus shows that the most important thing for the student without entrepreneurial experience is to feel that he possesses the required skills to become an entrepreneur.



Other effects of entrepreneurship education

We have followed 220 students in eight entrepreneurship programmes over a year. Four of these programmes have a strong focus on the students' ownership of the projects they work with as well as on the involvement of their prior contextual knowledge in the educational process. The other four programmes also have a strong focus on entrepreneurship and action-based learning, but in these programmes the students are working with ongoing innovation projects in established organizations. The focus in the latter has been on letting the students apply the knowledge they acquire in the classroom in a practical and action-oriented way.

It was the goal of this study to find out what competences are especially important for entrepreneurial activities and what kind of education strengthens these competences and activities. As both approaches used action-based teaching methods and the students were engaged in innovative and entrepreneurial projects, it was to be expected that both approaches would have a positive effect on the students' perceived level of non-cognitive entrepreneurial competences.

However, the effects on the students' entrepreneurial activities were also expected to vary due to the context in which the students operated – a context which depended especially on the students' feeling of ownership of the project and on the extent to which they were allowed to use their own background knowledge in the project.

As expected, we saw that the students in both groups increased their perceived level of non-cognitive entrepreneurial competences, but it was only the educations which focused on entrepreneurial projects within established organizations that also strengthened the students' perceived cognitive entrepreneurial competences. This result seems to indicate that the process-oriented approach to entrepreneurship education is preferable, because such an approach includes a broader range of skills and competences.

At the same time, however, we saw that for students in this group there was a considerable decline (33%) in entrepreneurial activities, whereas students taught through the method-oriented approach had a considerable increase (22%) in entrepreneurial activities.

In table 4 the results of the analysis are presented.

Tested model	X ²	df	Avg. difference	CFI	ΔX ²	Δdf	sig	ΔCFI	Difference
Baseline	417.49	258		.923					
Process-oriented approach									
Exploitation									
(Creativity)	425.10	259	5.31/5.54 (.23)	.919	7.61	1	.01	.004	Yes
Evaluation									
(Cognitive)	428.92	259	5.01/5.23 (.22)	.917	11.43	1	.00	.006	Yes
Exploitation									
(Non-cognitive)	431.66	259	4.64/4.92 (.28)	.916	14.17	1	.00	.007	Yes
Entrepreneurial activities			49/34 (-33%)						Yes
Baseline									
Method-oriented approach									
Exploitation									
(Creativity)	426.93	259	4.87/5.18 (.31)	.918	9.44	1	.00	.005	Yes
Evaluation									
(Cognitive)	420.38	259	4.35/4.49 (.14)	.922	2.89	1	.09	.001	No
Exploitation									
(Non-cognitive)	428.20	259	4.59/4.91 (.32)	.918	10.71	1	.00	.005	Yes
Entrepreneurial activities			32/39 (+22%)						

X² = chi-square; df=degrees of freedom; CFI= comparative fit index; sig = significance

Table 4

These findings suggest that there are many ways in which to teach entrepreneurial competences. But when it comes to the immediate effect on the students' entrepreneurial activities, it is important that the students get the chance to take ownership of the entrepreneurial projects which they work with and use their own background knowledge in the process.

When you moreover see that the entrepreneurial activities of the students in both groups were considerably connected with their perceived non-cognitive entrepreneurial competences after having completed the education, the results seem to indicate that this type of skills are best learnt through own experience with entrepreneurial activities. These results do not suggest that industry-collaboration and practical experience with entrepreneurial projects in established organizations should be avoided. It does, however, point out the importance of the students' psychological ownership of educational projects and the importance of including their prior contextual knowledge in these educational projects, as this is an effective way to mimic the learning process which entrepreneurs go through. This type of education spurs the students' interest, motivation and engagement. In order to be able to offer a more precise estimate of which approach gives most successful entrepreneurs, however, we need data that extend over several years.

Conclusion

The analysis showed that it is of great importance whether or not the students have already had any experience with entrepreneurship and entrepreneurial projects and whether or not this experience is included in the teaching. For this type of student there is a connection between education in skills related to the implementation and exploitation of opportunities and the student's intentions of starting his own as well his desire for a career as an entrepreneur .

For students without prior entrepreneurial experience it is essential for their desire to become an entrepreneur that they are taught planning and financial skills, as these skills give them confidence in their own abilities to carry through an entrepreneurial project and, thus, in their ability to become an entrepreneur.

It is important for the students' entrepreneurial behaviour that they feel ownership of the projects they work with and that their contextual experiences are included. Education which considers these elements has, in our study, considerably increased students' level of entrepreneurial activity.



Summing up and concluding remarks

The studies of the short-term effects of entrepreneurship education, carried out in 2013, show that regardless of the educational level, it is important in which way students are taught and with which educational content. The different approaches to teaching in primary school are called *entrepreneurship as a method* and *entrepreneurship as an occupation*. The analysis shows that *entrepreneurship as an occupation* has a positive effect on ninth-grade pupils' ambitions for the future. At the same time we see that this type of education, which focuses on giving the pupils cognitive entrepreneurial competences, goes hand in hand with an action-oriented pedagogy as well as with teaching focusing on strengthening non-cognitive entrepreneurial competences. Education in *entrepreneurship as a method* with a focus on non-cognitive competences has many important and positive effects on pupils. The pupils who experience an increase in this type of education have also increased their level of connectedness to school, to classmates, and to teachers. This is very positive, as other research has shown that positive experiences in primary school are of great importance for the young people's performances later in life.

In a special study of an educational programme for pupils in the sixth and seventh grades we looked at the importance of incorporating in the programme a competition about the best idea for an entrepreneurial project. According to the analysis, the interviewed teachers think that the element of competition helps to motivate the pupils and strengthen their efforts. At the same time the quantitative analysis shows that only those pupils who have become more positive towards competition increase their tolerance of risk and become happier about school and classmates. The important thing is thus that the pupils get interested by the specific teaching method used and that they engage in the learning process. All pupils in the study felt that the Edison programme helped to increase their experience of creativity and entrepreneurship in the teaching. This is very positive, in so far as we already at this educational level also see a clear connection between entrepreneurship teaching and entrepreneurial competences.

For students in entrepreneurship educations at university it is of great significance that their background knowledge and possible earlier experience with entrepreneurship and entrepreneurial projects are included in the teaching. For students with such an experience there is a relation between being educated in competences in implementing and exploiting opportunities and their intentions of starting their own as well as their desire for a career as an entrepreneur. For students without earlier entrepreneurial experience it is important that they are taught planning and financial skills, as this will give them confidence in their own ability to carry through an entrepreneurial project and thus increase their desire to pursue an entrepreneurial career.

We moreover see from the analysis that it is important for the entrepreneurial behaviour of the students that they feel ownership of the projects they work with during teaching and that their contextual experiences are involved. Students who experienced these things during their education considerably increased their level of entrepreneurial activity during the year between pre- and post-testing.

Together with the results from earlier years this year's results thus give valuable knowledge about how to design and plan entrepreneurship education. It will be interesting to follow pupils and students during the next years to see the longer-term effects of the different kinds of education.

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The Danish Foundation for Entrepreneurship – Young Enterprise
Ejlskovsgade 3D, 5000 Odense C, Denmark
www.ffe-ye.dk

The Danish Foundation for Entrepreneurship – Young Enterprise is the central national knowledge center and focal point for the development of entrepreneurship education at all educational levels. This takes place through activities which ensure that more pupils and students are introduced to an entrepreneurial mindset and that more training opportunities are created in cooperation with the country's educational institutions.

The vision is to strengthen Denmark's competitiveness by influencing the interest and competence in entrepreneurship, independence and innovation through efforts in the education sector.



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