



Introduction to

# Entrepreneurship from ABC to Ph.D.

Mapping of Entrepreneurship Education in Denmark



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 Denmark’s educational institutions.

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

## **The Danish Foundation for Entrepreneurship – Young Enterprise**

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## Entrepreneurship from ABC to Ph.D.

For the third year in a row the Danish Foundation for Entrepreneurship – Young Enterprise (FFE-YE) has mapped the spread of entrepreneurship education at all levels of the education system in terms of the number of courses offered and the number of pupils and students who participate in this education. The purpose is to examine whether a development is taking place, partly in view of the previous government's commitment to the area with the creation of a single organization to implement the strategy for the area at all educational levels.

The report may be downloaded at [www.ffe-ye.dk/videncenter](http://www.ffe-ye.dk/videncenter) and is published in a printed version which can be ordered through the website.

This commitment is based on the belief that through entrepreneurship education children and young people achieve competencies which give them better opportunities later in life to create growth for the benefit of the individual and of society; competencies such as the ability to create opportunities, competence to act, creativity etc. provide the young people with a basis for future employment as innovative employees and for creating their own job – in the long run perhaps even for creating jobs for others in their respective companies and thus generating growth in society.

The spread of entrepreneurship education to all levels of the education system, which this mapping documents, means that the entrepreneurship competencies of pupils and students are strengthened several times during their

schooling and education. An earlier analysis induced by FFE-YE has shown that this is very positive, because the more often students are taught entrepreneurship during their education, the greater the likelihood that they will start their own business and the higher the income they are likely to earn. This applies both to starting your own business and to being employed.

This analysis also examines the kind of entrepreneurship education implemented and the teaching methods used, which provides a good basis for measuring the effects of the teaching in the short term. It allows us to measure whether the competencies that teachers and instructors are trying to strengthen in their pupils and students are actually being strengthened. In the long term these are the skills which the young people use when they start their own business or when they act as innovative and entrepreneurial employees.

The Danish Foundation for Entrepreneurship – Young Enterprise has set up projects which examine the effects of entrepreneurship education at all levels of the education system. One of them is the Edison programme for pupils in the 6th and 7th grade, which examines the immediate effect for instance on different groups of pupils. One of the questions we seek to answer is whether there is a particularly beneficial effect on academically weak pupils. Another project is a longer term study of 9th graders where we follow a group of adolescents over a number of years. Here we look, among other things, at the attitudes and behaviour of the individual in relation to his or her aspirations, personal development, and choice of education. In the long run we will be able to measure the results in terms of new start-ups and income earned. The first results of this study show that pupils who participated in entrepreneurship education are happier about school, have higher ambitions for their further education and career, and feel they can contribute to society.





Foreign studies show that young people in upper secondary education (beginning at the end of full-time compulsory education) who participated in the Company Programme<sup>1</sup> (CP) are very likely to start their own business later on. This indicates that the programme has a special effect on the ability of young people to manage uncertainty. FFE-YE has begun a study of the Danish participants in CP, where we will therefore also examine which elements of the programme particularly influence and change young people's perception of barriers to starting their own business.

Moreover, a Ph.D. project is underway which studies the impact of the entrepreneurship education at university level on students' entrepreneurial self-efficacy (belief in own capabilities), intentions and behaviour. The project also studies which elements and methods of the teaching produce which effects in relation to the competencies of the students. In the long run we can measure whether the teaching results in more students starting their own business or using their skills as innovative employees.

The impact measuring surveys of FFE-YE are all longitudinal and the goal is to build databases which can answer the many different questions, in the short as well as in the long term. The impact measuring reports may be downloaded at [www.ffe-ye.dk/videncenter](http://www.ffe-ye.dk/videncenter).

The first results of the impact measurements show that entrepreneurship education has beneficial effects both for the individual and for society. It is therefore very positive that this year's mapping shows that the spread of entrepreneurship education is increasing, also in areas where there is no tradition for entrepreneurial thinking.

1. The Company Programme offers students aged 15 to 19 the opportunity to set up and run their own real company over the course of one academic year, with the support and guidance of a volunteer adviser from business, as well as their teacher.

## Mapping 2011/2012

The mapping shows the development at all educational levels in the number of courses and participating pupils and students as well as the areas in which entrepreneurship is mostly applied.

At the different educational institutions there are numerous initiatives which support entrepreneurship education, contribute to an entrepreneurial environment and development of entrepreneurial skills of the pupils and students. Some of these initiatives have been described and accounted for separately. At the basic school level (primary and lower secondary education) and in the upper secondary education these activities are generally part of the teaching and therefore included in this account. At the higher education level special activities are not included in the general quantitative account unless they are part of the proper formal teaching at the individual institution.

The data have been collected in different ways at the educational levels; for instance by means of a questionnaire survey among basic school teachers, by use of lektio.dk (website for student administration at the upper secondary education) and by direct contact to the educational institutions. In all cases we have sought to avoid that pupils and students are counted more than once, but since individual data are not accessible it cannot be completely ruled out that double counting may occur to a lesser extent.

The mapping covers the school year 2011/2012.

In this context, Entrepreneurship Education is defined from a broad understanding of entrepreneurship:

**Entrepreneurship is when you act upon opportunities and ideas and transform them into value for others. The value that is created can be financial, cultural, or social.**

Entrepreneurship Education is practice-oriented education which involves the surrounding community, supports creativity, and encourages initiative and action. The pupil/student is active in the learning process, which takes place by interacting with others, and the teacher acts as advisor and role model.

Entrepreneurship Education is in the broad sense about pupils and students receiving information and gaining knowledge about entrepreneurship and entrepreneurial thinking and developing their abilities to act in an entrepreneurial way.

The mapping is a quantitative account of the number of participants in entrepreneurship education at the different education segments. It provides an overview of the status at each area of education regarding teaching in entrepreneurship and shows the development over the last three years. It also clarifies which areas of education especially focus on entrepreneurship.





## Primary and Lower Secondary Education

The Danish basic school covers 0th (preschool class) – 10th grade and encompasses public schools, private and independent schools, and continuation schools with a total of 698,000 pupils.

In this mapping of the spread of entrepreneurship education in basic school in the school year 2011/2012 the analysis is based on the following:

- Teaching – A questionnaire survey among teachers
- FFE-YE competitions
- FFE-YE teaching
- Number of hand-outs and downloads of FFE-YE education materials
- Number of participants in NEIS (Network for Entrepreneurship and Innovation in School and educations)
- Entrepreneurship activities

The result of the mapping of the spread of entrepreneurship education in basic school in 2011/2012 is that 54,000 pupils participate in entrepreneurship education and special activities. This corresponds to 7.8% of the nearly 700,000 pupils in the Danish schools. So there has been an increase during the last three school years, as illustrated in figure 1.

### The proportion of basic school pupils participating in entrepreneurship education and entrepreneurship activities

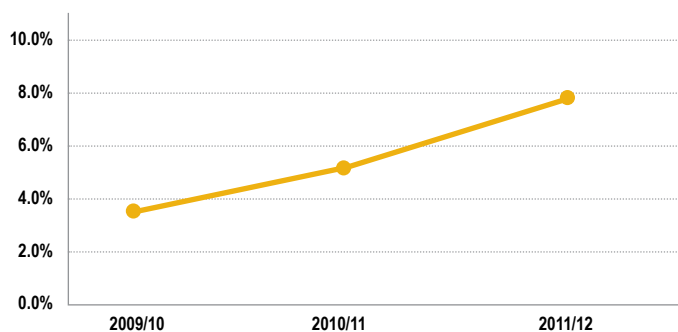


Figure 1

526 teachers participated in FFE-YE's survey in the school year 2011/2012. The completed questionnaires came from 183 schools; that is, approximately 8% of the country's schools participate in this study.

The analysis based on the teachers' responses shows that approximately half of the teachers teach entrepreneurship of some kind or another – we call it Entrepreneurship as Method. A fourth of these teachers, corresponding to 12 % of the participating teachers, are focusing on the classical form of entrepreneurship which involves teaching in finance and markets.

A general conclusion is that the teachers who teach Classic Entrepreneurship in comparison with the entrepreneurship teachers in general do not only have more focus on the idea of establishing a business and on financial understanding, but also on engaging the pupils in the learning process, involving the local environment, working interdisciplinary and working in the different phases of a project in the general school subjects. It is, however, not this form which seems to be the most common among the teachers, but more a form which uses methods as a basis for giving the pupils entrepreneurial competencies.

Teaching Classic Entrepreneurship is especially common in lower secondary school, 7th-9th grade, while teaching Entrepreneurship as Method is as common at the middle level as in lower secondary school. In general, it appears that the narrower the definition of entrepreneurship education, the higher the grade at which it is taught.

The result of the questionnaire survey is that 19,004 pupils are taught entrepreneurship. This corresponds to nearly 3% of all pupils in basic school. In 2010/2011 the result of the study was that 2% were taught entrepreneurship. The numbers are obtained on the basis of the teachers' answers concerning the grades they are teaching as well as the numbers for the school pupil population obtained from the Data bank of the Danish Ministry of Education.

At the other entrepreneurship areas included in the mapping of the basic school level there is also an increase in the number of pupils. It involves FFE-YE competitions, handed out teaching material from FFE-YE, FFE-YE education, teaching conducted by members of NEIS, as well as special entrepreneurship activities.



### The number of basic school pupils participating in entrepreneurship education and entrepreneurship activities

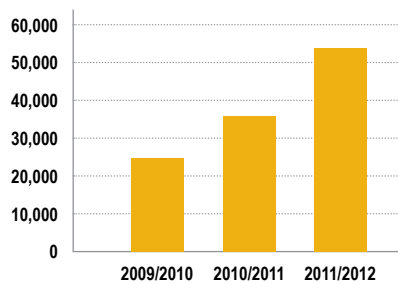


Figure 2

Entrepreneurship education is thus spreading in the Danish basic school. Over the last three school years the proportion of pupils in this kind of education/training has increased from 3.5% to 7.8% in 2011/2012. Unfortunately, still only a small part of the country's teachers have participated in the questionnaire survey, which is why the number of pupils is probably a minimum rather than the total.





## Upper secondary education

Upper secondary education in Denmark comprises the upper secondary schools the general upper secondary education (STX), the higher preparatory examination (HF), the higher commercial examination (HHX), the higher technical examination (HTX) and the vocational education and training programmes as well as the basic social and health training programmes etc. (EUD). A total of 258,500 students attend upper secondary education.

In this mapping of the spread of entrepreneurship education at the upper secondary education level in the school year 2011/2012 the analysis is based on the following:

- Teaching at the upper secondary schools and in the vocational educations
- The FFE-YE competitions Company Programme and Innovation & Design
- Number of hand-outs and downloads of FFE-YE teaching materials
- Entrepreneurship activities

The mapping starts by concentrating on the formal teaching and when it comes to the upper secondary education area the identification of subjects and modules with an entrepreneurship content has been based on curricula. It does not always appear from these which pedagogical method is used in teaching, and therefore it cannot be quantified.

In total, 72,011 students in upper secondary education participated in entrepreneurship education and special activities in 2011/2012. This number corresponds to 28% of all students in upper secondary education. Figure 3 shows the development over the last three school years.

### The proportion of students in entrepreneurship education and entrepreneurship activities

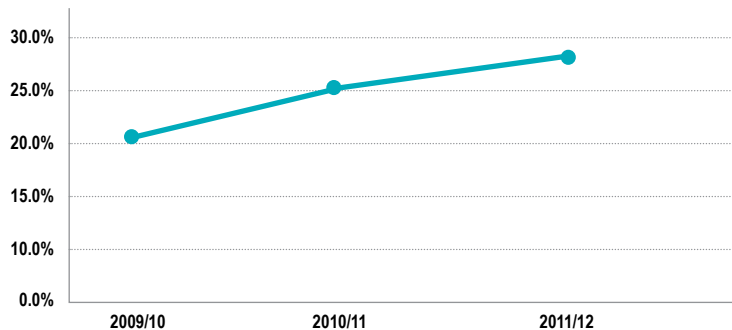


Figure 3

The mapping of the formal education at the upper secondary education level showed that 53,461 students corresponding to 21% of all students at the upper secondary education level participated in entrepreneurship subjects and modules in 2011/2012. This is a decent increase compared to the 17.6% in 2010/2011.

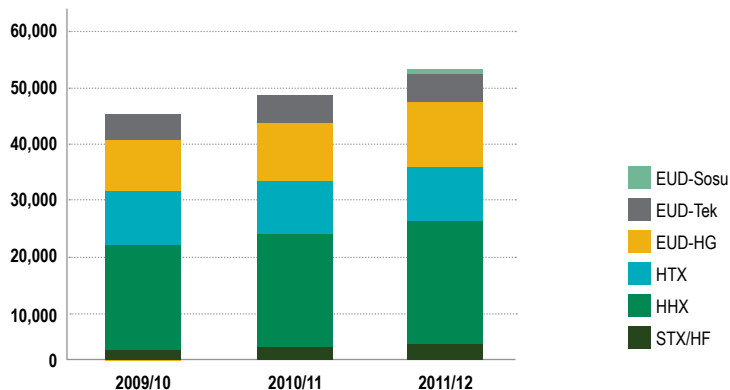
In the upper secondary schools HHX and HTX there are compulsory subjects, which include entrepreneurship, while in STX/HF elective subjects are offered. Since this mapping covers one single school year, however, not all (100%) students in HHX and HTX may be counted as participants in entrepreneurship subjects, because the subjects are compulsory only at some point during their three-year education. The calculation shows 84% participants in HHX and 80% in HTX. The detailed mapping of the different upper secondary schools showed that the interest is increasing at all three schools, since also the demand for the elective subjects in HHX and HTX is increasing. In STX/HF nearly 4% chose an entrepreneurship subject, while in HHX and HTX the numbers were 17.6% and 8.7%, respectively.

In total, 35,198 students in the upper secondary schools, corresponding to 27% of all 130,500 students in the Danish upper secondary schools, participated in entrepreneurship subjects.

At the vocational education level there was a total of 18,303 students from the three vocational courses EUD-Tek (technical line), EUD-HG (commercial line) and EUD-Sosu (social and health line) who participated in entrepreneurship subjects and modules. This corresponds to nearly 18% of all 128,000 EUD-students in 2011/2012. This is a considerable increase from the 12.8% in 2009/2010. For the first time, teaching in entrepreneurship is now also offered students in the EUD-Sosu area.

To sum up, there has been an increase in the number of students who participate in entrepreneurship education over the past three school years. The largest proportional increase is seen at EUD and in STX/HF. From 2009/2010 to 2011/2012 there has been an overall increase of 9,000 students at the upper secondary education level, corresponding to an increase of 20%.

### The number of students in entrepreneurship education at the upper secondary education level



Note: Includes formal teaching.

Figure 4

Participation in FFE-YE's competitions is included in the overall mapping. The number of participants in the Company Programme and Innovation & Design as a whole has grown significantly over the past years. The participants are mainly from the vocationally oriented upper secondary schools (HHX and HTX) as well as from the commercial vocational course (EUD-HG).

Many students are taught by means of materials from FFE-YE. In the school year 2011/2012 the number of hand-outs reached 3,616. It is now possible to download the materials from the FFE-YE website, which has probably contributed to the large increase over the past years, where the number has tripled.

All over the country students participate in special activities which increase their knowledge of and competencies in entrepreneurship. In this mapping we have registered the students' participation in regional projects, competitions, camps, Opfindertjenesten<sup>2</sup> and projects supported by FFE-YE. A total of 10,690 students participated in these activities in 2011/2012.

So we also see a spreading of entrepreneurship teaching and training at the upper secondary education level in 2011/2012. As a whole, 72,011 students at the upper secondary education level participate in entrepreneurship education and special activities, which corresponds to 28% of all students at this educational level (see figure 3).



2. Opfindertjenesten is financed by the Ministry of Science, Innovation and Higher Education and operated by the Centre for Ideas and Innovation at the Danish Technological Institute. It provides free courses for students from elementary school to university level on how ideas and inventions can be turned into value.



## Higher education

Higher education in Denmark comprises the short-cycle higher non-university programmes, the medium-cycle university and non-university programmes as well as the long-cycle university programmes. The educations are offered by 9 business academies, 11 university colleges, 11 maritime institutions, 11 art colleges<sup>3</sup> as well as 8 universities. A total of 236,000 young people are registered at these institutions.

In this mapping of the spread of entrepreneurship education at the higher education institutions in 2011/2012 the analysis is built on data about the following:

- Teaching at the Danish business academies, university colleges, maritime institutions, art colleges as well as universities
- FFE-YE competition: Start Up Programme
- Entrepreneurship activities – Number of participants in Venture Cup<sup>4</sup> and other competitions, camps, The Consultancy Services for Inventors, projects supported by FFE-YE as well as teaching activities in student incubators (number of participants is not included in the total account).

At the higher education institutions courses, subjects and modules have been identified by reviewing curricula, descriptions of courses and subjects as well as by direct contact with the institutions. At the universities a special model for categorizing the entrepreneurship courses is used.<sup>5</sup>

3. The Danish Design School, The Academy of Fine Arts School of Architecture and The Academy of Fine Arts School of Conservation have now merged under the name of The Royal Danish Academy of Fine Arts Schools of Architecture, Design and Conservation (KADK). In this mapping the division in three units is maintained in order to be able to compare the numbers with those of the earlier years.

4. Venture Cup is a business idea competition for students, graduates and faculty at Danish universities.

5. Developed by the Øresund Entrepreneurship Academy and since 2007 used for mapping the entrepreneurship education at Danish universities.

During the past three years from 2009/2010 to 2011/2012 entrepreneurship education has become more widespread at the higher education level. 22,719 students corresponding to 9.6% of all 236,000 students participated in entrepreneurship courses in 2011/2012.

### The total share of entrepreneurship students in higher education

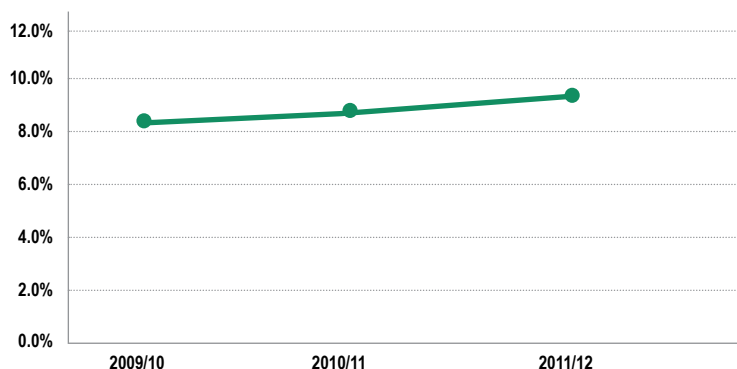


Figure 5

In 2011/2012 entrepreneurship education has spread to all 9 Danish business academies. The range of courses has increased from 53 to 96 in 2010/2011. A total of 4,324 students participated in entrepreneurship courses in 2011/2012, which is an increase by 31% from 2010/2011. The share of entrepreneurship students at the business academies has thus reached approximately 29%. The financial area is clearly dominant among entrepreneurship students in the educations offered at the Danish business academies.

In almost all 11 Danish university colleges there was an increase in the number of entrepreneurship courses in 2011/2012. We have registered 148 entrepreneurship courses in the academic year 2011/2012 with a total of 7,184 students. This corresponds to 11.5% of the approximately 62,000 students in the country's university colleges having completed an entrepreneurship course in the academic year 2011/2012. The number has increased by 83% over the past two academic years. In relation to educational areas more students (28%) in the design professional area participate in entrepreneurship courses. Then follows the pedagogical area (23%), where the entrepreneurship courses are offered to both student pedagogues and student teachers. Entrepreneurship is also getting more integrated in the health area (19%), where physiotherapy students and occupational therapy students alike now participate in entrepreneurship education.

At the maritime educations nearly a quarter of all students, that is 565, participated in entrepreneurship education in 2011/2012. Over the past three academic years this number has thus more than doubled.

In 2011/2012 29% of all students at the artistic and cultural educational institutions participated in one of the 22 entrepreneurship courses offered by the individual institutions, including the Career Workshop at the School of Architecture in Aarhus, or by CAKI (Center for Applied Artistic Innovation). So, clearly more students participate in specific entrepreneurship courses in the artistic and cultural educations in 2011/2012. In comparison 988 students, corresponding to 18.4%, did so in 2009/2010.



The mapping shows that 224 entrepreneurship courses were offered at the 8 Danish universities in 2011/2012 which is 2 courses less than in 2010/2011. In return, both the number of students in each course and the proportion of participating students among the total of university students has increased. In 2011/2012 a total of 9,181 students participated in entrepreneurship courses, corresponding to 6.4% of all university students in 2011/2012. In this context, it should be observed that the total number of enrolled students at the universities has increased by approximately 10,000 students in comparison with 2010 and comprises in 2011 about 144,000 students. Summer courses have increased in popularity. It is still during fall, however, that most students participate in entrepreneurship courses and where most courses are offered.

The vast majority of the entrepreneurship courses (71%) are offered at the social science studies. Then follow the technical sciences, natural sciences and the humanities. Less than 1% of the courses are offered at the health sciences.

The analysis shows that generally more men than women participate in entrepreneurship education at the Danish universities, so the distribution does not follow the general gender distribution among university students where women are in the majority. In the 2010/2011 mapping, for the first time, we looked at the gender distribution among participants in the entrepreneurship courses at the universities. The distribution was then 57% men and 43% women, while in 2011/2012 the numbers were 59% men and 41% women. The proportion of men has thus increased in 2011/2012. However, a comparison of two academic years does not provide a satisfactory basis for making any conclusions about the development of the gender distribution at the entrepreneurship courses; a longer period is necessary in order to detect a pattern.

In higher education FFE-YE offers the competition Start Up Programme to students at the business academies, university colleges, art colleges as well as the maritime institutions. The competitors are included in the account at the individual institutions. In 2011/2012 a total of 75 students from 7 institutions took part in the competition. This is a very considerable increase compared to 2010/2011, where 43 students participated in the Danish championship.

The below figure 6 shows the distribution of the 22,719 entrepreneurship students at the different segments of higher education. It is evident that most of them are found at the universities, although the number of entrepreneurship students at the university colleges has also grown significantly.

### The distribution of participants in entrepreneurship courses at the higher education level

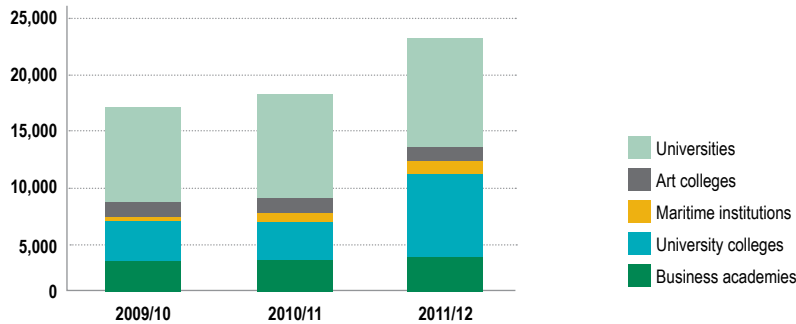


Figure 6

The range of studies offered by individual institutions in different segments and the nature of these studies, for instance how business-related they are or how practice-oriented they are, probably plays a role in relation to their offering of entrepreneurship education. In addition, one must consider culture and traditions and the institutions' openness to this relatively new education area. In general, entrepreneurship is fairly integrated in the range of courses offered at the commercial and technical studies. The analysis shows that entrepreneurship education is now also included in educational areas which do not seem immediately obvious, for instance the humanities, the nutrition and health area, occupational and physical therapy as well as the pedagogical educations.

Apart from the formal education offered by the educational institutions many activities and initiatives are started up to motivate students and strengthen their competencies within entrepreneurship. This year's mapping describes a number of activities under the heading 'Entrepreneurship activities'. Some of them are Venture Cup and other business idea competitions, innovation camps and student incubator arrangements. We know that a total of 13,500 students, coming from all the higher educations, have taken part in these activities. This number is not included in the number of participants for the higher educations, because the activities are extracurricular.

The proportion of students at the higher education institutions who have participated in entrepreneurship education is approaching 10% and has been growing over the past three academic years.





## Summary

The overall conclusion of this mapping which covers the school year 2011/2012 is that:

- Nearly 150,000 of the 1.2 million pupils and students in the Danish education system participated in entrepreneurship educational activities. This number corresponds to 12.5%.

### The proportion of pupils and students in entrepreneurship education and entrepreneurship activities

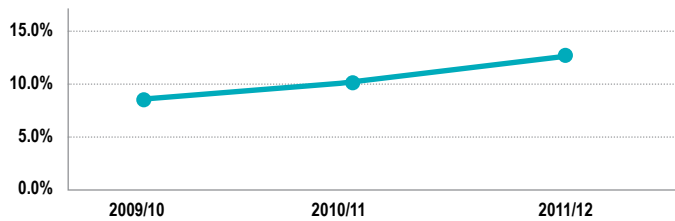
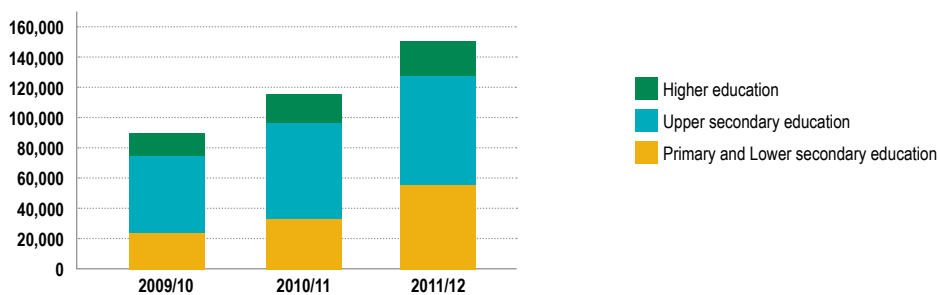


Figure 7

- 54,046 pupils corresponding to 7.7% of the nearly 700,000 pupils in primary and lower secondary education participated in entrepreneurship education and special activities.
- 72,011 students corresponding to 27.9% of the 258,500 students in upper secondary education participated in entrepreneurship education and special activities.
- 22,719 students corresponding to 9.6% of the 236,000 students in higher education participated in entrepreneurship education.

### The number of pupils and students in entrepreneurship education and entrepreneurship activities



Note: Please note that numbers for the higher education institutions only include formal education leading to ECTS-points.

Figure 8

