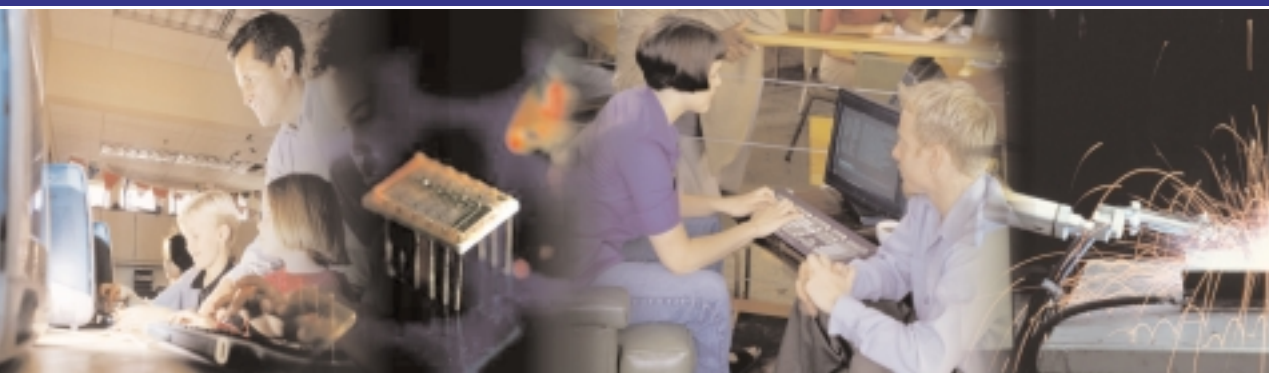


Innovation, Entrepreneurship and a Culture of Independence in the Danish Education System



Ministry of Science, Technology and Innovation
Ministry of Education
January 2004

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Abstract: In this report the Minister of Education and the
Minister of Science, Technology and Innovation introduce
a general strategy for developing and strengthening a culture of
entrepreneurship and innovation in the educational system.

The strategy takes into account the needs of different education
programmes. It spans from the primary and upper secondary schools' focus on developing personal qualities such as creativity, inventiveness and independent problem-solving skills, to the need for higher education courses in both practical skills (e.g. how to prepare business plans and accounts) and general subjects such as management, organization and marketing.

The strategy should function as a general framework for promoting innovation and entrepreneurship, and make it easier to coordinate the various educational programmes on offer.

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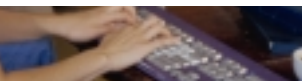
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Preface

Denmark must become part of the European elite in entrepreneurship. Enterprise and innovation are essential to maintaining and improving Denmark's position in the global market and the global community. To fulfil this aim, we need to further develop Denmark's culture of independence and entrepreneurship. The education system is central to this development.

The purpose of this strategy is to provide a coherent framework for the practical implementation of the government's aims. It is designed to form the basis of a stronger entrepreneurial culture by giving students on all educational levels more opportunities to learn about entrepreneurship.

A number of studies have shown that there is no lack of motivation or desire for change and innovation among young people in Denmark today. What young people lack are the necessary methodological and practical tools. Students must therefore be offered educational programmes that stimulate innovative ideas and drive and prepare them for starting their own companies.

Against this background we will strive to create practice-oriented partnerships between the education sector and the business community. The new education programmes will incorporate role models, more teachers, external examiners, lecturers and mentors with entrepreneurial backgrounds, thus giving students greater insight into the real world of entrepreneurship. In this way entrepreneurship will not simply become another academic subject, but a living, dynamic culture.

Ulla Tørnæs
Minister of Education

Helge Sander
Minister of Science,
Technology and Innovation

January 2004



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The government's action plans

As early as the summer of 2002 (*Bedre uddannelser, Handlingsplan* – Better Educations, Action Plan), the government highlighted innovation as one of the five central areas where greater efforts must be made to improve Danish education programmes so that they rank among the best in the world.

With the *Iværksætterhandlingsplan* (Entrepreneurship Plan) of January 2003 the government made it clear that the field of education occupies a central role in the efforts to make Denmark part of the European elite in entrepreneurship by 2010 – because it is in the educational system that the seeds of a strong culture of enterprise must be sown.

In the report *Et samfund med plads til det frie initiativ* (A Society with Room for Free Initiative) of October 2003, the government therefore presented a range of new measures to be implemented in the educational sector in order to create more opportunities for free initiative in Denmark. The first is the present general strategy, which will form the basis for carrying out the government's policy throughout the education sector in the areas covered by the Ministries of Education and Science.

The aim is to create a broad basis for innovation and entrepreneurship and to strengthen the students' motivation to work innovatively and with open attitudes towards starting their own businesses. This demands a farsighted effort, one which over time is to contribute to a new and more positive entrepreneurial culture among students in Denmark.

The strategy takes into account the needs of different education programmes. It spans from the primary and



upper secondary schools' focus on developing personal qualities such as creativity, inventiveness and independent problem-solving skills, to the need for higher education courses in both practical skills (e.g. how to prepare business plans and accounts) and general subjects such as management, organization and marketing.

The strategy should function as a general framework for promoting innovation and entrepreneurship, and make it easier to coordinate the various education programmes on offer.

The planned academy of entrepreneurship will be central in promoting and providing training in innovation and entrepreneurship in higher education.



Analyses and recommendations

An assessment that was presented in the *Global Entrepreneurship Monitor's* annual report on Denmark in 2001 stresses that although the Danish educational system teaches students to think independently, it does not succeed in converting this independence into commercial drive.

In November 2002 an expert group working for the European Commission published a report entitled 'BEST Procedure Project on "Education and Training for Entrepreneurship"'. In it the group stated that frameworks should be set out for training in entrepreneurship on the national (or regional) level, to make it possible to develop specific initiatives, set out long-term perspectives, create sustainability and thus have real effects. The current measures should be integrated into a comprehensive strategy for promoting a culture of entrepreneurship. Programmes and courses should be made available to students on all educational levels and in all subjects.

The report *Opplæring i entreprenørskab. Omfang, kvalitet og nasjonale forskjeller. En nordisk kartlegging, 2002* (Training in entrepreneurship. Range, quality and national differences. A Nordic survey, 2002), prepared by Nordland Research Institute for the Nordic Council of Ministers, describes three areas where the educational sector can systematize its efforts:

- 1) student companies, where children and young people establish true-to-life companies that produce and sell products (though only to a limited extent in primary and lower secondary schools);
- 2) educational activities related to employment and business;
- 3) motivational activities such as project work and experience-based learning.



A consultancy analysis prepared for the Ministry of Education in August 2003 entitled *Bedre uddannelser: Øget innovation og økonomisk vækst. Status og perspektiver* (Better Educations: Promoting innovation and economic growth – Status and perspectives) presented a new view of the entrepreneur's situation. While in previous models the entrepreneur was associated with traditional business methods, this analysis presents a concept of innovation as a collective process taking place in new creative ways of doing business. This raises new expectations for the education system's ability to develop the professional, social and personal competences which will motivate and prepare students for a future as entrepreneurs or intra-preneurs. Apart from offering professional qualifications, the education programmes must strengthen the individual's competences, motivation and drive.

Thus it is the government's ambition to:

- ensure that students develop the professional competences they need to take part in a society that is continuously changing. A high degree of professionalism is often the first prerequisite for realizing the dream of becoming an entrepreneur,
- support students in developing initiative, independence, drive and willingness to take risks,
- communicate knowledge about business, innovation and entrepreneurship through the education programmes.



The implementation strategy

The present implementation plan is the Minister of Education's and the Minister of Science's common strategy for a coherent carrying out of the government's action plans. It is intended to provide a link between the overall aims and the concrete initiatives.

The aim is that, throughout the students' educations, they will be offered an unbroken chain of educational opportunities that, seen as a whole, will strengthen the students' innovation, deepen their understanding of the business world and give them professional qualifications that will help them establish and operate independent companies.

The efforts to foster a culture of entrepreneurship in the education sector will be aimed at producing long-term effects, using resources that will be linked to the government's education schemes in various ways and to varying degrees. The resources and degree of responsibility will vary and will be adapted to the educational levels and the aims of individual programmes. Broadly speaking, the higher the educational level, the greater the degree of practical applicability and responsibility.

The implementation will be fourfold. It will involve, firstly, a general effort to strengthen the culture of entrepreneurship; secondly, a targeted development and dissemination of teaching and learning methods to strengthen students' innovative competences; thirdly, central support for targeted training in the skills that are necessary for starting and operating one's own company; and finally, a continued development of the higher education programmes' function as regional generators of growth and development.

The implementation will reflect the progression in the level of skills and qualifications students need to acquire in the course of their education. Thus the aim in primary and



lower secondary schools is that students develop competences such as creativity, initiative and inventiveness, while the overall aim for the higher education programmes is that students acquire knowledge of and competences in innovative processes, curricular synergy, innovation management, commercialization, etc.

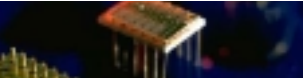
The entrepreneurship policy must therefore be anchored in the specific skills and pedagogic methods of the different academic disciplines. Teachers are to build up their skills through developmental work, practical experience, research, etc. They must also be provided with ongoing training in innovative teaching and learning methods.

One of the five principles the government is promoting as a foundation for the road to a society with room for free initiative is that the educational system must become more open to the outside world ('The Open School'). Depending on the programmes' different goals and levels, the aim is to increase the institutions' links with the business community, for example through partnerships with private companies. This continuing series of partnerships between educational institutions and businesses is an essential link in the 'Enterprise Chain' (see Appendix).

As an alternative to direct contact with businesses and as means of learning about the business community, students should also be given opportunities to take part in business competitions, business games or other ways of simulating business operation in education programmes.

Education programmes are planned, developed and renewed in schools and institutions. There must be room for new ideas, initiatives and collaborations. The central coordination's main focus should therefore be to create the right framework and incentives for the educational institutions to collaborate with private organizations and companies in promoting innovation and entrepreneurship.

This strategy sets out a framework for a strong, wide-ranging and coordinated effort to promote a culture of innovation and entrepreneurship in the educational system.



Concrete initiatives

Primary and lower secondary schools

Primary and lower secondary schools will focus on developing fundamental personal competences in students, such as the desire and ability to investigate, experiment and invent, and producing things in groups. They will also focus on bringing schools into contact with the business community, including innovative environments in large and small businesses.

- *“Science and entrepreneurship” (formerly ‘Technology pilots in schools’)*. Educating science teachers to focus on inventiveness and product development.

- *Open Schools*. Wide-ranging initiatives to motivate schools to include role models in the teaching, e.g. parents and graduates. Also introduction of award for ‘Entrepreneurial School of the Year’.

- *Development of educational material*, including an internet-based entrepreneurship simulator. The simulator is to teach students about business plans, product development, negotiating with investors, and so on, in a simulated reality.

- *Education and continuing education of teachers*. See below under **Short- and medium-cycle higher education**.

- *Primary and lower secondary school tests* must not be limiting, but in so far as possible promote experimental, innovative and practical ways of working that engage the basic personal competences mentioned above. This initiative is part of the development programme ‘Dynamic Schools’.



Upper secondary school programmes

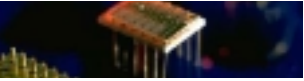
The focus of the upper secondary school programmes will be to provide students with methodological competences in innovative and interdisciplinary processes. Here the implementation will be planned in connection with the reform of the upper secondary school programmes, and will focus on the following: interaction between academic disciplines, strengthening of academic skills, developing new models for process evaluations and tests and creating optional subjects common to all four education programmes.

- *Carrying out the upper secondary school reform.* The new rules state that innovation and entrepreneurship must be included in each of the four upper secondary school programmes, in order to develop the students' creative and innovative skills and critical faculties.

- *Optional subject: 'Innovation'.* The planned optional 'Innovation' subject is designed to promote initiative, independence and creativity and teach students the methods and theories of business, innovation and entrepreneurship.

- *Young Enterprise and European Business Game.* In addition to the standard education the students can take part in company competitions and other activities. For example, Economics and the optional 'Innovation' subject may involve planning and creating student companies and projects carried out in partnership with businesses.

- *Ready to Start.* A project that offers schools a theme day with a multimedia show. The purpose is to advise and prepare young people for the labour market of the future and thus strengthen their understanding of and motivation for starting independent businesses. Schools, students and teachers must take an active role in planning the event.



Business and vocational programmes

The vocational programmes for young people are often targeted at professions and crafts with entrepreneurial traditions. There is a genuine interaction between the programmes and the business community, and the students are in close contact with the business community throughout their courses. The vocational training courses typically combine teaching (c. 1/3) with practical work experience (c. 2/3).

- *Revision of the core subject 'Business and Innovation'*. Entrepreneurship and innovation will become the core competences for this subject. The students' competence development will be tailored to the individual educational programmes.

- *Inspiration seminar* in 2004 for teachers and managers, aimed at establishing networks and focusing attention on innovation and entrepreneurship in the education programmes.

- Entrepreneurship and innovation will be *one of the focus areas of the 2004 Experiment and Development Programme*. Among other things the schools can apply for funding to achieve relevant pedagogic and academic aims and to develop optional local subjects that will teach students about innovation and about how to establish an independent company.



Short- and medium-cycle higher education, (KVVU and MVU), higher adult education (VVU) and diploma courses

Short- and medium-cycle higher education programmes are business- and vocation-oriented, and the implementation in this area will focus on strengthening the interaction with the business community and developing the students' innovative and entrepreneurial skills. The students are to work on practical problems in real companies and thereby gain greater insight into innovation and business management. Business academies and centres for higher education are to function as regional generators of growth and development, and generate a culture of innovation and entrepreneurship in the education programmes. The institutions must function as innovative learning environments where students and teachers take part in development projects in close collaboration with trades, businesses and other promoters of trade and industry.

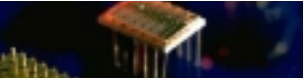
- The education programmes are to set out *competence targets* for innovation and entrepreneurship.

- *Solution Camps (formerly Real Problem-Solving Camp)*. A pilot project where students in the fields of Economics, Design and Engineering will collaborate on developing solutions to real problems set by Danish companies.

- *Pedagogic development project on methods of innovation*. Development project based in centres for higher education and aimed at improving teachers' abilities to integrate the subjects of innovation and entrepreneurship into their daily teaching.

- *Knowledge centres*. Centres aimed at strengthening the role of education institutions in promoting innovation. Establishment of knowledge centres in the business academies, centres for higher education and other medium-cycle higher education institutions in order to enable a quick and effective conversion of knowledge and research into innovative business initiatives.

- *Catalogue of ideas* on education programmes and development initiatives related to innovation and entrepreneurship.



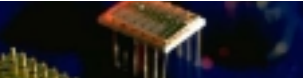
Long-cycle higher education programmes (LVU), PhD and Masters programmes

Efforts to strengthen the spirit of innovation and entrepreneurship in university education should focus on making commercial use of academic knowledge. Apart from basic entrepreneurial skills, this requires concrete knowledge of patenting and licensing laws, innovation management, organizational transformation, and more. Understanding entrepreneurship, intrapreneurship and innovation should also be part of these programmes. The implementation should be aimed at improving the universities' framework for developing a culture of entrepreneurship and opportunities for commercialization.

- Making it possible for *universities to establish their own enterprises* to handle activities related to commercialization and technology transfer.

- Consideration of whether the Employment Consolidation Act puts sufficient emphasis on *taking entrepreneurial skills into account when recruiting teachers*.

- An annual *Entrepreneurship Barometer* that measures the entrepreneurial culture among university students and awards the 'Entrepreneurial University of the Year'. An experimental programme related to intrapreneurship at the University of Southern Denmark in collaboration with local businesses, offered to students at several education institutions. Investigation of possibilities for developing an education programme about the culture and entertainment economy with a focus on entrepreneurship and innovation.



Cross-sector initiatives

- *An academy of entrepreneurship.* The academy will be based on a collaboration between several higher education institutions. It will function as a central institution for pedagogical development, research and training in innovation and entrepreneurship.

- *Improved guidance in entrepreneurship and business.* After the guidance reform, youth guidance must among other things provide information about opportunities for self-employment. Guidance counsellors are trained to focus on helping young people understand the labour market. At the university level the aim is to create better frameworks for intensifying individual academic supervision and making students aware of their entrepreneurial opportunities.

- *An Entrepreneurship Portal for the education sector.* This website will offer examples of implementing innovation and entrepreneurship in the education sector, educational tools, tools for forming partnerships and collaborations with companies, information on establishing companies, and more.

- *Enterprise Foundation.* A foundation will be established with the aim of supporting the development of a strong Danish entrepreneurial culture. Using both public and private resources, the foundation will support general initiatives that will make self-employment more prestigious, as well as initiatives linked to the education system that will heighten students' interest in becoming entrepreneurs. The foundation's Board will consist of representatives from both the business community and the education sector.



Publishing the implementation strategy

The purpose of publishing this strategy is to make public the general goals for the implementation of innovation and entrepreneurship, and thus contribute to building a bridge between the various – often local – initiatives.

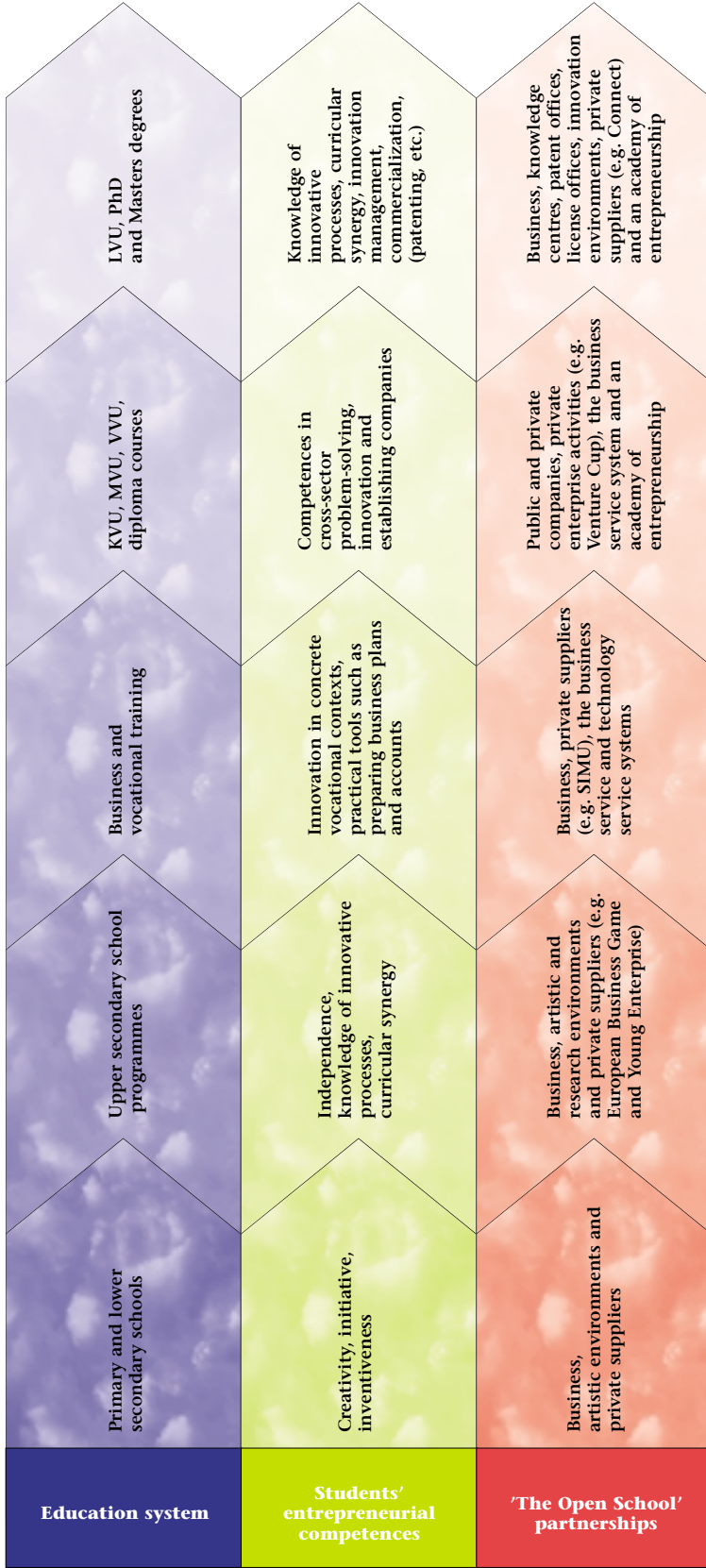
It is therefore important that the strategy is disseminated among teachers, managers and schools and educational institutions, including their owners and managers. Other relevant target groups are business people, entrepreneurs and opinion formers with interests in this area.

In the first phase the strategy will be published on the Ministries' websites (www.vtu.dk and www.uvm.dk), with links to the entrepreneurship portal at www.emu.dk.

The next phase will be to consider how to ensure that the strategy and the list of initiatives stay dynamic, and how to implement them in the education sector.

The Entrepreneurship Chain:

A strategy for implementing entrepreneurship in the education system



The Enterprise Chain represents the government's commitment to help students acquire competences and skills related to entrepreneurship and innovation, for example through partnerships.

The Enterprise Chain can be read both vertically and horizontally. It consists of three chains with five links each. The main chain is the top blue one, which shows the education system's five links. The middle green chain shows the competences and skills students are to acquire on the various education levels. The bottom red chain shows some examples of the kinds of partnerships education institutions can form with other organizations, with a view to giving students the skills and competences they need.

In this report the Minister of Education and the Minister of Science, Technology and Innovation introduce a general strategy for developing and strengthening a culture of entrepreneurship and innovation in the educational system.

The strategy takes into account the needs of different education programmes. It spans from the primary and upper secondary schools' focus on developing personal qualities such as creativity, inventiveness and independent problem-solving skills, to the need for higher education courses in both practical skills (e.g. how to prepare business plans and accounts) and general subjects such as management, organization and marketing.

The strategy should function as a general framework for promoting innovation and entrepreneurship, and make it easier to coordinate the various educational programmes on offer.