
Competent to innovate?

Conference on **Learning, Innovation and the Use of Information**, Aalborg University Library, 1-2 April 2008

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Innovation: Dayton, Ohio



Innovation: Alang Beach



The Bridge & fore-part of the Island, part of the flight deck and cable deck have been removed

Innovation: Germany



Themes

- Concepts and modes of innovation
- Innovative competence
- Education for innovation

Key messages

The concept of innovation should not be used indiscriminately

Innovation draws and should draw on:

- Science and technology as well as on experience and learning
- Formal education as well as competence building in workplaces

The competence to innovate includes:

- Transfer and combination skills
- Balanced autonomy
- Focusing ability and discipline

At present education and training seems to contribute little to innovative competence

It is possible to improve the contribution of education and training to innovation through reform of curricula and pedagogy

Concepts and modes of innovation

Concepts of innovation

Innovation is:

- A creative idea that is realized (F. Johansson)
- Change that creates a new dimension of performance (P. Drucker)
- The process of translating new ideas into tangible societal impact (K. Holly)
- When a firm develops a new production process, a new product or a new service and introduces it into the market or into production (B. Lundvall)

Concepts and modes of innovation

Related concepts

What distinguishes innovation from

- change?
- invention?
- creativity?
- learning?
- entrepreneurship?

Drivers of innovation

- Producers
- Users
- Multiple actors at different levels

Concepts and modes of innovation

Systems and processes

Systems of innovation

- If we focus on the firm as center of the system of innovation, the external context of the firm is defined by institutions and organizations such as other private firms, universities, government agencies, financial institutions etc. In the same way the internal context are defined by the firm's institutions and organizational elements that are important for learning and promoting product and process innovation (P. Nielsen 2007)

Modes of innovation

- Innovation based on science and technology (STI)
- Innovation based on experience and interaction (DUI)

Concepts and modes of innovation

Employee education and competence

as contribution to innovation

Nielsen's analysis:

- New products or services on the market as materialisations of the firm's collective and dynamic ability to learn and generate knowledge
- The most innovative firms have the lowest job turnover. Innovation related to personnel policies of keeping knowledge resource and learning competences
- Firms with learning organization features have much higher chance of product innovation
- Firms learning organization features hired the largest proportion of higher educated
- Firms with high extensity of vocational training also give high priority to competence development. There is a positive relation between these two parts of innovative learning.
- The flows of unskilled employees in an out are lowest in the firms with high extensity of training, where unskilled often are included in the training activities

Innovative competence

Innovative competence in individuals

Danish "Competence audit" 2005

- Identification and definition of 10 key competences, including "Creative and innovative competence"
- National survey, representative sample of individuals

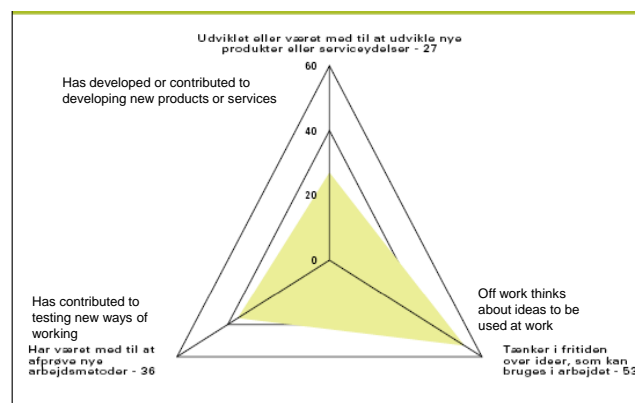
Definition: Creative and innovative competence is the capacity of a person, given the resources and the situation allows it, to effect visible innovation in a domain of knowledge and practise

Components:

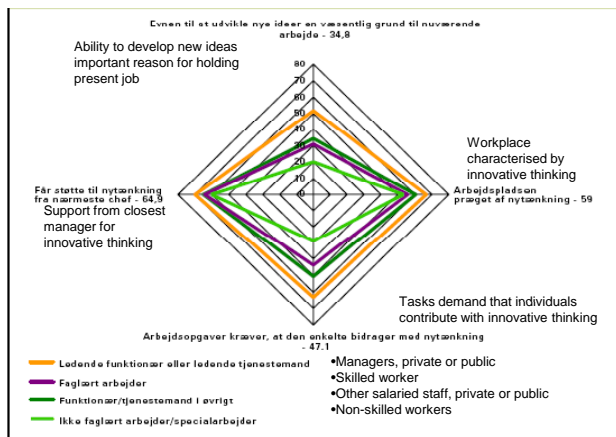
- Transfer and combination skills
- Balanced autonomy
- Focusing ability and discipline

Innovative competence

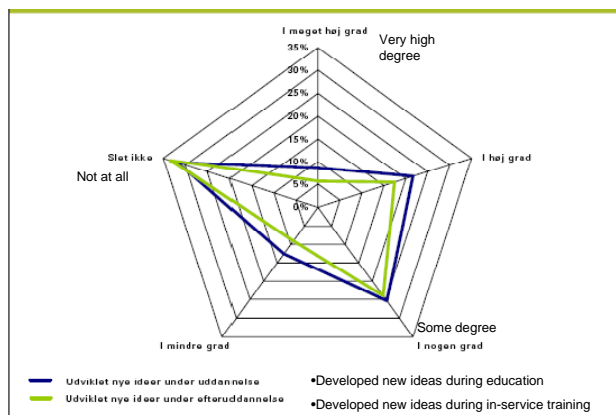
Index of creative and innovative action in the workplace



Innovative competence
 Frameworks for innovative thinking
 in different jobs



Innovative competence
 Learning to develop new ideas through education or in-service training?



Innovative competence

Patterns of innovative competence in Denmark

- In general the highly educated are more creative and innovative than persons with lower levels of education.
- The highly educated employees with long working hours and management responsibility represent Denmark's most creative and innovative group: the intrapreneurs.
- A certain level of experience in the company and the job enhances creativity, but too long time in the same job hampers creativity.
- Independent businesspersons are creative, but not very much so.
- Many Danes planning to start on their own are people with a low level of education reporting few innovative skills
- The contact to research institutions is very limited, especially for persons in private business.
- There is an uneven distribution of innovative competence in different trades; but average level in public sector is not lower than in the private sector
- Most Danes think that they work in innovative workplaces, but their own jobs do not to the same extent demand innovative thinking. This applies especially to unskilled workers.
- Skills and tools for innovations are only to a very limited degree acquired through education and in-service training.

Education for innovation

Example 1: Workplace-directed teaching in general adult education

The context

- The system of general adult education in Denmark: "Second chance", school-based curriculum
- Adult education as individual pursuit of knowledge or career
- Increasing demands on general competencies in SMEs

The programme

- Courses for groups of employees from a workplace, sometimes given in the workplace
- Curriculum in modules, adapted to company and employee group
- Exams optional

The perspective:

- In-service education that can provide general skills but also lead to further education
- Competencies that allow low-skilled employees to participate in organisational learning and innovation

Education for innovation

Example 2: Project-organised study in higher education

The educational model of the Danish “reform” universities:

- Problem based study: Within a curricular framework based on scientific or professional fields students choose and formulate problems
- Project organised study: The students work on the problems making use of existing sources, methods and theories. This work is documented in a report and becomes the basis for oral examinations at the end of term.
- Cooperative study: Students are generally expected to work in groups, but individual study is accepted. Groups meet and work in the university, and rooms for project groups are provided.
- Balance between project work and course work
- The teacher role involves guiding students in the processes of problem analysis and investigation as well as assessing and grading the results through the examination

Education for innovation

A curriculum for creativity

What would a curriculum based on the need for creative application of knowledge look like?

- Learning would be structured mainly through **projects**. Some projects would be individual, while many would be group-based.
- Students would repeatedly practice **identifying and solving problems**.
- Learning would take place in a **range of contexts** and use a range of methods.
- Knowledge and learning gains would be **assessed from different perspectives** – including that of the learner.
- **Thinking and self-assessment** would be embedded across the curriculum.
- Skills would be **revisited and practiced over time**, so that knowledge gained earlier in an educational career could be applied creatively to new problems.
- Students would gain **depth of understanding in a number of disciplines**, or domains of knowledge, including traditional academic subjects.

(Selzer & Bentley pp. 81-82)

Innovation as rhetoric and practise

The current discourse of innovation as a cure for everything

Two types of resistance to innovation:

- from powerful traditionalists in education and business
- from people with relatively low levels of education and who fear for their working conditions and jobs

The risks of innovation:

- In the workplace: Stress, burn-out
- In society: New types of inequality

The need for balanced strategies of innovation

- In business and society
- In education

Key messages

The concept of innovation should not be used indiscriminately – the character of and conditions for innovation processes should be highlighted.

Innovation draws and should draw on:

- Science and technology as well as on experience and learning
- Formal education as well as competence building in workplaces

So policies promoting innovation (in economic policy as well as in educational policy) should use a balanced mix of instruments and involve actors at many levels.

The competence to innovate includes:

- Transfer and combination skills
- Balanced autonomy
- Focusing ability and discipline

Such skills should be promoted in all areas of education and training, but also in work organisations and civil society

- At present education and training seems to contribute little innovative competence
- It is possible to improve the contribution of education and training to innovation through reform of curricula and pedagogy

Examples of and principles for this are mentioned above; but the specific conditions and resources of national and regional contexts should be taken into account.