THE CONTRIBUTION OF HIGHER EDUCATION AND VOCATIONAL EDUCATION TO INNOVATION AND INCLUSIVE DEVELOPMENT

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Features of higher education and vocational education

Higher education

- Long-cycle (master)
- Medium and short-cycle

- Mostly run by universities
- Connected (through departments and academics) to research

Vocational education

- Medium and short-cycle
- Secondary

- Mostly run by specialized vocational colleges
- Links to business and policy stakeholders

Differences in higher education

Balance between education and research

- Research universities with major share of (public and private) research funds, less focus on teaching
- Mass universities with main obligations and resources in teaching
- (also smaller specialized teaching universities)

Relations between teaching and research

- Transmission of disciplinary knowledge
- Involving students in research-like activities

More differences in higher education

Types of relation to society and business

- Inward-focused academic autonomy
- Delivering the wanted skills (but keeping the distance)
- Collaboration and dialogue with many types of stakeholders

Sources of funding

- Public funds (for teaching and research)
- Student tuition
- Research grants from public agences and/or business
- Donations

Tensions in higher education

- Research as production of new important knowledge vs. research productivity as an arena for competition between groups, institutions, nations
- Interaction between university and society: New public management (higher education as business) versus academic autonomy versus service to society
- Improving the quality of broad segments of higher education vs. achieving world class for selected institutions
- Providing higher education for a much larger share of generation vs. experiencing limited demand and graduate unemployment

Differences in vocational education

Schooling and practical training: Different types
- Practical training, little formalized
- General and practical teaching in vocational schools
- Combination of formalized practical training and teaching in schools (sandwich system)

Types of institutionalization in educational systems
- Independent vocational schools (with 'academic' schools as alternative choice)
- Comprehensive schools with academic and vocational streams

Challenges in vocational education

Recruiting

- Vocational education demands a combination of theoretical and practical skills but often finds it difficult to attract students with motivation for the more general subjects

Providing quality practical training

- School-based systems tend to provide too little practical training

- Non-formalized practical training often lack quality

- Sandwich programmes may have high quality if firms (a) provide placements, (b) live up to guidelines

- Firms often do not use their full capacity for training because they focus on short-term economic gains

Innovation and innovation systems

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

These two modes may interact in different ways.

Systems of innovation
- If we focus on the firm as centre 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 (Nielsen 2006)

- The same applies for innovation in other types of organization (like public services and voluntary associations)

Inclusive development

- Inclusive development is a process of structural change which gives voice and power to the concerns and aspirations of otherwise excluded groups. It redistributes the incomes generated in both the formal and informal sectors in favour of these groups, and it allows them to shape the future of society in interaction with other stakeholder groups (Johnson & Andersen 2012).

- and innovation

- Incorporating the perspective of inclusive development in all phases of innovation processes
- Identifying needs of and opportunities for the disadvantaged
- Engaging in social innovation as well as business innovation
- Accept that innovations will sometimes produce inequality, but are still needed

Education and innovation

- Training students to identify and voice needs and engage in interactive learning on how to develop relevant responses
- Involving students in research-like activities
- Engaging education in collaboration and dialogue with many types of stakeholders
- Providing quality practical training in firms and other types of organizations and using it to develop innovation capacity (Lundvall, Rasmussen & Lorenz 2008)
- Making authority relations in education flexible so that students can develop self-reliance and collaborative competence

Innovative competence

Definition of creative and innovative competence developed for Danish "Competence audit" 2005 (Rasmussen 2012) :

- *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 of creative and innovative competence :

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

A curriculum for innovative competence

What would a curriculum based on the need for innovative 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 1999)

An example: Problem Based Learning

The educational model of the Danish "reform" universities (Kolmos et al 2007) :

- Problem based study: Within a curricular framework based on scientific or professional fields students identify problems

- Project organized study: The students work on the problems making use of existing sources, methods and theories. The 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.

- 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

An example of a PBL project

- Group of 3 students in master programme on 'Learning and innovative change'
- 3-month project
- Testing the approach 'appreciative enquiry'
- Working conditions in a local post office
- Interviews and workshop with employees
- Analysis and suggestions for improvement
- Concluding meeting with employees
- Group exam

Learning spaces

Learning spaces are focal points in innovation systems where

- earning capabilities and learning opportunities coexist in a specific context
- actions are motivated by the 'effective demand' for a solution to a specific problem or challenge

Communities of practice (Wenger 1998) – *and* of innovation

Educational institutions and programs can involve themselves and their students in such learning spaces, contributing to innovation and at the same time acquiring relevant competencies

Because they depend less on profitability, the work of students may sometimes a crucial element in learning spaces

Policy elements

- Laying down principles of inclusive development (redistribution, voice) *and* implementing these at sector and institution levels

- Maximizing (through incentives and legislation) the capacities for learning and training in companies, public institutions and other organizations

- Being ready to stimulate the demand for higher and vocational education

- Developing and maintaining balanced conditions (for instance between research and education, between autonomy and accountability) for educational institutions

Conclusion

Well educated and confident graduates with competencies to engage in innovation is the main contribution of higher education and vocational education to inclusive development.

In order to educate such graduates educational institutions must involve their students (*and* teachers) in the same types of learning spaces and innovative activities that they are being educated for.

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