



ENTREPRENEURSHIP EDUCATION IN FINNISH POLYTECHNICS

Public private co-operation or business to business relationships?

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Abstract: Finnish higher education is mainly a public enterprise. All universities are State institutions, and they are primarily financed from public funds. Polytechnics (AMKs) are mainly maintained by municipalities or federations of municipalities. The costs of the polytechnics are shared by both the State and the local authorities. Like elsewhere in Europe, however, the share of private or semiprivate funding is constantly increasing, bringing the market forces ever more closer to the daily operations of higher education.

In the legislation, the State has entrusted Finnish AMKs with a special mission of building co-operation with local enterprises in order to promote employability, entrepreneurship and innovation. In this presentation we analyse the different models of entrepreneurship education used in the Finnish AMKs, and the various modes of co-operation between educational institutions and private enterprises, particularly SMEs. Specific focus is on business incubators, and the various problems occurring in far-reaching public-private co-operation.

Our presentation draws on an ongoing project titled 'Entrepreneurship education in polytechnics' financed by the Finnish Ministry of Education. The data consists of official documents on the models and missions of entrepreneurship training, student surveys, and interviews among teachers and AMK personnel.

Introduction

Europe needs to foster entrepreneurial drive more effectively. It needs more new and thriving firms willing to reap the benefits of market opening and to embark on creative or innovative ventures for commercial exploitation on a larger scale.

(European Commission 2003)

To open a business, very easy. To keep it open, very difficult

(Chinese proverb)

Finnish higher education is mainly a public enterprise. All universities are State institutions, and they are primarily financed from public funds. Polytechnics (AMKs) are mainly maintained by municipalities or federations of municipalities. The costs of the polytechnics are shared by both the State and the local authorities.

Like elsewhere in Europe, however, the share of private or semiprivate funding is constantly increasing, bringing the market forces ever more closer to the daily operations of higher education (e.g. Williams 1997). The main driving force behind this shift in State policies and responsibilities can be traced to the massification of higher education, which has brought about various forms of differentiation and diversification but could not be strained (Neave 2002a, 26). Although governmental illusions about education are now as all-embracing as they ever were, in the global era of mass higher education systems governments seem to lack both the will and capacity to pay (Neave 2002b, 196).

In addition to the effects of the diversified funding base (see Clark 2003), private concerns and problems penetrate public higher education in many ways. Our attention will be on the phenomenon of 'entrepreneurship education'. The new knowledge-based economy needs a dynamic enterprise culture and policy, and the leading role in this undertaking is reserved to education. In addition, traditional and new ways of co-operation are called for (European Commission 1995; cf. Fredrikson 2003). "General knowledge about business and entrepreneurship needs to be taught right through primary, secondary and tertiary education" (European Commission 2000a).

In the processes of globalisation the Nation State has lost its regulative powers and multinational corporations have increased their power and influence. The boundaries between public and private have become blurred (Bourdieu 1998; Ehrenberg 1998), or the public sphere has even been colonised by the private (Bauman 2000). As pointed out in the recent OECD (2003) evaluation on polytechnic education in Finland, under the ‘corporate-pluralist’ steering system, in addition to the State various other actors, including representatives of working life, participate in the competition for power in the higher education field characterised by a “multitude of markets” (Jongbloed 2003, 111).

In the legislation, the State has entrusted Finnish AMKs with a special mission of building co-operation with local enterprises in order to promote employability, entrepreneurship and innovation. In this presentation we analyse the different models of entrepreneurship education used in the Finnish AMKs, and the various modes of co-operation between educational institutions and private enterprises, particularly SMEs. Specific focus is on business incubators, and the various problems occurring in far-reaching public-private co-operation. We will not, however, restrict our analysis to the issue of ‘best’ ways of cooperating, but extend it to the underlying question of how to train or teach entrepreneurship (Armstrong 2001). The effectiveness of entrepreneurship education has been questioned especially as concerns the realm of higher education (Ahola & Silvennoinen 1999).

The broader context of increased public-private co-operation in higher education can be traced to the highly ITC-intensive way of building the information society or the ‘Europe of Knowledge’, and the accompanying technocratic politics emphasising networking in all possible directions. The emerging network economy requires new efficient, flexible and entrepreneurial modes of action. Also institutions of higher education seek new opportunities for alliances on the one hand and, on the other, enter the competition for new resources, as well as for prestige and honour in the “stakeholder society” (Neave 2002a, 33).

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Co-operation, triple helix and the ‘third mission’

One unsatisfactory element in the European system has been that the linkages between university and industry, research and business world are not strong enough (e.g. European Commission 2000b). The information society, however, also means that boundaries between public and private, science and technology, university and industry are blurring as the distribution of research locations becomes a key factor of economic growth in a knowledge-based economy. Knowledge has become in growing extent a potential product that can be exploited on the market, which means the industrialisation of the production of scientific knowledge (e.g. Jacob 1997; Ziman 1994).

Institutions of higher education (HEI) and firms are in growing extent assuming each others tasks, and, as HEIs cross traditional boundaries in developing new linkages to industry, they have to devise the connections between research, teaching, and economic development. Within industry, questions are raised about what should be located inside the firm, between firms, or among firms, HEIs, and government institutions? Are the firms willing to support basic research or is it better to leave this task to the HEIs? What is the role of government given the need for technological innovation in international, national and regional development? (Etzkowitz & Leydesdorff 1995.)

The three institutional spheres, public, private and academic, which in the *laissez faire* societies operated in separation, or in the Nordic social-democratic welfare countries, like Finland, in which state control over higher education was strong, are increasingly interwoven with a spiral pattern of linkages emerging at various stages of the innovation and industrial policy-making process. This ‘spiral pattern’ is referred to as triple helix by Etzkowitz and his colleagues (*ibid.*; Etzkowitz et al. 2000).

The notion of triple helix is more than just a metaphor adopted from biology for the intensifying co-operation between governments, higher education and private businesses. It refers, on one hand, to the changes in the innovation process and, on the other, to the new social contract between the HEIs and the larger society. The former contract was based on a linear model of innovation, presuming only long term contributions of academic knowledge to the economy. Now both long and short term contributions are envisaged. A spiral model of innovation is required to capture multiple reciprocal linkages at different stages of the capitalisation of knowledge (Etzkowitz & Laydesdorff 1995).

There are processes operating on four distinct levels related to major changes in the production, exchange and use of knowledge which twist and twine the triple helix in ever complex forms. First, there are the

internal transformations in each of the helices, like internationalisation of higher education. Secondly, each institutional sphere affects the others bringing about transformations. Etzkowitz et al. (2000, 315) refer, for instance, to the changing rules of intellectual property rights. In Finland this process is still ongoing and much debated. The effective Act on the Right of Employee Invention (see The Ministry of Trade and Industry 2004) excludes higher education personnel which makes Finland among the minority of OECD countries where rights to an invention in higher education still belongs to the individual researcher. However, in order to enhance the 'entrepreneurial university' (see Clark 1998) the government is planning new legislation which would give also higher education institutions greater rights to the inventions made by their personnel.

Thirdly, there is a new overlay of trilateral linkages, networks and organisations among the three helices. Technology centres and science parks are the 'praised' examples of these installations. In Finland the State Science and Technology Council including representatives from all three spheres is an important actor shaping the national innovation policy. Another example is the national enterprise programme The Entrepreneurship Decade 1995-2005 supported by business, industry, different government ministries, local authorities, trade unions and educational institutions.

The fourth process mentioned by Etzkowitz et al. (ibid.) includes the recursive effects of these inter-institutional networks representing higher education institutions, industry and government both on their originating spheres and the larger society. One important effect is the transformation of science itself as proposed, for instance, by Gibbons et al. (1994). The research function in an entrepreneurial university is geared towards problem solving and the research agenda is based on transdisciplinary planning and contracting of services. This change is reflected in a dual cognitive mode of thinking as researchers focus both on basic research and fundamental breakthroughs in knowledge, and inventions that can be patented and marketed (Etzkowitz et al. 2000, 315).

This line of thinking and devising industrial policies has been especially beneficial for the hard sciences, in which basic and applied research can be organised according to the triple helix model, and where new inventions and innovations can yield to considerable profit. However, in the field of humanities and social sciences, anything comparable to the technology centres has not yet been established, even though there are some efforts to that direction (see. Ahola et al. 1999).

Figure 1 describes the triple helix of government - higher education - business world relationships, and the related policies. In higher education and science policies the centre place is occupied by pursuit towards the European higher education and research areas. The European employment policy rests on what has become known as the 'four pillars' of the Commission's employment strategy: employability, entrepreneurship,

adaptability, and equal opportunity¹. The policy of the ‘third mission’ is exemplified in the simple formula proposed by the recent report of a Finnish working group on higher education and regional development (OPM 2001a):

CO-OPERATION → INNOVATION → REGIONAL DEVELOPMENT

The current arrangements in the name of the triple helix seem to boil down to the question of the competitive edge of the Finnish economy in the global world. Thus, the idea is not so much to develop regions as such, but to develop regions for the national innovation system and for the nation’s international competitiveness (Ahola 2004).

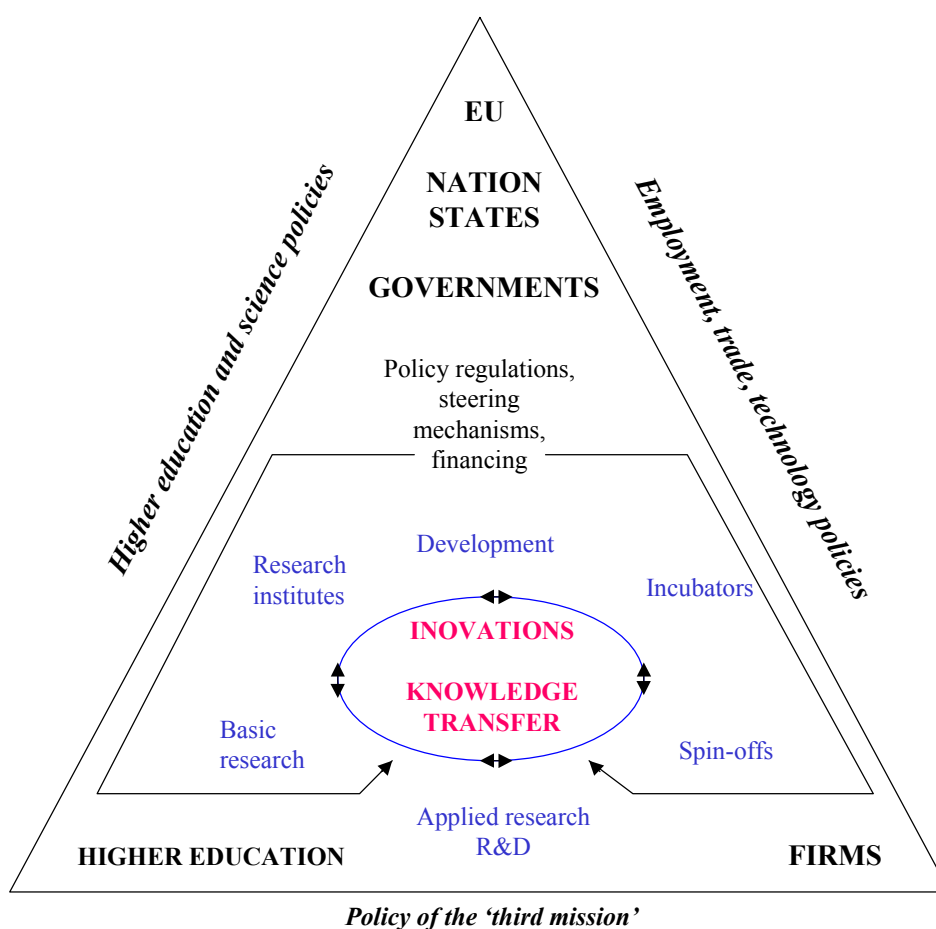


Figure 1. The triple helix of government, higher education and private business world

In 2001, just shortly after the aforementioned report on regional development, Finnish Ministry of Education published another working group report targeted at an enhanced internationalisation strategy for higher

¹ See the EES website:
http://europa.eu.int/comm/employment_social/employment_strategy/guidelines_en.htm.

education in the globalising world (OPM 2001b). These seemingly separate policy papers bear an important common objective and exemplify the interconnectedness of global, national, and local spheres (cf. Marginson & Rhoades 2002). According to both reports, one of the main objectives of higher education institutions is an acknowledged high international quality in teaching and research. The latter report binds local concerns also in many other ways to the problems of globalisation (see Ahola 2004).

Thus, the major international challenge for local and regional development comes from the fact that 'local is global'. What this means more specifically is that all markets are becoming increasingly global, and that international and global changes have more numerous and direct effects on national and local levels. According to the local development working group, in the globalising world, the success of regions depends on their standing in international competition. This requires high quality in all actions and well functioning innovative networks.

The basic problematic of regional development seems to circle around the need to produce new commercial innovations. In the former decades of expansion, the mere founding of a higher education institution to a certain locale meant considerable injection of resources and activities to the whole region. These same benefits surely exist also today, but the expectations from higher education are much greater. Institutions of higher education should interact together and with their local environment in order to produce applicable innovations. In addition, all activities should pursue high international quality because in the global world markets are also global.

In the governmental strategy, the AMKs have their most important functions on the regional side. They too resort on high quality and intensive co-operation with each other, with the universities and especially with the local SMEs. The special mission of entrepreneurship education and other entrepreneurial activities in the AMKs are based on legislation. According to the Polytechnics Act the functions of AMK institutions can be divided to professional training of experts and applied research and development serving local employment and development needs. The Polytechnics Degree states further that AMK graduates should be also able to function as self-employed. According to the Development Plan (Ministry of Education 2004) AMKs will enhance their business incubator activities and undertake projects to facilitate generation changes and women's entrepreneurship. According to the prevailing entrepreneurship policy there exists a serious deficit of enterprises, but what does this actually mean?

The entrepreneurial deficit?

The two starting mottoes in the introduction highlight out critical minds towards the present developments in the name of entrepreneurship education taking place all over Europe, in the education systems in general and

in the Finnish AMKs in particular. We do not want to claim that entrepreneurship is unimportant. We however question the intrinsic value of establishing more enterprises just to satisfy the policy aiming at ever higher entrepreneurial activities. The share of self-employed (farmers excluded) from total employment in Finland (8 %) cannot be compared to that of, for instance, Italy (23 %) or Greece (29 %) for arguing that we lag behind in the European entrepreneurship development. There is no clear connection between the number of entrepreneurs and a country's economic success. For instance, in the US, which is the model of entrepreneurial spirit for EU, the share of self-employed is even lesser (6 %) than in Finland².

Another point of criticism is directed to the current policy of entrepreneurship education which starts from the assumption that everybody can become an entrepreneur (they just do not know it yet) and makes considerable effort in order to introduce entrepreneurship education throughout the education system. In the recent action plan of the Finnish Ministry of Education for entrepreneurship education the aim is that educational institutions at all levels, together with other stakeholders, raise students' awareness of the significance and potential of entrepreneurship. At the same time, measures are taken to enable students to get hands-on experience of setting up and running a business (Ministry of Education 2004, 16).

Why is it, then, that entrepreneurship is considered so important? According to the European Commission's Green Paper "Entrepreneurship in Europe" (EU 2003) entrepreneurship

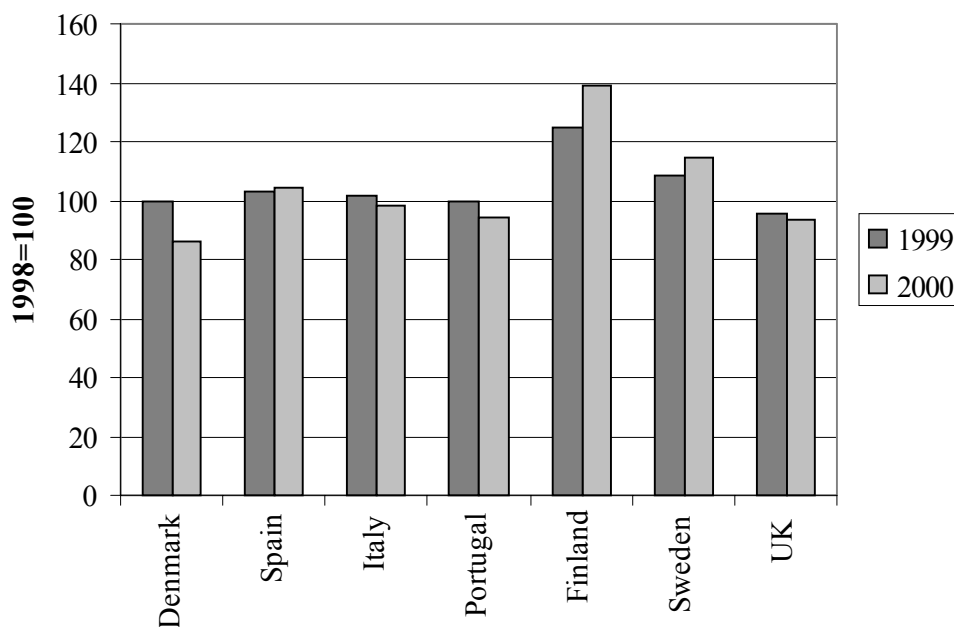
- contributes to job creation and growth
- is crucial to competitiveness
- unlocks personal potential and
- is also socially beneficial

As to the first point, it is naturally true that every new entrepreneur employs at least him/herself. It is, thus, implausible that a great number of small enterprises would weaken overall employment. However, research and methodology on these questions is just developing, and at the moment there are both arguments that there is no clear connection between the number of entrepreneurs and the level of general employment (e.g. Kiander 2004) and that entrepreneurial activity tends to result in higher subsequent growth rates and lower unemployment (Audretsch & Thurik 2001). Audretsch and Thurik make, however, several reservations to their findings urging for follow-up studies for the corroboration of the results (ibid., 23).

There is some other statistical data available to explore this question further. The following figure shows results from seven Member States concerning the employment in new firms born in 1998 and surviving until 1999 and 2000. In these countries there were altogether 1.86 million jobs created in newly born enterprises in 1998. In 1999 those firms that survived their first year employed 1.88 million. Two years later the total

² See OECD National Accounts database at <http://www.sourceoecd.org> (see also Kiander 2004)

employment was 1.85 million. Only in Finland and in Sweden firms have been relatively successful in terms of job creation. In Finland the growth of employment from 1998 to 2000 was 40 per cent. The worst situation was in Denmark where the reduction in employment was 14 per cent.



Source: Eurostat 2003

Figure 2. Growth of employment in new firms born in 1998 surviving until 1999 and 2000 in seven European countries (index 1998=100)

The competitiveness argument runs as follows: New firms increase competitive pressure increasing efficiency and leading to new innovations which enhances the competitive strength of an economy as a whole. Competition among entrepreneurs and firms means also consumer benefits through greater choice and lower prices. The other side of competition is evident if we look at the number of terminations and bankruptcies. In Finland, for instance, from 2001 to 2002 the total number of enterprises grew by 1 746 from 224 847 to 226 593 (about 22 000 new start-ups and 20 200 terminations). At the same time the number of employees in these firms decreased by 3 581 persons. (StatFin data base.)

The third point mentioned in the Green Paper reflects the somewhat naive conception of entrepreneurship as an inner human trait. The belief that enterprise is a natural human behaviour, which will emerge spontaneously once the barriers are removed, promotes the policies of entrepreneurship education. According to Armstrong, however, business incubator facilities and other enabling measures are not so much ways to produce new entrepreneurs as of making the enterprise welcome should it appear. “The ontological status of entrepreneurship is a mystery wrapped in ideology” (Armstrong 2001, 526).

The traditional mainstream view sees the entrepreneur as a risk taker bringing different factors of production together (e.g. Henderson & Robertson 2000, 280). Armstrong, on the other hand, claims that risk taking appears to be exceptional as a feature of new venture creation in general, and science-based enterprise in particular. Armstrong is especially critical towards the methodology by which psychometric research demonstrates a correlation between individual risk taking trait and self-employment. Secondly, Armstrong points to several empirical surveys and case studies of small business owners which show that the vast majority are not risk takers. Also research on the formation of science-based new ventures frequently tells a story of the transfer or avoidance of risk, rather than engagement with it. (Armstrong 2001, 527.)

Finally, the Green Paper discusses new ideas of “corporate social responsibility” relating to larger issues of sustainable development, “green production” etc. These questions are, however, besides the point of our presentation.

Waking up the ‘inner entrepreneur’ is a special problem in Finland. According to the Entrepreneurship Flash Eurobarometer, Finland is the least entrepreneurial country if measured with the question whether respondents would rather choose an employee status or become self-employed. In Finland only a fifth would, if they could freely choose, consider self-employment. The European Union average was 47 per cent in the 2003 survey. In the entrepreneurship ‘model country’, US, three out of five would choose self-employment.

Table 1. The share preferring self-employment in Finland, EU and US in 2001-2003

	2001	2002	2003
US	59	67	59
EU average	48	45	47
Finland	27	26	26

Source: Flash Eurobarometer 146

There is, however, an interesting discrepancy between these figures and the actual number of entrepreneurs in a country, as already pointed out. Also Brown and Scase (1994, 158-159) have argued that the possibility of self-employment is more rhetorical than real. The attraction of self-employment is an expression of an ideal rather than a practical and seriously considered alternative. The situation appears to be different in deed if we look at the results from another question in the Eurobarometer showing that about a half of Finnish respondents, which is slightly less than in EU and US, have never thought self-employment as a real option. On the other hand, 23 per cent, clearly more than in US and slightly more than EU average, are currently self-employed or have been self-employed in the past.

The entrepreneur survey includes also questions on the effect of the educational system on the entrepreneurial spirit. According to the published flash report, “respondents in both the United States and the European Union believe that managing a business is something that can be learned” (p. 37). This is somewhat an overstatement concerning the actual questions in the questionnaire. In fact, on average 67 per cent in EU, 64 per cent in Finland and 51 per cent in the US agreed on that the education system “does not develop a state of mind in young people that encourages them to create a firm”. The more positive impression comes from the question: “in your opinion, where should basic knowledge of how to run a business be taught?” Multiple answers were possible, and one item, among the offered types of schooling³, included the idea “nowhere, it cannot be taught”. In this type of framing the question, the latter alternative attracted relatively few answers, in Finland, for instance, only three per cent while 12 per cent of US respondents thought that entrepreneurship cannot be taught.

There is an ongoing discussion in the literature about ‘can entrepreneurship be taught’ (e.g. De Faoite et al. 2003; Galloway & Brown 2002; Kolvereid & Moen 1997; cf. Armstrong 2001). Behind this is the wider ontological question whether entrepreneurs are born or made. In the wildest visions entrepreneurship is represented through a biblical metaphor in which Eve was the first entrepreneur supplying Adam with the apple (cf. Koiranen 1993). Maybe this is why Fiet (2000), for instance, making a reference to Thomas S. Kuhn’s *The Structure of Scientific Revolutions*, argues that theory is the most practical thing to teach to students in entrepreneurial education.

Models of entrepreneurship education in Finnish AMKs

Collaboration between different cultures

Co-operation and networking has an important role in EU policies towards the ‘learning society’ (Fredrikson 2003; European Commission 1995). In the ‘learning economy’ the success of both individuals, firms and regions is depending on their learning capabilities and networking (OECD 1999, 29).

The underlying vision of and rationale for entrepreneurship education in the AMKs was quite uniform. In a way it was also vague because the majority of teachers just shortly commented that “it’s our mission”. Some teachers even pointed out to a ‘governmental ukase’. The specific role assigned to the AMKs, the close connectedness with the working life, requires entrepreneurial emphasis in all aspects of their functioning. The AMKs are also strongly committed to various municipal programmes and local development projects

³ The option “university or tertiary level” attracted 43 per cent of answers in the US, 42 per cent on average in the EU and 34 per cent in Finland.

aiming at elevating the entrepreneurial spirit of the population, developing entrepreneurial activities and creating new jobs. The economy, on the other hand, requires new competitive entrepreneurs, experts of business and trade, and partners. At the moment, the AMKs seem to be sought-after partners.

According to Marttila et al. (2004), the main reasons why firms engage in co-operation with local AMKs in the first place include the active role of AMKs in seeking partners. In many cases co-operation also requires established personal contacts between teacher and entrepreneurs. A natural prerequisite for the emergence of co-operation is a problem based need in the company and a nearby AMK whose know-how matches with the need.

Not only outside firms but nowadays also students can be partners. One teacher described the ideology of partnership as it differs from the traditional, straightforward idea of subcontracting:

As our students put up a firm already in the first year, so they actually are during their studies, four or five years, our partners. And the firm develops all that time. After graduation, they don't just leave us. They stay as our partners.

From the firms interviewed by Marttila et al. about a half had not experience any problems in their collaboration with the AMKs. The other half pointed out to problems especially in the knowledge and expertise offered by the AMKs. There was also problems in the methods of co-operation and information flows. Some firms mentioned the common problem that HEIs and private firms “live their own lives”. This is a widely sited problem in the literature (e.g. Gibb 1993; Hill & Turpin 1995; Kivinen et al. 1997; Välimaa 1998). An illuminating presentation of this ‘cultural barrier’ problem can be found, for instance, in Garavan & O’Cinneide (1994).

In order to overcome this cultural barrier, the AMKs have developed curricular structures in which students are being encountered with real entrepreneurs and the harsh facts of business life right from the beginning of their studies (e.g. ‘the entrepreneurial path’; see below). However, the AMKs still have the problem how to balance between theoretical and practical studies and how to create a functioning connection between the two aspects of knowledge.

Projects, paths and practise firms

Our conceptual framework for studying entrepreneurship in the AMKs is sketched in figure 3. It depicts learning experiences as a continuum from (theoretical) school learning to learning on-the-job. School learning ‘knowing that’ is the mode of learning that has been mostly criticised of being unable to transmit relevant work-based knowledge for the enhancement of employability. In regular education, the traditional

and most simple way to increase vocational content is to bring in practical examples as part of class room teaching (area 2 in the figure). There exists a whole ideology of ‘vocationalism’ around these practices which start from the assumption that certain features and skill requirements can be extracted from the world of work and translated into curricular contents. Attempts to vocationalise the curriculum according to the ‘needs of the industry’ have never been very effective. They serve more as an ideology of production regulating education than as an educational ideology serving society, whether students’ employability or needs of the economy (see Moore 1987).

Among others, Gibb (1993; 1996) has argued consistently that training and education systems have enforced values and abilities which do not encourage entrepreneurship. Referring to the cultural barrier mentioned above, conventional classroom approaches stress theory and conceptual thinking, involve large amounts of information and knowledge dissemination, tend to be teacher or trainer-led, and have a general, subject or functional focus. The emphasis is on understanding and critical analysis with the development of problem-solving skills often in a case-study context of assumptions and partial information. This generally passive approach contrasts with the reality of the entrepreneur operating with intuition and limited information under time pressures and with specific problems to resolve (Henderson & Robertson 2000, 281).

The AMKs are trying to reduce traditional teaching methods like lectures. However, lecturing is one of the most used teaching method in entrepreneurship education according to the students (see table 2 below). Teachers on their part do not think that lectures are the best way of educating entrepreneurs but its predominance was explained by referring to the need of ensuring students’ theoretical knowledge and basic know-how.

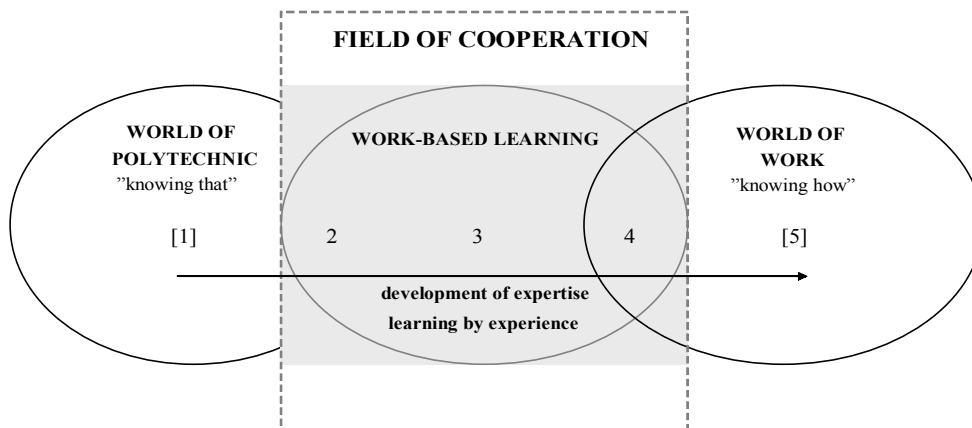


Figure 3. Work-based learning continuum

- [1]. FORMAL VOCATIONAL EDUCATION
 - Traditional methods: lectures, classroom teaching, readings
- 2. WORK-BASED TRAINING CONTENTS
 - Work based methods: visiting experts from enterprises and working life, students' visits to enterprises, practical examples of entrepreneurship in teaching etc.
 - Simulation methods: practice firms, business games
- 3.1. PROJECT LEARNING
 - Participating methods: cases, projects, group and team working, mentors, tutors
- 3.2. WORK-BASED ENVIRONMENTS
 - Foster-firms
 - Student enterprises
- 3.3. COOPERATION ORGANS
 - Further Education Centers
 - Business incubators
 - R&D Units
 - Career and recruitment offices
- 3.4. OTHER COOPERATION PROJECTS
- 4. PRACTICAL TRAINING
- [5]. LEARNING ON-THE-JOB, tacit occupational skills etc.

The AMKs have been quite active in developing new work-based learning methods and environments (area 3). In addition to the popular forms of project learning etc. simple innovations include taking the class room as near to the work place as possible. This has become possible in the triple helix of the new technology centres and science parks. Students are also linked with private firms and their development projects through existing collaborative organisations which include business incubators, further education centres, career and recruitment offices, R&D organisations etc. They host various projects funded, for instance, from the EU structural funds.

According to the teachers, different kind of projects are used in entrepreneurship education in growing extent. Various course assignments, especially the final diploma work, are important to the AMKs in their R&D and other services. How these projects are connected to entrepreneurship education or how much students actually learn from entrepreneurship, is still quite unclear. Questions have been also raised, what is the role of students in these work based projects? Are they only a free resource in business to business relationships? Yet another question is that entrepreneurs do not necessarily have time or resources to guide students in projects or during their practical training.

Partnerships can pose also problems of quality and equality of teaching. Not all companies that offer themselves as partners can live up to the expectations of a 'good and properly run firm' which nonetheless is the objective from the point of view of teaching. Thus, some students enjoy excellent learning environments as regards to their entrepreneurship education while others end up with a sloppy firm which provides nothing but bad examples. A similar problem has been encountered in project working. In successful projects students learn appropriate and profitable entrepreneurial processes. If the project, however, fails – as they in many cases and for many reasons do – the learning experience can be described, as some teachers did, like: *“well, at least they learned that life can be hard”*. In this kind of projects the main responsibility of results usually falls on students which are the main resources of the project. According to Marttila et al. (2004) partner firms do not consider this very positive, especially when they expect some profit from the project. And profit is nearly always what they expect.

According to the students, co-operation projects are in a fairly frequent use in the AMKs. About a half indicated that they are used in some extent, and about a quarter said that project work is a much used method in entrepreneurship education (see table 2 below).

One step ahead from a partner firm is a 'foster firm'. Foster firm is a local firm that takes a student in its guidance and care like a loving godfather or godmother. The idea of foster firm activity is to create a lasting partnership between the entrepreneur and the student including mutual commitment that exceeds regular collaboration. The objective is that in the various assignments and projects belonging to the entrepreneurship curriculum, the student will concentrate in analysing the functioning of his/her foster-firm. In an ideal case, students also do their practical training and their diploma work for the foster firm. Foster firm activities are not yet widely used in the AMKs (see table 2 below).

Even further developments relate to the problems of generation change in SMEs. There are a growing number of elderly entrepreneurs who have no family to take over their businesses. This problem is also noted in the European Commissions action plan for entrepreneurship (European Commission 2004a). The AMKs are developing projects to train entrepreneurial students who would be willing and able to take over this kind of enterprises.

Methods which imitate real entrepreneurship are also used in the AMKs. A practice firm is a training method based on the simulation of entrepreneurial life in order to study the changing operations and the preconditions of running a successful enterprise. In this teaching method students plan and set up the operational system of an enterprise and run it like a real firm. They have various roles as managing director, manager of sales, marketing, accounting etc. according to the organisation of the firm. The roles change during the exercise so that the students have the opportunity to work in different positions. A practice firm can also have a real firm as a mentor company. (European Commission 2004b.) Of the students surveyed in our project 41 per cent said that practice firm activity was not part of their entrepreneurship education. The same amount told that this method was used in some extent (see table 2 below).

Entrepreneurship education is realised in most concrete form when students work as real entrepreneurs. One way to accomplish this is through student enterprises. In addition to practice firms or simulated enterprises student enterprises can, for instance, offer services inside the AMK. A typical student enterprise maintains, for instance, the school cafeteria. It is also common that school based enterprises offer their services outside, and students can do the assignments as part of their diploma work, for instance.

Allowing institutions to engage in revenue-generating activities makes them look more intensely and innovative to their environment and their clients. However, it also bears the risk of the institution entering into direct competition with private businesses, consultancy firms or other commercial education providers. This may lead to concerns about conflicts of interest, unfair competition and market distortion, especially when commercial businesses argue that publicly funded institutions use government grants to engage in cross-subsidisation and under-pricing (Jongbloed 2003, 121).

This kind of problems have surfaced also in Finland as the AMKs have been expanding their entrepreneurial activities. In 1998 the Finnish Competition Authority made a recommendation in agreement with the Ministry of Education, The Association of Finnish Local and Regional Authorities and The Association of Finnish Entrepreneurs concerning the pricing of student products and services. This recommendation includes the general guidelines of entrepreneurial activities in an educational institutions. The starting point naturally is that the AMKs should price their products and services on sound economic grounds.

Finally, cross-sectional area 4 in figure 3 represents traditional practical training which takes place in real working environment (cf. Schulte 2003). The required practising period in the AMKs varies from 20 to 60 study weeks⁴ depending on the field of study. Organising places of practising for all students is naturally a huge job for the teachers and administrators of the AMKs. Notwithstanding that many students do their practising on their own, during summer jobs for instance, the idea is to integrate practising as a part of the

⁴ The normal AMK degree adds up to 140 or 160 study weeks.

study process whereby students develop their professional expertise. In the field of entrepreneurship education students can, for instance, do their practising in their own firm.

One of the models of the entrepreneurship education presented as ideal includes organising the study curriculum in a way, that the whole ensemble of studies follow the pattern of start up activities. This kind of ‘entrepreneurial path’ is described in figure 4.

During the first year students familiarise themselves through various projects with the concepts of entrepreneurship, leadership and business processes, and find a partner of foster enterprise. During the second year students learn how business opportunities can be found, and they draw a business plan which can be an imaginary plan based on partner firm data or a real plan for student’s own firm. Practical training takes place in the forster or partner firm, and students who have some kind of business idea can also enroll into a business incubator or a student enterprise. Specialised courses are offered on more theoretical questions of business and enterprise.

Some teachers, especially in fieds like social and health care, were also critical towards this kind of ‘one eyed’ path because it takes students too early and forces them to become entrepreneurs. According to them, it would be better for the students to study first and to acquire the knowledge and expertise of their professional field. Also some work experience would be beneficial for graduates before they step to the entrepreneurial path. Basically the same message was given by the graduates in the cultural field in our ‘Cultural Education and New Careers’ project (Honkanen & Ahola 2003).

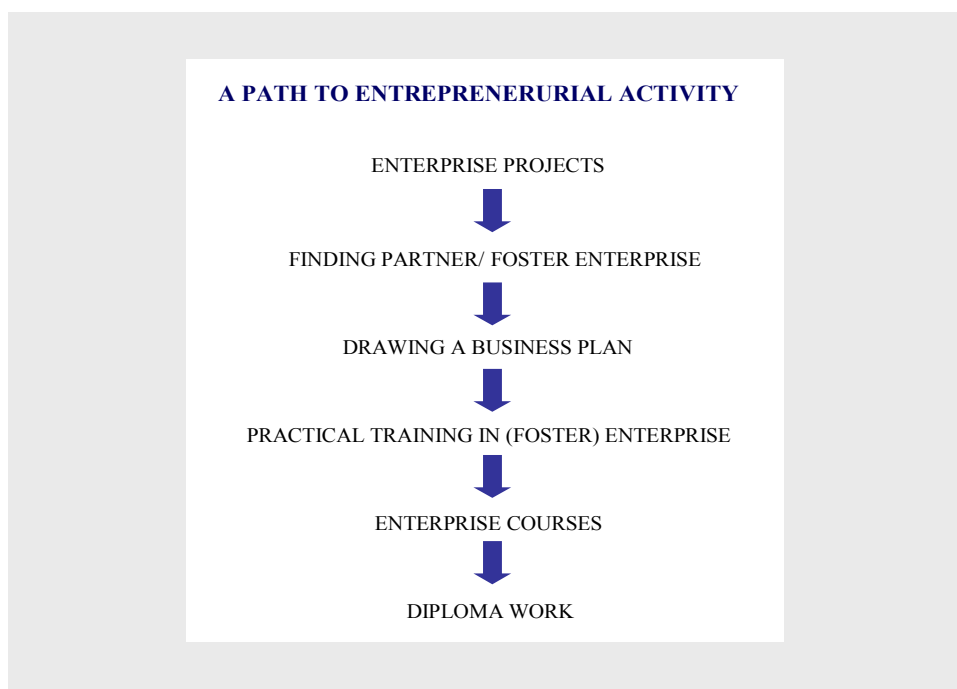


Figure 4. The entrepreneurial path model of entrepreneurship education

Business incubators

Current ideology of entrepreneurship education encourages students to start up their own businesses already while studying. This involves various problems, and business incubators are offered as one way to tackle them. Business incubators represent a growing form of support for entrepreneurial activities. The development of business incubators started in Finland in the late 1980s. Incubator development accelerated after Finland joined the EU, and gained access to its targeted programmes. According to Saurio (2003, 13), we now live the third phase of business incubators in which higher education institutions have a major role. The majority of Finnish incubators are so called embedded incubators, i.e. they are part of an larger organisation. In 2001, 18 out of the 80 existing embedded incubators belonged to a university or AMK (ibid.).

According to our study, nowadays almost all AMKs either have some kind of incubation activities or are planning to establish it. The majority of students, however, claimed that incubators were not a part of their entrepreneurship education (table 2).

Table 2. Methods used in entrepreneurship education according to the students, and their account on the overall sufficiency of entrepreneurship education (%)

Teaching methods	Not used	Used in some extent	Much used
Classroom teaching and lectures	3	25	72
Visiting experts from working life	17	57	26
Practical examples of entrepreneurship	14	61	25
Co-operation projects	28	49	23
Practice firm activities	41	41	18
Students' visits to enterprises	28	55	17
Subcontracting works from working life	34	45	16
Business games	59	34	7
Foster firm activities	54	39	7
Incubator activities	69	26	6
Pre-incubator activities	68	26	5
Sufficiency	Irrelevant	In-sufficient	Sufficient
	36	28	36

Business incubators offer a learning, support and development environment for business enterprise start-ups. Business incubators' primary mission is to catalyse the process of starting a business and to help it grow.

Incubators nurture young firms, helping them to survive and grow during the start-up period when they are most vulnerable. Incubators provide management assistance, access to financing and technical support services. They can also offer shared office services, access to equipment, telecommunication links and other tools that students need to make their ventures.

In the AMK setting, incubator activities can be divided to pre-incubators and regular incubators. Pre-incubator is rather a phase than a facility. It means certain services offered in the early state of the development of a business idea (cf. Saurio 2003, 15-16). Another important and a more concrete difference relates to funding. Pre-incubators or their ‘enterprises’ do not receive incubation or investment support as established enterprises in an regular incubator do. Yet another difference suggested by our interviews relates to the participant status: is he/she a student or a self-employed. The latter point has caused some problems that are a potential obstacle for enlarging student entrepreneurial activities. A student acting as a real entrepreneur with income naturally loses his/her student financial aid and also the other social benefits tied to student status. This can be avoided, for instance, by organising student enterprises in a co-operative form.

According to the teachers, entrepreneurship is process, which begins when the candidates are planning to enter into the incubator. Different phases or stages in the incubation process are shown in figure 5.

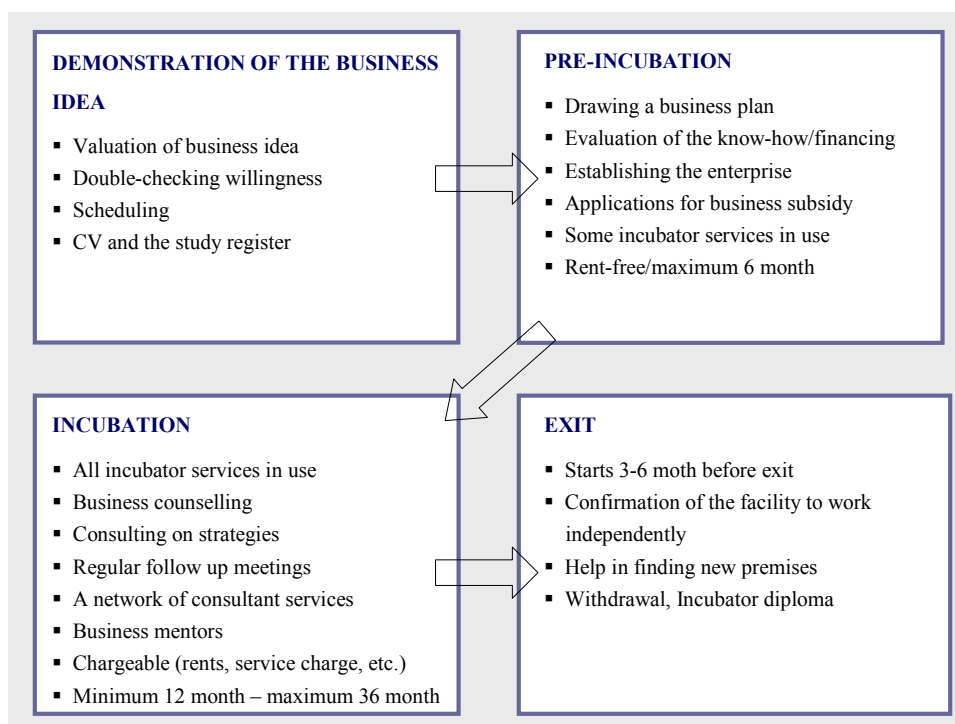


Figure 5. Different phases in the incubation process (Adopted from the Lahti Polytechnic)

In the first phase, one of the most important task is to validate the soundness of the proposed business idea. After that, most of the process boils down to the question of getting “near the resources” (Aldrich & Zimmer 1985, 3; Carton, Hofer & Meeks 2003, 1; Jenssen & Havnes 2002). In this respect the ideal model for an incubator comes from the Silicon Valley combining lucrative start-ups, new growing enterprises and established firms that make the market for venture capital regenerative in relation to successful ventures, because such ventures create ‘business angels’ and ‘serial entrepreneurs’ who provide the financial, human and social capital to start new ventures (Thornton 1999).

In the pre-incubation phase a business plan is drawn, existing and needed know-how is evaluated, and available financing and subsidies are mapped. The AMKs offer various kinds of assistance and consultation to the ‘would be’ entrepreneur varying from legal advise to filling up applications. In the regular incubator, the new firm is entitled to public investment loans etc. and can rely on the whole business network and its expertise concerning, for instance, clients and markets.

The time that the incubated enterprise can stay in the hands of the incubator extends to a maximum of three years. The exit phase starts about three to six months before exit. In this phase the capability of both the firm and the entrepreneur to independent existence will be evaluated. Help will be provided, for instance, in finding a new premises for the enterprise, and finally ‘student’ leaves with a incubation diploma.

From the point of view of the AMKs, one basic problem is how to steer students, and which one, into the incubation process. As pointed out in the beginning of this paper, only a faction of students are really interested in an entrepreneurial career. We can see, for instance, from table 2 that one third of the students considered the whole question of the sufficiency of entrepreneurship education irrelevant for themselves. Of the interested, only a faction may have some kind of business idea worth further consideration. Without a benevolent business angel, which are scarce in a small country like Finland, only a fraction might have access to the capitals needed. And so on. The whole problematic is described in the following figure.

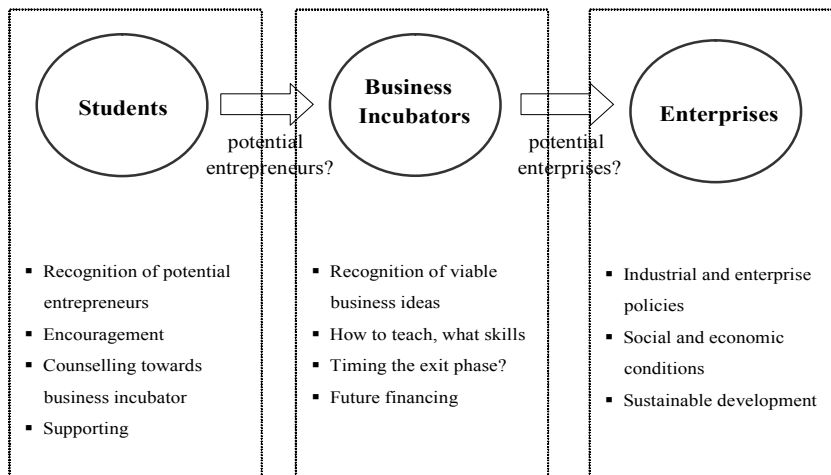


Figure 6. From students to enterprises – problems in the entrepreneurship career path

According to Carayannis, Evans and Hanson (2003), entrepreneurship career path can be decomposed into five unique stages: foundation, awakening, specialisation, creation and maturing. All these unique stages have their special features, reinforcement and feedback mechanisms (environmental forces). These mechanisms underscores the fact that there is a constant interaction between the entrepreneur and his environment. As pointed out by the European Commissions action plan, “there is no silver bullet for creating a more entrepreneurial Europe” (European Commission 2004a).

Foundation means the creation and reinforcement of entrepreneurial values both for the individual and for society as a whole. Can the educational system live up to the expectations that today rest on its shoulders? Awakening is the fragile moment when the individual is confronted with entrepreneurship as a viable alternative to other forms of career paths. How should we organise entrepreneurship education so that we do not spoil this moment? If foundation is laid and awakening happens, specialisation is a relatively straightforward task. In this phase initial skills necessary for business creation are acquired, and the individual identifies him/herself as being “entrepreneurial”. Creation is again more problematic. During this phase the individual moves from knowledge and learning to action. The creation of a company or other valorisation of mastered entrepreneurship skills is attained. In the final maturing phase the individual builds upon his experience and advances his career through knowledge-based development and networking as well as through external validation and valorisation of his chosen career.

A final word on public-private co-operation and entrepreneurship

In the mid 1980s Ladislav Cerych discussed the changing climate concerning university-industry relationships. Why this dramatic change in attitude from almost a taboo to a widely accepted necessity? Among the various reasons offered by Cerych are not only those relating to the developments towards the 'Europe of Knowledge' (used to be 'The Coming of the Information Society'), and which now compel national governments, higher education, and their stakeholders in the form of the Lisbon Strategy aiming at making the EU the world's most dynamic and competitive economy, but also those relating to the massification of higher education, for instance, the growing difficulties face by graduates in the job market, and the 'funding crisis', which forces HEIs to seek new resources. (Cerych 1985.)

Especially the latter pressure is transforming HEIs towards entrepreneurial forms and their personnel to entrepreneurs who have internalised the entrepreneurial culture. In the entrepreneurial discourse, many teachers are rather engaged in 'business to business relationships' than in collaboration between higher education and industry. They are "state-subsidised entrepreneurs" as termed by Slaughter & Leslie (1997, 210).

Also the problems of collaboration and relationships between the 'two worlds' pointed out by Cerych (ibid.) are much the same today as in the mid 1980s. Naturally some convergence has happened and new collaborative systems have been developed during the last 20 years. The problems are related to the basically different missions, values and organisation of higher education and private business yielding to conflicting interests. Higher education, especially the university sector, for instance, is still organised around disciplines and taught subjects between which there is often relatively little communication. The production of goods and services, and the solving of related problems are organised differently. HEIs and their functioning is typically subject to cumbersome legislative and administrative practises which, although in constant change, is something unfamiliar to the 'business is business' way of thinking.

Gerych also mentioned the problematic status of higher education teachers and researchers in relation, for instance, to their extramural activities, and the above mentioned dubious role of 'state entrepreneur'. There are clearly also lots of teachers who feel uncomfortable with this new role seeing themselves more traditionally as civil servants and setting high value for academic freedom. They are willing to co-operate, if the projects serve the interests of teaching and research, but business to business relationships do not belong to their vocabulary.

The current discourse around entrepreneurship seems to mix three different elements. On one hand it is true that the meaning of 'employment' has fundamentally changed. Before the reference was full-time regular employment, and nowadays it includes part-time work, temporary employment, and growing proportion of

self-employment (Brown & Lauder 2001, 158). On the other hand, there exists the plausible idea that the founding of businesses by young graduates is an effective instrument for economic development (Schulte 2004). Thirdly, there is the empirical evidence that the increase in self-employment has contributed to the rising numbers with relatively low incomes. “There is clearly a growing group for whom ‘self-employment’ involves marginal activities generating little income.” (Brown & Lauder 2001, 158.)

Schweickart (1996, 129) has seen also the ironic side of all this : “One might see in all this activity - so much of it doomed - a remarkable lack of prudence and wonder about how bad ordinary jobs must be to induce so many people to take such risks. At the same time, one can scarcely deny that such “creative destruction” has its positive side, providing a capitalist economy with a continuing supply of economic innovations.”

It is commonplace knowledge that in the knowledge economy 'knowledge is increasingly important'. But as Conceição et al. (2003, 3) point out, “comfortable as they are, commonplaces are often sterile both intellectually and while suggesting actions to public or private decision makers. Is it important to what? What to we mean by 'important'? What does 'increasingly' really mean ...?”

Regarding to entrepreneurship education, for instance, longitudinal research designs, using control groups to compare participants with individuals who did not have entrepreneurial educational experience, are needed to examine the lasting effects of entrepreneurship education and training interventions (cf. Garavan & O'Conneide 1994). Also our project will continue to this direction by taking a look at the future careers of the students surveyed: Who will embark on an entrepreneurial career and why?

References:

- Ahola, S. (2004) Global and Local Priorities in Higher Education Policies - a headache at the national level? *Tertiary Education and Management* 10, (forthcoming).
- Ahola, S. & Silvennoinen, H. (1999) Towards New Understanding of School-to-Work Transitions. In O. Kivinen, H. Silvennoinen & P. Puustelli (eds.): *Work-Based Learning. Prospects and Challenges*. Ministry of Education.
- Aldrich, H. & Zimmer, C. (1986) Entrepreneurship through Social Networks. In: D. Sexton & R. Smilor (edit). *The Art and Science of Entrepreneurship*. Cambridge: Ballinger Publishing Company.
- Armstrong, P. (2001) Science, Enterprise and Profit: Ideology in the Knowledge-Driven Economy. *Economy and Society* 30 (4), 524-552.
- Audretsch, D.B. & Thurik, R. (2001) *Linking entrepreneurship to growth*. STI Working papers 2001/2. OECD.
- Bauman, Z. (2000) *Liquid modernity*. Cambridge: Polity Press.
- Bourdieu, P. (1998) *Acts of Resistance. Against the New Myths of Our Time*. UK: Polity Press.
- Brown, P. & Scase, R. (1994) *Higher Education and Corporate Realities: Class, Culture and the Decline of Graduate Careers*. London: ULC Press.
- Brown, P. & Lauder, H. (2001) *Capitalism and Social Progress. The Future of Society in a Global Economy*. Great Britain: Anthony Rowe Ltd.
- Carayannis, E., Evans, D. & Hanson, M. (2003) A cross-cultural learning strategy for entrepreneurship education: outline of key concepts and lessons learned from a comparative study of entrepreneurship students in France and the US. *Technovation* 23, 757-771.
- Carton, R.B., Hofer, C.W. & Meeks, M.D. (2003) *The Entrepreneur and Entrepreneurship - Operational Definitions of Their Role in Society*. Paper presented at the annual International Council for Small Business conference, Singapore. Retrieved January 16, 2003. Available at: <http://www.sbaer.uca.edu/Research/1998/ICSB/k004.htm>.
- Clark, B. (1998) *Creating Entrepreneurial Universities. Organizational Pathways of Transformation*. Oxford: IAU Press/ Pergamon.
- Clark, B. (2003) Sustaining Change in Universities: Continuities in Case Studies and Concepts. *Tertiary Education and Management* 9 (2), 99-116.
- Cerych, L. (1985) Collaboration Between Higher Education and Industry: an overview. *European Journal of Education* 20, 1, 7-17.
- Conceição, P., Heitor M.V. & Lundvall, B-Å. (2003) Towards a learning society. In: P. Conceição, M.V. Heitor & B-Å. Lundvall (eds.) *Innovation, Competence Building and Social Cohesion in Europe*. Cheltenham: Edward Elgar.
- De Faoite, D., Henry, C., Johnston, K. & van der Sijde, P. (2003) Education and training for entrepreneurs: a consideration of initiatives in Ireland and The Netherlands. *Education + Training* 45 (8/9), 430-438.
- Ehrenberg, J. (1998) *Globaliseringsmyten. Eller: hurusom kapitalet skulle frälsa världen*. Stockholm: Norstedts.
- European Commission (1995) *White Paper on Education and Training. Teaching and learning. Towards the Learning Society*. Available at: <http://europa.eu.int/comm/education/doc/official/keydoc/lb-en.pdf>.
- European Commission (2000a) *Communication from the Commission. Challenges for enterprise policy in the knowledge-driven economy*. Proposal for a Council Decision on a Multiannual Programme for Enterprise and Entrepreneurship (2001-2005). COM(2000) 256 final/2. Available at:

- http://europa.eu.int/comm/enterprise/enterprise_policy/mult_entr_programme/doc/com2000_0256en.pdf.
- European Commission (2000b) *Communication from the Commission. Towards a European Research Area*. COM(2000) Final 6. Available at: http://europa.eu.int/eur-lex/en/com/cnc/2000/com2000_0006en01.pdf.
- European Commission (2003) *Green Paper on Entrepreneurship in Europe* (presented by the Commission). Document based on COM(2003) 27 final. Available at: http://europa.eu.int/comm/enterprise/entrepreneurship/green_paper/green_paper_final_en.pdf.
- European Commission (2004a) *Communication from the Commission. Action Plan: The European Agenda for Entrepreneurship*. COM(2004) 70 final. Available at: http://europa.eu.int/comm/enterprise/entrepreneurship/promoting_entrepreneurship/doc/com_70_en.pdf.
- European Commission (2004b) *Final Report of the Expert Group. "Education for Entrepreneurship". Making progress in promoting entrepreneurial attitudes and skills through Primary and Secondary education*. Available at: http://europa.eu.int/comm/enterprise/entrepreneurship/support_measures/training_education/final_report_february.pdf.
- Etzkowitz, H. & Leydesdorff, L. (1995) The triple helix-university-industry-government relations: a laboratory for knowledge-based economic development. *EASST Review* 14 (1), 14-19.
- Etzkowitz, H. & Leydesdorff, L. (2000) The dynamics of innovation: from National Systems and "Mode 2" to a Triple Helix of university-industry-government relations. *Research Policy* 29, 109-123.
- Eurostat (2003) *Business demography in 9 Member States*. Statistics in focus. Theme 4 – 9/2003.
- Eurostat (2004) *Flash Eurobarometer 146. Entrepreneurship*. Available at: http://europa.eu.int/comm/enterprise/enterprise_policy/survey/eurobarometer146_en.pdf.
- Fredriksson, U. (2003) Changes of Education Policies within the European Union in the Light of Globalisation. *European Educational Research Journal* 2 (4), 522-546.
- Fiet, J. (2000) the theoretical Side of Teaching Entrepreneurship. *Journal of Business Venturing* 16, 1-24.
- Galloway, L. & Brown, W. (2002) Entrepreneurship education at university: a driver in the creation of high growth firms? *Education + Training* 44 (8/8), 398-405.
- Garavan, T. N. & O'Conneide, B. (1994) Entrepreneurship Education and Training Programmes: A Review and Evaluation – Part 1. *Journal of European Industrial Training* 18 (8), 3-12.
- Gibb, A.A. (1993) The enterprise culture and education: understanding enterprise education and its links with small business, entrepreneurship and wider educational goals. *International Small Business Journal* 11 (3), 11-34.
- Gibbons, M. et al. (1994) *The New Production of Knowledge. The dynamics of science and research in contemporary societies*. London: SAGE.
- Henderson, R. & Robertson, M. (2000) Who wants to be an entrepreneur? Young adult attitudes to entrepreneurship as career. *Career Development International* (5) 6, 279-287.
- Hill, S. & Turpin, T. (1995) Cultures in collision: the emergence of a new localism in academic research. In: M. Strathern (eds.) *Shifting contexts*. Lontoo & New York: Routledge.
- Honkanen, V. (2004) *Yrittänyttä ei laiteta. Ammattikorkeakoulujen yrittäjyyskoulutuksen viisasten kiveä etsimässä*. (forthcoming).
- Honkanen, V. & Ahola, S. (2003) *Kulttuurin koulutus ja uudet urat. Ammattikorkeakouluista kulttuurialalta valmistuneiden koulutuskokemukset, työllistyminen ja yrittäjyys*. (Culture education and new careers. In Finnish only). Research Unit for the Sociology of Education. Report 61. University of Turku.

- Jacob, J. (1997) Life in the Triple Helix: The contract researcher, the university and the knowledge society. *Science Studies* 10 (2), 35-49.
- Jenssen, J. & Havnes, P. (2002) Public intervention in the entrepreneurial process. A study based on three Norwegian cases. *International Journal of Entrepreneurial Behaviour & Research* 8 (3), 173-187.
- Jongbloed, B. (2003) Marketisation in Higher Education, Clark's Triangle and the Essential Ingredients of Markets. *Higher Education Quarterly* 57 (2), 110-135.
- Kiander, J. (2004) Korkea yrittäjyysaste ei saa olla itsearvoinen tavoite. *Helsingin Sanomat* 26.7.2004.
- Kivinen, O., Lehti, H. & Metsä-Tokila, T. (1997) *Tohtoroitumisen ilot ja kirot*. Koulutussosiologian tutkimuskeskuksen raportteja 40. Turun yliopisto.
- Koiranen, M. (1993) *Ole yrittäjä. Ulkoinen ja sisäinen yrittäjyys*. Tampere: TT-Kustannustieto.
- Kolvereid, L. & Moen, Ø. (1997) Entrepreneurship among business graduates: does a major in entrepreneurship make a difference? *Journal of European Industrial Training* 24 (4), 154-160.
- Marginson, S. & Rhoades, G. (2002). Beyond National States, Markets, and Systems of Higher Education: A Glonacal Agency Heuristic. *Higher Education* 43 (3), 281-309.
- Marttila, L., Kautonen, M., Niemonen, H. & von Bell, K. (2004) *Yritysten ja ammattikorkeakoulujen T&K - yhteistyö. Ammattikorkeakoulut alueellisessa innovaatiojärjestelmässä: koulutuksen ja työelämän verkostoitumisen mallit, osaprojekti III*. Yhteiskuntatieteiden tutkimuslaitos. Työelämän tutkimuskeskus. Tampereen yliopisto.
- Ministry of Education (2004) *Education and Research 2003–2008. Development Plan*. Publications of the Ministry of Education, Finland 2004:8. Available at: <http://www.minedu.fi/julkaisut/koulutus/2004/opm08/opm08.pd>.
- Moore, R. (1987) Education and the ideology of production. *British Journal of Sociology of Education* 8 (2), 227-242.
- Neave, G. (2002a) The Future of the City of Intellect: A Brave New World - European Style. *European Education* 34, 3, 20-41.
- Neave, G. (2002b) Anything Goes: Or How the Accommodation of Europe's Universities to European Integration Integrates an Inspiring Number of Contradictions. *Tertiary Education and Management* 8(3), 181-197.
- OECD (1999) *The Response of Higher Education Institutions to Regional Needs*. Paris: OECD.
- OECD (2003) *Polytechnic Education in Finland. Reviews of National Policies for Education*. Paris: OECD.
- OPM (2001a) *Korkeakoulujen alueellisen kehittämisen työryhmän muistio*. Opetusministeriön työryhmien muistioita 28:2001. Helsinki.
- OPM (2001b) *EU:n koulutuspolitiikka – OPM:n strategia koulutuspoliittisessa EU-yhteistyössä*. Opetusministeriön työryhmien muistioita 26:2001. Helsinki.
- OPM (2004) *Yrittäjyyskasvatuksen linjaukset ja toimenpideohjelma*. (Ministry of Education Policy for Entrepreneurship Education). Opetusministeriön julkaisuja 2004:18. Helsinki.
- Saurio, S. (2003) *Yrittäjyyden edistäminen ja yrityshautomotoiminta ammattikorkeakouluympäristössä*. Satakunnan ammattikorkeakoulu. A, Tutkimukset 1.
- Schulte, P. (2003) Extrabudgetary funding and institutional relationships between higher education, industry, and social partners. *Higher Education in Europe* 28 (2), 189-194.
- Schulte, P. (2004) The Entrepreneurial University: A Strategy for Institutional Development. *Higher Education in Europe* 28 (4), 187-192.
- Schweickart, D. (1996) *Against Capitalism*. The US.: Westview Press.

- Slaughter, S. & Leslie, L. (1997) *Academic capitalism: Politics, policies and the entrepreneurial university*. Baltimore: John Hopkins University Press.
- StatFin. *Data base*. Available at: <http://statfin.stat.fi>.
- The Ministry of Trade and Industry (2004) *Industrial property rights*. Available at: http://www.ktm.fi/index.phtml?menu_id=862&lang=3&fs=10.
- Thornton, P.H. (1999) The Sociology of Entrepreneurship. *Annual Review of Sociology* 25, 19-46.
- Välimaa, J. (1998) Akateemisen maailman ja yritysmaailman eroista. In: J. Välimaa (eds.) *Tohtori tuli taloon? Tutkimus tohtoreista ja pk-yrityksistä*. Koulutuksen tutkimuslaitos. Jyväskylän yliopisto. Jyväskylä: Jyväskylän yliopistopaino.
- Williams, G. (1997) The Market Route to Mass Higher Education: British Experience. *Higher Education Policy* 10 (3/4), 275-289.
- Ziman, J. (1994) *Prometheus Bound: Science in a dynamic steady state*. U.K.: Cambridge University Press.