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PIRKANMAAN AMMATTIKORKEAKOULU
Pirkanmaa University of Applied Sciences

TAMPEREEN AMMATTIKORKEAKOULU
University of Applied Sciences

NOVIA
UNIVERSITY OF APPLIED SCIENCES

Seinäjoen ammattikorkeakoulu
SEINÄJOKI UNIVERSITY OF APPLIED SCIENCES

PIRKANMAAN AMMATTIKORKEAKOULU

Kuntokatu 4, 33520 Tampere
puh. (03) 245 2111
fax (03) 245 2351
www.piramk.fi

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Forewords

In higher education research and development activities play an important role as a basis for education and also as a tool for innovations and developing work practices. Within the universities of applied sciences research and development focuses on regional economic and service development. In the Finnish higher educational system universities of applied sciences were established in the 1990's. The two main, interlinked tasks assigned for them were education and regional development. Each of the higher education institutes have designed their own way of fulfilling these tasks answering to the needs of the region.

During some years some of the universities of applied sciences situated in Western Finland cooperated informally in a group of R&D directors. Within the group, an idea was formed to benchmark European universities of applied sciences and thus have a wider understanding of research and development activities and how they are organized as a part of educational institutes' functions.

The benchmarking project planned was funded partly by the Finnish Higher Education Evaluation Council (FINHEEC) and implemented in November 2007. This publication is based on the benchmarking project and summarizes the main features, similarities and differences between the seven Universities of Applied Sciences which participated in the process: from Finland: Pirkanmaa university of applied sciences from Tampere Region, Tampere University of Applied Sciences from Tampere, Seinäjoki University of Applied Sciences from Ostrobothnia, Svenska Yrkeshögskolan (now Novia) from Vaasa, and Fontys Hogeschool from the Netherlands, PHLimburg from Belgium and Fachhochschule Dortmund from Germany.

The report was written in cooperation with all the Finnish partners involved in the benchmarking project. The representatives of Fontys Hogeschool, PHLimburg and Fachhochschule Dortmund commented and gave their own inputs for the text as well.

I wish to thank all who cooperated in the project and in writing and editing the publication. Like in research and development, project work is a cooperative and collaborative task.

In Tampere, January 2009
Ulla-Maija Koivula
Editor-in-chief

Contents

1 Introduction

Universities of applied sciences have a special role in higher education in Western Europe. Their history is connected to the need to upgrade the level of vocational and professional training thus meeting the demands of more knowledge intensive work. The division between universities (UNI) and universities of applied sciences (UAS) is usually described by their different mission. The universities' aim is to conduct scientific research and provide instruction and postgraduate education based on it. Universities of applied sciences educate professionals in response to labour market needs and conduct research and development which supports instruction and promotes regional and local economic development. In some European countries the UAS (called also as polytechnics or university colleges) have merged with UNI, e.g. in UK, where so called old and new universities exist. Still in many Western European countries the UAS and UNI exist in parallel, as is the case in Finland, the Netherlands, Belgium and Germany investigated more closely within this study.

The role of research and development (R&D) differs in these two higher education institutes. Academic research is the main function of the university on which the education is based on. In UAS education is based on professional competence requirements while research and development activities are mainly a form of cooperation and development with work life, which then effects the education as well. There have been many disputes between UNI and UAS regarding the role of R&D since also UNI, especially in medical and technical field of research, have an active role in product development and innovation work and cooperating with work life.

How is R&D organized in UAS and what is its role in teaching and learning? Is R&D similar with that in UNI or does it have a special aim? How can R&D activities better become part of learning and teaching and what is the role of teaching staff in these activities? These were the questions which led to an interest for an international benchmarking project regarding R&D especially in UAS in Western Europe.

2 Aims and process of benchmarking

The main aim of the benchmarking project was to form a general conception and understanding about the role and position of R&D in universities of applied sciences located in Finland, the Netherlands, Belgium and Germany. Of course the benchmarking tells only the tale of few examples, so this information cannot be generalized as being a model or even a typical one of all the UAS in these countries, let alone in Western Europe in general. The main focus was to compare and learn from different kind of practices as well as share ideas for good practices and innovative solutions possible for adaptation

The project was planned together with four UAS located in Western Finland. The participating UAS from Finland were PIRAMK (coordinator), SeAMK, SYH and TAMK. The project was realized during September – November 2007 with a support of project funding from the Finnish Higher Education Evaluation Council (FINHEEC). FINHEEC is an independent expert body assisting universities, UAS, and the Ministry of Education in matters relating to evaluation of

higher education institutions.[1] The Finnish article of the benchmarking project has been published in a report by the FINHEEC in May 2008.[2]

The aims of the project were set to compare and analyze the following themes within R&D

- Organization and funding
- Integration with learning and teaching
- The role of teaching staff in research and development and
- Cooperation modes and methods with enterprises and employers both in private and public sector

The main criteria for the selection of benchmarking partners were that they should be multidisciplinary, active in R&D and international cooperation. One practical criterion was also that the partners should be situated in the vicinity of each other in Western Europe. The benchmarking partners selected were:

- Fontys Hogeschool (Eindhoven, the Netherlands),
- Provinciale Hogeschool Limburg (Hasselt, Belgium) and
- Fachhochschule Dortmund (Dortmund, Germany).

Previously, only one of the selected UAS (Dortmund) had cooperated under Erasmus Programme with one of the Finnish UAS involved in this project. Thus, the benchmarking also offered an opportunity to create and develop new international networks both in education as well as in R&D. The benchmarking was based on a comparative matrix which was sent before the benchmarking visit to each of the participating UAS. The actual benchmarking visits were done in November 2007.[3]

This report describes first briefly the participating UAS and their educational fields. Secondly the report compares the organization and funding of R&D activities. The third focus of benchmarking is on how R&D activities are part of and integrated with teaching and learning and how R&D activities are linked and related to the regional and economical development. The report also contains examples of R&D from each UAS involved in the project. The case examples are selected randomly from different fields of research to give a multiple view. In the end of the report the good practices and development challenges in R&D of UAS are discussed and compared.

3 General description of UAS in the Netherlands, Belgium, Germany and Finland

3.1 The Netherlands

The higher education system in the Netherlands is based on a three-cycle degree system, consisting of bachelor's, master's and PhD degrees. The three-cycle system was officially introduced

[1] FINHEEC web-pages: www.kka.fi/english
[2] Hiltunen, K. & Kekäläinen, H. (toim.) Benchmarking korkeakoulujen laadunvarmistusjärjestelmien kehittämisessä. KKA:n julkaisuja 5:2008. Helsinki.
[3] See Annex 3: Benchmarking matrix

in the Netherlands at the beginning of the academic year 2002–2003. The Netherlands has a dual system of higher education, which means there are two types of programmes: research oriented education (wetenschappelijk onderwijs, WO), traditionally offered by research universities, and applied sciences (hoger beroepsonderwijs, HBO), traditionally offered by hogescholen, in English, universities of applied sciences.

The higher education system in the Netherlands was renewed by Bologna process in 2002 to Bachelor- and Master-programmes. A graduate of a profession-oriented Bachelor programme is sufficiently equipped to be able to work at a high level position, but can also progress to a Master study programme. Universities of applied sciences have been able to offer Master programmes since 2002. The range of programmes available is growing rapidly. In most sectors, Master programmes are offered for students with several years' work experience. In the arts, education, health care and social and community work sectors, Master programmes are funded by the government. In the economics sector in particular, Master programmes (MBAs) are full-fee paying. The Dutch universities of applied sciences are working hard to significantly extend the range of programmes in the future.

Most of the universities of applied sciences are multi-sectoral. They sometimes have more than 30 000 students. But there are also mono-sectoral smaller UAS offering an education in one field, such as teacher training or agriculture. Altogether there are 41 universities of applied sciences and 14 research universities in the Netherlands. Two thirds of all the students in higher education are enrolled at UAS. In the last ten years, the number of students enrolled for programmes at universities of applied sciences has increased by 34 %.

3.1.1 Fontys Hogeschool, Eindhoven[4]

The main campus of Fontys Hogeschool is situated in Eindhoven but there are three other campus areas in Southern part of the country, in Limburg, Tilburg and Venlo. Fontys has about 39 000 students in total of 36 institutes. The number of staff is 3 500, out of which 2 500 belong to teaching staff.

At present Fontys offers over 200 Bachelor programmes and 40 Master programmes. Besides teaching in Dutch there are 18 English degree programmes and some German degree programmes. The institutes are independent in their curriculum development and teaching as well as in their R&D activities.

The degree programmes are formed with major and minor studies. For example, Bachelor degree includes one major and two minors. Major studies are comprehensive and based on core competences of the profession. Minors offer an opportunity for widening and/or deepening skills and specialization. A minor can also consist of an international project or of an R&D project. The minors are offered not only within Fontys but any higher education student in the Netherlands can apply for minor studies at Fontys.

The pedagogical strategy of Fontys is based on context based learning and competence based education. Cooperation with work life is both a necessity and a basis for developing education.

[4]See http://www.fontys.nl

The student-centred model focuses on the skills and competence development and thus e.g. portfolio is one of the key methods of evaluation of learning.

3.2 Belgium

Universities and university colleges, in this text called UAS (in Flemish: ”Hogescholen”) offer higher education programmes. The UAS in Belgium differ depending on whether they are situated in the French or Flemish community. In the French community there are 30 UAS (École supérieure), four higher education institutes for architecture (Institut Supérieur d’Architecture) and 16 art institutes (Établissement d’enseignement artistique and Établissement supérieur de la musique et des arts de la parole). In the Flemish community there are 24 UAS (Hogeschool) and in the German community three UAS (Hochschule).

The Professional Bachelor courses are only provided by UAS (university colleges) and are oriented towards professional practice. As in Finland and in the Netherlands the professional bachelor is trained to immediately enter the labour market.

But in Belgium both university colleges (UAS) and universities offer Academic Bachelor courses, which prepare students for Master courses and thus do not give a direct qualification in the labour market. Master courses are offered by universities and university colleges participating in an association faculty. Master courses are always academically oriented but some have also a professional orientation (doctor, engineer, pharmacist, translator, interpreter, physiotherapist…).

A diploma of an Academic Bachelor course is a general prerequisite for an entry to a Master course. But a Professional Bachelor can take a Master course after completion of a bridging programme. Colleges of higher education and universities autonomously set up this programme which amounts to a minimum of 45 credits and a maximum of 90 credits. Qualifications and competencies acquired elsewhere can reduce the bridging programme to 30 credits or less.The new structure of higher education ensures that transfer from one type of education to another is possible thanks to bridging courses between universities and university colleges (UAS).[5]

3.2.1 Provinciale Hogeschool Limburg, Hasselt[6]

Provinciale Hogeschool Limburg (PHLimburg) is situated in the Flemish community in the north-east part of Belgium, only 60 km from Eindhoven. In PHLimburg there are about 4 000 students in six institutes: biotechnology, health care, business, architecture and art, education and music. In health care department education the pedagogy is based on problem based learning. In all educational fields cooperation with work life as well as multidisciplinary projects are in the core of education.

PHLimburg offers a total of 18 Bachelor-programmes and three Master-programmes in an association faculty with a university. The Master programmes comprise architecture and interior design, art and physiotherapy[7]). The academisation process is requiring more inputs from UAS to research and development activities and to the production of research publications.

[5]Source: Education in Flanders. The Flemish education landscape in a nutshell 2008. Available at http://www.ond.vlaanderen.be/publicaties/eDocs/pdf/120.pdf

[6]See http://www.phl.be

[7]From the Finnish point of view, it is an interesting detail that in Belgium physiotherapy is a Master degree programme when in Finland it is a Bachelor degree programme.

3.3 Germany

The higher education system in Germany is also divided between research universities and universities of applied sciences (Fachhochschule). Largely the education follows the two-level higher education structure with Bachelor and Master -degrees. In the end of 2005 already one third of the traditional Diploma and Magister Artium -educations had been substituted by Bachelor and Master degrees. The aim is that the old degree programmes will be totally changed by 2010.

Bachelor-degree gives qualification for a profession and the aim is that most of the students would enter the work life directly after graduation and then maybe later on continue for Master degree. Usually the students continue their studies within the same kind of institute, either UNI or UAS, from where they have graduated from, but in theory it is possible to apply for a Master degree in a university after graduating as a Bachelor from UAS and vice versa. The Master -graduates from UAS can also apply for PhD studies in a university since the universities select their students independently.

3.3.1 Fachhochschule Dortmund, Dortmund[8]

Fachhochschule Dortmund is situated in the Western part of Germany, near Belgian border, in the state of North Rhine-Westphalia The population in the state is 5.4 million, the region having one of the highest population densities in the whole of Germany. The city of Dortmund has 650 000 inhabitants. Fachhochschule Dortmund is a multidisciplinary UAS, which gives education in architecture, design, information technology, electronics, communication and information technology, engineering, social sciences and economics. The educational structure has changed from the former Diploma-education (4.5 years) to three year Bachelor and two-year Master degrees. There are altogether about 9 500 students and 270 staff members, of whom 220 belong to teaching staff.

The Dortmund region is situated within the famous Ruhr area with its coal and steel industry and breweries. The area has been suffering from mass unemployment which is till now at the level of over 15 % (in the city of Dortmund 20 %) due to the structural change from heavy metal industry towards high technology and service economy. From 1980s onwards the higher education institutes, enterprises, Economic chamber and the city of Dortmund have cooperated together to enhance new knowledge and innovation based economy. The role of local higher educational institutes has been extensive. The area has become a kind of ”laboratory for scientific know-how”, in which the higher educational institutes have a central role in knowledge development.

3.4 Finland

In Finland the Universities of Applied Sciences (UAS) were founded during 1990s, relatively late compared to most countries in Europe. In the Finnish higher educational system UAS and universities have their own roles and educational profile. The UAS give education for a professional Bachelor-degree (210–270 ECTS, 3.5–4 years, depending on the programme). There is a limited offer of Master programmes (60–90 ECTS) in UAS. To enter a Master programme in a UAS requires a minimum of three years of work experience after a professional Bachelor degree. In this respect, the Finnish UAS differ from the UAS in Western Europe where the education can be continued to the Master level directly after the Bachelor degree.

[8]See http://www.fh-dortmund.de

Presently there is a process on to develop cooperation between UAS and UNI in education as well as in research and development activities. Another development process is the reforming and merging of higher educational institutes into bigger units.

Research and development activities were included as part of functions of UAS in 2003 by legislation. The UAS in Finland have organized their R&D activities in different ways, some within the degree programmes, and others by establishing specialized R&D units. The profile and focus of R&D is under constant discussion in the Finnish higher education system: whether the UAS should focus on development projects linked to regional and local development or whether the focus should be on the more academic research.

The UAS involved in this benchmarking project are described in brief in the following subchapters.

3.4.1 PIRAMK University of Applied Sciences, Tampere region[9]

PIRAMK University of Applied Sciences was established in 1997. PIRAMK is a regional, multidisciplinary, service sector-oriented higher education institution located in the Tampere Region in Finland. In PIRAMK there are approximately 4 000 students and 400 staff members. The units of PIRAMK are located in the city of Tampere and in the towns of Ikaalinen, Mänttä and Virrat. The four clusters of PIRAMK University of Applied Sciences define the special fields of interest in education as well as R&D.

The clusters are
- Wellbeing Services
- Wellbeing Technology
- Business Administration and Tourism Services
- Cultural Services

There are 17 degree programmes of which three are taught in English (degree programmes in Nursing, Social Services and Tourism) leading to Bachelor Degrees. In addition, three Master Degree Programmes are offered in social and health care field. These are Degree Programmes in Development and Management of Health Care and Social Services, in Health Promotion and in Well-Being Technology. In addition to degree-awarding education, PIRAMK University of Applied Sciences organises plenty of further and continuing education, professional specialisation studies and open instruction.

The research and development services of PIRAMK University of Applied Sciences support the development of working life and along with it, the renewal and development of the province and municipalities in the region.

3.4.2 TAMK University of Applied Sciences, City of Tampere[10]

TAMK is located in the city of Tampere and it offers Degree Programmes in Technology, Business Economics, Art and Media, Natural Resources and the Environment. TAMK provides internationally competitive education to meet the needs of business life, society, and students. There are 5 000 students, 400 staff members, and 300 part-time lecturers at TAMK.

[9] See http://www.piramk.fi
[10] See http://www.tamk.fi.fi

The studies at TAMK lead mainly to Bachelor's degrees. Furthermore, TAMK offers six Master's programmes. There is also a Teacher Education Centre (TAOKK), which offers teacher education for teachers at universities of applied sciences and other professional institutions. In total TAMK offers 22 degree programmes out of which three are taught in English. Additionally, there are some one- to two-semester programmes in English.

The learning environment at TAMK is continually being developed to become more international by emphasising the mobility of students and staff. Increasing the number of international projects and courses in foreign languages has been a steady trend. Close links to university partners and the working life help to reach innovative solutions in research and development. The intention is to involve teaching staff and students in R&D as much as possible.

The education offered at TAMK provides a solid base for the skills needed in order to meet the various research and development needs of today's business world. TAMK's staff operates actively in collaboration with companies and other bodies in diverse projects. This collaboration with the working life takes place through teaching, studies, development projects, continuing education as well as expert exchange. TAMK also participates in the Tampere Region Centre of Expertise project, which supports the development of a knowledge intensive business environment in the City of Tampere.

3.4.3 SeAMK University of Applied Sciences, Seinäjoki[11]

Seinäjoki University of Applied Sciences, SeAMK, is a multidisciplinary, regional institution of higher education. SEAMK was one of the nine first UAS to be granted a permanent status in 1996. Since then, the activities of SeAMK have grown because the number of students has increased and new degree programmes have been introduced. In 2007 the institution has a total of almost 4 600 students

SeAMK provides courses aiming at high-level professional qualification in the fields of social sciences, business and administration, culture, technology, communication and transport, social and health care, tourism, catering and domestic services.

The educational activities of SeAMK, and research and development based on them, aim at supporting business and service activity based on Ostrobothnian entrepreneurship and requiring high-level know-how. The interaction between SeAMK and working life and the business life in the region is exemplified by such units of Seinäjoki University of Applied Sciences as SeAMK Library, Seinäjoki University of Applied Sciences Social and Health Care Research and Development Centre SoTe, SC-Research and by extensive adult education activities.

3.4.4 Svenska yrkeshögskolan University of Applied Sciences, Vaasa[12]

Svenska yrkeshögskolan University of Applied Sciences is one out of three Swedish speaking UAS in Finland. Therein, it answers to the need for Swedish speaking skilled labour force as well as regional development in the bilingual region of Ostrobothnia. About half of the degree programmes are the only ones of their kind in Finland that are provided in Swedish; the other half has equivalents in one of the two other Swedish-speaking UAS in Finland.

[11] See http://www.seamk.fi

[12] From 1.8.2008 Svenska yrkeshögskolan UAS is merged with the Yrkeshögskolan Sydväst UAS, located in Turku (Åbo), Ekenäs (Tammisaari) and Helsinki (Helsingfors). The new UAS is called Novia University of Applied Sciences. See http://www.novia.fi

Today, the SYH UAS has approximately 200 employees and approximately 1 800 students, most of who are situated in Vaasa (Vasa). Cultural studies are also provided in Nykarleby (Uusikaarlepyy) and Jakobstad (Pietarsaari). Approximately 85 % of the students will stay in the region after having completed their studies.

The SYH UAS is divided into three units: Technology and Communications, Health Care and Social Welfare and Culture. Together, they offer a total of 20 degree programs on Bachelor's level. In addition, there are two Master's degree programs since 2007, one in Health Care and one in Technology. R&D activities are upheld at all units in cooperation with education and working life, as well as with other universities and UAS in Finland and abroad. Within technology and communications, the SYH UAS shares joint laboratories with the Vaasa UAS and Vaasa University, having together a total of 3000 students in technology orientated studies in Vaasa.

4 Purpose of R&D, organization and funding models in comparison

The purpose of R&D varies according to UAS and their educational profile as well as their regional location. Also the organization of R&D activities differs from centralized models to professor or institution – centred model. In the following the organization models of each benchmarked UAS from Western Europe are compared with those of UAS from Western Finland. In the end of the chapter the organization models and the main spear heads of R&D are compared by a comparative table.

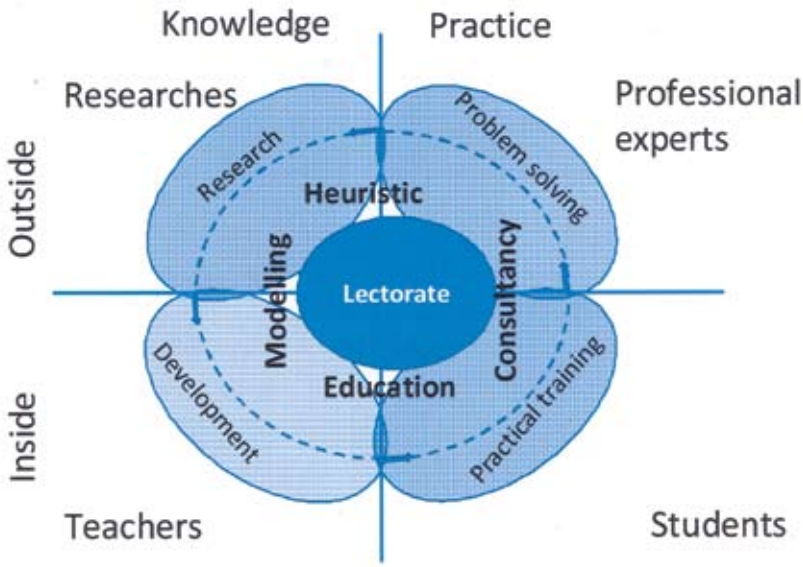
4.1 Fontys Hogeschool: D(evelopment) before R(esearch)

Applied research was not part of UAS functions in the Netherlands until it was allowed by the legislation in 2005. Before the renewal UAS were considered to be "teaching universities". The role of research differs from traditional universities which concentrate more on basic research than applied research and development.

The main focus areas of R&D at Fontys are professional innovations, development of professional competence and curriculum development. The R&D activities concentrate on humanistic and educational sciences, economics, engineering and arts. Each of these fields has their own research programmes. From 2001 onwards there has been a possibility to found specific "lectorate chairs" for R&D. The lectorate acts as a leader of the research and development activities of a certain field. At the traditional universities the lectorates would be called professors, but yet this has not yet been accepted "title" for UAS. The lectorate is nominated for four years with a possible extension of another four years. Lectorates are assigned to a knowledge centre and are often involved in the university degree programmes in their areas of expertise.

Knowledge Centres are multidimensional and multidisciplinary research and development units which focus on special field; "Innovation Management" and "Sustainable Urban and Regional Development" are two examples of these at Fontys. In the Knowledge Centre researches, teachers, professionals and students work together.

The working model of Knowledge Centres has been described by the following picture.



Picture 1. The Knowledge Circle model in Fontys UAS

From 2005 onwards the doctoral students as well as teacher-researchers have cooperated in the joined R&D projects within UAS and universities. Besides Fontys Graduate School offers e.g. joined methodological courses for Master and PhD students. From 2007 onwards experienced professionals from work life have also been hired to bring know-how and professional experience for R&D projects.

4.2 PHLimburg: Professional competence and academic research

Under the new higher educational policy in Belgium the accredited Master programmes from UAS will be joined under university faculties. Because of this there is at present a trend towards increasing the amount of both academic and applied research within UAS. In Bachelor programmes the focus in R&D is on competence development and regional cooperation with work life, but in Master-programmes R&D activities aim also at academically high level research.

This is one of the reasons why in PHLimburg, the organization of the research and development activities has been coordinated under the Research and Innovative Services Unit.

Picture 2. Organization of R&D at PHLimburg

The unit coordinates the research and development activities, forms the strategies and approves research project proposals. DOP unit supports project administration, e.g. by assisting researchers and degree programmes in designing projects, building consortiums and cooperating with enterprises. PHL-Congress organizes training, seminars and conferences.

At PHLimburg R&D activities are organized in four research institutes, which concentrate on ICT, logistics, architecture and health and rehabilitation.

- TINFO (Research Institute on Applied ICT) concentrates on ICT research cooperating with enterprises; the central focus area are mobile technology and wireless systems
- Log-IC (Research Institute on Logistics) develops logistics systems and ICT solutions within the field
- ArcK (Research Institute on Architecture and the Arts) -institute's research areas are graphic design, architecture, interior design and visual presentations in all their forms
- REVAL (Research Centre for Health Care and Rehabilitation) -institute aims to develop care and rehabilitation in neurological disorders, and technology and services in rehabilitation in general and in preventive health care

About one third of the research projects are multidisciplinary which is also one of the development aims within the R&D. International R&D projects are carried out in cooperation with other universities. In the chapter 5 one of these is described as a case example.

4.3 Fachhochschule Dortmund: Higher education institutes as regional developers

The functions of higher educational institutes within Dortmund region are seen as education, research and development and transfer of innovation and technology. The main focus areas of R&D are regional development, job creation and knowledge development as well as innovation creation and support of innovative spin-offs. Research and development is regarded an investment for the future.

The focus areas of R&D at FH Dortmund lie strongly on engineering, due to its situation in the core area of technological industries in Ruhr. The central interest areas are communication technology, information technology and its applications e.g. in health care, mobile technology and e-business, car engineering and also architecture and social sciences.

R&D activities take place in different institutions and depend highly on the interests of professors and researchers. Project activities are supported by R&D coordinating unit and Transfer Office. Their role is to support and advice professors, teachers and researchers to formulate projects and assist in finding funding. Transfer office has an intermediate role between university and entrepreneurs and work life supporting e.g. spin-offs and patenting.

4.4 UAS from Western Finland

4.4.1 PIRAMK University of Applied Sciences

R&D activities at PIRAMK University of Applied Sciences in Tampere Region are organised within an individual unit called R&D Services. The unit is led by R&D Director who is also a member of the board of PIRAMK. The personnel of the unit consists of permanent administrative staff, programme managers, project managers, project assistants, and teaching staff responsible for the part of teaching administrated by the R&D unit. The integration with the education is guaranteed by close co-operation and involvement of principal lecturers, teachers and students in the R&D projects and activities.

The focus areas of the R&D activities are characterised by five competence development programmes: Wellbeing Services and Technology, Management of Networks and Services, Experience Services, Service and Product Development Programme PractiCo, and Education Services. The joint themes for all these programmes are human-centred approach and focus on different kind of services and the processes involved. Each programme hosts several projects, which in many cases include multidisciplinary elements thus crossing the borders of individual programmes. Education services provide further and continuing education, personnel training, and open higher education to a large clientele.

The main sources for project funding include European Regional Development Fund, European Social Fund, Finnish Workplace Development Programme, Finnish Funding Agency for Technology and Innovation, and other European Union funding sources. Also national ministries, regional organisations, municipalities and companies provide funding for different types of activities.

4.4.2 TAMK University of Applied Sciences

TAMK's research and development projects combine the skills of the experts from the different fields of technology and business as well as from the media, art and education sectors.

There is a close connection between R&D activities and teaching. The topics of the research projects are closely connected to the development of the educational contents. Both teachers and students take part in preparing and implementing R&D projects.

The primary focus of TAMK's R&D activities is on promoting regional development and the operations of SMEs through applied research and development which is based on internationally

esteemed expertise in the chosen focus areas. The expertise gained through research and development projects also makes it possible to develop the contents of teaching in a manner which enables TAMK students to benefit from the latest information and methods.

The three strategic R&D programmes of TAMK are ”Good living environments”, ”Digital services and technologies” and ”Future machines and systems”.

In 2007, the total volume of R&D activities was 2,5 million euros. This corresponds to 10 % growth from 2006. One third of the externally funded projects are direct R&D assignments from companies, one third is supported by Finnish public research funding and one third is EU-funded R&D projects. TAMK’s own R&D funding is directed towards strategic research topics and development targets.

4.4.3 SeAMK University of Applied Sciences

Seinäjoki University of Applied Sciences in South Ostrobothnian Region has organized its research and development under the brand ”SeAMK Research and Development”. The organization consists of five educational units in Seinäjoki University of Applied Sciences and a University Library. Research and development work is done by the University Units which are: SeAMK Culture, SeAMK Social and Health Care, SeAMK Business and Administration, SeAMK Technology, SeAMK Natural Resources and Forestry and University Library. The R&D-personnel of SeAMK Research and Development consists of R&D managers, principal lecturers, lecturers, researchers, project managers and other project personnel. SeAMK Research and Development is organized and coordinated by research director, research manager and service manager.

The focus areas of R&D-activities are characterised by three ”Spear Heads” and seven ”Peak Areas”. Spear Heads are: Entrepreneurship and Leadership of SMEs, Developing the Welfare Technology and Services and Optimization of Production. Peak Areas are: Business, User Centered Product Development, Welfare Technology, Application of Intelligent Technology, Experience Production, Agro Technology, and Technology of Food Production.

The aim of R&D-services is to support business and service activity based on Ostrobothnian entrepreneurship. Seinäjoki University of Applied Sciences has rapidly become an efficient actor in the field of education in the region of South Ostrobothnia and plays an active and responsible role in various international and national development projects as well as in the development of the surrounding region. A growing part of R&D-activities is integrated into study courses.

The R&D-budget in Seinäjoki University of Applied Sciences is about 4.8 M€. Project funding comes from national and international sources e.g. national ministries, municipalities, local and national organizations.

4.4.4. Svenska yrkeshögskolan, University of Applied Sciences

Research and development in the Svenska yrkeshögskolan University of Applied Sciences is organized within as departments of the three units of the UAS; each unit has its own R&D department with its own budgetary responsibility. In the technology & communication and health care & social welfare units, the department of R&D is managed by R&D directors, whereas R&D of the somewhat smaller cultural sector is coordinated by a coordinator. Together with unit manag-

ers, the R&D directors and the coordinator form an R&D team. A member of the R&D team is appointed overall coordinator of UAS's R&D activities.

R&D activities focus both on activities in cooperation with working life and activities in cooperation with the degree programs and other educational and research oriented organizations. Cooperation with working life is maintained through a number of different channels and strategies, including research projects, development projects including processes and applications, evaluations – and occasional consultancy work. Teaching staff and students are involved especially in research and development projects, some of which are coordinated from within the degree program.

Within technology and communications R&D activities focus primarily on energy and environmental technologies, though information technology is emerging as a field of competence. In addition, there is a strong competence in mathematics, physics and chemistry. Within health care and social welfare the SYH UAS has four main focus areas: elderly care, competence development, leadership and management and methods development, including evaluation strategies. Within cultural studies the two main focus areas are cultural identity and media and design.

R&D is mainly financed by external resources; EU interregional funding is one of the main financers, followed by ministries, municipalities (especially in respect of health care and social welfare), companies and NGOs.

4.5 Funding of R&D activities

In all of the visited countries in Western Europe there existed either national or regional funding systems for R&D within UAS. This was something which was different compared to Finland where there is not a special "earmarked" funding source available yet.

In the Netherlands the main funding source for R&D is RAAK (Regional attention and action for knowledge circulation) project funding. RAAK is a national funding system for regional development. It is targeted especially towards the development projects to boost small and medium sized enterprises (SMEs) but also renewing social and health services.

During 2007 the RAAK budget was 20 M€ but it is planned to be increased to100 M€ in the near future. RAAK funding is channelled to UAS which then execute the R&D projects together with enterprises and public agencies. Maximum funding for SME projects is 300 000 euros/2 years and for projects within public sector 250 000/2 years. During 2008 starts a new funding programme RAAK Pro, in which the maximum funding is 500 000/four years. The minimum number of e.g. SMEs involved in a RAAK project is 10. The planning of RAAK -projects is time consuming and demanding, thus Fontys is developing methods to allocate resources also to making project proposals. The key personnel involved in project planning are the previously mentioned lectorates.

Besides regional and projects within the Netherlands Fontys is also active in international cooperation and R&D projects. For these activities Fontys has a special International Office.

In Belgium the important source of R&D funding comes from regional Innovation Ministry. In 2007 PH Limburg received over 1 M€ for its R&D activities and the sum is expected to increase in the following years. The amount depends on e.g. the number of publications and conference

presentations, thus the criteria are comparable with those of universities. The funding is divided into two ”baskets”: for academic and for applied research. The amount of funding for an individual project varies generally from 30 000 – 50 000 euros. The decisions of funding are made by the Directing Committee based on the recommendations by DOP.

The universities and UAS are competitors when applying funding for their R&D activities. Within the association faculties universities and UAS can apply funding together for their R&D. The advantage of UAS in relation to funding is its close relation with work life, especially with private sector. Only a very small part of R&D funding comes directly from enterprises.

Fachhochschule Dortmund does not have a special budget for R&D. From the general funding from the Ministry of Education 20 % is achievement based and this share is also used for R&D activities. During 2007 the R&D share of R&D activities from the budget was 200 000 €. Nowadays also a part of the students' term payments (500 euro/term/student) is used for R&D activities.

The new funding source for UAS working in the Dortmund region is called TRAFO. The funding programme supports R&D between enterprises and UAS. In this funding system the resources are allocated to UAS but the results gained are ”donated” to the participating enterprises. FH Dortmund has also recently established a separate company through which the professional expertise and know-how can be sold to private market. Before this the professors of FH Dortmund used their own companies for this, now this can be channelled through the UAS.

The newly established Innovation Allianz joins all the universities and UAS within North Rhine-Westphalia together. The main function of this Allianz is to join forces to find funding from e.g. ministries and enterprises for new R&D activities to promote the economic activity and employment within the area. This cooperation is seen as a potential to enhance the volume of R&D within the higher education.

For the Finnish UAS, R&D activities are mostly funded by external funding sources including European Social Fund, European Regional Funds, and other international sources as well as by funding granted by regions and municipalities and regional innovation centres. In average about two third of the R&D funding is generated by competitive applications and tendering from outside sources. The Ministry of Education allocates yearly some funding for R&D activities based on the applications from the UAS. In Finland there is a lack of special funding sources for R&D from regional or national funds.

4.6 Comparing organization and funding of R&D

In all of the compared UAS, R&D activities were organized in different ways. The most centralized model with coordinated planning and management unit and specialized research institutes existed at PHLimburg in Belgium. Also the multidisciplinary and multi-sectoral projects were focused more at Limburg than in the other UAS. The educational structural change towards both bigger higher educational institutes as well as partly merging with universities had probably affected the focus on academic research and criteria in R&D as well as the need for further education of teachers.

In Germany R&D activities have been part of UAS over 10 years and were based on professors own research interests. Especially in the region of Dortmund R&D activities were connected to regional economic development and cooperation with work life.

In the Netherlands R&D activities have been developed within the framework of applied research and development projects initiated and executed within professional field. With the Knowledge Centre -structure Fontys has developed the cooperation model with teachers, researchers, students and professional staff which supported both the development needs in practice as well as in education. Fontys' publication strategy also supported the same basic ideology of connection to the work field. The research and development projects were urged to be published in internet and other forms having a lowest possible threshold for access. Instead of competing with traditional universities in the same publication forums, Fontys stressed transparency and dissemination in its publication strategy.

The Finnish UAS differ from each other especially in regard to their R&D organization. The most centralized system of organization of R&D is in PIRAMK where there is a separate R&D Unit which also is managing the further and continuing education besides R&D activities. In other UAS the R&D activities are coordinated by R&D managers from different degree programmes or educational fields.

5 Examples of R&D projects

Some case examples of R&D projects are presented in the following pages. These case examples have been selected on a random basis, so there is no evaluative approach in the selection process. The criterion for selection was to pick up different types of R&D projects from various educational fields.

5.1 Fontys Hogeschool

Examples of the cooperation between Fontys Hogescholen and regional SME's financed by the RAAK programme

SME applications of polymer electronics

The lectorate in functional polymers formed the basis for this cooperation with industry and SME's. Polymer electronics is a hot topic in the Brabant region, and several industries, among them Philips, are working with the technology.

In the projects, techniques like spin coating, inkjet printing and sputtering were investigated.

Projects are realized through contract research, exchange of information, excursions, practical training, and student involvement.

The consortium included OTB Engineering BV and Syntens Eindhoven.

SME applications of vision technology

This project involved several of the lectorates at Fontys. Vision technology deals with the acquisition of digital visual information, as well as interpretation and utilization of this information.

Projects were realized by multidisciplinary teams at Fontys involving both teachers and students, in cooperation with companies. Activities included testing of new applications and products, as well as testing of new concepts from a physical and technological point of view.

Projects included courses, knowledge exchange, and student involvement.

The consortium included Groep Technische Automatisering and Syntens Eindhoven.

Smart Materials

This research program focused on synthetic and composite materials. The projects were concerned with intrinsic properties of the materials, their production methods and recycling possibilities.

An important goal was the formation of study circles for the exchange of knowledge between participating SME's and the UAS. The exchange focused on product innovation, process innovation and sustainability.

The consortium included Federatie Nederlandse Rubber- en Kunststofindustrie and Syntens Eindhoven.

Towards an increased participation in the knowledge exchange

This program was divided into four subprojects involving OEM industry, subcontractors in the Metalelektro industry and Limburgse Werkgevers Vereining.

The goal was to perform analyses of companies, and using the results to create action plans. Good practices were gathered with respect to sustainable entrepreneurship.

High-level groups were formed with Limburgse Werkgevers Vereining that meet regularly in order to reflect on strategic choices. The consortium also included Stichting het Metaalhuis and Syntens Eindhoven.

Source: RAAK werkt door! 81 Innovatie-projecten in het mkb en de publieke sector. Stichting Innovatie Alliantie, den Haag 2007.

Case story written by Sten Engblom from Novia University of Applied Sciences.

5.2 PHLimburg

Transnational cooperation for research, education and service to meet community based problems in the Gilgel Gibe area in Ethiopia

Recently the department of Health Care of the PHLimburg has become involved in a long term international Institutional University Cooperation (IUC) with the Jimma University (JU) in Ethiopia and different Flemish universities. The project is sponsored by the department of developmental cooperation of the Flemish Interuniversity Council (VLIR-UOS). Aim of these North/South cooperation projects is to promote transnational cooperation between Flemish institutions in research, education and service to meet community based problems in the South in a structured way by promoting.

The IUC JU consists of 7 subprojects (website: www.iucju.ugent.be) and the overall focus is the impact of the Gilgel Gibe hydro-electric dam on human and animal health, ecology and agronomy. Multidisciplinary research is undertaken in the Gilgel Gibe area to improve the quality of life of the communities. The department of Health Care is involved in subproject 2 "Child health and nutrition" in cooperation with the University of Gent and the Institute of Tropical Medicine in Antwerp.

Ethiopia has indeed a long history of food insecurity and nutritional problems. Nearly 60 % of deaths of children under 5 years are due to the problem of malnutrition. The children who survive the first 2 years may show developmental delay. Therefore the main objective of this topic is to improve growth and development of these target children. A second goal is to empower the research and educational capacity of the JU staff (Department of Paediatrics, Obstetrics, Population of Health Family, Chemistry, Agriculture, Health Officers, Health Education and Behavioural Sciences) involved in the topic "Child Health and Nutrition". This is planned by strategies to improve complementary feeding, rehabilitation of the functional and adaptive skills of the child, education of the health workers in patient centred care to the caregivers and children and decentralising the management of malnutrition to first line health services. Planned feeding interventions will also be linked with improved household food security. To do so teachers from 5 different programs (physiotherapy, nursing, occupational therapy, midwifery and creative therapy) within the department of Health Care of the PHL collaborate together in a multidisciplinary way.

Case story written by Marita Granitzer from PHLimburg.

Adventure Therapy

R&D within the PHL is basically organized as Project-orientated Scientific Research (PWO), as well as within five interdisciplinary institutes. Of these, REVAL is primarily focussed on (interdisciplinary) research within the field of health care service. Among ongoing PWO-projects at the UAS, health care and social welfare is fairly well represented. Projects deal with, for instance: nutrition and

pregnancy; registration of meals in hospitals; the effect of revalidation of patients with neuro-motoric dysfunctions on their contentedness and quality of life; the use of micro-electro therapy for therapy resistant wounds; work integration of oncological revalidates; and research on the effects of "adventure therapy" on youth with socio-emotional problems.

In respect of adventure therapy, since a few years, adventure camps have been organized for children with emotional and behavioural problems in order to deal with some of the problems influencing their every-day life. Therein, the intention is to find tools, through adventure therapy, to deal with problems at hand, and to transfer new patterns of behaviour into ordinary life on a long-term basis. During the adventure camps, children are expected to experience emotions of anxiety, fear, friendship and belonging, and they will be expected to identify and deal with their own emotions and behavioural challenges through the excitement they experience. The adventure therapy approach also includes actively involving teaching staff and parents, and their reactions to the youth, in the process of therapy, therein aiming at implanting long-lasting effects on the interaction between the children/youth and their immediate surrounding.

It appears that positive results are likely to be gained for all parties included, however the effects may not at all times be long-lasting. For instance, teachers may easily fall into old patterns of behaviour after some time has passed, challenging the child in his/her development towards new behavioural patterns. In addition, it also appears that the process of validating the results is a difficult one. There is a vast range of other factors influencing the emotional and behavioural development of youth; vast differences in age and background of the participants, and the fact that interventions are time consuming reduce the possibility of large numbers of interventions to enhance the process of evaluation.

In this project, both students and staff members are included. UAS students participate in the adventure camps whereas staff members carry the main responsibility for the analytical and development work.

Contact person: Piet Vandebriel, Email: pvandebriel@mail.phl.be

Case story written by Susanne Jungerstam-Mulders from Novia University of Applied Sciences.

5.3 Fachhochshule Dortmund

R&D related to car engines

Manufacturing of cars and their engines has long been an important part of the German industrial economy. Many big companies have their factories in the Ruhrgebiet area close to Dortmund. Although the Ruhrgebiet has undergone a comprehensive economical and industrial transformation during the last twenty years, new industries based on ICT and electronics are not likely to completely replace the more traditional car manufacturing and related industries. The region is a world class centre of excellence on car and engine manufacturing, and it is part of the regional strategy to build on this expertise.

Car traffic is an important issue in Western Europe. Crowded roads and pollution caused by cars are problems which urgently require innovative solutions. Development of car engines with better environmental characteristics is one of the main objectives along the road towards sustainable traffic solutions.

Car engine research is one of the four research fields of the Department of Machine Engineering. The research is led by Prof. Dr.-Ing. Ulrich Hilger, who has 20 years experience from car engine manufacturing and research. The engine laboratory of FH Dortmund Fachbereich Maschinenbau is well equipped to support R&D projects.

Prof. Hilger's group has developed a natural gas diesel engine (DING: Direct Induction Natural Gas). The first version has been put in a VW Caddy and is now in daily use. However, there are a number of technical issues to be solved before the DING engine is ready for wider use. Parallel use of ordinary diesel fuel and natural gas in the same engine would be the most important further development. In his current projects, Prof. Hilger is focusing on the development of such an engine.

The development of the DING engine started in 1996 with a R&D project funded by the Volkswagen corporation. The work continued with projects funded by German Environmental Authority and the German Gas Industry. After these projects, Prof. Hilger could not get further support from German companies and funding organizations for his research which has long-term goals with fewer possibilities for short-term benefits. He decided to look for foreign partners and found the Canadian company Westport, which is the world leading manufacturer of direct induction gas engines. The DING R&D work continues now as a joint project with Westport Germany GmbH. Gas engine markets are rapidly expanding in North America, and Westport is now looking for a more widespread use of gas engine technology also in Europe. In addition to joint R&D, Westport is also using FH Dortmund to test their engines and adapt them to the European markets.

The car engine R&D of FH Dortmund is based on the engine manufacturing traditions and know-how of the Ruhrgebiet companies and universities. It is also very well linked to regional strategies, the needs of the society, and global environmental objectives. Therefore, it is a good example of a suitable R&D topic for a university of applied sciences.

Case story written by R&D Director Perttu Heino from TAMK University of Applied Sciences

5.4 PIRAMK

HyNä – Wellness at Work Project Supporting Wellbeing of SMEs and Their Personnel in the Area of Technology Industries

The HyNä – Wellness at Work Project was run in the Tampere Region in 2004–2007 in co-operation with four partner organisations: Technology Centre Hermia Ltd. (coordinator), Hermia Business Development Ltd., PIRAMK University of Applied Sciences, and Tampere University of Technology. The project was funded by European Social Fund EQUAL Programme which brought along international co-operation with the SME Net Project with Belgian and Polish partners. In spring 2008, the European Commission selected HyNä to be presented by film reportage as a good project example funded by the EQUAL Programme.

The starting point of the HyNä Project was to help small machine and metal industry enterprises in the Tampere Region to enhance their productivity and to confirm their existence in the changing operational environment. The basic idea was to get the enterprises to commit themselves to the goals of the project by developing their business skills, subcontracting and co-operation networks as well as professional education and wellbeing at work of the personnel.

Over 50 SMEs participated in the development partnership activities within the project. The state of the art of each SME was analysed separately and, consequently, appropriate development processes and methods were applied in order to support and enhance the competitiveness of the enterprise. In addition to the individual development plans for enterprises, also several tools and products were produced which are available for all interested people and organisations.

Contact person: Lecturer, Project Manager Hannele Rapatti, PIRAMK University of Applied Sciences, email: hannele.rapatti@piramk.fi

Regular Nordic Walking May Reduce the Risk of Falls of Elderly People

PIRAMK University of Applied Sciences in Finland and Tohoku Fukushi University in Japan are investigating how the structured long-term Nordic walking exercise program affects mobility, balance and physical condition of the elderly.

Japan is the fastest ageing nation in the world and currently there are 32 000 centenarians in Japan. The study carried out in Japan involved two groups of 20 Japanese people over the age of 65 (experimental group and control group). After baseline measurements the members of the experimental group participated for eight weeks in supervised Nordic walking practice. The balance measurements were supervised by the Finns and muscle strength and well-being evaluations will be done by the Japanese. The final measurements have been taken and the results are analyzed in spring 2008.

The participants were very enthusiastic about the experiment even though Nordic walking is a totally new form of exercise for them. The effects of Nordic walking on their mental wellbeing will also be evaluated.

If Nordic walking reduces the risk of falls in the elderly, it is safe and cost effective exercise and it gives new ways for health promotion, supports independent living and reduces fall risk globally. The effects of Nordic walking have been shown to be similar on a global level regardless of the elderly person's cultural environment.

The research project was originally planned by PIRAMK University of Applied Sciences, which is implementing it together with the Tohoku Fukushi University, Exel Ltd. and Hur Labs Ltd. In Japan the project has got support from the Sendai-Finland Wellbeing Center. Also the Tampere Region User-Centred Wellbeing Technology Programme (HYVITE) has supported the study.

Photo: Takayuki Kawamura

Contact person: Principal Lecturer Dr. Jarmo Perttunen, PIRAMK University of Applied Sciences, email: Jarmo.perttunen@piramk.fi

5.5 TAMK

Sustainable sanitation

TAMK University of Applied Sciences has carried out a number of important projects in the field of sustainable sanitation. For example, the nutrient content of wastewater from premises in sparely populated areas was studied in a project funded partly by the involved small communities. The purity results from numerous new management techniques were tested, resulting with findings which are a help in the planning of domestic wastewater and sewage management required of new premises in sparsely populated areas. One objective is to enhance the competitive ability of Finnish companies producing wastewater purification products.

Microbiological and chemical tests show that almost all the nitrogen and well over half the phosphorus in wastewater originates from human excrement. Results indicate that it is possible to recycle the treated sludge and waste from earth closets in the garden and on fields if it is appropriately treated and mixed with peat.

In an EU-funded project, ten examples of indoor earth closets were planned and constructed for the Tampere Region and several also for Estonia and Latvia. The experts from Tampere have also presented their results and objectives in international eco-sanitation conferences in South Africa and China. One aim is to increase awareness in developing countries of how to keep clean and dirty water separate and how nutrients originating from human excrement can be simply converted for use.

Three undergraduates on the Degree Programme in Environmental Engineering at TAMK are working on theses in sustainable development in co-operation with the city of Kunming in Yunnan Province, southern China. There the students are studying the chances of improving environmental conditions in the humid climate on Lake Dian area. As a part of the solution almost half of the 110 000 dry toilets are already constructed by Kunming environmental officials.

TAMK also helps Tampere city to provide its twin city Mwanza with support in waste management know-how. Practical training in Tanzania is part of the International Degree Programme of Environmental Engineering at TAMK and supports in an excellent way the development of Mwanza. Tampere provides Mwanza in particular with know-how of sorting waste, composting and safe processing of bio waste, and the economic benefits of recycling.

Contact person: Eeva-Liisa Viskari, Senior Lecturer, TAMK University of Applied Sciences, email: eeva-liisa.viskari@tamk.fi

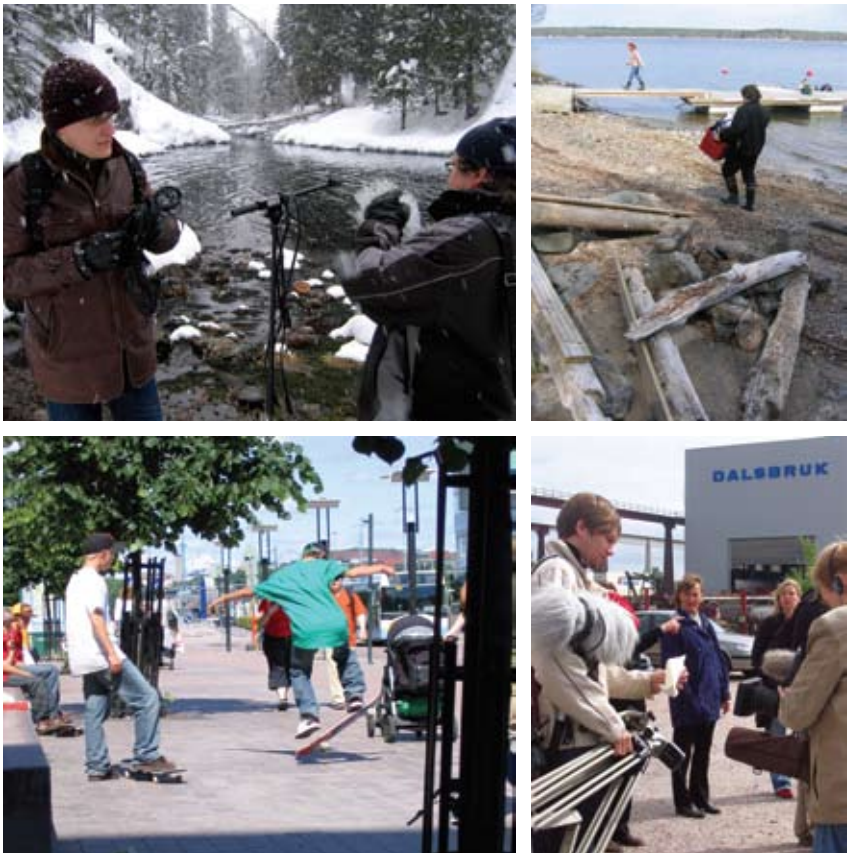
One hundred Finnish soundscapes

The crunch of the frosty snow, the creaking of cottage cheese while chewing, the whirr of the marine engine, the growl of motorcycles, the hum of the city, the gurgle of the chest drain bottle after a bypass surgery, the cry of seagulls at the market square…

One Hundred Finnish Soundscapes was a three-year (2004–2006) project consisting of collecting and preserving soundscapes within Finnish geographical borders. The main organisers were the Finnish Society for Acoustic Ecology, Tampere University of Applied Sciences (TAMK), the Finnish Literature Society (SKS), the musicology departments of Universities of Turku and Tampere and YLE, the Finnish Broadcasting Company. The main coordinator for the project was Professor Helmi Järviluoma from the University of Joensuu. To date, this was the most comprehensive attempt in Finland to explore the qualitative aspects of the sound environment and the ways in which the people living within their soundscapes experience their environments. The primary aim was not the col-

lection of materials, but to increase the awareness of the Finnish people of the meaningfulness of soundscapes.

The materials were collected through a form of competition started in the autumn 2004. People were asked to write either about personally or communally meaningful sonic environments. Nearly 800 very diverse descriptions, memories and short notes were submitted. They included hitting the billiard ball on the pool table, the jingle of ice bells, early summer birds, the harbour train in Helsinki, factory whistles, the sound of a Chinese restaurant in Tampere, and the sound of rain falling on shingle roof in summer time. Age scale varied from 7 to 92 years. The suggestions were written in Finnish, Swedish and English from all over Finland with themes of nature, people and technology.



Photos: Meri Kyttö

The final One Hundred Finnish Soundscapes were selected by the jury. An integral part of the project was to get the suggested soundcapes recorded and archived. The fieldwork was carried out in collaboration with those who made the suggestions to gather additional information of the sounds and to get the soundscapes recorded in the way they would have been recorded by the writer.

The data compiled constitute a comprehensive overview of Finnish soundscapes. The suggestions often concentrated on the moment of hearing or listening to a

sound, the actual experience. Particular places were, thus, not always central in the descriptions. However, it is possible to analyse the data from the point of audition of spatial discourses. The collection is practically unique in the world and has aroused considerable international interest. The ”Aesthetic action of the year 2006”-prize was awarded by Finnish Society for Aesthetics. Several articles were written as well as radio- and television documentaries made from the project.

One hundred soundscape stories were selected for publication and 30 were recorded for inclusion in the CD. The publishers of the book Sata suomalaista äänimaisemaa are SKS (Finnish Literature Society) and TAMK.

Orders for the book via the Finnish Literature Society by e-mail: books@finlit.fi and Online bookstore. Samples of the material can be heard on the site: www.100aanimaisemaa.fi and http:// www.gruenrekorder.de/?page_id=172

Contact person and the writer of the case story: Ari Koivumäki, Principal lecturer, TAMK, email: ari.koivumaki@tamk.fi

5.6 SeAMK

JOBSIS – Jobrotation-mainstreaming, Sister-Mentoring & Empowering

The Jobsis Equal Project (ESF and Social and Health Ministry in Finland) is a community initiative (2004–2008) being implemented by the School of Healthcare and Social Work at the Seinäjoki University of Applied Sciences with national and international partners. The project had two main aims: 1) To help health and social care professionals return to employment in the specialised field following an extended period away from the workplace. Reentry into work environment has been promoted through the development and testing of an innovative mentoring model and job rotation system, 2) To develop a new operational model to support older workers in the health and social care sector in coping with their work and helping them to maintain their ability to work and to prevent “burn-out”.

During the project three groups got further education (lasted 18 weeks/group). Two of the groups comprised unemployed job applicants in the field of healthcare (n=16), and one group applicants from the field of social work (n=8). They had at least a 2-year degree in the field. The students who took part in the further education found employment well. The Jobsis Mentoring Model was developed and tested in collaboration with participants and representatives from social and health care organisations. The Jobsis Mentoring Model is a practical tool for orientating a new employee into a new work unit or new duty. The basis for this involves having an experienced employee function in the role of mentor after having received appropriate training for it. The model can be utilised to transfer passive knowledge and as a learning tool in internal job rotation and in orientating substitutes, for example. It can be used as an alternative to the traditional job orientation programme. The evaluation measurement for mentoring model was

also developed during the project. Also the computer based regional deputize register program was developed as part of the project.

During the project the older workers' (over 40 years old) well-being at work was promoted in collaboration with three groups. Two of the groups comprised older workers in the field of healthcare (n=15), and one group comprised older workers from the field of social work (n=7). The intervention of four months was planned to promote coping and well-being at work. This intervention contains individual interviews with each participant, discussions in the groups (Jobsis-rehabilitation expert, participant and representatives of employer and occupational health care), an individual rehabilitation plan, education, physical and mental rehabilitation according to the plan and evaluation by questionnaires and interviews after 6 months and 12 months. As the result of the process The Jobsis Early Reaction Model was developed.

The JOBSIS project has international partners from United Kingdom and France. This Ageless at work -collaboration was based on four workpackages: Mentoring in Action, Improving the Health and Well-being of Older Workers, Implementing Appropriate Working Practices and Conditions and Strategies to promote Vocational Mobility for a Longer Working Life.

For more information, please contact: Dr. Merja Sankelo, Senior Researcher,
Tel. +358 40 830 4234, E-mail: merja.sankelo@seamk.fi

User Centred Design Methods in Furniture Personalization

South Ostrobothnia is a relevant research area for development projects since the area is one of the biggest areas of Finnish furniture industry. About 30 furniture SMEs participate in these projects, which support their business networking. Furniture is profitable targets for personalization since, according to Luomala and Lindman (2006), a piece of furniture usually embodies many meanings as a member of a design-intensive product category. Therefore, consumers have different desires and expectations – furniture industry needs to answer to this challenge with reasonable costs.

Aim of the research projects was to develop user centred design methods to support consumers' participation in furniture development process by personalization and mass-customization requires new ways to communicate with customers. The responsible actor in the projects Habit5xM® Consumer Profiler and Habit Focus Group Usability Testing was Seinäjoki University of Applied Sciences and its User Centred Design Laboratory Habitcentre®. The research was carried out in co-operation with University of Tampere, Tampere University of Technology and Technical Research Centre of Finland (VTT). About 50 students of the Seinäjoki University of Applied Sciences were working in the research teams during the project years 2003–2007.

Furniture retailing is a mature business branch where culture and changing interior tastes are important macro level factors. Furniture personalization can offer

one advance in the competition by moving towards mass-customization when organizations call for creativity and flexibility. For understanding the consumer point-of-view and the need for personalization, we have to perceive how consumers evaluate products in design intensive sector such as furniture. The idea and practice of design are changing.

In the field of furniture, we understand that the target of personalization should be consumer's experience. A user inspired design (UID) discourse or human-centered design revolution finds an appreciation of different kinds of users and consumers and their own creativity, everyday lives and their needs and desires for products. The path of design revolution is changing from 1) design for consuming, 2) design for experiencing, 3) design for adapting, and 4) co-designing.

With the furniture personalization we are working in the phase of co-designing, consumers' everyday creativity and the production of cultural discourses within taste of different kinds of consumers and segments: young, old and middle-aged people

One result of the projects is that the researchers co-operate with the actors of 30 furniture enterprises. Another result is a learning possibility, which is offered by the diversified co-operation with different university organizations, researchers and students. Third result is a spin off enterprise Habitpro Oy which was founded by a group of researchers creating new core competence with the projects.

Contact person: Vuokko Takala-Schreib, Dr., Principal in Design Research, Seinäjoki University of Applied Sciences, email: vts@SeAMK.fi

5.7 SYH (Novia)

GERDA: Gerontological Regional Database and Resource Centre

GERDA – Gerontological Regional Database and Resource Centre is an Interreg (EU) project, first, aiming at building a Regional Database containing information about living conditions of the elderly on both sides of the Gulf of Bothnia. During the first project period (2004–2007) data was collected in Ostrobothnia, Finland and in Västerbotten, Sweden. A total of 4 927 elderly persons (65 and 75 years old) participated in the study by means of a questionnaire, whereas a total of 549 (85, 90 and 95+) received home visits and participated in extensive interviews. The data base provides tools, among other things, for identifying those medical, social and economical requisites that affect the elderlys' possibilities to good life and a sustainable development of society in respect of the living conditions of the elderly.

In the second project period (2008–2011) a continued longitudinal study is planned, in addition to intervention studies, further analyses, quality assessment studies of elderly care and evaluation studies in a comparative perspective. The project also aims at developing a common post graduate course for Finnish and Swedish PhD students.

Second, the project aims at establishing a Resource Centre for the development of elderly care in the region. The centre is a forum for the exchange of knowledge and experience of Elderly Research Projects. It is also the administrative and informational unit of the project: it coordinates the activities of the project and functions as the administrator of the database. The Resource Centre is a common platform for all stakeholders coordinating physical and virtual meetings. In addition, the activities within the project create a foundation for networks between universities, the public sector, the private sector and the third sector, including the organizations of the elderly.

During 2004–2007 the GERDA project resulted in a number of poster presentations, reports and articles, as well as in students' theses, seminars and courses held for students and scholars as well as for the elderly, personnel within elderly care and professionals active in this field. Municipalities as well as health care and elderly care organizations were actively engaged in the processes.

During 2004–2007 the GERDA project was financed by Interreg Kvarken-Mittskandia. Co-financiers were, among others, the Regional Council of Ostrobothnia, Umeå University, Åbo Akademi University, the University of Vaasa and the Svenska yrkeshögskolan University of Applied Sciences.

Contact person: Sirkku Säätelä, project coordinator, tel. +358-(0)6-328 5461,
email: sirkku.saatela@novia.fi

Competence Centre Buildings – Indoor Air Quality – Health (KLUCK)

Reports of building-related health symptoms are usual in many countries. Factors that influence the quality of the indoor air are ventilation and thus the outdoor air quality, emissions from the building itself, emissions from users of the building in the form of perfumes used, etc.

Sick Building Syndrome, SBS, is a collective term describing the various symptoms people experience while visiting a building with poor indoor air quality.

KLUCK was an Interreg IIIA project in the Kvarken-Mittskandia region. National funding came from the Regional Council of Ostrobothnia in Finland and Umeå University in Sweden.

The first project period was for four years, 2004–2007. An application for a continued project during 2008–2011 has been submitted to the Interreg IVA region Botnia-Atlantica.

Goals of the project were:
- *To develop a questionnaire for locating damages in a building*
- *To compare sampling of VOCs (Volatile Organic Compounds) in room air with sampling of VOCs from air inside the building construction*

- *To find chemical patterns relating VOCs to SBS by passive sampling*
- *To measure both total amount and living amount of microbes on building materials*
- *To evaluate data using multivariate methods*

Partners
Svenska yrkeshögskolan, University of Applied Sciences Umeå University,
National Institute for Working Life in Umeå,
Vaasa University of Applied Sciences,
The City of Vaasa,
Drytec Anderssen.

Contact person: Annika Glader,
email: annika.glader@novia.fi

6 R&D in development of regions and work life

In all the countries compared R&D activities within UAS were targeted towards regional development of work life, economic activity and services. Especially in the Netherlands this was supported heavily by national funding RAAK, targeted just to boost up R&D with small and medium size enterprises and public sector services. This might be due to the fact that R&D activities were just recently approved to be functions of UAS and thus the strategy was created as unique instead of copying the format from the traditional universities.

The main objective of R&D in Fontys is to generate new innovations and transfer these to new spin-offs and to develop professional competences both within the work life, professionals and students. Fontys stresses its connections with enterprises and service agencies in applied research. The R&D activities are evaluated, not only by the number of publications and conference presentations as in many universities, but by the number of contacts with enterprises.

Also in its information strategy Fontys stresses easy access and contacts with work life by internet publications, joined seminars and ”eating and talking” -events the latter being informal gatherings with professionals from different sectors to discuss and exchange ideas and create contacts. Graduated students, alumni, are also important in remaining and up-keeping contacts with work life.

PHLimburg in Belgium is a small UAS in European context, the same size as many Finnish UAS. The cooperation with work life takes place during practical training periods which are, like in all UAS, a forum to create contacts and initiate research and development projects. The role of students in R&D at the Bachelor level trainings is mostly assisting, at the Master level there can be more demanding tasks as well. For teachers R&D activities serve as a way to competence development and keeping up relations with work life and research institutes.

In Germany, Dortmund, traditions of academic research are prevalent. The ”business-like” research is often seen as a threat to independent academic research. Also small and medium sized enterprises are not very willing to participate in research funding, thus R&D projects need funding sources from public funds. But public funding requires that also enterprises contribute by

putting in their work force or other resources to the R&D activity. Enterprises can also pay the student for acting as a research assistant (e.g. 800–1000 €/month). The cooperation forms differ depending on the situation, the main point being that the results of R&D would be usable in practice. Besides R&D there are also examples of direct selling of services to the companies, e.g. testing motors for a car factory. The forms of cooperation differ depending on the activity and relations of the responsible professors.

Often the problem in cooperation with enterprises and UAS lies in the lack of ”common language”. To overcome the barrier FH Dortmund arranged e.g. a possibility for local entrepreneurs to visit their laboratories and see in practice the opportunities these offered.

In all compared UAS different local and regional R&D seminars were arranged to create contact forums, disseminate information and results on ongoing projects and initiate new ones. Besides the more ”official” forums there is a need for more informal forums, such as the previously mentioned ”Eating and talking” at Fontys. Different kind of theme events and research days for researchers, teachers and professionals are important.

In Finland R&D has been defined as one of the main functions of UAS. Each UAS has its own profile depending on the degree programmes and especially regional location. Regional development and UAS role in regional innovation processes is seen as a major strategy in R&D. How well this is realized in practice varies. Technological, construction, business, media and other cultural enterprises as well as within tourism UAS cooperate actively in product and service development and piloting. Also in health care, especially in health technology there are joined research oriented projects. Cooperation with entrepreneurs and employers both in public, private and third sector are mainly linked with practical training and practical oriented thesis work the aim of which is to serve the needs of the enterprise/organization as well as learning.

7 R&D integration with teaching and learning

7.1 The role of teachers and students

R&D is basically seen as part of teaching and learning. The other basic assumption was that R&D should contribute to the local and regional development and promote cooperation with higher education and enterprises and public sector agencies.

Knowledge Centre -model in Fontys was a designed structure to enhance interaction between teaching, learning, and curriculum and competence development. The teachers involved in these could use 1–2 days/week for R&D activities. The lectorates in charge of the Knowledge Centres also participated in curriculum development. Also the Graduate School -studies of PhD students supported education since PhD students used 20–30 % of their working hours for teaching. But not all the students or the teachers were involved in R&D. The students’ participation was hindered by limited time frames; the projects continue for 1–4 years but students can usually be involved only for one semester, e.g. during their thesis work or practical training. The recruitment of students required flexibility from the curriculum (and teacher) as well as inner motivation.

At PHLimburg the research institute -model with specific research programmes supported more research activities than teaching as such. The role of R&D differed in Bachelor- and Master -de-

grees. At the Bachelor-level the research activities were connected to Problem Based Learning -method and reflective practice -type of approach. In the Master-degrees theses mostly are connected to ongoing R&D projects. Some teachers in Master-degrees (professors) used about 40 % of their work time for R&D while at the Bachelor-degrees the time used by teachers (lectors) was 5–50 %. The time allocated to the researcher varies a lot.

The official budget for research to deload teaching tasks of professors is not systemic. Research is often done on a voluntary basis or indirectly by guiding thesis students. A common problem is that there is no time to write applications for research and development projects and funding. In PHLImburg research funding is only allocated to focus areas, not to individual research interests.

In Germany R&D activities have longer traditions in the Fachhochschule-system than in Belgium, the Netherlands and Finland. The R&D activities were led by professors who have a minimum of PhD-degree. Professors' teaching hours were 18 hours a week with rest of the time free for research activities. As comparison, the teaching obligation of a professor in the traditional universities in Germany is 12 hours. Because of research activities there was also an option to apply for deduction of 4–7 % of teaching hours. The students were involved in R&D projects but not in all of them. The best Master-students or graduated students were hired as research assistants. At the Bachelor-level the students were involved in R&D mainly within practical training or by doing their thesis in an enterprise. In Dortmund the R&D activities are highly dependent on individual professors whose expertise is respected. The support units for R&D are meant mostly to assist, advice and contribute in finding funding sources for R&D projects.

In the Universities of Applied Sciences in Finland the integration of R&D activities with teaching is found as important as in other countries in Europe. The duty for this integration has been brought up already in the law on UAS since 2002. The integration is promoted by the fact that both R&D and teaching are included in the work of teaching staff (lecturers and principal lecturers). The share of R&D from the working time of teaching staff is varying in Finnish UAS. For example in SeAMK UAS at least 25 % of the working time of principal lecture's should be focused on R&D-activities. In comparison at PIRAMK the similar amount is 5 %. There are also full-time R&D personal in Finnish UAS, who are planning, carrying on, supporting and leading the R&D activities. In every UAS in Finland there are different ways how this kind of action is integrated with education. In SeAMK UAS the full-time R&D-persons give lessons to the students and by this way the new research- and project results are transmitted straight to the students. There are also seminars and other events organized for the teaching staff in which the implementation and results of projects are presented and discussed.

In Finland the Bachelor-degree education started in UAS in 1992 but first Master-degree programmes did not start until 2002. There are still only a few Master-programmes in each disciplines at the moment. Because of this the R&D activities in Finnish UAS vary much within the degree programmes.

The students take part in R&D activities through projects and final theses. However, the students are not taking part in all projects. The UAS students in Finland seldom receive payment for participating in R&D-activities but, instead, they get study credits. There are still a lot of development needs how to promote studies done in integration with R&D projects. During the two last years the participation of students in R&D activities has been monitored by counting accumulated study credits which have to be reported to the Ministry of Education annually.

In the beginning of UAS system in Finland the R&D activities were organized to separate research and development units. During the recent years there has been, however, a clear movement towards a change in the way R&D is organized by removing the functions of these separate units into direct connection with teaching departments. This is happening because of a strong will to promote the integration of R&D activities with teaching and learning.

7.2 The added value of R&D for teachers and students

During the visits to UAS in the Netherlands, Belgium and Germany the different kind of benefits were brought up concerning the participation of teaching staff and students in R&D activities. It is easy to agree with all these mentioned benefits also in Finland. The added value of R&D within UAS was stressed unanimously. For teaching staff R&D was stressed to have an effect on competence development, gaining of new knowledge and know-how and opportunity to link it directly in teaching and learning. R&D was also seen as a way to create networks with work life and to develop their own careers further on.

For students R&D activities ensure that students will become ”innovative professionals instead of routine performers”. Within R&D projects the teaching is based on up-to-date knowledge and know-how when it is given not only by teachers, but also professionals from the work field. Participation in R&D also helps in employability due to forming of links with work life and enterprises already during the education. Familiarizing with project type of work also increases students’ potentials in getting engaged with similar type of work after graduation. Also entrepreneurship might become a more tempting opportunity after graduation when it has become more familiar in R&D project.

7.3 Conclusions

The integration of R&D with teaching and learning within UAS in Europe is seen as a self-evident starting point. The basis of integration is shared participation of teachers and students. The way how R&D was organized in different UAS varies.

From the point of view of teaching staff, in general, the challenge is how UAS teachers can change their role to become teacher-researchers. Some of the teachers are not interested, some are lacking skills in research and development methods. Further education of teachers and promoting their opportunities for involvement in R&D are needed to make this change happen.

A common challenge is also the resources to allocate enough time for R&D for teaching staff, mostly this is due to limited funding, also maybe, due to too structured ways of organizing more varied and flexible learning environments within the curriculum. For students involvement of R&D is generally taking place during practical training and thesis work. But the challenge is how to create more innovative learning environments based on project work which would not take place within the walls of the institute but in the real work life – not only during practical training but during theoretical studies as well.

8 Comparisons and lessons learned

8.1 Common features

International benchmarking on R&D activities of UAS showed similarities as well as differences between different institutes and countries.

The common features in R&D services are among others:

- The changing role of UAS from teaching universities to units of applied research and regional and local development cooperating with private, public and third sector
- The challenge of organizing R&D in such a way that it serves both studying, teaching as well as work life
- The challenge in competence development of teachers in R&D
- The multi-channeled R&D funding for projects, national or regional funds and EU and need for support in finding funding sources
- Students' participation in R&D as part of their studies, especially through practical training and thesis work

R&D activities are seen especially as forms of developing education and competences as well as being an effective tool for transfer of knowledge and joint research with working life.

But there are also some differences.

8.2 Differences in strategies

There is a strategic difference on whether the focus of research and development activities is mainly on promotion of professional expertise and practical solutions and innovations for work life or on more academic research.

The R&D strategy in the Netherlands was clearly fitted to UAS ideology which stressed the cooperation especially with SME sector and public service providers. The R&D activities were also funded by a special funding mechanism RAAK to enhance cooperation between work life and higher educational institutions. Also the organizational structure with special lectorate chairs supported multi-disciplinary R&D activities. The lectorates are situated in degree programmes and knowledge circles which thus represent the main focus areas of research. The teachers' involvement and competence development in R&D were supported by further education, e.g. joint methodological courses with universities in Graduate school. Also the publication policy of Fontys stressed low-threshold access types of publications instead of focusing on publications in academic referee publications.

The German organizational model at Fachhochschule Dortmund resembled more that of universities which lies heavily on the activity and interests of individual professors and their interest areas. On the other hand the main focus areas of R&D were being a "think-tank" and innovation pool for economic and technological development. The universities and universities of applied

sciences worked together in various R&D projects and research institutes were seen as important partners in regional development efforts for employment and economic activity.

In all the UAS there were different kind of support systems to enhance R&D activities and co-operation with work life. The good practices were e.g. research and development events, easy access publications and co-operational alliances. The importance of being in close cooperation with enterprises and public services is essential.

8.3 Organizational differences

The models of organization differed from centralized to decentralized versions.

In Belgium at PHLimburg the centralized coordinating units supported especially project preparation and formulation and forming of consortiums for bigger researches and finding of funding sources for them. The actual projects were then carried out within degree programmes. This model supports especially formulation of multi-disciplinary projects compared to more decentralized models of e.g. FH Dortmund.

The UAS involved in the project from Western Finland have also different organizational models from decentralized models where R&D activities are managed within degree programmes to a more centralized R&D units. Both of these organizational models have their pros and cons. The more centralized models support planning and implementation of projects funded by external funds but the projects might be difficult to be connected to students' learning programmes and staff might have to be recruited from outside the UAS. On the other hand R&D activities organized within degree programmes tend to be mono-sectoral and require a lot of individual activity from an individual teacher and are dependent of his/her own interests but are often more related and easily integrated to students' studies. To conclude, there is a need for both kinds of R&D activities.

8.4 Common challenges

The benchmarking showed that R&D activities face similar challenges both in Western Europe and in Finland. Teachers have limited time to be part of research projects and many of them would need more skills in R&D project work. Teachers are supported to join in, but the time resources allocated are scarce. In some UAS special researcher-teacher -posts, e.g. lectorate chair in Fontys, have been established to integrate teaching and researching to studies. In Germany the professors have a role as researchers as well as teachers, but e.g. in Limburg and in Finland many principal lecturers are still mainly teachers with very little time to concentrate on R&D.

In Finland involvement in R&D does not bring extra funding, salary or prestige – at least not without publications. That is why motivating teachers to be involved in time consuming and challenging project work can be problematic.

This is also related to the role of R&D in studies. In Bachelor studies R&D is mainly linked to practical training and thesis work. In Master studies students are able to take more part in R&D. In Finland the challenge is that many Master programmes are part-time studies for 1–2 years with very limited time to be engaged in long term R&D activities.

R&D activities still need developing. The strategy of R&D needs clarification and crystallization. What are the priorities and what is the mission of R&D? Whether the first aim is to do research, to contribute to the economic and technological development of work life, to enhance competences of teachers and students, to gain external funds or to show academic research ability? All of these strategies lead to different activities with their own strengths and weaknesses.

But, all in all, R&D is here to stay. Research and development activities form an opportunity to combine teaching and learning with work life, service and product development and thus promote the economic life of the region and promote employment in future.

Annex 1: UAS from Western Finland as comparison

Name of UAS/ THEME	PIRAMK	TAMK	SEAMK	SYH
Organization model	Separate R&D Services Unit	Matrix organization with R&D as one of the three core processes of UAS	R&D is done in all educational departments. SeAMK R&D is organized under the brand "SeAMK Research and Development"	Three R&D departments in sectors of technology and communications, social welfare and health care and culture
Personnel	R&D director + administrative staff Programme managers Project managers Project assistants Teaching staff (part-time)	R&D director + administrative staff Programme and project managers Project assistants Teaching staff + students	Administrative personnel: research director, research manager and service manager. In educational units and library: R&D managers, principal lecturers, lecturers, researchers, project managers and other project personnel.	Two R&D directors and one R&D coordinator; R&D team consisting of directors, coordinator and unit managers; project managers and project assistants; teachers and students
Focus areas of R&D	Wellbeing Services and Technology Management of Networks and Services Experience Services Service and Product Development PractiCo	Promoting regional development and the operations of SMEs through applied research and development. The three strategic R&D programmes "Good living environments", "Digital services and technologies" and "Future machines and systems".	**Spear Heads**: Entrepreneurship and Leadership of SMEs, Developing the Welfare Technology and Services and Optimization of Production. **Peak Areas**: Business, User Centered Product Development, Welfare Technology, Application of Intelligent Technology, Experience Production, Agro Technology, and Technology of Food Production.	R&D strategy emphasises regional development and integration between education and R&D. Thematic focus areas are particularly within fields of energy and environmental technologies, elderly care, competence development, and cultural identity, media and design

Name of UAS/ THEME	PIRAMK	TAMK	SEAMK	SYH
Activities	Projects – multidisciplinary Further and continuing education Human resource development Open higher education	Projects Applied research	Research and development projects Human resource development Evaluation studies Laboratory and testing services	Research and development projects, including process and application development work, evaluation studies and consultancy work.
Funding sources	European Regional Development Fund European Social Fund Finnish Workplace Development Programme Finnish Funding Agency for Technology and Innovation Regional organizations, municipalities and companies For further education: Ministry of Education	One third of the externally funded projects are direct R&D assignments from companies, one third is supported by Finnish public research funding and one third is EU-funded R&D projects. TAMK's own R&D funding is directed towards strategic research topics and development targets.	National and international sources	Mainly financed by external resources, EU interregional funding is one of the main financers, followed by other public funding, including ministries and municipalities. In addition, funding is obtained from companies, private funds and NGOs.
Typical elements	Separate unit with R&D personnel and extensive outside funding Further education part of R&D Services	Research is part of learning Decentralized organization model	R&D service unit and R&D coordinators at each department	R&D is decentralized; upholds personalized contacts with local companies and authorities; extensive cooperation with other Nordic countries

Annex 2: UAS from Western Europe in comparison

Name of UAS/ THEME	FONTYS Hogeschool	PHLimburg	Fachochschule Dortmund
Organization model	R&D is done interlinked with education and in all institutes of the UAS. Knowledge Centres are key units for R&D	Centralized model units for R&D services and research institutes TINFO, Log-IC, ArcK and REVAL	R&D is done in all departments (Fachbereiche) of the UAS by the researchers and lectures. A separate R&D Service Unit (Transfer & Research Office) as an internal central institute was established 25 years ago. The R&D unit is working together with a university-owned company
Personnel	Knowledge Centres are multidimensional and multidisciplinary research and development units which focus on special field.	Research and Innovative Service Unit as a coordinating body Directing committee and Advisory Council draft strategies and approve project proposals Projects carried out in the degree programmes and in research institutes	Two heads of department, one R&D coordinator, one person responsible for consultancy in the area of entrepreneurship / start-ups, three persons doing project administration, two project managers (project finance) and student workers
Focus areas of R&D	The R&D activities concentrate on humanistic and educational sciences, economics, engineering and arts. Each of these has its own research programmes. Service and product development in the SME sector	ICT research: mobile technology and wireless systems, logistics systems, graphic design and architecture, rehabilitation technology and services	Regional structural changes and development Information and communication technology MST automotive engines aging population, demographic changes
Activities	Applied research International R&D projects	Applied research Product development	Applied R&D projects Expert reports Software development Evaluation studies Consultancy

Name of UAS/ THEME	FONTYS Hogeschool	PHLimburg	Fachochschule Dortmund
Funding sources	RAAK funding Project funding from various sources, e.g. EU	Regional Innovation Ministry Project funding from various sources	R&D is financed by third parties as well as public research programs. Nearly one half of the R&D is funded by companies and other external organizations; the second half by public money from national and international R&D programs. The own R&D funding is focused on strategic research topics or used as an initial financing for young researchers and research group starting their R&D activities.
Typical elements	R&D activities connected to SMEs and development of service sector in the region R&D important part of competence development and learning	Master students theses done in R&D projects Multi-sectoral projects	Consultancy in developing project ideas, assistance in writing proposals, project management and administration central organized, as a contact point for researchers and external partners/customers; R&D part of the projects done in the different departments.

Annex 3

MATRIX FOR COMPARISONS ON R&D ACTIVITIES AT UNIVERSITY OF APPLIED SCIENCES

A. ORGANIZATION AND ROLE OF R&D

A.1. What are the main goals of R&D as part of university's functions?
A.2. What are the focus areas of R&D?
A.3. What is the organizational structure of R & D?
A.4. What is the number of staff working in R&D activities?
A.5. What is the effect of R&D on the funding of UAS?

B. R&D AS PART OF PEDAGOGICAL STAFF'S WORK AND COMPETENCE DEVELOPMENT

B.1. In which way are teaching staff members involved in R&D activities?
B.2. How many teachers (% of total number of teachers) were involved in R&D activities during 2006?
B.3. What is the typical mechanism of teachers' participation in R&D activities?:
B.4. What is the meaning of R&D in relation to competence development?
B.5. What are the main benefits of participating in the R&D activities for teaching staff?

C. R&D ACTIVITIES FROM THE POINT OF VIEW OF STUDENTS

C.1. What is the relation between teaching and R&D activities in a students' curriculum?
C.2. Which kind of studies can be realized by participating in R&D activities: e.g. final thesis, practical training or other? What are the typical models?
C.3. What kind of added value does participation in R&D activities provide for a student?

D. R&D ACTIVITIES IN RELATION TO WORK LIFE

D.1. What kind of cooperation and network structures have been established between enterprises and organizations and UAS?
D.2. What are the most important networking and cooperation models within R&D?
D.3. What are the marketing channels of R&D? What are the most effective of these?
D.4. How are the client relationships managed, e.g. partnerships, strategic alliances, joined boards etc
D.5. What the typical models of sharing of funding in projects?

F. GOOD PRACTICES AND DEVELOPMENT AREAS IN R&D

F.1. What have been found to be the good practices in R&D?
F.2. What are main development areas in R&D?

PIRKANMAAN AMMATTIKORKEAKOULU

Kuntokatu 4, 33520 Tampere
puh. (03) 245 2111
fax (03) 245 2351
www.piramk.fi

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