CDIO conferens in Turku Finnish Universities of Applied Sciences MODE 2 and role of UAS

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Content of presentation

- In my presentation I will discuss e.g. following questions:
 - What is the scope and task of UAS sector in the sense of industryuniversity co-operation?
 - What does applied research and student centered learning means in this context of industry, working life cooperation?
 - Competences and learning networks in HEI.

Theoretical concepts of this presentation is linked to the framework of a Mode 2, open innovation, co- creation and applied research.

• I will also describe the Finnish Universities of Applied Science and role of Rector's Conference, Arene. And present the strategic-based focus areas of Finnish UAS in education and R&D, and innovations.







Arene ry is the Rectors' Conference of Finnish Universities of Applied Sciences. It's main functions are influencing on the development of the Finnish higher education system and promoting closer cooperation between the universities of applied sciences.

Universities of Applied Sciences in Finland



1. Arcada, Helsinki

2. Diaconia University of Applied Sciences, Helsinki 3. HAAGA-HELIA University of Applied Sciences, Helsinki 4. HUMAK University of Applied Sciences, Helsinki 5. HAMK University of Applied Sciences, Hämeenlinna 6. JAMK University of Applied Sciences, Jyväskylä 7. Kajaani University of Applied Sciences, Kajaani 8. Central Ostrobotnia University of Applied Sciences, Kokkola 9. Kymenlaakso University of Applied Sciences, Kotka 10. Lahti University of Applied Sciences, Lahti 11. Laurea University of Applied Sciences, Vantaa 12. Helsinki Metropolia University of Applied Sciences, Helsinki 13. Mikkeli University of Applied Sciences, Mikkeli 14. Oulu University of Applied Sciences, Oulu 15. Karelia University of Applied Sciences, Joensuu 16. Police College, Tampere 17. Lappi University of Applied Sciences, Rovaniemi 18. Saimaa University of Applied Sciences, Lappeenranta 19. Satakunta University of Applied Sciences, Pori 20. Savonia University of Applied Sciences, Kuopio 21. Seinäjoki University of Applied Sciences, Seinäjoki 22. TAMK University of Applied Sciences, Tampere 23. Turku University of Applied Sciences, Turku 24. Vaasa University of Applied Sciences, Vaasa 25. Novia University of Applied Sciences, Vaasa 26. Aland University of Applied Sciences, Maarianhamina

There is a wide range of study opportunities at a university of applied sciences. The fields of study are:

- Humanities and Education
-) Culture
- Social sciences, Business and Administration
- Natural Sciences
- Technology
-) Natural Resources and the Environment
- Social Services, Health and Sport
- Tourism, Catering and Domestic Services

The core of a university of applied sciences education is workplace-based and professional higher education.

The educational offering in universities of applied sciences is extremely diverse. The various alternatives of a university of applied sciences education are:

-) Bachelor's degrees
- Master's degrees
- Professional specialisation
- Supplementary education and training
- Open UAS education
- Vocational teacher training

Universities of applied sciences ensure Finnish competitiveness by providing the skilled labour and experts needed in various fields. A university of applied sciences education renews the workplace and expert competence in research and development as well as innovation.

Arene

Is the Rector's Conference of Finnish Universities of Applied Sciences. It's main functions are influencing on the development of the Finnish higher education system and promoting closer cooperation between the universities of applied sciences.

Arene provides universities of applied sciences with the prerequisites for high-quality, workplace-oriented higher education as well as research, development and innovation. www.arene.fi

Universities of Applied Sciences in Finland

- 1. Arcada University of Applied Sciences, Helsinki
- Diaconia University of Applied Sciences, Helsinki
- HAAGA-HELIA University of Applied Sciences, Helsinki
- Humak University of Applied Sciences, Helsinki

- Häme University of Applied Sciences, Hämeenlinna
- JAMK University of Applied Sciences, Jyväskylä
- Kajaani University of Applied Sciences, Kajaani
- Centria University of Applied Sciences, Kokkola
- Kymenlaakso University of Applied Sciences, Kotka
- Lahti University of Applied Sciences, Lahti
- 11. Laurea University of Applied Sciences, Vantaa
- 12. Helsinki Metropolia University of Applied Sciences, Helsinki
- Mikkeli University of Applied Sciences, Mikkeli
- 14. Oulu University of Applied Sciences, Oulu
- 15. Karelia University of Applied Sciences, Joensuu
- 16. Police University College, Tampere
- 17. Lapland University of Applied Sciences, Rovaniemi
- Saimaa University of Applied Sciences, Lappeenranta
- 19. Satakunta University of Applied Sciences, Pori
- Savonia University of Applied Sciences, Kuopio
 Seinäjoki University of Applied Sciences, Seinäjoki
- Tampere University of Applied Sciences, Tampere
 Turku University of

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- Applied Sciences, Turku
- 24. Vaasa University of Applied Sciences, Vaasa
- Novia University of Applied Sciences, Vaasa
 Áland University of
- Applied Sciences, Maarianhamina

UNIVERSITIES OF APPLIED SCIENCES IN FINLAND

- 26 Universities of Applied Sciences
- Approx. 140 000 students
- Approx. 23 000 bachelor's degrees/year
- Approx. 2 000 master's degrees/year
- Staff approx. 9,900, of whom approx. 5,500 are teaching staff
- The volume of research, development and innovation activities € 150–165 million/year



Degrees in Universities of Applied Sciences



Finnish education system

In university of applied sciences studies, students acquire the necessary qualifications for professional positions based on degree programme competence targets.

- The scope of university of applied scienses education is 210-270 study points (ECTS), taking 3.5-4.5 years to complete.
- Students can gain international experience by completing part of their studies or a work placement in a foreign country.

Placements, different projects and theses are implemented in cooperation with companies and communities.

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Close cooperation with the labour market ensures good opportunities for finding work. 111111

Master's degrees provide persons in the labour market an opportunity to deepen their special expertise in development tasks or to expand their professional competence.

- The scope of a master's degree is 60-90 study points (ECTS)
- The studies can be completed alongside work.
- A workplace development assignment of 30 credits is included in the degree.
- In order to be qualified to gain access to Master's studies at a university of applied sciences, applicants must have a Bachelor's degree or other applicable degree from a higher education institution and three years of work experience from the field after the completion of the degree.

Research, development and innovation (RDI)

Research and development conducted at universities of applied sciences comprehend applied research, which is based on the integration of practical experience with the latest knowledge and unparalleled expertise.

Research and development conducted at universities of applied sciences serves studies at university of applied sciences and their development.

Research, development and innovation functions at universities of applied sciences also promote working life and regional development as well as renew the regional economic structure.

Universities of applied sciences have selected their areas of core competence and emphasis to benefit the labour market and businesses in the best possible way and to support strengthening the national and international RDI expertise of the university of applied sciences.

RDI projects are carried out with both EU funding and national and private funding.

The promotion of entrepreneurship is a key focal point for the future of universities of applied sciences. In order to support this effort, Arene (Rector's Conference of Finnish Universities of Applied Sciences) has drafted an entrepreneurship strategy for universities of applied sciences.

Entrepreneurship recommendations can be found at the website www.arene.fi

The mission of universities of applied sciences

The mission of universities of applied sciences is stated in the UAS Act.

"Working on research, artistic and cultural premises, universities of pplied sciences shall provide higher education for professional expert jobs based on the requirements of working life and its development; support the professional growth of individuals and carry out applied research and development, [innovation and artistic work] that serves universities of applied sciences education, supports the world of work and regional development, and takes the industrial structure of the region into account. In executing these tasks, universitites of applied sciences shall promote lifelong learning,"

100% of the basic funding for universities of applied sciences is provided by the state

In addition to laws and decrees, the operations of universities of applied sciences are also guided by performance agreements of the Ministry of Education and Culture as well as education and research policy strategies and plans.

UAS – professional oriented HEI degrees

UASs are multi-field higher education institutions proving professional higher education degrees in response to labour market needs and conduct R&D which supports instruction and promotes regional development in particular.

Universities of applied sciences

• There are 26 Universities of Applied Sciences in Finland

- of these 24 are operating under the Ministry of Education and Culture

- 140,000 students
- an intake of more than 22,000 in degree programmes for a Bachelor's degree
- an intake about 3,000 students in degree programmes for a Master's Degree



Strategy-based focus area/strengths of Universities of Applied Sciences.

Source: Arene Ry surveys for Universities of Applied Sciences. Situation in January 2016. Lapland UAS: Service Business and Entrepreneurship, Smart use of Natural Resources, Managing Distances, Security Competence, Arctic Co-operation and Cross-Border Expertise

Oulu UAS: Future health and well-being, Energy, Natural Resources and the Environment, Intelligent Learning, Innovative Products and Services, Entrepreneurship and New Business Operations

Centria: Multidisciplinary Service and Business Expertise, Development of Industrial Processes and Production Technologies, Information Networks and Content Production

Vasa UAS: Export Industry Business Expertise, Smart Machines, Devices and Systems in Electrical Engineering; Promotion of Popular Health and Well-being

Novia: Health and living conditions of the elderly, Sustainable energy technology, Natural resource management, Vessel simulation, Culture andentrepreneurship.

Seinäjoki UAS: Food Solutions, Smart and Energy-efficient Systems, Participatory Well-being Services, Entrepreneurship and Growth

Satakunta UAS: Services for the Elderly, Seafaring, Automation and Industry 4.0

Tampere UAS: Entrepreneurship and New Business, Smart Machines and Devices, New Operating Models in Social and Health Services, Energy Efficient and Healthy Buildings, Pedagogical RDI

Police University College: Internal Security

TUAS: Development of Well-being, Technical Innovation University of the Future, Innovation Pedagogics

Häme UAS: Thin Plate Competence, Bio-economy, Smart Services, Professional Competence

Laurea: Service Business, Health and social integrity, Coherent security.

HAAGA-HELIA:

Service, Marketing,

Entrepreneurship

Kajaani UAS: Intelligent solutions: (Intelligent) Home Care, (Intelligent) Experiential Activities, (Intelligent) Business Operation Potential, (Intelligent) Production Systems, (Intelligent) Game and Measurement Applications

Jyväskylä UAS: Education Expertise and Business, Bio-economy, Applied Cyber-security, Multidisciplinary Rehabilitation

Savonia: Renewing Machine and Energy Industry, Water Safety, Responsible Food Production, Applied Well-being Technology

Mikkeli UAS: Sustainable Well-being, Forest, Environment and Energy, Digital Economy

Karelia: Renewing Well-being Services, Sustainable Energy Solutions and Materials

Lahti UAS: Well-being and Renewing Growth, Smart Industry, Vital Environment, Design

Saimia: Business from Innovation, Internationalisation and Growth of SMEs, Customer-oriented Social and Health Services

Kymenlaakso UAS: Sustainable Well-being, Forest, Environment and Energy, Logistics and Seafaring, Digital Economy

Diak: Sustainable Well-being and Health, Interpretation, Church Professions, Immigration and Multiculturalism

Metropolia: Cleantech and Bio-economy, Well-being and Rehabilitation, Creative Economy and City Culture, Healthy Construction, Smart Technology

Arcada: Nordic collaboration, Health promotion and patient safety, Functional materials for smart solutions, Information analysis (Big Data), Story culture

Humak: Communities and Integration Competence, Youth Work and Guidance, Interpreting and Communication Competence, Producership and Cultural Management

Vision of UAS: Towards the World's Best Higher Education System



Developing the World's Best Higher Education System

Societal effect

- Balance of science, application of knowledge and new expertise around the country
- Ensuring higher education institutions have study paths to professional expertise
- Effect on higher education policy
- Developing an internationally competitive network of higher education institutions by mutual profiling and division of labour
- Confirmation of Professional Higher Education and Science education activity (specification of the dual model)
- Smaller-than-current number of higher education institutions. Solutions for new higher education modules have been created from the individual starting points of autonomic higher education institutions as results of the division of labour and new cooperation structures
- Administrative and operative cooperation has led to improved cost-efficiency and usage of resources *Effect on regional and economic policy*
- Ensuring regional viability and the conditions for equality
- Higher education institutions ensure opportunities for lifelong learning (incl. Master's programmes in UASes) *Effect on universities of applied sciences*
- Real opportunity to network, be profiled, and develop into international higher education operators
- Cooperation and division of labour can help higher education institutions find their profiled role as a part of the higher education system

More information: <u>http://www.arene.fi/en/universities-applied-</u> <u>sciences/effectiveness/structural-development</u>

Aim at professional knowledge, skills and new competences

Eight disciplines and over 40 degrees from engineer to dance teacher offer a wide range of professional higher education. **Professional Teacher's Education** in 5 UAS.

- Humanities and Education
- Culture
- Social Sciences, Business and Administration
- Natural sciences
- Technology, Communication and Transport
- Natural Resources and the Environment
- Social Services, Health and Sports
- Tourism, Catering and Domestic Services



Master's Degrees in Finnish UAS

Master's Dergrees in the Universities of Applied Scienses are professionally oriented HEI degrees and offer graduates already active in working life an excellent opportinity to advance and expand their skills in their own specialisation area

Master's degrees

- 60 90 ECTS credits
- can be completed alongside a full-time job
- includes a working-life development R&D project as a Master`s thesis, comprising 30 ECTS credits
- entry requirements: UAS degree or other suitable higher education degree and three years of relevant work experience after graduation

Master's Degree includes

- 1) Advanced specialist studies
- 2) Free-choice studies
- 3) Master's thesis



Working life based Higher Education, Innovations and R&D

RDI is applied and practice-oriented, which:

- meets the research and development **needs of global industry, business and society**.
- produces concrete results, practical solutions, knowledge, competence, models etc. based on a practical, applied approach;
- makes use of user-oriented innovation activities, open innovation approach
- influences development, well-being and competitiveness also at a regional level with co-operation of world of work.

The special assets of universities of applied sciences are

- their applied and multidisciplinary research, development and innovation activities, which
- are guided by a strong user orientation and a genuine problem-solving focus.



MODE2 (Gibbons et. al. 1994)

"Traditional knowledge creation, Mode1" vs. New approach of different players in R&D, networks in value constellation, Mode2

Transdisciplinary, multidisciplinary approach in R&D

Research problems are not any more set from the perspective of only a one science discipline

> New knowledge is created in social context, while doing the applications. Social responsibility of the knowledge.

Networks and knowledge creation – co-creation.

Networks are not stable, there are created on the basis of context, networks change and are based on mutual co-operation and competence needed, not only on status and hierarchy.

Knowledge flows between basic research, applied research and innovations; theory, practice and solutions combined (steps to open innovation approach, and co-creation)

MODE 2- Knowledge and Applications Co-creation and CDIO curriculum



MODE 2 and UNIVERSITIES

CONTEXT OF APPLICATION	AIM IS TO PROVIDE PRACTICAL AND "USEFUL" KNOWLEDGE AND COMPETENCE. THIS SHOWS IN R&D AIMS, QUESTIONS AND PRACTICES.	UAS
TRANSDISCIPLI- NARITY	FIRST OF ALL IT IS A QUESTION OF SOLVING PROBLEMS, NOT CREATING A NEW RESEARCH AREA/DISCIPLINE.	UAS
HETEROGENEITY, ORGANISATIONAL DIVERSITY	NETWORKS CREATE NEW IDEAS. DIFFERENT KIND OF KNOWLEDE PLAYERS CREATE NEW KIND OF "SPACE" AND MARKETS FOR PROFESSIONAL KNOWLEDGE.	UAS
SOCIAL ACCOUNTABILITY AND REFLEXIVITY	KNOWLEDGE CREATION IS PART OF AUTENTHIC SOCIETY. RESEARCHER`S AND PARTICIPANTS/PROFESSIONALS ARE IN DIALOGY.	UAS
QUALITY CONTROL	KNOWLEDE HAS TO BE SOCIALLY SOLID, IT'S RELEVANCE, QUALITY IS EVALUATED AND APPLIED IN PRACTICAL CONTEXTS. THE AUDIENCE OF NEW KNOWLEDGE IS NOT ONLY RESEARCH PROFESSIONALS, BUT ALSO PROFESSIONAL AUDIENCE IN SOCIETY, VARIOUS USERS, PUBLICITY ETC.	UAS
(Gibbons et.al. 1994; modiefied by Kallioinen, Rissanen)		

UNIVERSTIES OF APPLIED SCIENCES, USER-DRIVEN INNOVATIONS

"In many ways the applied research done at UAS institutes is part of the missing link between the world of research and the world of work. They are committed to upscaling its innovative role and to make sure that the much needed impact on EU research is realized."

"The current trend in all European RDI activities is shifting more towards entrepreneurship, regional development and added cooperation with the world of work and civil society."

"The added value of the UAS lies in their skills to bring research results to the market, reach out to regional partners and foster cooperation with industry, notably SMEs."

Applied research quadruple helix







Concept of competence

- It can be used in a connection of an individual, a group of people or a company/organization.
- Individual competence comprises of several factors, e.g. skills, knowledge and learning capacity of a person (Sternberg, 2005)

CDIO > competence building in technical higher education.

Concept of competence

- Competences can be seen as an *individual* asset, or inter-individually constructed in a social context (Ellström, 1998).
- The value and meaning of the competence is measured in a certain business context, therefore the nature of the competences can be seen context-bound (Rissanen, 2003).

The concept of learning networks

- As well as the organizations can learn, also the networks can be seen as learning systems in certain criteria.
- Tidd, Bessant and Pavitt (2005, 435) argues, that one of the primary function of a new corporate venture is to learn new competences.
- Lave and Wenger (1991) coined the term "communities of practices".
- This concept can be seen as "an early root" for the concept of "user-oriented innovation systems", where the user/participants/students are actors, who create everyday solutions based on learning.

THEORY AND PRACTICE COMBINED

NETWORKS

NEW SKILLS

PROBLEMS TO BE SOLVED

EMPLOYABILITY



WORKING LIFE AND STUDENT



GUIDANCE

SUPPORT

SELF EVALUATION

TIME AND PROJECT MANAGEMENT

LEARNING OF SOFT SKILLS





STUDENT CENTERED LEARNING (= EXPLORE, DISCOVER, CREATE, LEARN)

- STUDENT HAS AN ACTIVE ROLE IN LEARNING AND ARE RESPONSIBLE FOR THEIR OWN LEARNING
- AUTENTHIC LEARNING ENVIRONEMTS, E.G. REAL LIFE
 PROJECTS AND LEARNING ENVIRONMENT
- MEANINGFUL LEARNING CONTEXTS; MOTIVATION
- INDEPENDENT WORK, GROUP WORK, NETWORKS
- COMMUNICATION
- SELF EVALUATION
 - NEED FOR FEEDBACK AND EVALUATION OF LEARNING OUTCOMES in DIFFERENT LEVEL OF PROJECTS

> CDIO – Conceive, Design, Implement, Operate

ROLE OF WORKING LIFE IN HEI

- OFFERING REAL LIFE CONTEXT AND PROBLES TO BE SOLVED
- WILLING TO KNOWLEDGE SHARING AND LEARNING
- MOTIVATION TO EVALUATE AND UNDERSTANDING OF LEARNING
 OUTCOMES
- TIME AND COMMITMENT
- ACCESS TO RESOURCES AND LEARNING FACILITIES
- SHARING NEW, DIFFERENT KIND OF PROFESSIONAL NETWORKS FOR HIGHER EDUCATION
- **PARTNERSHIPS** IN A LONG PERSPECTIVE





15.6.2016

The key is understanding the change of Degree Education, teaching & learning and assessment in HEI

How UAS sector has reacted to this change in Finland?

- the changing roles of teachers and students has been raised into strategic issue
- raising the status of innovative teaching in HEI
- strengthening educational leadership
- developing learning environments, together with companies, students, education institutions
- making strategic partnerships with business's locally, nationally and globally
- aligning learning outcomes and assessment
- developing methods for external evaluation of the quality of teaching and learning, e.g. working life feedback.
- investing in R&D and entrepreneurship activities in UAS.

THANK YOU!

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CDD Conceive-Design-Implement-Operate

Ammattikorkeakoulujen rehtorineuvosto Arene ry