The Environmental Expertise Programme at Turku University of Applied Sciences (TUAS) – answering to the challenges of environmental protection

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Abstract

The environmental expertise programme rises to the challenges originating from local and global environmental problems. The programme is divided into three sections: environmental technology, responsible business activities and environmental communication.

The programme strengthens the skills and know-how of staff and students in the technologies involved in the monitoring and improvement of the state of the environment. It also promotes networking with other organizations and enhances the competitiveness of Southwest Finland in the growing market of environmental expertise.

The programme combines teaching and RDI activities in projects which offer students a new kind of learning environment to improve their skills and capacities for working life and to give them contacts with companies working in the field. The students’ participation in RDI activities is seen as an essential learning method which is in line with the innovation pedagogy developed at TUAS. The RDI activities take place in research groups which represent a wide range of expertise from engineering to business and environmental issues.

The financing of the projects implemented in the programme is based on external funding programs and internal TUAS funding. Yearly, there are around 100 different projects and funding between 3-4 million euros. A notable aim is to promote both national and international networking between different players in the field, such as universities, research institutes, companies and environmental authorities.
Projects are fuel for our engine in applying innovation pedagogy

The Faculty of Technology, Environment and Business of Turku University of Applied Sciences (TUAS) is a multidisciplinary and international actor whose research and development activities provide solutions for the development needs of its operating area and the business sector.

The RDI activities are also a learning environment for TUAS students. A new kind of learning approach – innovation pedagogy – combines learning and development projects in a way that improves the students’ capability of producing innovations (Kairisto-Mertanen, L. and Lappalainen, H. 2013; Penttilä, T., Kairisto-Mertanen, L. and Kettunen, J. 2013). In practice, innovation pedagogy denotes a holistic view to enhance our students’ innovation competencies. According to our philosophy, RDI operations and joint projects should be seen as a pedagogical method, just like lectures or other traditional learning methods. Projects are a magnificent learning platform for our students. Therefore, we should always define the project’s convergence to our curricula already at the early stages of project planning. Projects are fuel for our engine in applying innovation pedagogy in daily work and students are involved in all projects, e.g. through thesis projects, training periods and special courses.

The research groups form the basis of research, development and innovation activities at TUAS, with expertise ranging from engineering, business and sales to environmental issues (Figure 1).

Aquatic Systems and Water Management

The Aquatic Systems and Water Management group carries out projects related to water monitoring, protection and restoration. Aquatic ecosystems are simultaneously affected by a number of human-induced and natural processes, such as eutrophication, climate change and normal weather variations. Continuous monitoring technology combined with on-line data transfer makes real-time follow-up of water quality changes possible.

Integrated management plans of drainage areas, cost-efficiency comparison of water-protection measures, comprehensive management of nutrient flows, co-operation with companies linked with water issues and the development of oil prevention in archipelago
areas are a few examples of how the group strives to promote water protection at the strategic level.

**Environmental Research group**

The Environmental Research group is a versatile expert and developer of environmental protection and sustainable solutions. The group's focus areas include energy efficiency, control of waste flows and material flows, renewable energy sources, natural materials and environmental communication and education.

**Energy Technology**

The Energy Technology group has conducted applied research on internal combustion engines and offers expertise in energy recovery systems and the improvement of energy efficiency of vehicles. Economical low-emission engines are needed to minimize environmental impact and to control climate change. Engine research will be an important cornerstone of our operations as the EU’s emission standards are becoming more and strict and fossil fuel prices are rising.

**Corporate Responsibility**

The Corporate Responsibility group’s primary objective is to participate in the development of responsible and successful business and to promote responsible business to improve the competitiveness of companies. Corporate responsibility is an open and sustainable activity where a company takes responsibility for the effects of its operations on society, its stakeholders and the environment. The group’s research interests are the generation of sustainable innovations, resource efficiency and corporate networks, environmental business, cleantech and responsible business and business ethics.

**Civil Engineering**

Underpinning is one of the fastest growing sectors of renovation construction both in Finland and abroad. The Civil Engineering group has been focused mainly on strengthening the expertise on underpinning and the development of a new type of drilled pile. A theme for the future is linking ground-heat recovery to the foundations of houses in conjunction with renovation construction.
Wood construction is another focus of group studies focus on the patented “Timperi” technique, the developing of glued laminated wood components that can be used e.g. in apartment buildings.

**Sales and Purchases**

The Sales and Purchases group studies and develops sales and purchasing expertise in order to improve the competitiveness of companies. High-quality products and services are not enough – a company must also be able to sell them both locally and globally. Research on purchase operations seeks to meet the challenges presented by the ever-increasing strategic importance of purchase operations to organisations. Other important research topics include supplier evaluation and responsible procurement.

**Innovation Pedagogy**

The Innovation Pedagogy group is a developer of learning and teaching, a training provider and a research body. The central aim of the group is to be involved in the development of innovation pedagogy and, consequently, future experts and business achievers. In addition to research and development activities operations include the commercialization, training and consulting of innovation pedagogy.

**References**


Figure 1  Degree programs (outer circle) and Research Groups (inner circle) at the Faculty of Technology, Environment and Business TUAS