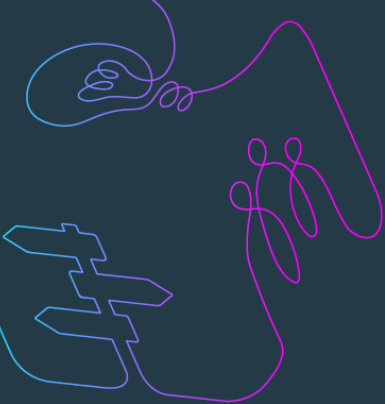




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TEADMISTEST MÕJUKATE LAHENDUSTENI

Impactful examples of applied research, development and collaboration projects

TTK University of Applied Sciences

Energy efficiency analysis of a sports center

An energy balance analysis was prepared to assess the building's energy consumption and developed a preliminary energy efficiency model using 3D modelling. Based on the analysis, proposals were made to optimize the energy costs of the building and its systems. An estimated energy consumptions was calculated for the implementation of new technical solutions.

Pilot study of physical activities of elderly people

TTK conducted a study that collected and analyzed data from wrist-worn monitoring devices used by elderly to track daily movement patterns, including wake and sleep times as well as periods of activity and rest. The project resulted in a report outlining changes in the physical activity amongst elderly people and assessing the potential for using wearable technology to support elderly people in Estonia.

Controlling a robot along a contour using machine vision

A TTK research group investigated the possibilities for robotizing work processes in which machine vision is used to identify object geometry. The results are used to generate a movement path and work process for the robot.

Pallas University of Applied Sciences

Pallas Gallery in Estonian Art Life

Pallas Gallery is the main public-facing exhibition platform of Pallas University of Applied Sciences, presenting art, design, conservation, and restoration projects by students, staff, and

partners. Through exhibitions, workshops, lectures, and collaborative programs, it contributes to contemporary art and community engagement in Tartu and beyond. Between 2020 and 2025, the gallery hosted 140 exhibitions and 151 public events, while attracting over 180,000 visitors over the last six years.

MART Centre for Materials Development and Research

MART (Materials Development and Research Centre) was established at Pallas University of Applied Sciences in May 2025 as a hub for material-based research, education, and innovation. The centre supports experimental and creative research, material development, and teaching activities, with a particular focus on sustainable textile materials.

MART's work is closely linked to the doctoral research of its two junior researchers: Liisi Tamm (PhD candidate, Estonian Academy of Arts) explores the designer's role in material creation through the use of local sheep wool, developing textile objects that foster emotional attachment and encourage more sustainable consumption and longer product lifecycles. Mari-Triin Kirs (PhD candidate, University of Tartu) investigates the valorisation of locally produced industrial hemp in textile art and design, combining archival research, material experimentation, and collaborative learning to advance sustainable and circular bioeconomy practices.

Rosette and Its Transformation in Interior Decoration

"Rosette and Its Transformation in Interior Decoration" (2024) is a publication based on several years of student research into historic interiors and ceiling rosettes as key decorative elements. The project reflects Pallas University of Applied Sciences' long-standing expertise in the restoration of Estonian architectural heritage.

The study examined rosettes in historic interiors, particularly from the Neoclassical and Historicist periods, through detailed analysis of three heritage buildings: Kiltsi Manor, Esna Manor, and the von Knorring residence in Tartu. Researchers documented the buildings, analysed rosette structures and materials, and compared stylistic developments across Estonian manor architecture.

The project also produced a practical glossary with drawings and material samples, serving as a resource for students, conservators, and heritage professionals involved in restoration and reconstruction projects.

Tallinn Health University of Applied Sciences

Identifying Individual Visual Adaptation to Extended Reality

The study investigates how the human visual system adapts to extended reality (XR) environments during both short- and long-term use. As XR technologies become increasingly common in healthcare, education, and defence, individual differences in visual sensitivity and adaptation may affect visual fatigue and discomfort.

The project combines clinical optometric assessments, eye-tracking measures, and subjective discomfort ratings to identify adaptation patterns and users who may be particularly vulnerable to XR-related visual strain. Preliminary findings from a pilot study suggest XR-specific adaptation in convergence, accommodative facility, fixation duration, and saccade amplitude, while substantial individual variability remains.

The project aims to develop evidence-based, individually tailored guidelines for XR use, including recommendations for break frequency and duration, to reduce visual discomfort and support long-term visual well-being.

Supporting Nursing Students' Health Behaviour: A Contribution to Future Nurses' Work Ability and Professional Identity

The study explores how pedagogical approaches in the Adult Health Behaviour course can support nursing students in developing healthy lifestyle habits as part of their professional identity. As future health professionals and role models, nurses are expected to promote healthy behaviour, yet nursing students themselves may experience challenges such as physical inactivity, sedentary behaviour, and unhealthy lifestyle choices.

Using action research conducted in two cycles, the study will identify students' needs, implement and evaluate course developments, and examine how teaching can strengthen learner agency, self-regulation, and meaningful learning.

The findings are expected to inform the development of health-supportive teaching practices and curricula and, in the longer term, contribute to nurses' well-being, work ability, quality of care, and the resilience of the health-care system.

The Education and Health for Ukraine" (EduHealthUA)

The Education and Health for Ukraine (EduHealthUA) project supports the development of Ukraine's rehabilitation system through higher education, vocational training, and continuous professional development. The initiative builds on the expertise of Estonian universities and hospitals, fostering long-term cooperation between Estonian, Ukrainian, and other

international partners to ensure evidence-based, modern, and internationally aligned approaches in rehabilitation.

In 2025, the consortium of Estonian hospitals and higher education institutions conducted a preliminary analysis, mapped Ukrainian partner organizations, identified development needs, and prepared a joint action plan. During the next phase, from 2026–2028, this plan will be implemented by developing new curricula, complemented by continuing professional development programmes delivered both in person and online.

Through this systematic and coordinated approach, EduHealthUA strengthens professional capacity, enhances the quality of rehabilitation services, and lays the foundation for sustainable international cooperation that supports Ukraine's health, education, and social protection sectors.

The project is led by the Estonian Centre for International Development (ESTDEV) in cooperation with Tallinn Health University of Applied Sciences, Tartu Applied Health Sciences University, the University of Tartu, East Tallinn Central Hospital, Haapsalu Neurological Rehabilitation Centre and the Medicine Estonia Cluster.

Estonian Academy of Security Sciences

Testing and Analyzing of Performance Parameters of Scent Detection Dogs in Search of Illegal Substances

Dogs are capable of detecting hazardous substances in situations where technological tools are limited. However, the evidence base regarding the scent discrimination capabilities of service dogs has not always kept pace with the rapidly changing compositions of synthetic drugs.

A particular challenge in the work of service dogs is the drug containing 3,4-methylenedioxy-N-methylamphetamine (MDMA)—commonly known as "ecstasy"—which circulates in tablet form. These are synthetic substances whose chemical composition, excipients, and even color can vary significantly in concentration depending on the "underground" production method and batch. This raises the question: does the dog detect the actual active ingredient or, instead, its associated compounds?

The Estonian Academy of Security Sciences research group focuses on how service dogs distinguish ecstasy and which substances should be used in their training to ensure the highest possible accuracy and reliability. The study centers on the specificity of the service

dogs' sense of smell—the ability to correctly select a target odor from a mixture that also contains non-target odors.

The aim of the study is to validate the quantity and composition of the training substance used for ecstasy detection and to develop standardized training and handling protocols that support a consistent and high level of scent discrimination performance. Preference is given to training that directs dogs to respond primarily to the active substance, rather than to other components used in the manufacture of the tablets.

Illicit Trade in Estonian Seaports

The aim of the study was to identify the main vulnerabilities of Estonia's largest cargo port, the Port of Muuga, to illicit trade. The study highlighted a number of problem areas to which the parties responsible for port security should pay greater attention in the future.

Although the Port of Muuga is relatively small compared with the world's largest seaports, the study identified a number of fairly typical vulnerabilities that have also been identified in previous research conducted at significantly larger ports, both in Europe and elsewhere. At the same time, the study also highlights specific characteristics arising from the context of Estonia and the Port of Muuga.

Based on the findings of the study, recommendations have been developed to improve the security of the Port of Muuga, focusing primarily on strengthening cooperation between the various stakeholders and enhancing risk-analysis capabilities.

"New Morning"

The idea for "New Morning" originated from a research article identifying the link between poor sleep among prisoners and morning incidents and proposing potential solutions. From this initial research idea, the project progressed into the development phase through the Innosprint programme and eventually to a real-world pilot at Tallinn Prison.

During the pilot, changes were introduced to prisoners' daily routines and the night-time environment, as well as to staff working practices during the night and morning hours. The aim was to support better sleep, a calmer prison environment, and dynamic security. Although the quantitative results did not show a significant change, the impact was clearly reflected in the interviews: both prisoners and staff described a calmer atmosphere, better cooperation, and improved communication.

For the Prison Service College, the project's greatest value lies in demonstrating how a research idea can progress through development and experimentation into real changes in practice. "New Morning" illustrates how research, development, and innovation, when carried

out in close cooperation with practitioners, can bring about meaningful change even in a complex organisational environment.

Estonian Aviation Academy

Urban Air Mobility Roadmap for Cities

The Estonian Aviation Academy participated in the CITYAM project, co-funded by the European Union through the Interreg Baltic Sea Region Programme 2021–2027. The project aimed to support cities in the Baltic Sea Region in the responsible and sustainable introduction of Urban Air Mobility (UAM) and its integration into existing transport systems and urban planning.

As part of the project, a UAM Roadmap for Cities was developed, providing local authorities with a practical step-by-step framework for UAM integration – from stakeholder engagement and mapping regulatory and operational needs to strategy development, policy measures, implementation, and monitoring. The roadmap is intended to help cities proactively manage the development of UAM, taking into account aspects such as airspace use, the planning of take-off and landing sites, infrastructure, and existing regulations.

Estonian Military Academy

Development of Military Psychology at the University of Tartu Institute of Psychology and the Military Leaders' Combat Effectiveness Project

The project analyzes the psychological combat readiness, resilience, and preparedness of military leaders – examining what these entail, how they develop, and what interventions can be used to foster these qualities. Based on the project's findings, plans are in place to update and modify the curricula at the Estonian Military Academy. At the same time, the project contributes to the development of military psychology at the University of Tartu's Institute of Psychology.

A follow-up project under the TEM-TA program will involve various medical institutions including HeBA Clinic, Meliva, Sensus, and Viljandi Hospital to integrate comprehensive data on physical and mental condition with elite professional performance, aiming to mitigate the impact of exhaustion on that performance.

Tartu Applied Health Sciences University

Nursing Home Services from multiple perspectives: Residents, Family Members, and Staff

The ongoing applied research project explores the quality of nursing home services and residents' well-being from multiple stakeholder perspectives. By integrating the experiences of residents, family members, and staff, the study aims to develop a holistic understanding of service quality, identify strengths and areas for improvement, and inform the future development of person-centred long-term care services in a nursing home setting.

Empowering Young Adults with Cancer and Their Loved Ones

MELODIC is an international EU4Health project (2024–2027) that aims to improve mental health support for young adults aged 18–35 with a cancer diagnosis and their loved ones. In the initial stages of the project, the needs of young adults with cancer, their loved ones, and healthcare professionals were explored, and a training programme for healthcare professionals was developed and tested. A 12-week feasibility study is now being planned. Based on the principles of social prescribing, the intervention will include online psychoeducational sessions, video-guided exercises to support physical activity and guided group walks.

Project activities take place in Finland, Greece, the Netherlands, Ireland, Portugal and Estonia. The Estonian project partners are Tartu Applied Health Sciences University and Tartu University Hospital.

Estonian Entrepreneurship University of Applied Sciences

Sustain4Future

The project empowers higher education institutions to integrate sustainability and entrepreneurship into their core activities through three pillars: entrepreneurial teaching and learning, preparing and supporting entrepreneurs, and fostering entrepreneurial ecosystems. It promotes innovation by helping young entrepreneurs develop practical skills and innovative thinking, while creating opportunities for cooperation with local and international partners.

The project delivers sustainability-focused educational content and training programmes in entrepreneurship and sustainable development, trains academic and non-academic staff to embed sustainability into their teaching and support work, and prepares comprehensive materials so that students, lecturers and administrative staff understand and can promote sustainable entrepreneurship. Training sessions and a Knowledge and Business Interface (KBI)

are established, and the project maps existing actors and structures across the regions of all participating universities to provide a foundation for strengthening the entrepreneurial environment.

Finally, the project supports startups that prioritise sustainability in their business models and fosters sustainable practices and collaboration within regional ecosystems.