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2.1. Description of the GenoNurse Project

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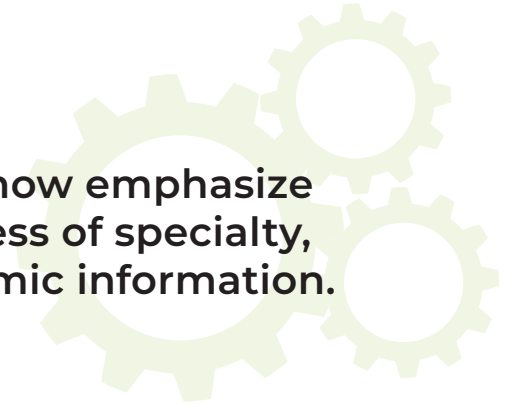
Genomic-informed nursing care is a relatively new focus area in Europe, despite the global surge in research on personalized medicine and precision care. While genomics has been present in medical research for years, particularly in cancer treatment, its integration into nursing research and practice remains limited. At the same time, citizens increasingly turn to direct-to-consumer genetic tests, highlighting the urgent need for healthcare professionals who can interpret and apply genomic information. Recognizing these needs, the GenoNurse project was launched to develop and enhance nursing competencies in genomics, ensuring that future nurses are equipped to provide evidence-based, individualized patient care in a rapidly evolving field.

Genomic nursing education and practice have advanced notably since the early 2000s, as genomic science and the decreasing cost of genetic testing have broadened the scope of precision healthcare. Early analyses in the mid-2000s (Jenkins et al., 2005; Prows et al., 2005) recognized the need to enhance nurses' genomic literacy, anticipating significant changes in clinical care. In subsequent years, a global landscape of limited infrastructure and uneven competencies slowed integration into mainstream nursing curricula (Calzone et al., 2018). Over time, more countries began establishing basic genetics competencies, albeit slowly and largely in high-income settings.

The next wave of development, marked by the formation of the Global Genomics Nursing Alliance (G2NA) in 2017, provided nursing with a more coordinated approach to genomics education, research, and practice (Calzone et al., 2018). Despite such advances, many genomic resources remained inaccessible worldwide, highlighting the need for more deliberate efforts to integrate genomics into standard nursing curricula. Updated genomic competencies (Calzone et al., 2024) now emphasize that all registered nurses, regardless of specialty, must understand and apply genomic information.



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Nevertheless, a scoping review of genomics in nursing (Thomas et al., 2023) observed that most studies remained descriptive, focusing on knowledge acquisition rather than intervention-based outcomes. Pharmacogenomics, genetic counseling, and specialized nursing roles are all recognized as key areas for growth, yet research on practical implementation in diverse healthcare contexts is comparatively sparse. Given these persistent gaps, projects like GenoNurse have taken on a vital role in advancing genomic literacy and competency across Europe.

← Launching and Implementation the GenoNurse Project →

In 2018, Tampere University of Applied Sciences (TAMK) initiated the Profitu project after identifying a significant gap in nursing curricula: the absence of genomics content despite rapid advances in whole genome sequencing. The project, funded by the Finnish Ministry of Education and Culture, aimed to develop a roadmap for the responsible utilization of genomic and well-being data through national and global collaboration. This initiative aimed to build new capabilities and opportunities for shaping modern health and welfare services, an effort that underscored the transformative potential of big data in healthcare. (Profitu n.d.) Recognizing the urgent need to prepare nurses for these emerging demands, TAMK and its European higher education institution (HEI) partners, University of L'Aquila (Italy), University of Ljubljana (Slovenia), and University College Cork (Ireland), launched the GenoNurse project. Building on insights from Profitu project, this initiative systematically incorporates genomics into nursing education,

ensuring that future healthcare professionals can fully harness the benefits of personalized medicine.

In the GenoNurse project, project work and various activities were organized into iterative work packages (WPs), each focusing on creating, piloting, evaluating, refining, and disseminating the main project outputs, such as the GenoNurse Educational Model and RoadMap as well as establishing a GenoNurse Community. Every WP had a designated lead HEI, with support and guidance provided by all consortium partners. Figure 3 outlines the project's objectives, goals, actions, key activities and milestones, as well as deliverables.



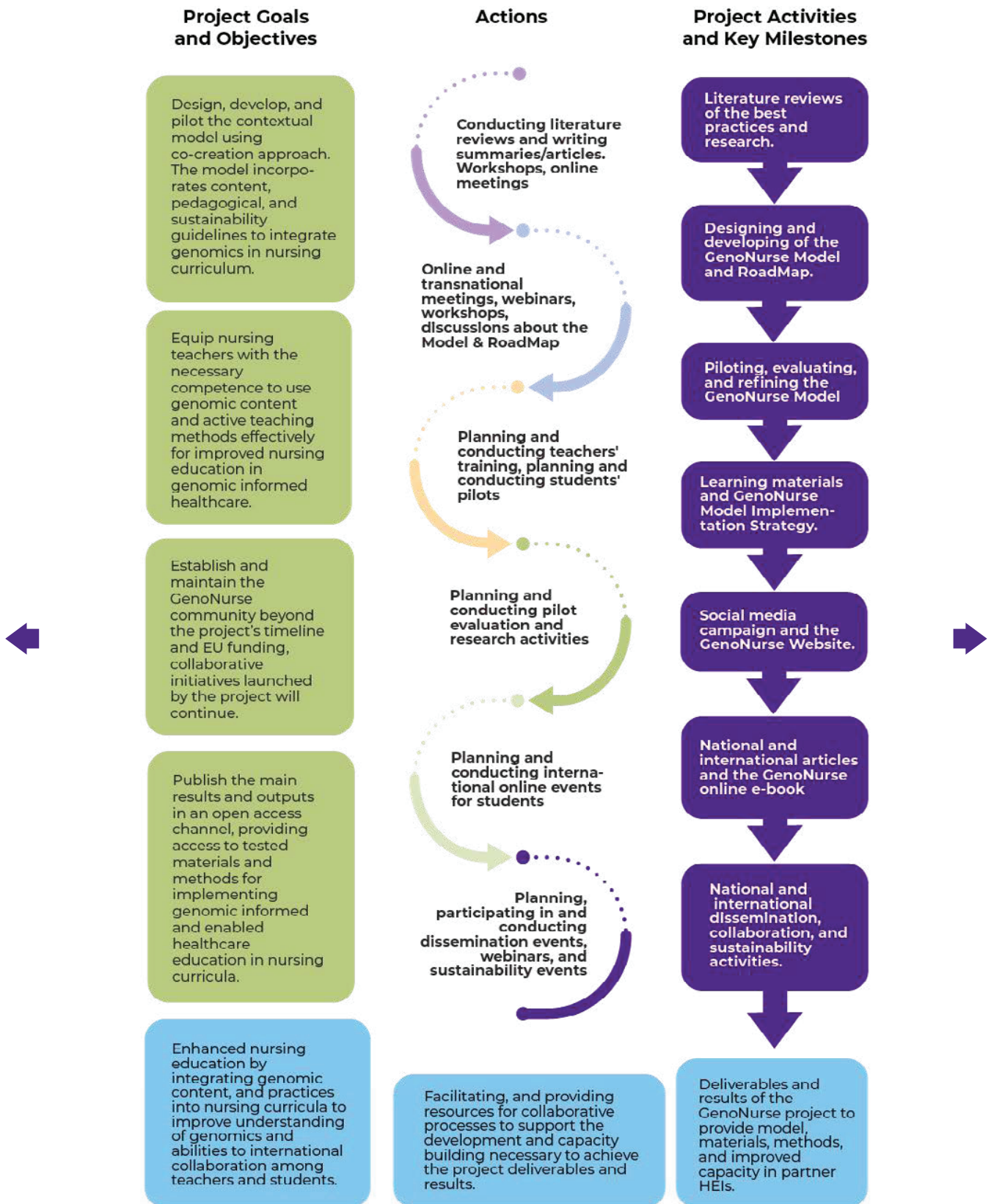
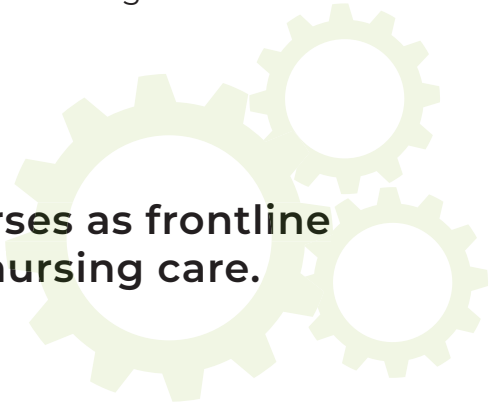


Figure 3. Goals, Objectives, Actions, Activities and Key Milestones of the GenoNurse project

Notably, each partner HEI and their teams contributed to both facilitation and implementation, applying their unique expertise while integrating new competencies developed during the project. This collaborative structure ensured a systematic and comprehensive approach to advancing genomics integration into nursing education.



GenoNurse seeks to empower nurses as frontline providers in genomics-informed nursing care.



The GenoNurse project directly addresses the need for cohesive genomic education, infrastructure, and research. By creating the GenoNurse Educational Model and RoadMap for integrating genomics into nursing curricula, GenoNurse seeks to empower nurses as frontline providers in precision medicine and genomics-informed nursing care. In doing so, the project aligns with global calls for more robust competency frameworks, accessibility of educational resources, and policy support. Through pilot studies, collaboration with nursing associations, and ongoing refinement of teaching methods, GenoNurse represents an important step toward ensuring that genomic nursing education keeps pace with rapidly evolving scientific breakthroughs, ultimately benefitting both nurses and the patients they serve.



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