Discussion

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In the final chapter of the GenoNurse project e-publication, we discuss key highlights and outputs from the GenoNurse project (Erasmus+ Cooperation Partnership), emphasizing its transformative impact on European nursing education. Over three years, partner institutions from Finland, Ireland, Italy, and Slovenia collaborated to design the GenoNurse Educational Model and pilot it through seminars and webinars, using student-centered teaching methods such as storytelling and case-based learning to integrate genomics into nursing curricula. The project produced a robust educational model, a practical Roadmap, and an open-access eBook documenting our innovative strategies. Pilot feedback indicates improved genomic literacy and enhanced clinical confidence among participants, signaling a significant shift in teaching practices and student readiness for genomics-informed care. This chapter reviews these achievements and outlines pathways for future evidence-based advancements in genomic nursing education.

The GenoNurse project, spanning three years (February 2022–January 2025), brought together a multicultural consortium of four European higher education institutions: Tampere University of Applied Sciences (Finland), University of L'Aquila (Italy), University of Ljubljana (Slovenia), and University College Cork (Ireland). The project aimed to address the growing need for genomic nursing competencies and systematically incorporate genomics into nursing education.

The GenoNurse Educational Model is a groundbreaking initiative designed to address a critical gap in European nursing education by integrating genomic content into nursing curricula. Recognizing that genomics is at the forefront of precision medicine, this project not only equips nursing educators with the necessary competencies to teach complex genomic concepts but also ensures that future nursing professionals develop robust clinical skills in genomics-informed care. By piloting innovative and interactive teaching methods, such as storytelling, case-based discussions, and collaborative group work, across multiple pilot cycles, GenoNurse transforms abstract genomic knowledge into practical, clinically relevant applications. This approach fosters active learning and critical reflection among both educators and students, ultimately enhancing the overall quality of nursing education in Europe. The project is highly commendable for its commitment to continuous improvement through rigorous feedback and iterative refinement, ensuring that it remains adaptable and responsive to evolving educational and clinical demands. Through GenoNurse, the future of nursing is being redefined to meet the challenges and opportunities of precision healthcare.

GenoNurse project transforms abstract genomic knowledge into practical, clinically relevant applications.

From the outset, the GenoNurse project embraced an interdisciplinary approach. Partner institutions from Finland, Ireland, Italy, and Slovenia pooled their expertise to design a model that addresses both the theoretical foundations and the practical applications of genomics in healthcare. The model is structured around four main themes—Genomics Informed and Enabled Healthcare—each further divided into sub-themes that cover the scientific basis, ethical and legal considerations, patient engagement, collaborative decision-making, and integrated care pathways. This multifaceted framework ensures that genomic nursing education remains flexible enough to adapt to varying institutional contexts and genomic knowledge is delivered holistically, enabling nurses to provide high-quality, personalized care.

A central achievement of the project is the development of the GenoNurse Educational Model, which offers a clear, adaptable framework for incorporating genomics into nursing education. This model not only provides content on genomic theory and evidence-based practice but also integrates practical strategies for delivering genomics-informed care. By presenting the model in an accessible format within the GenoNurse eBook, the consortium has provided educators and students with a tangible resource to guide curriculum development and clinical practice.

Equally important was the creation of the GenoNurse Community, a network that brought together nursing educators, students, and healthcare professionals. This community served as a platform for knowledge exchange and international networking, enabling participants to share

experiences and best practices. Through a series of webinars, local and national teaching seminars, the project engaged hundreds of participants—468 in online webinars, 191 in local teaching seminars, and 75 in national seminars—fostering a culture of continuous learning and collaboration (Figure X). The community not only enriched the project's outputs but also provided valuable external feedback, reinforcing the model's relevance and guiding its ongoing refinement.

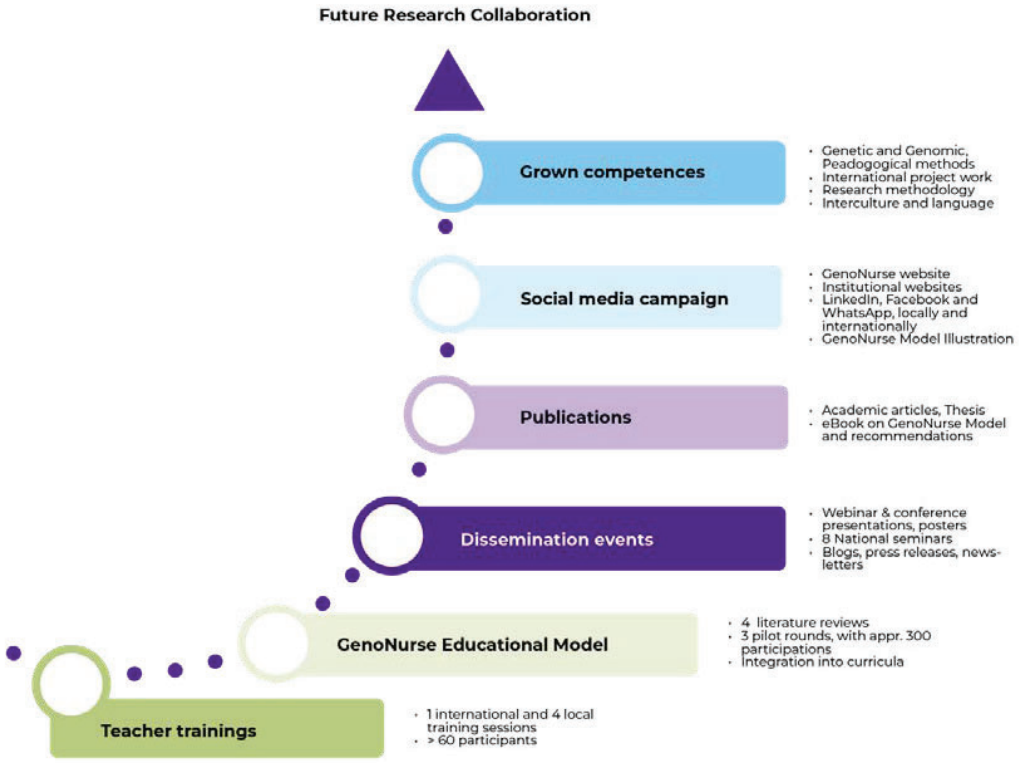

Figure 44. GenoNurse project achievements and outputs

Another key output is the GenoNurse Roadmap, a strategic document that outlines practical guidelines for implementing the GenoNurse Educational Model in nursing institutions. The roadmap details pedagogical strategies, practical tutorials, course structure guidelines, and success stories from various partner countries. It serves as an actionable blueprint, supporting continuous professional development and helping institutions seamlessly integrate genomic competencies into their curricula.

In addition, the project produced an open-access E-Publication, which you are presently reading, that documents the project results, teaching methodologies, and examples of learning materials developed throughout the initiative. This publication addresses the current gap in genetic and genomic nursing education resources by making validated content widely available. By involving nursing teachers, students, and associate partners in its development, the publication has enhanced the credibility and impact of the project, ensuring that its benefits extend far beyond the immediate consortium.

The GenoNurse project's innovative methodology combined interactive, multidisciplinary, and blended learning approaches. Web-based courses introduced the fundamentals of genomics-informed nursing, while interactive webinars, workshops, and in-person courses allowed participants to explore the GenoNurse model through storytelling, case-based learning, and group work. This diverse range of educational interventions—ranging from fully online modules to blended and face-to-face experiences—ensured that the learning process was dynamic, engaging, and adaptable to different educational settings.

Throughout the project, literature reviews were conducted by partner institutions to establish a robust theoretical foundation. These reviews informed the development of genomic competencies and helped shape the model's content, ensuring that the approach was evidence-based and aligned with global standards. The integration of these research findings into the GenoNurse model has positioned the project as a pioneering initiative in the field of genomic nursing education.

The collaborative spirit of the GenoNurse consortium has been a cornerstone of the project's success. Regular online meetings and transnational gatherings enabled team members to overcome challenges related to differing institutional practices, busy schedules and language barriers. The shared commitment to advancing genomic

nursing education fostered an environment of mutual support and innovation, resulting in significant capacity building among all participants. This international collaboration not only strengthened the consortium's research and educational outcomes but also established lasting networks that will continue to influence nursing education and practice beyond the project's duration.

The GenoNurse project has laid a strong foundation for the future of genomic nursing education in Europe.

Looking ahead, the GenoNurse project has laid a strong foundation for the future of genomic nursing education in Europe. The comprehensive model, the collaborative community, and the practical guidance provided in the Roadmap and E-Publication collectively offer a sustainable pathway for integrating genomics into nursing curricula. By equipping nurses with essential genomic competencies, the project aims to transform patient care and support the ongoing evolution of precision healthcare. Ultimately, the GenoNurse project represents a significant step forward in preparing the next generation of nurses to navigate the complexities of genomic medicine, ensuring that advancements in genomics translate into improved health outcomes for patients and society at large. We sincerely hope that this project ignites ongoing, science- and evidence-based development of the GenoNurse Educational Model and RoadMap to meet the rapidly evolving needs of genomics-informed nursing care.

The TAMK team extends sincere thanks to all colleagues who contributed to the GenoNurse project, recognizing their hard work,

enthusiasm, and the creation of a positive and supportive project community. Our shared passion for advancing genomic nursing education continues to nurture collaboration through the exchange of innovative project ideas, the sharing of expertise, and ongoing development.