

## National MEDigi project: systematic implementation of digitalization to undergraduate medical and dental education in Finland

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### Abstract

MEDigi is a nationwide Finnish project that aims to develop and implement digital teaching, learning and assessment solutions and to provide possibilities for national harmonization of undergraduate medical and dental education in Finland. The MEDigi project will investigate the options and feasibility of a common national digital online platform and produce digital content and solutions for medical education. Furthermore, tools and support system for digital pedagogy training will be created to ensure that the teaching staff will achieve and retain appropriate digipedagogical skills. The project aims also to increase the competence related to the digital tools used in clinical practice (eHealth, digital health) of physicians and dentists. Furthermore, academic research will be carried out on various aspects of the project. All the universities in Finland that offer the Licentiate Degree in Medicine and Dentist programmes are involved: Universities of Eastern Finland, Helsinki, Oulu, Tampere and Turku. The project is coordinated by the University of Oulu. The project is carried out in close collaboration with the Finnish Medical Society Duodecim and the Finnish Dental Society Apollonia. The project lifespan is until the end of May 2021. MEDigi project is financed by the Finnish Ministry of Culture and Education and its total budget is over 4 million euros.

**Keywords:** education, medical, educational technology, telemedicine, digital skills

### Introduction

E-learning and the use of different digital learning platforms have increased in medical education. E-learning, in its most rudimentary form, is the use of internet-based resources in teaching and learning [1]. Currently, virtual patient cases, digital modeling, and online tutorials, as well as standardized videos, images [2] and e.g. flipped classroom learning concept [3] are increasingly

used in medical education around the world. As new technological frontiers rapidly emerge, digital solutions potentially provide feasible alternative and complementary approaches to traditional teaching and learning [4] and a way to facilitate distance education [3].

Alongside with a rapid technological evolution, digital solutions have become as an essential part of our society and healthcare. The ability to operate in a digital

working environment is required for current and future health care professionals. Patient records have been transformed into a digital format, remote diagnostics and remote treatment are becoming more common, and doctors and dentists are more often assisted by artificial intelligence. Increasingly diverse digital competence and preparedness to use the digital health tools are expected from the medical and dentistry students. As the landscape of the society, clinical practice and medical education continues to change, teachers and students must adapt accordingly [4].

Professionalism and competence of a physician develops throughout the education and continues as a lifelong learning process. Undergraduate medical education in Finland aims to ensure that the graduate physicians and dentists have the basic knowledge and skills to act as a physician or dentist at the level of primary health care, and to pursue other career options like specialty training and research. The program for the Licentiate Degree in Medicine is provided by the five medical faculties (at the Universities of Eastern Finland, Helsinki, Oulu, Tampere and Turku) and the program for the Licentiate Degree in Dentistry by four medical faculties (at the Universities of Eastern Finland, Helsinki, Oulu and Turku) in Finland. However, the practical implementation of the curriculum and the teaching methods and learning objectives used are variable, partly due to the historical reasons and administrative autonomy of the universities and the faculties. The first national evaluation of undergraduate medical education in Finland was carried out by the Finnish Education Evaluation Centre (FINEEC) in 2016–2018 [5]. The evaluation produced an overall picture on the current state, strengths and challenges of undergraduate medical education, and developed recommendations that reflect the changing competence requirements in medical doctors' work and their future operating environment. The evaluation team recommended medical schools to continue and enhance collaboration to align the curricula and to share good practices so that shared national programme outcomes can be taught, learnt and assessed with certainty in Finland. Furthermore, one of the identified key skills taught to the students needing special attention according to the report was the readi-

ness of a physician to apply new technologies with a critical attitude.

Currently, digital platforms and e-learning approaches are used variably in medical education in Finland. There is a need to develop a common national digital online platform and learning material repository targeted especially for medical education. Also, appropriate training options are needed to increase the digipedagogical skills of the teaching staff. Furthermore, new solutions and innovative training approaches are needed to ensure the skills and competences related to the digital health tools (eHealth) of both the students and the teaching staff. The project is a part of the implementation of digital environment by the Finnish Ministry of Culture and Education [6], and all the universities that offer the Licentiate Degree in Medicine and Dentist programmes in Finland are involved (Universities of Eastern Finland, Helsinki, Oulu, Tampere and Turku). MEDigi-project enhances and provides tools for the continuum of national collaboration in the development and harmonization of medical and dental education in Finland.

The MEDigi project works in close collaboration with the other projects receiving key project funding and with their coordinating parties. For example SOTE-PEDA 24/7 -project aims to develop the digital social and health service competence specifications for different fields of higher education and create shared digital social and health services studies, pedagogical solutions, a competence badge system and learning environments for the national network of higher education institutions [7].

### Detailed objectives and expected results

The overall objective of the MEDigi project is to provide possibilities for harmonization and modernization of education in medical fields in Finland by utilizing digitalization in undergraduate medical and dentistry teaching. The specific aims of the project are:

- To support the harmonization of medical education in Finland

- To create an online service for the graduate medical and dental education
- To produce digital study material
- To develop digital exam and evaluation tools
- To support the development of student's competence in using digital health care tools (eHealth, digital health) in medical practice
- To create tools and support system for digital pedagogy training

The first aim of the project is to support national, discipline-specific collaboration in reaching consensus of the core content of undergraduate education in medicine and dentistry. This process will support all digital learning and teaching solutions created during the project. The content of the produced digital material has to be categorized at three levels: core content (level 1), complementary content (level 2) and specialty content (level 3). In every faculty, regardless of curriculum and ECTS credits, level 1 core content should form the core of teaching and provide the student the base for further development of competence. The core content analysis and national agreement on core competencies will enable to specify consistent learning outcomes and evaluation criteria for the medical education. Furthermore, common assessment criteria will be defined, as well as curriculum mapping at universities.

The options and feasibility of a common national online service or platform and learning environment will be investigated, e.g. in collaboration with the national DigiCampus project (<https://digicampus.fi>) which is piloting a national open source learning environment. The second aim of the MEDigi project is to have a functional, national medical education online service for the basic education of licentiates in medicine and dentistry. This service should include connections and necessary data transfer interfaces to the student information system.

The online service should fulfill the pedagogical objectives of the subject by being intuitive and easy-to-use for students and teaching staff. A well-functioning online platform includes a sufficient number of features

enabling the diverse implementation of the learning and evaluation of set learning objectives. The development work of the online service will pay special attention to the fact that digitalization in teaching does not solely refer to the implementation of new technologies and acquisition of software for teaching purposes, but also involves significant possibilities to change modes of operation. Taken into account the diverse needs of the medical fields, the online service and learning environment have to suit for the sharing and archiving of national study materials and learning evaluation methods in all subjects of medicine and dentistry.

The ultimate goal of the online learning services is to create a systematically progressing learning path that will cover basic medical education and specialist, post-graduate and continuing education in the future. At its best, the online service will enable continuous learning. The online service will also enable supplementing the competence of Finnish doctors and dentists studying and working abroad with the help of topical online courses, for example, on the Finnish public health care and service system.

As its main target, the MEDigi project will produce digital content and approaches for studying and teaching (including assessment) medicine and dentistry. The subject-specific divisions serve as experts on the content of the produced material and other digital solutions. Each division or workgroup has a dedicated university in charge of the progress of the operations of the division. However, all the universities are represented in each of the division in order to promote national collaboration. Currently there are 33 main workgroups, some of them have subdivisions, too. The produced digital material will be piloted on a national online platform for medical and dental education. At the same time, user experiences of the functionality of the platform and its suitability for medical sector education will be collected.

Furthermore, the MEDigi project aims to provide tools for the development of student's competence in using digital health care tools (eHealth, digital health) in medical practice. Finland has since 2012 been one of the forerunners by providing a special competence in

healthcare information technology for already graduated physicians and dentists [8]. The eHealth training in MEDigi project will provide also future health care professionals with the necessary abilities to meet the digital requirements of a changing healthcare working environment. There are also new opportunities to involve those who are interested in innovation and co-creation activities with industrial partners.

Finally, the MEDigi project aims to support the development of the digital skills of the teaching staff by utilizing the most recent research data on the field of digital pedagogy. Teaching staff will be offered digital pedagogy training during the project, and tools and support system for digital pedagogy training will be created to ensure that the teaching staff will achieve and retain appropriate digipedagogical skills in the future. The goal is to create a digital pedagogy training model to allow the implementation of the project results and to ensure the competence of new teaching staff once the project period has ended. The project takes into consideration the results of other development projects and international digital pedagogy trends in medical education, especially learning solutions and learning analytics that integrate seamlessly into a digital learning environment.

## Outcomes

As the outcome of the MEDigi project we will receive new knowledge of the feasibility of a common national digital online service and jointly produced digital content and solutions for medical and dental education. The online service will include learning material repository targeted especially to the medical and dental students and educators. MEDigi will create contents both for learning and assessment. This is achieved by national collaboration within individual medical and dental learning topics (disciplines) which will define the common learning objectives, core contents and competence goals before producing the material for the project. MEDigi will support the medical education developers and faculties to answer to the recommendations given by FINEEC in their evaluation report of medical education [5]. In order to fulfill the goals, MEDigi will improve

the digital skills of teachers, too. Moreover, MEDigi will support future physicians and dentists in their professional environment by creating special learning contents for eHealth and mHealth teaching already in undergraduate phase. The MEDigi project offers an excellent opportunity for academic research and collaboration. The feasibility and validity of various aspects and outcomes of the project will be investigated scientifically, and the results will be published in national and international academic and scientific journals.

The most important outcome of the MEDigi project will be the extensive national collaboration that will be invested in the development of medical and dental education. The current digitalization effort will not only produce new teaching materials and create new skills. There are opportunities to change our teaching models and support not only the medical and dental teachers but also the future workforce from their basic education level to lifelong learning.

## Conflict of interest statement

The authors are researchers in the project that is described here but they declare no conflicts of interests with the producers of the equipment or producers of data used in this study.

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