Inter-university initiative Austria

Project Digital Skills, Knowledge and Communication für Studierende der Humanmedizin,

Goal:

Development of curriculum elements to educate students of human medicine in digital skills, knowledge and communication. Thus enhance the medical curriculum toward training students on

- Knowledge and in-depth understanding of the basics and processes behind digitalization in medicine
- Skills in dealing with digital media
- Proper use of the instruments in clinical routine
- Competencies in digital communication

Project partners: Medical Universities of Vienna (lead), Graz and Innsbruck

Duration 2020-2024, funded by the Austrian Ministry for Education, Science and Research,

Contact:

Lead University: Medical University of Vienna.
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MEDigi: National initiative Finland

Towards digitalization of medical education and educating digitalization in Finland.

Main targets:
- Define the national priorities in core competencies for physicians and dentists.
- Create an online service for the graduate medical and dental education.
- Produce digital study material.
- Develop digital exams and evaluation tools.
- Support the student's competence in using digital health tools (eHealth, mHealth) in medical and dental practice.
- Create tools and a support system for digital pedagogy training (for teaching personnel).

Duration: 3 years, 2018-2021
Members: 5 medical schools

In practice:
- Basics in eHealth web course, 5 ECTS. Multiprofessional for medical students available since 2006, optional studies in preclinical years since 2018.

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- Connected Health and mHealth, 5 ECTS. Multiprofessional, primary target biomedical engineering and information science students, co-creation with medical students expected.

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Bachelor and Master in Technical Medicine
Netherlands
Joint degree of three Universities: University of Leiden, Technical University of Delft and Erasmus University Rotterdam.

Goal:
To train students in both the technical and medical domain to become professionals to initiate, implement and evaluate med-tech innovations in health care. When graduated, the professionals have a registration to perform medical procedures (BIG registration).

BSc courses (180 EC) with integrated medical and technical courses such as:
- Imaging
- Image processing
- Biomechanics and the muscular-skeleton system
- Signals and the nerve system etc.

MSc courses (60 EC) such as
- Machine Learning
- Advanced Image Processing
- Python
- Biomaterials
- Radiation physics
- Image guided interventions
- Computer assisted reconstructive surgery

MSc internships (120 EC): The students learn the clinical routine in several hospital departments and do research on several med-tech problems.

Lessons learned: our programme started in 2014. Our students are much in demand since they combine a unique medical and technical background. They come up with new solutions by bridging the gap between the engineers and the physicians.

https://www.tudelft.nl/onderwijs/opleidingen/masters/technical-medicine/msc-technical-medicine/

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Module: Machine learning

What is or are the challenge(s) for medical student curricula?
The current programme is already full, so it is challenging to find space for this digital skills. This is a challenge for the course developer and the education director. It will also be challenging to find educators in this field. Some **recommendations** to remedy this can be:

- Integrate the digital skills in the program.
- Use Zoom for anamnesis teaching, use decision tools for clinical reasoning teaching
- Let the students practice extensively with an EPD during clinical encounter training sessions so that they understand how important it is to enter structured, unambiguous, reliable data.
- Let the students practice with reading remote data from subjects/ (mock) patients and making clinical decisions based on these data etc.

What is the goal of the module Machine Learning?
This course familiarises students with the basic concepts and methods of Machine Learning. The course covers several classifiers, deep learning, performance metrics, feature selection, dimensionality reduction, overfitting and regularization. Examples and assignments will be primarily from the medical field. The target group consists of first year MSc technical medicine students, who receive 2.5 ECTS upon completion of the course.

https://studiegids.tudelft.nl/a101_displayCourse.do?course_id=52122

- The student understands the basic machine learning concepts and methods.
- The student is able to select and implement ML methods in Python to well-defined problems and to interpret and evaluate the results.
- The student is able to justify the choices in the chosen ML-strategy.
- The student is able to identify and explain the pitfalls in ML strategies, and the advantages and limitations of several ML related methods

The course consists of lectures, video clips, working groups, reading materials, self study, programming and group assignments. The students (in groups of 4) developed and evaluated in Python a classification strategy for existing open-source datasets and discussed the added value for healthcare of their method.

Toolkit box EMSA

The European Medical Students' Association (EMSA) is a non-profit, non-governmental organisation representing medical students from all across Europe.

The digital transformation of health care represents one of the greatest challenges modern health care systems are facing today. Thus, it inevitably affects the key actors at the front line keeping the health system running: the healthcare professionals. Knowledge on the technological advances in healthcare, the awareness of ethical and legal implications of new digital tools as well as different communicative competencies will become indispensable for future health workers.

How does the digital transformation of health care change the daily routine of a healthcare professional? Which knowledge and skills will healthcare professionals need? Are universities in Europe preparing their students well enough to work within a digitised health system?

In this link you will find a toolkit encouraging you - as future healthcare professionals - to put the digitalisation of health care into practise. It provides you with an insightful context, an introduction to the topic of digital health and a framework to inspire you to start activities and discussions at your university.

Enjoy the read!
Europeanly yours,

The EMSA Student Task Force for Digital Health

Website: https://emsa-europe.eu/european-health-policy/
info@emsa-europe.eu

Technological innovation in the medical specialist further education. Competency set

Technological developments have an influence on health care and on the daily work of the medical specialist as the current practice is changing at an increasingly rapid pace. The competences for the medical specialist are laid down in the CCMS Framework Decision and elaborated in the document. The CanMEDS roles (communicator, collaborator, leader, etc.) now deserve further elaboration. In 2017 important vision papers released with much attention to the role of technology in the care of the future, namely 'Medical Specialist 2025' of the Federation of Medical Specialists (Federation). The Federation outlines that medical specialists will need to evaluate, implement and develop innovations in healthcare. This includes big data analysis and wearables as concrete examples with which the modern doctor must be able to deal. Workgroup Healthcare 2025, consisting of healthcare professionals (also in training), sees technology as an important opportunity to improve care. They signal that the implementation of technological developments is desired. There are too few medical courses or training and in this document they outlined their vision on what levels of competencies are needed for medical specialists to be medical innovators.

Document: https://dejongespecialist.nl/hulp-advies/carriere-profilering/technologische-innovatie/

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Medicine in Digital Age

"Medicine in the digital age "was the first curriculum, which addresses digital transformation and the changing qualification need for future doctors at a German medical school. It has been implemented since 2017.

The curriculum "Medicine in the Digital Age" explicitly pursues the approach of mapping the digital transformation of medicine in an interdisciplinary and interactive way. In addition to imparting knowledge, the focus is on practical skills in dealing with digital applications and a reflection of personal attitudes.

Knowledge - skills - attitude: Only the integration of these three aspects leads to competence.

Description of what was done and the approach

Digital communication, smart devices and apps, telemedicine, virtual/augmented reality and robotic, artificial intelligence and big data are core topics of the curriculum. The local team of lecturers consists of doctors, psychologists, computer scientists and medical ethicists. It is supplemented by external lecturers from medical start-ups, the state data protection department and patients who use digital applications. The aim is to reflect the interdisciplinary nature of digital medicine with a variety of perspectives and broad expertise.

The blended learning curriculum "Medicine in the digital age" consists of six compulsory learning modules, each of which consists of an approx. 2-hour e-learning unit and a 4-hour classroom teaching unit and transfer projects.

Simulations with app-based treatment concepts, video consultation hours and discussion rounds enable active and practical interaction with the new treatment concepts. In critical discussions between the participants and the teams of lecturers, the opportunities and possibilities as well as the risks and limitation of digital medicine become visible.

Reception by students

The target group for this curriculum is medical students in the first and second year of the clinical curriculum, who receive approximately 1.5 ECTS upon completion of the course. The evaluation in the form of semi-structured interviews showed a high acceptance of the course concept. The students emphasize the perceived appreciation and motivation through the intensive and creative cooperation among themselves and with the lecturers. Especially the possibility of practical interaction and clarification of medical care concepts were positively evaluated.

Lessons learned

The development of a digitization strategy & its didactic mediation is a relevant component of future planning for curricular development of medical studies for all locations, but also for further education & training of the medical profession. In the future, this will require a comprehensive implementation in the curriculum. In this context, it must be critically reflected whether & how the range of courses presented here is scalable. We are convinced that the practical and reflective parts, even when scaled to the number of semesters, should be represented in the form of internships for a maximum of 15-20 students in order to foster exchange. When developing these curricula, the high speed of the change process should also be taken into account & curricular adaptation in the sense of "agility by design" should be made possible right from the conception stage.

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