E-health at EU partner Universities

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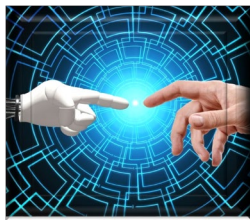
Criteria and methods

- Within the WP3 of the ICURERE project we collected information about the presence of training activities in the European partner universities related to e-health.
- e-health means all training activities aimed at training health professionals in the use of information and communication technology-based tools to support and promote disease prevention, diagnosis, treatment and monitoring and health and lifestyle management.
- To collect the data, a questionnaire was used, either online or in a fillable word format, consisting of 40 items related to e-health training in the European partners' different training levels.

Main Idea of the investigation was:
- to search of syllabus among the courses that are delivered so formally recognized in domain of e-health;
- to analyse the courses at the different levels and individuate courses linked to e-health and in line with the project objectives.

The research was done in different steps:
- Administration of questionnaires to EU partners
- Analysis of data
- Individuation of courses indicated by Eu partners
- Analysis of Lebanon and Egypt data on E- health national priorities

The questionnaires were administrated via google drive
Responders
- Linnaeus University – 1 person
- Tallinn Technological University 1 person
- University of Genoa 2 persons

Data From Questionnaire

Bachelor courses related to E-health

Only University of Genoa
Name: *Biomedical Engineering*
Course indicators:

- Since 1996
- With more than 100 student
- ECTS – The weight of disciplines related to e-health is 27

Description

- The Bachelor Program in Biomedical Engineering focuses on the application of engineering to medicine and biology. The curriculum includes courses that specifically focus on e-health, intended as the application of information and communication technologies to promote prevention, diagnosis, treatment monitoring of diseases and more in general the management of personal health and well-being.

Course related to e-health at UNIGE

- BIOMEDICAL DATA AND SIGNAL PROCESSING
- ELECTRONICS AND BIOMEDICAL MEASURES
- BIOMEDICAL INSTRUMENTATION
- Medical Informatics laboratory (elective)
- Biomedical Instrumentation Laboratory (elective)

Master courses related to E-health

Are held at Universities
- o Linnaeus University
- o University of Genoa
- o Tallin Technological University

MA at Linnaeus University indicators

Name: *Master on E-health*
- *Course indicators*:
  - Since 2017
  - Students – 30
  - ECTS - 60

Description

Objective

Upon completion of the course, the student should be able to:

- define eHealth;

- describe a country's health system;

- give examples of different types of digital information technology used for prevention, diagnosis and treatment in health care;

- describe and explain the current situation and development of eHealth in different countries;

- reflect on the opportunities and challenges of eHealth in different countries.

Content

The course includes parts that deal with:
- basic knowledge of the concept of eHealth (digital information technology in healthcare) examples of health systems in different countries; examples of eHealth for prevention, diagnosis and treatment; overview of digital information technology for healthcare
- Global eHealth strategy- globalization, clinical effects, profitability and economy, empowerment, usability, digital divide, patient safety, ethics, information security, laws and guidelines
- literature coverage in health informatics

MA at Tallin Technological University

Name: *Master of Science in Engineering (discipline: Health Care Technology)*
- *Course indicators*:
  - Since 2009
  - Students – 20
  - ECTS -120

Description (took from website)

- Digital Health is a unique Master's programme in Europe that provides interdisciplinary knowledge on digital technologies, innovation and change management of health care. It relies on the best practices of health care digital transformation and e-health innovations from Estonian e-health system and international successes.
- Skills and knowledge for implementing new innovative technologies in health care.
- Experience and examples of countrywide e-health implementation in Estonia.
- You learn to understand how healthcare, IT and medicine interact.
- Most of the lectures will take place in the Business and Innovation Centre Mektory.
- Events and have site-visits help you to get first-hand experience from different healthcare, medical and digital health companies.

Courses descriptions TallTech (took from website)
- **Basics of e-Health**. The course provides knowledge about electronic data reflecting human health in the health care system. Gives overview of electronic health care services and creates an understanding of the structure of health data and application limits of e-Services in health care. Gives an overview of digital and analogue processes in health care. Introduces different international e-Health experiences.
- **Evaluation and Financing in Healthcare** To provide an overview of the methods of financing, remuneration and reimbursement in healthcare in connection with evaluation. The course will explore the different evaluation methods that are relevant in the design of health information technologies. The course will help students to design, plan, and conduct independent evaluations of health care technologies. The course also provides practical abilities of economic evaluation methods in health care, and how economic evaluation can be applied to the health care sector to make informed decisions.
- **Healthcare Data Systems and Analysis** Healthcare data systems and analysis course goal is to introduce students to different data systems used in Estonian healthcare organisations (including central registries and integrations systems) and hospitals. How are the data systems created, what is their purpose, how the systems are integrated, and do they satisfy the end user. Also the different hospital and other healthcare data systems structure, user interface and to see the pros and cons of different data systems.

- **Medical Law and Ethics** The course gives students depth knowledge of the medical law and ethics. The course will provide a comprehensive overview of other areas of law related to medical law and ethical issues in medicine. Students are given the opportunity to understand and critically evaluate ethical questions in medicine.
- **Medical Imaging and Signals** To give students knowledge about physical and chemical bio-signals and their registration. To introduce signal registration and analysis processing methods and equipment. Giving overview of imaging methods in health care. To teach different steps of data flow starting from the registration of bio-signals to presentation of image in user understandable mode. Practical introduction to different imaging and signal processing methods in health care institutions. Introduction to basic models of image, graphs and image series filing, saving and presentation systems in health care. To introduce the use of different signal and image processing methods from the point of view of the clinical question or examined organ system. Also to give overview of the contraindications of the use of diagnostic methods in medicine.
- **Servicing and change management at health care enterprise**. A student having successfully completed the studies has got a systematic overview of the functioning of the health care system on all management levels (quality, strategic, financial and human resource management), and of the objectives of health care marketing and demand. A student is able to apply one's knowledge and skills to practical work. The course gives students a practical understanding of the different workflow management methods in a healthcare organization. A comprehensive overview of the different methods used will ensure an equal understanding of the relevant processes and their subsequence. The course aims to give students the ability to use a variety of methods to identify the essence of a problem, define what needs to change in order to achieve the desired result. In addition, the students will understand how to assess the costs and benefits of a planned change, as well as how to define if and why a change in a specific process is needed; Finally, the course will give an overview of the methods that support the successful implementation of changes in a health care organisation.

MA at University of Genoa

Name: *Bioengineering*

- *Course indicators*:
  - Since 1996
  - With more than 70 student
  - ECTS - The weight of disciplines related to e-health is 45

Description

- The Master Program in Bioengineering aims at training engineering professionals who are capable of operating in numerous applications, research, and innovation domains in the medical-biological field, which naturally requires inter-disciplinary skills. Students will achieve knowledge and skills that are applicable in different domains: diagnostic systems, clinical engineering, rehabilitation and assistive technologies, cybernetic and bio-inspired systems, biomaterials, bio, and neuro-technologies.
- As regards e-health, we offer a track on 'Information and Communication Technologies for personalized medicine', focusing on the use of information technologies for diagnostics, therapy and prevention with the direct involvement of the patient in the treatment path. This includes the development of diagnostic tools and devices based on bio-images, biosignals, genetic information; telemedicine, biomedical robotics, wearable devices for monitoring, prevention, treatment and assistance; the design and management of hospitals and health systems centered on the patient's needs and on taking charge of situations of fragility.

Courses Names:
- ANALYSIS OF BIOMEDICAL DATA AND SIGNALS
- BIOMEDICAL IMAGING
- BIOMEDICAL ROBOTICS
- TECHNOLOGIES FOR PERSONALISED MEDICINE
- BIOINFORMATICS
- DIGITAL HEALTH
- ARTIFICIAL INTELLIGENCE IN MEDICINE
- WEARABLE DEVICES AND INTERNET OF HEALTHCARE THINGS

PhD related to e-health

University of Genoa

Name: *Doctorate in Bioengineering and Robotics*

- Students 35

Data from UNIGE (related to PhD)

- Robotics for rehabilitation,
- Data management for health applications,
- Simulation,
- Nanotechnologies

Website data from Eu partners Sites

Research at Tal Tech

•supporting the development of IT solutions for digitalisation of healthcare and examining interoperability factors (strategies, standards, IT architecture, data sets, databases) needed for the implementation of digital health solutions

•evaluation of digital health technologies and developing the necessary framework for deployment

•testing and development of solutions related to personal medicine

Research at LNU

The main research is at the e-Health Institute at Linnaeus University acts for a sound, knowledge-based use of digital technology, well-suited for its purpose, within nursing and care. We work with knowledge on how the digital technology can increase patient participation in nursing and care and make it more secure and sustainable in the long term.

The e-Health Institute is a dynamic, interdisciplinary knowledge and learning environment that offers education and seminars within e-Health. We carry out research and evaluation projects with focus on user and citizen utility. We also offer single-subject courses and a master's programme in e-Health.

The e-Health Institute has a broad research approach – with focus on the use of medicines and the introduction of digital technology and Big Data – and collaborates with one the foremost research environments at Linnaeus University, Linnaeus University Centre for Data Intensive Sciences and Applications (DISA).

We also run several research and evaluation projects in collaboration with authorities, municipalities, county councils, companies and organizations.

Projects :

eHealth – Improved Data to and from Patients

Informed healthcare decisions with evidence based real-time data and long term monitoring are of interest for society as they provide new ways to monitor patients and to try out and prescribe treatment. For supporting high quality medical/healthcare services, reliable measurements can act as a trustworthy informed decision base for patient-doctor communication, physically and/or remotely. The quality of measurements of personal mobile sensors, e.g., glucose or heart rate, needs to fulfil certain requirements such as the systems storing and analysing the data. Qualities like, e.g., integrity and safety, are managed with healthcare assurance and certificate systems. They consider a wide variety of individuals/patients with diverse interest, knowledge, and cognitive level.

The goal for the researchers within eHealth – Improved Data to and from Patients is to generate new knowledge on how to model, engineer, visualize and validate systems and tools for supporting healthcare applications in for example the fields of diabetes and medication. This research will result in novel ways for systematic data collection, monitoring and visualization of different medical values.

Analysing data with mining techniques

Open/personalized, real-time/registered data is collected from a variety of systems (health-care records, mobile sensors) and their environments. The data is analyzed using different mining techniques combined with visual analytics.

This type of research needs clinical competence related to the interpretation and trust of data that is generated automatically or by the individuals respectively. This is supplemented by system and data analysis and visualization competences from computer scientists. External partners will provide access to national quality registers and clinical data output from electronic patient records.

Platform eHealth
A strategic platform for eHealth at Linnaeus University that will contribute to collaboration and increased knowledge exchange. Within the platform, researchers from many different fields of subject collaborate with different professions and organisations in the region.

A platform for interdisciplinary collaboration within the field of eHealth
The national vision "eHealth2025" implies that Sweden will be best in the world at using the opportunities offered by digitisation and have great expectations that digital products and services will solve societal challenges linked to an ageing population and an increased need for individualised health services and medical care. In order for this to happen, a long-term strengthening of research and education within the field is necessary.

At Linnaeus University, research is carried out and degree programmes are offered that are fully or partly focused on eHealth, and in the Linnaeus region initiatives are going on that aim to strengthen the region's ability to meet the national vision. With its eHealth platform, Linnaeus University wants to support and stimulate researchers to engage in interdisciplinary collaborations within the field of eHealth and then work together with the surrounding community to meet these societal challenges.

How do we work?
The platform is a collaboration, with funding for 2018–2020, between the different faculties at Linnaeus University and coordinated and run by the faculty of health and life sciences. The platform will provide support for the development of interdisciplinary research and eHealth ventures on relevant programmes and courses, all with links to social benefit.

In order to meet societal challenges from different angles and approach, a multidisciplinary coordination of research resources is needed. Through strengthened interdisciplinary research, new forms of knowledge can be acquired that can enrich both education and innovation, that is to say, generate collaborations between the university and the surrounding society.

Research at UNIGE
- Medical informatics: Development and use of statistical and informatics methods for the analysis, management and reuse of biomedical data, supported by standards, for applications to research for health, knowledge extraction and decision support.
- Neuro-engineering: study of the nervous system at several levels, from genes to neurons up to behavioural and cognitive mechanisms, both in normal

conditions and in pathologic conditions, also by definition of models and the design of artificial systems.

- Cellular and tissue engineering: development of methods and techniques at micro and nano levels for biology and medicine, both from diagnosis and therapy point of view.
- Therapy, rehabilitation, well-being: study and development of methods for man-machine interaction, intelligent systems, multi-modal interactive systems, and serious games.
- Major research collaborations include: regional health system, local research hospitals (Gaslini, San Martino, Galliera, Santa Corona, Maugeri), Fondazione Istituto Italiano di Tecnologia, charities (Italian Multiple Sclerosis Foundation, Chiossone Institute for the Blind)

The National E-Health Program
Lebanon

According to decision No.1/227 of 04/03/2013

E-Health National Program shall be established within the Ministry of Public Health with the aim of developing the health sector and enhancing the quality of health care through the use of ICT. This program shall be a division of the Directorate General of Health and fulfil the tasks mentioned in article 2 of this decision.

The tasks of E- Health National Program shall include the following:

- Improve the health information systems and data base and establish a data centre for health information
- Supervise the management and implementation of the E-government
- Ensure interoperability by exchanging information and data electronically with the central administration and linking the Ministry of Public Health with the different public administrations and syndicates
- Adopt M-health technology by using different means of communication such as smart phones and wireless devices to disseminate information and provide health services
- Develop E-prescription to reduce the medical errors and bill and ensure the safety of drug prescription
- Introduce Telemedicine through the use and exchange of medical information from a geographic location to another by electronic means of communication to provide diagnostic and therapeutic services for individuals, in particular to people living in remote areas, those with disabilities and elderly
- Provide E-learning to train the Ministry's employees and the staff specialized in health informatics who are able to keep up with developments in IC. This will also ensure continued development of the skills and competencies of health workers
- Abide by the ethics of E-health by preserving the credibility, confidentiality and privacy of information through the establishment of security and privacy principles that govern the use of information and the right to access them
- Cooperate with the national and international stakeholders to keep up with developments and exchange expertise in this field

National priorities of Egypt on e-health

The Egyptian government is pushing for universal healthcare and cross-industry partnerships. With that, digitised hospitals are emphasising on connectivity and hardware and software developments related to big data, machine learning, artificial intelligence and the Internet of Things—a pathway for innovators in healthcare worldwide.

In comparison, Egypt's approach to healthcare is quite similar to other African countries. For example, in Africa, different start-ups are using artificial intelligence to diagnose diseases, provide treatment recommendations and data management solutions to its users.

Likewise, advancements in health-tech in Egypt are driven by artificial intelligence. An article published in the MIT Technology Review pointed out that artificial intelligence has the potential to save cost by taking over diagnostics procedures previously carried out by health workers. However, with the integration of artificial intelligence hospitals will be able to better utilise the resources.

According to a PwC report titled The Potential Impact of AI in the Middle East, Egypt is aiming to have 7.7 percent of its GDP derived through artificial intelligence by 2030. The Egyptian government is driving digitisation in the country across sectors.

More recently, it developed a national AI strategy to integrate artificial intelligence in different sectors such as healthcare, education, smart cities, infrastructure and transport among others.

Conclusion

All 3 Eu Universities has courses on e-health field at MA on e-health
We concentrated the course at MA level in
Policy
Education and Research
Clinical application

Title of the course

POLICY

HEALTH SYSTEMS IN THE 21ST CENTURY

HUMAN RIGHTS, ETHICS AND TECHNOLOGY

E-HEALTH IN A GLOBAL PERSPECTIVE

TECHNOLOGY, SOCIETY AND THE FUTURE

EDUCATION &RESEARCH

E-OCCUPATIONAL HEALTH AND SAFETY

WORK ENVIRONMENT : RISKS MANAGEMENT   AND WELL-BEING

BASICS OF E-HEALTH

METHODOLOGY OF RESEARCH

CLINICAL APPLICATIONS (PEC):

ANALYSIS OF BIOMEDICAL DATA AND SIGNALS

BIOMEDICAL INSTRUMENTATION AND BIOIMAGING

BIOMEDICAL ROBOTICS
HEALTH INFORMATION SYSTEMS

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The questionnaire

.E. Health Survey areg
</div>

Below you will find a series of questions aimed at collecting information on the presence of training activities in the field of health conducted in online or blended mode in your University. The information collected will be used to define the current status of online or blended health education in ICU-RERE EU Partners to describe the state of the art in the European Union. The same information will be collected through Egyptian and Lebanese Partners. The data collected will be used to develop Work-package 3 of the project "development of Diploma, study and training programs. The reply of this survey will be used by the work package 3(diploma and study programs) and work package 9 (management) for the future planning and re-planning due to covid-19.

PLEASE NOTE THAT YOU SHOULD FULFIL THE SECTION THAT CHARACTERIZES YOUR ACADEMIC REALITY (FOR EXAMPLE IF YOU HAVE ONLY A BA IN E-HEALTH YOU CAN SKIP THE SECTIONS OF MA PHD AND PROFESSIONAL)

IF NO BACHELOR IN E-HEALTH IS ACTIVATED AT YOUR UNIVERSITY PLEASE GO TO THE NEXT SECTION

Name: --

Title/Position & main Task/s at the organisation--

Name of the university/faculty, Department, institution/organisation--

- Date of your reply ------------------------

Would you please describe the e-health study or training program at your organisation

1. Do you have at your University courses related to e-health?   ☐ Y   ☐ N

    (If NO, please go to question number 38)

SECTION 1 – BACHELOR LEVEL

	Date	Number
2. Since when do you have the program/ course, training and how many?	_____	_____

	h x y	ECTS	N. Student
3. Could you indicate the number of hours per year or ECT value and the number of student attending the Educational program?	_____	_____	_____

4. Please, could you indicate the name?

5. Please, could you attach course/training description and indicate the web site address?   WWW.

6. Do you have cooperation with non-academic institution such as hospitals, ministry, syndicate, and other stakeholders?   ☐ Y   ☐ N

7. Describe very short the Research activities on eHealth at your organisation, and if you have research cooperation with non-academic institutions

_____

_____

_____

_____

SECTION 2 – MASTER LEVEL

Date   Number

8. Since when do you have the program/ course, training and how many?

_____   _____

9. Could you indicate the number of hours per year or ECT value and the number of student attending the Educational program?

h x y   ECTS   N. Student

_____   _____   _____

10.   Please, could you indicate the name?

_____

11.   Please, could you attach course/training description and indicate the web site address?

WWW.

_____

12.   Do you have cooperation with non-academic institution such as hospitals, ministry, syndicate, and other stakeholders?

Y   N

13.   Describe very short the Research activities on eHealth at your organisation, and if you have research cooperation with non-academic institutions

_____
_____
_____
_____
_____

SECTION 3 – PhD

Date   Number

14.   Since when do you have the program/ course, training and how many?

_____   _____

15.   Could you indicate the number of hours per year or ECT value and the number of student attending the Educational program?

h x y   ECTS   N. Student

_____   _____   _____

16.   Please, could you indicate the name?

_____

17.   Please, could you attach course/training description and indicate the web site address?

WWW.

_____

18.   Do you have cooperation with non-academic institution such as hospitals, ministry, syndicate, and other stakeholders?

Y   N

19.   Describe very short the Research activities on eHealth at your organisation, and if you have research cooperation with non-academic institutions

_____
_____
_____
_____
_____

SECTION 4 – LIFE LONG LEARNING

Date   Number

20.   **Since when do you have the program/ course, training and how many?**

     _____   _____

21.   **Could you indicate the number of hours per year or ECT value and the number of student attending the Educational program?**

h x y   ECTS   N. Student

   _____   _____   _____

22.   **Please, could you indicate the name?**

_____

23.   **Please, could you attach course/training description and indicate the web site address?**

WWW. _____

24.   **Do you have cooperation with non-academic institution such as hospitals, ministry, syndicate, and other stakeholders?**

Y   N

25.   **Describe very short the Research activities on eHealth at your organisation, and if you have research cooperation with non-academic institutions**

_____

_____

_____

_____

_____

SECTION 5 – PROFESSIONAL TRAINING

26.   **Since when do you have the program/ course, training and how many?**

Date   Number

     _____   _____

27.   **Could you indicate the number of hours per year or ECT value and the number of student attending the Educational program?**

h x y   ECTS   N. Student

   _____   _____   _____

28.   **Please, could you indicate the name?**

_____

29.   **Please, could you attach course/training description and indicate the web site address?**

WWW. _____

30.   **Do you have cooperation with non-academic institution such as hospitals, ministry, syndicate, and other stakeholders?**

Y   N

31.   **Describe very short the Research activities on eHealth at your organisation, and if you have research cooperation with non-academic institutions**

_____

_____

_____

_____

_____

SECTION 6 – INDIVIDUAL COURSES

32.   **Since when do you have the program/ course, training and how many?**

Date   Number

_____   _____

33.   **Could you indicate the number of hours per year or ECT value and the number of student attending the Educational program?**

h x y   ECTS   N. Student

_____   _____   _____

34.   **Please, could you indicate the name?**

_____

35.   **Please, could you attach course/training description and indicate the web site address?**

WWW.

_____

36.   **Do you have cooperation with non-academic institution such as hospitals, ministry, syndicate, and other stakeholders?**

Y	N

37.   **Describe very short the Research activities on eHealth at your organisation, and if you have research cooperation with non-academic institutions**

_____
_____
_____
_____
_____
_____

38.   **(If you don't have e.health activities) Describe in brief if your organisation/university plan to develop such study training and research alone and or in cooperation with actors of health care sector**

_____
_____
_____
_____
_____

39.   **As the project is also about transfer of know how from EU program countries to partner countries your organisation is expected to provide**

_____
_____
_____
_____
_____
_____

40. *YOU CAN PUT A QUESTION BY YOUR OWN AND ANSWER IT HERE:*

_____
_____
_____
_____