

# Educating Health Care Professionals Master's Program in Health Informatics at Aalborg University

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## Abstract

*The program in Health Informatics at Aalborg University was started in 1994 as a part-time continuing education for health care professionals. The program is based on a problem based, project organized learning strategy and is structured in a mix-mode way with face-to-face seminars at the university combined with learning activities on a learning platform. Since 1994 both healthcare and the role of ICT in health has changed as ICT systems has matured and grow into being a natural part of everyday practice in all aspects of the health domain. Thus the focus and content of the education has been revised several times during the past almost twenty years in order to meet the changing needs and expectations to health care technology. At the moment we are going through such a revision and in this paper we present our program, the revision process that we are going through, and discuss major trends and challenges in health care, and how this should be reflected in continuing education of health care professionals within the area of health informatics.*

## Keywords:

Health informatics education, continuing education, future challenges

## Introduction

The conception that Information and Communication Technologies (ICT) could and should play an important role in the delivery of better and more efficient health care is far from new, nor is the acknowledgment that education is needed in order to fulfill the expectations. International Medical Informatics Association (established in 1979) has during the years initiated various activities in order to promote health informatics education and a special working group, the IMIA working group on Health and Medical Informatics Education, is especially dedicated to this work. The aim of this working group is to raise the scope and quality of education by dissemination and exchange of information on Health and Medical program and courses. This has been done by e.g. organizing conferences on health and medical education, by special issues of the international Journal of Medical Informatics on education, and by establishing and promoting the IMIA database on programs and courses [1, 2]. The focus on educational issues also led to the development of recommendations on educations in health informatics, the first version of these came in 2000, and a revised version was available in 2010 [3]. Recently a procedure for accreditation of health informatics programs is developed and tested [4].

Thus the emphasis on education as a way of promoting health informatics has a long history, but the focus and the content

has obviously changes over the years as ICT systems in health has matured and grown into being a natural part of everyday practice in all aspects of the health domain. In the early days there was a high focus on computer literacy and health care specialists. The focus of today is also including applications that are more directly utilized by patients and citizen, and on health care professionals as IT users. This is also reflected in the IMIA Strategic plan – Towards IMIA 2015 [5] where several target groups are mentioned as relevant health informatics education e.g. health informaticians, implementers, health professionals and people. Taken to the extreme, one could say that the early expectations were that IT in itself could change the healthcare system and make it more efficient and cohesive. It has appeared that this is not the case and this has led to more focus on contextual issues, and the need for a deeper understanding on how IT mediates remediate different health practices.

## The Master's program at Aalborg University

The program in Health Informatics is a continuing education program for health care professionals based on a problem based, project organized approach. The program was initiated in 1994 and has run ever since. Approximately 380 persons have successfully completed the education since we started. It is an inter disciplinary program run in a collaboration between Department of Health & Technology (host of the education), Department of Development & Planning, and Department of Communication & Psychology at Aalborg University. Around 15-20 students primarily from Denmark, but also from Scandinavia are admitted every year, the admission criteria being a bachelor or master degree in health sciences (e.g. doctors and nurses) and at least two years of professional experience. The program is a 2 years part time study, corresponding to 60 ECTS, and provides the students with knowledge, skills, and competencies to work theoretical and methodological with health informatics problems from different angles, e.g. management, health care professionals, and patient/citizens perspectives. The aim is to provide the students with capabilities that enable them to bridge the gap between health professionals and IT professionals, thus being able and to cooperate with e.g. suppliers, regions and municipalities. Furthermore the students should be able to handle both development- and implementation processes in a professional way, and to cooperate with patient and citizens on specific IT solutions. The program is organized as a mix-mode study combining face-to-face seminars at the university and work on a learning platform between the seminars. The face-to-face seminars takes place at the university 4 times a year and include intensive lectures, laboratory exercises and perhaps most importantly dialog and discussions between the students and the teachers and the students.

The students work with two main types of activities: project work and courses. A course is a systematic presentation of a discipline and the purpose is to provide the student with sufficient disciplinary knowledge to cope with inter disciplinary problems. There are 6 courses, three each year, and three projects, two on the first year, and one master thesis at the last year. Table 1 provides a list of study activities. To complete a course the students have to pass a test. These tests are normally conducted through the learning platform; at a specific date and time an assignment is made available for the student at the system, and the students then have one or two hours to work with the assignment.

The project works offer the students the possibility of working with problems of their own choice and usually student work with problems relevant for their professional background. The project of the first year has to be stated within the frame of "Health Informatics from an analytical perspective" whereas the master projects of the second year are within the frame "Health informatics from a design and/or implementation perspective". To identify and work with problems in collaboration with other students is an important part of the education. Examples of project from this year are "Design of a consent register", "Standards in communication between home care and hospitals", "The role of paper in digital information environments", "Challenges in implementation of new technologies in home care", and "User perspectives on apps for self-monitoring and control in diabetes care". Work with the project is discussed in "project seminars" at the weekend gatherings at the university. At these seminars the student present their work and discuss the challenges with other students and supervisors. The result of the project work, the project report, forms the basis for an examination that takes place at the university as an oral presentation and discussion between the students, the teachers, and the external examiner.

	1. Year	ECTS
Courses	Introduction to problem-based learning	5
	Health informatics from an analytical perspective	10
	Data flow and quality	5
	Implementation and usability	5
	Technological and organizational changes	5
	2. Year	
	Health Informatics from a design and/or implementation perspective	15
Courses	Clinical databases and decision support	5
	User driven innovation and patient empowerment	5
	Management, quality improvement and evaluation	5

Table 1: study activities at the master program in Health Informatics at Aalborg University

More information on the master's program in Health Informatics at Aalborg University can be found on: <http://www.sundhedsinformatik.aau.dk/>

### Ongoing revision

The educations have, as mentioned, been revised several times since 1994 both in size, content and organization. Thus the size has varied from 60 ECTS, to 90 and back to 60 ECTS again. The course content has changed from being based at a

data cycle perspective to include the contextual perspectives of management, organization, implementation, and use practices. Some of the features in the development of the education have been described in [6 and 7]. The problem based, project organized learning approach is still a very important feature of the education. Development in how to frame and enacts this pedagogical model is an ongoing process for all of Aalborg University and to strengthen this process a PBL academy have been established in 2010 [8].

The ongoing revision was initiated in spring 2013 and addresses primarily the content of the courses. We conducted a series of interviews with important stakeholders in the health informatics area that is decisions makers from municipalities and regions, clinical experts, representatives from doctors and nurse's trade union, patient organizations etc. We gathered information on these people's conceptions of health informatics, and what kind of knowledge, skills and competencies students should poses. We interviewed 12 people and on this background we identified at list of keywords that could be used for revising the course content. The list of keywords included: Implementation, usability, quality assurance, patient empowerment, data quality and clinical information systems. As for now we have made a revision of the course content taking into account the ideas and opinions of the stakeholders. In the coming year we are going to teach and test the courses with the students. We also are considering developing the program into a more module-based structure making room for individual needs and a flexible cooperation with other programs. Furthermore the use practices of the learning platform need to be developed.

### Future trends and challenges

In a discussion paper from 2010 Rainhold Haux reflects on medical informatics as a discipline and suggests and discusses future research directions within the field [5]. He presents two different ways of thinking in identifying important future research fields within medical informatics, the first one called the evolutionary approach, and the other one called the revolutionary approach. The evolutionary approach is based on former discussions and papers and Haux makes 10 statements that sum up the discussion of future research directions. He then sums up the evolutionary approach in 4 statements, which he uses as an outset for 16 statements hen denotes the revolutionary approach. The four central statement reads as: (a) Health has to be considered more and more as an integral and continuous part of life (not as health care within a limited time frame of a disease episode), (b) medical informatics is addressing both health care professionals (plus their professional environment) and individual/consumers (plus their social environment), (c) the individual, the human being, is being at the center of research, even though medical though medical informatics research can range from molecules to populations, (d) research, education and practice may shift more and more from local, to global activities. [4, p. 606]

These statements, along with the idea that typical individual health problems (e.g. diabetes and COPD) that require prevention and health promotion strategies should be addressed in communities of practices, will be used as an inspiration in the further revision of the Master in Health informatics at Aalborg University.

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