

# IPHIE: an International Partnership in Health Informatics Education

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## Abstract

Medical informatics contributes significantly to high quality and efficient health care and medical research. The need for well educated professionals in the field of medical informatics therefore is now worldwide recognized. Students of medicine, computer science/informatics are educated in the field of medical informatics and dedicated curricula on medical informatics have emerged. To advance and further develop the beneficial role of medical informatics in the medical field, an international orientation of health and medical informatics students seems an indispensable part of their training. An international orientation and education of medical informatics students may help to accelerate the dissemination of acquired knowledge and skills in the field and the promotion of medical informatics research results on a more global level. Some years ago, the departments of medical informatics of the university of Heidelberg/university of applied sciences Heilbronn and the university of Amsterdam decided to co-operate in the field of medical informatics. Now, this co-operation has grown out to an International Partnership of Health Informatics Education (IPHIE) of 5 universities, i.e. the university of Heidelberg, the university of Heilbronn, the university of Minnesota, the university of Utah and the university of Amsterdam. This paper presents the rationale behind this international partnership, the state of the art of the co-operation and our future plans for expanding this international co-operation.

## 1. Introduction

The field of medical informatics has attracted considerable attention by improving health care. The significance of information and knowledge in medical practice as backed by sophisticated information and communication technology is well acknowledged. Worldwide, there is a need for highly educated professionals in the field of medical informatics to fulfill the increasingly complex task of information processing in health care in a proficient way [1]. Medical informatics is taught at various levels for the different professions and ranges from specialized courses in medical curricula for nurses and physicians, for administrators in the medical field, to dedicated programs in this field [2]. Ever since its foundation, medical informatics has grown rapidly. This involvement of medical informatics is partly due to its international orientation. Organizations such as the International Medical Informatics Association (IMIA) and national and regional IMIA members contribute immensely to expansion of the medical informatics field by organizing and funding congresses in the field, by publications such as the yearbook of medical informatics and by sponsoring special working groups on education.

So far, these activities mainly focus on professionals and not so much on trainees in the field. To advance and further develop the beneficial role of medical informatics, high

quality training of medical informatics specialists with a thoughtful international orientation in the field is crucial. Today, many national health care systems and medical research areas are forced to deal with global problems that call for creative solutions on an international scale. Students in medical informatics should be aware of these demands and trained in an international medical environment to meet the requirements of the international medical information society. To accomplish this, an International Partnership of Health Informatics Education (IPHIE) of 5 universities, i.e. the university of Heidelberg, the university of Heilbronn, the university of Minnesota, the university of Utah and the university of Amsterdam has been established. This paper presents the rationale behind this international partnership, the state of the art of the co-operation and our future plans for expanding this international co-operation.

Over the last twenty years, other international co-operations and projects in the field of medical informatics have emerged. For example, the EDUCTRA programme of the European Advanced Informatics in Medicine Programme, which started in 1992, focussed on and succeeded in producing guidelines for educating and training health care professionals in health informatics [3]. The ERASMUS programme is an important initiative in postgraduate training in the health informatics field. A European postgraduate M.Sc. course has been developed within the ERASMUS programme for university graduates holding degrees in medicine, nursing or other health-care related professions, in engineering or computer science [4]. A teaching network as well as pregraduate/postgraduate courses for educating and training of health professionals was created [5]. The results of EDUCTRA and ERASMUS, among other initiatives, have contributed to the European project IT-EDUCTRA of the Telematics Applications Programme that started in 1996. The IT-EDUCTRA project aims at the development of learning material for health professionals based on the guidelines defined in the EDUCTRA project and organising courses to remedy the knowledge gaps of these professionals with respect to health informatics [6].

Most of these projects focus on the penetration of health informatics and information and communication technologies to medicine and health care by educating health professionals or university graduates who wish to apply for jobs in the health service area. By contrast, one of the main aims of the co-operation described in this paper is to train and educate medical informatics students on a global level. An international orientation and education of medical informatics students may help to accelerate the dissemination of acquired knowledge and skills in the field and the promotion of medical informatics research results on a more global level. In the end, the transfer of new methodologies and research evidence into practice may be accelerated as these students take (international) positions in the medical informatics field. Thus, the international health care community, including health care organizations, health care agencies, governmental organizations and vendors of information and communication technology tools operating within the medical field, will benefit from the new opportunities that medical informatics offers. In the long term, we will explore the possibility of expanding our co-operation by establishing an information and communication technology network and infrastructure by which courseware may be shared, distance learning may be realized, and perhaps even links to other resources may be established. For now, the main goal of the partnership is to establish an international network for training and educating medical informatics students on an international level in order to prepare them for leading positions in medical information and communication technology.

At first, the departments of medical informatics of the universities of Heidelberg/Heilbronn and the university of Amsterdam decided to co-operate in the field of medical informatics. These three universities offer two specialized programs that lead to an integrated Bachelor/Master of Science degree in medical informatics, which are the only well established programs in Europe. Now, this co-operation has grown to an international

partnership of 5 universities in medical informatics education (IPHIE), i.e. the university of Heidelberg/ university of Applied Sciences of Heilbronn, the university of Minnesota, the university of Utah and the university of Amsterdam. In the rest of this paper, first the state of the art of the co-operation between the three European universities will be presented. Then the status of IPHIE will be described, and finally our future plans for expanding both these international co-operations will be given.

## **2. The European co-operation between Heidelberg/Heilbronn and Amsterdam**

The co-operation between the universities of Heidelberg/Heilbronn and Amsterdam started in 1996 and was formalized by a contract in 1999. In order to explore the possibilities of co-operation, several meetings between all three universities were organized. Prospects of co-operation in education that were investigated were inter programme exchange between universities, individual student research training exchange, joint meetings between students and staff from all three universities and finally the establishment of a European post graduate training program. Possible research co-operation elements investigated were the exchange of researchers and Ph.D. students and the establishment of a joint Ph.D. degree. During these exploratory meetings it became clear that the focus of the Heidelberg/Heilbronn curriculum is on informatics whereas the Amsterdam programme is more medicine oriented. To tailor student's education to their specific interests and needs, it was concluded that inter programme exchange could be of great value to students from both sites. Detailed comparison of both curricula revealed, however, that a simple exchange of modules was not an option because of different time- schedules, required entrance levels of students and variations in module frameworks. Nevertheless, several student exchange tracks through both curricula were compiled, medicine oriented tracks in the Amsterdam programme for students from Heidelberg and informatics tracks in the Heidelberg/Heilbronn curriculum for students from Amsterdam.

The prerequisites for the exchange of research training students were discussed and a formal procedure is in place now. Any student interested in fulfilling (part of the) research work in Heidelberg or Amsterdam must put in an application that is appraised by a committee of staff members of the posting institute. To meet the requirements, students must be highly motivated to fulfill their research work at the other institute, must have received good grades in the preceding years and must speak fluent English. This application procedure starts around January and is completed by the end of February. The receiving institute assists the student during the application procedure, accommodates the student and appoints a staff member who supervises the student during the research work. Likewise, a staff member of the posting institute is responsible for monitoring a student's progress and quality of the research work. Both the receiving and posting institute evaluate whether the student has fulfilled the traineeship requirements of the posting institute but the final accreditation of credits remains with the posting institute.

The present state of affairs is that we started the exchange of students at M.Sc. level by having 4<sup>th</sup> grade students fulfill their traineeship with the other European partner.

Also, two reciprocal meetings of students and staff from the university Heidelberg and Amsterdam were held, the first in the Academic Medical Center in 1998 and the second in Heidelberg in 1999. Both students and staff feel that these meetings are highly informative as regards the curriculum and research work at the other site and therefore form an indispensable part of the co-operation.

Though we acknowledge the importance of the establishment of a European postgraduate training for graduated medical informatics students and plan to exchange researchers and Ph.D. students and to establish a joint Ph.D. degree in the long term, we decided to first focus our efforts in establishing the co-operation by student and teacher

exchange. With regard to teacher exchange, it was found that the expertise of the Heidelberg/Heilbronn staff members on lecturing specific software engineering topics in the Amsterdam curriculum could be of additional value for Amsterdam students, whereas the expertise of Amsterdam staff members with respect to the formalization, implementation and evaluation of clinical guidelines could add to the Heidelberg programme. We will start the exchange of teachers in spring 2000.

At the end of 1999, we organized master classes extending over 3 days for talented students of both the universities of Heidelberg/Heilbronn and the university of Amsterdam. In this context, master classes are defined as: 'seminars for talented students in medical informatics developed by professionals, well known for their knowledge, skill and experience in the field of medical informatics'. Several celebrities in the medical informatics field lectured in these master classes. Two topics were selected that linked up with the knowledge level of students from both Heidelberg/Heilbronn and Amsterdam and yet should deepen their knowledge of the subjects chosen. Main topics of these master classes were 'assessment of decision-support systems in health care' and 'structure, application and ethical aspects of electronic patient records'. To ensure active student participation, students had to prepare and present papers during these master classes. Evaluation of these master classes by the students showed that they were strongly involved in these master classes, that the master classes expanded their knowledge level more efficiently than regular lectures and that they highly appreciated the international character of the master classes.

Finally, we are in the preparation phase of developing an international module on hospital information systems with teaching material completely available via Internet, that will be offered to students of both curricula. In a first pilot phase, planned for May 2000, we will explore the possibility of using video conferencing as a communication medium for this module.

### **3. The International Partnership in Health Informatics Education (IPHIE)**

To increase the opportunities of students to tailor their education to their individual needs, while at the same time becoming internationally oriented, the universities of Heidelberg/Heilbronn and the university of Amsterdam felt the urge to expand the established co-operation by linking with other universities which likewise provide established programs in medical informatics. This has resulted in an international partnership (IPHIE) of 5 universities in medical informatics education, the universities of Heidelberg/Heilbronn, the university of Minnesota, the university of Utah and the university of Amsterdam. The main goals of this partnership are: 1) to support and encourage the exchange of talented students, 2) to support and stimulate the exchange of teachers and the sharing of courseware and 3) to establish joint international master classes for talented students [7].

The present state of affairs is that we have started the exchange of talented students that now do (part of) their research thesis work with one of the partners. In implementing these international traineeships, points of special interest were the preparation, the supervision and the evaluation of the research traineeship. We discussed issues such as time scheduling, risk minimization, funding, evaluation of research work and written thesis. The formal procedure as regards the evaluation, supervision and accreditation of these international research traineeships that was agreed upon by the universities of Heidelberg/Heilbronn and the university of Amsterdam is extended to the IPHIE co-operation. Thus, selection of students is accomplished by competition. Only highly motivated and talented students are selected, which optimizes the chance of success in fulfilling their research obligations abroad. The posting institute is responsible for the selection of students. The selection procedure starts in

January, 10 months before students actually have to start their research work at the hosting institute. This time schedule minimizes the risk of falling into arrears in arranging visa, housing and other resources needed by the student. The final selection of students is left with the receiving institute, which sends a letter of acceptance to the posting institute, wherein likewise a summary of the research work project agreed on, the formal status, privileges and obligations of the student and available research resources are described. Incoming students have at least the same access to library and computer facilities as master students of the receiving institute. There is no charge of tuition or fees over and above those paid by the students for their current university matriculation in their own university. In order to fully integrate incoming students into the receiving institute, they are expected to attend journal clubs, seminars, research meetings and student activities.

Besides establishing these international traineeships, preceding the medical informatics conference 2000, we will organize international master classes that will be attended by students and staff members of all 5 affiliated institutes. The theme of these master classes will be: 'regionalization and standardization'. Students will have to prepare themselves in pairs for these master classes by reading, discussing and compiling presentations of medline papers on this subject matter, by attending lectures and by empanelling discussion groups. Our experiences with these international master classes will be presented during the conference. It is our intention to organize these international master classes annually in combination with an international medical informatics congress.

#### 4. Future activities

Future activities of the IPHIE partnership may include developing and sharing courseware by making use of telematics, expanding the international master classes to become a formalized international training scheme for graduating medical informatics students and promoting discussion on innovations in the field of medical informatics programs. The final aim of the IPHIE partnership is to consolidate education and innovation in the medical informatics field on an international scale by establishing an information and communication technology network and infrastructure to share courseware, realize distance learning, and perhaps even links to other resources.

Medical informatics is a rapidly growing and expanding field; internationally trained professionals can play a useful role in addressing world wide issues that ask for innovative information and communication technology solutions in the medical field.

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