Medical Informatics Training Programme to Support the Romanian Health Care Management Information System

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Abstract. The Health Management Information System (HMIS) project initiated by the Ministry of Health as a component of the healthcare reform is aiming to ensure the technical, functional and operative support for: i) a better overview of the population health status, of the medical care needs and of the Health System performances; ii) the improvement of the resource allocation and consumption; iii) reform support. This system is supposed to assure a better information flow from the lower to the upper levels of the healthcare network by help of a modern IT support. In the first development stage the system is planned to link the Ministry of Health with the 41 District Health Authorities (DHAs) and with more than 200 pilot health units. The implementation of such a large system raises serious problems of acceptability and a thorough training programme for both technical staff and end users must be considered in order to face this challenge.

1. Introduction

In the developed countries the computing equipment entered gradually in the daily life of different categories of professionals. In Romania this process has completely different characteristics due to the needs for reconstruction. A massive amount of computers were introduced by means of short term programmes into various fields of activity. This assault of the electronic machines might, and sometimes it even does, induce adverse reactions. How to make people understand that computers are not intruders in their professional lives? This was the main question we had in mind when we started to design the training programme to support HMIS. Before starting we took into consideration several important premises.

Teaching involves first of all communication. Thus the better is mastered the process of communication, the more effective are the results of teaching. When destined to the process of education, communication should be modelled so as to produce an appropriate understanding leading to proper attitudes, right actions and relationships. As Jerome S Bruner remarked, this is because to educate someone in a certain discipline doesn't mean only to help him to store in his mind results but to teach him how to participate to the process that enables the knowledge creation.

2. Objectives of the training programme

- how to meet the HMIS needs
    - to establish the topics
    - to establish the audience
    - to establish the teaching methods

- how to manage training resources
  - to assess existing training resources
  - to estimate the minimal resources for launching the training
  - to assess the quality of training
- working frame and standards
- to establish development guide lines for medium and long term

3. Influencing factors

In designing the training program for the users of HMIS we have considered that the teaching is determined by a number of factors that have to be controlled and tuned in order to have an efficient knowledge transfer: knowledge transfer channels, distorting factors and teaching barriers, teaching feedback, catalysts to teaching, training resources: time, trainers, teaching equipment, training rooms, communication means, costs.

4. Strategy adopted to reach the main targets of the training programme

Based on the analysis of the main factors influencing the education process and taking into account the objectives of the training programme the strategy for the development of the training network of the Ministry of Health was established [6]:

Stage	Assessment	Fertilisation	Growing-up	Maturity
Description	Basic courses at the universities of medicine Basic courses at the technical universities, usually at the medical electronics faculty Basic courses organised by the firms	The setting up of a training centres network	Inter-centres co-operation Initiating joint programmes with other institutions	Training orientation and strategy
Organising features	There is not an organised education structure for medical informatics	The organising and co-ordination of the centres Advertising campaign Hw and sw prestandards	Expansion of the training centres network	Moulding of the training network on an industry Intranet
Audience	Self-educated persons excepting the graduates who have a minimum amount of knowledge	Establishing the audience and the priorities of the training The deciders will be trained at first Establishing training topics	All staff categories	Excellence training centres
Technological level	Face to face lectures Poor endowment Rudimentary teaching materials	CAL programmes and frames for their development Books and manuals Audio/video tapes Computing and audio/video equipment	Local networking Multimedia facilities	Distance learning

5. Results

5.1. Meeting the HMIS needs

At this stage of development HMIS is mainly destined to the deciders in health care policy and to the administrators. The main concern of the project co-ordination staff was focused on the evaluation of the HMIS users qualification in order to prepare their abilities to take advantage of the new IT support. The target students, the curricula and the teaching methods were selected according to the results of the evaluation process.

5.1.1. Audience

The questionnaire based needs assessment survey on human resources skills revealed:
- a deficit of 77% of technical staff at the District Health Authorities level in the operation and maintenance of the system;
- a deficit of 72% of trained end users;
- a total lack of literacy of the end users at the dispensary level.

The target audience established for these training sessions is represented by physicians, nurses, administrators and IT staff. From each district, the staff participating in the courses comes from DHAs, District Inspectorates of Sanitary Police and Preventive Medicine, District Hospitals, Town Hospitals, Health Centres, Ambulance Central Stations, rural and urban dispensaries.

5.1.2. Training topics

The analysis performed on the HMIS project emphasised three classes of training categories needed: introductory, end user oriented and technical.

For the introductory courses the following topics proved to be necessary: basic knowledge about IT, communication and networking, operating systems, medical statistics and epidemiology, word processing, spreadsheets, graphics.

5.1.3. Teaching methods

The training was organised as a package of four one-week seminars on both introductory and HMIS oriented lessons. The content of the package is dependent on the background of the student, his/her position and level of computer literacy.

5.2. Training resources management

The poor development of computing in medicine confronted the project co-ordination unit with great difficulties because of the scarce resources for training. The managerial decision had to focus on the optimisation of costs in the conditions of the training programme fulfilment.

5.2.1. Training resources assessment

The number of qualified trainers in applied computing in medicine is very small and the peculiarities of the work developed by the people in health care makes difficult their scheduling for training courses. These problems can be successfully solved by help of Computer Aided Learning (CAL) programmes. The CAL programmes are able to offer the

books, manuals, notes, reports as well as audio/video advantages. At the same time CAL programs help to develop decision making skills and positively affects student performance. It facilitates the transfer of learning to actual situations and, perhaps more important, students like it very much. The critical thinking skills which are so necessary in medicine could be enhanced by CAL by offering a problem-solving environment which encourages a systematic approach to learning.

5.2.2. Minimal resources estimation

In order to cover Romanian territory four geographical zones where considered to host training centres: Bucharest, Piatra Neamt, Baia Mare, and Timisoara. Ten districts are assigned to each training centre. The selection criteria for establishing the towns to host the new training capacities took into account cost efficiency demands and logistic factors:
- the maximum distance to the training centre less than 200 km;
- support from other institutions (university, local administration, private companies, etc.);
- accommodation and training rooms availabilities;
- existence of training resources.

The four training centres were endowed with audio-video equipment and minimal hardware configurations.

5.3. Working frame and standards

The training programme initiated by MOH gave complete autonomy to the centres in organising their teaching programmes but it also gave guidance for the development of the training resources.

At the moment there is a large offer of CAL programmes but there is no co-ordinated attempt to discover what commercial software exists or is being written. There is a need for planned structured series of CAL programmes which will dovetail into curriculum rather than simple ad-hoc programmes [2].

The efficiency of CAL programmes is closely related to the level of computer literacy. This is a problem because there is a share of professionals coming from the arts who are considering technique and technology as an indecent frustrating interference in their field of activity [3].

The frame for CAL development established that any product must take into account:

Target audience. When designing a CAL programme we should think carefully who will use it. According to every group of users (the patients, the trainee medical staff, the experienced medical staff) and to the target environment of the CAL programme, the design frame establishes the content of the material, the level of complexity, the presentation means and the battery of tests.

Hardware and Software platforms. Many times software developers are in favour of the software tools they are familiar with. But for the success of the project it should be carefully decided which authoring package, program language or generic tool should be the most appropriate for the purposes of the design. The standards established by the MOH for minimal hardware configurations and software platforms (UNIX and WindowsNT operating systems with Windows95 clients, ORACLE relational data base engine) must be taken into account from now on.

Evaluation. It must be assessed if CAL programmes even equal to the performances of the traditional approaches. The evaluation techniques used differ, ranging from paper or computer questionnaires to controlled studies and external assessors [1, 4].

5.4. Development guide lines for medium and long term

The HMIS is supposed to be the first step towards the Intranet of the health care delivery industry in Romania. The client/network architecture of the very next future will allow the health care professionals to take the advantage of the distance learning which is supposed to play an important role especially for the healthcare staff [5]. The four training centres will act as excellence centres offering guidance, anticipating training needs and providing benchmarks.

Since there is an increasing demand for training in medicine, according to the large diversity of medical fields as well as to the dynamic of science and technology, it is hard to believe that the supply of trained instructors will cover this demand. So, it will continue to be many opportunities for CAL in medicine.

6. Conclusions

Although premature to draw conclusions upon the efficiency of the training programme because of its early stage of implementation it is obvious that there are several good apples in this approach:
- the improvement of links with the higher education definitely is a remarkable advantage allowing the know how transfer from university to industry and enabling the development of the interdisciplinary fields;
- the new created training capacities polarised the interest of different bodies and professionals that helped the training process with innovative ideas and material support;
- the semi-centralized manner in which the training campaigned was organised allowed the fructifying of a free market offer in a centrally controlled plan aiming to meet the needs of the HMIS.

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