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Evaluation of the Outcomes of a Multi-Professional Education Programme in Health Informatics

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Abstract

A multi-professional continuing education programme on healthcare information systems was designed on the basis of the IMIA WG 1 recommendations for teaching health informatics. This paper presents the outcomes of the education programme on the basis of the participants' (n=19) narrative assessments and a questionnaire. According to the results, the participants were very satisfied with their personal learning outcomes and they felt that the programme content was useful for their duties at work. They regarded that particularly the multi-professional group had given them many ideas and rewarding discussions. The learning arrangements were assessed very successful and the learning methods rewarding. In conclusion we suggest that it is important to include different professions – healthcare and technical – into the same continuing education programmes in health informatics, and to include real life-like team projects. The validity of the results to undergraduate education programmes should be studied.

Keywords:

Health Informatics Education; Healthcare Information Systems; Multi-Professional Group

Introduction

Accord to many international studies, the knowledge and skills in computer use are poor among health care professionals [1] [2]. Many international activities in health informatics education have emerged to improve the situation, eg. IT-Eductra [3] and Nightingale [4]. The IMIA Working Group 1 for health informatics education has also produced recommendations to teach health informatics [5].

The Centre for Training and Development, University of Kuopio, organized the first major continuing education programme in health informatics in Finland in 1997–98. It was designed as a multi-professional programme on Healthcare Information Systems, for both health care and IT professionals. Based on the highly encouraging results of the first programme, a second continuing education programme was compiled for 1999–2000, applying the IMIA WG 1 recommendations. The recommendations were modified for a multi-professional group. The purpose of the programme was to give an overview of the information systems used in information management and processing in patient care, especially focusing on the current national development projects as well as changes in the health care environment and working life in general.

The outcomes of the 1999–2000 programme are evaluated in this paper. First, the objectives of the study are stated and the methods discussed. The next section presents the quantitative results of a questionnaire administered among the participants and the qualitative results of narrative assessments. In conclusion, the wider applicability and relevance of the results are discussed.

Materials and methods

Research objectives

The purpose of the evaluation was to find out the outcomes of the continuing education programme and to get ideas for the next programme. The focus was especially on the form of the programme, the effectiveness of learning, and the efficiency of teaching.

The research questions were as follows:

- How well have the participants achieved their personal objectives?
- What is the impact of the education programme on the changes in the participants' work environments?
- How did the participants experience the learning environment?

Research materials

The programme consisted of 12 modules and the size of the programme was 15 credits (by definition 1 credit is 40 hours of work), as presented in Table 1. The programme started in October 1999 and ended in November 2000.

Thus, it lasted for over one year. While almost half of the first programme in 1997–98 had been split to two alternative sets of modules, one for health care personnel and the other for technical personnel, this time only modules 5 and 6 were alternative.

Table 1 – The modules included in the programme structure

No.	Credits	Topic of the module
1.	1	Introduction and orientation
2.	1.5	Legislation and ethical questions
3.	1.5	Information systems in health care, present and future
4.	1	Information management in health care
5.	1.5	New media as used in health care
6.	1.5	Programming techniques
7.	1	Usability design and assessment
8.	1	Project management and quality assurance in healthcare information system projects
9.	4	Developing activities and services through information systems development
10.	1	Procuring and implementing information systems in health care organizations
11.	1	Information technology assessment
12.	0.5	Future challenges

The programme was designed for contact and self-directed learning using the web-based learning environment *WebCT*. There were contact days (n=33) about twice a month, usually Friday and Saturday. Meanwhile the participants used the WebCT environment for studying. In the beginning of the programme the participants made their personal study plans. They were particularly asked to compile their own learning objectives on the basis of the curriculum of the programme.

Most of the modules were divided into two sections. During the first section, lectures and discussions were used to raise interest and almost all modules contained self-directed learning based on the problem-based learning method. The ideas and solutions of the "problems" were discussed during the second section of the module. A textbook, partly based on the material of the first programme, was used as a reference [6].

Twenty participants were admitted to the programme, from all parts of Finland (maximum distance from Kuopio was 450 km). One participant soon had to quit the programme because of personal reasons, but 19 participants passed the whole programme. The participants had the following backgrounds: 2 doctors, 2 nurses, 2 radiotherapists, 3 medical laboratory technologists, 3 educators, 2 IT system developers, 2 IT experts (technical and database), 2 IT managers, 1 IT salesperson.

Two aspects of the programme were exceptional in relation to other programmes described in literature – firstly, its multi-professional nature, and secondly, a large "almost real life" team exercise in module 9, "Developing activities and services through information systems development". In the latter, the participants were divided into multi-professional teams of 4–5 persons. One of the participants in each group was a "problem owner", who identified a real service development challenge in his or her organization, while the others acted as consultants conducting a feasibility study to investigate the issue at hand and to suggest organizational, educational and technical measures to proceed in it. The team thus had to establish a project organisation and to practice multi-professional teamwork in the project. Activity analysis was applied to investigate the issues in context [7].

The topics of the team projects were "The resources and actions needed for making use of digital imaging in hospital X", "Regional integration of laboratory information systems in district Y", "Information management in the joint after-hours emergency clinic of the hospital and the primary health care centre in city Z", and "Improving communication in the home care and old people's services in city W by a customer information system".

Research methods

Both a qualitative and a quantitative research approach was chosen for the evaluation of the continuing education programme. A qualitative design was regarded appropriate for generating interpretative insight into the research questions [8]. A quantitative method (questionnaire) was used to find out the participants' perceptions regarding the content of the programme.

The participants (n=19) were asked to assess their learning process in comparison to their personal objectives and motives for the IT education. They were also asked to describe the outcomes of the education – e.g. their own learning experiences, activeness and projects – and the social and web-based learning environment. The data were gathered through narrative assignments and a questionnaire developed for the evaluation. The participants were asked to assess the content of the modules according to the applicability, scope, expertise, and their own expectations as well as activity and motivation. Multiple-choice questions using Likert scale (1–5) were applied. The length of the narrative paper was not defined beforehand and every participant could write in his or her own style.

The assignments were sent by e-mail to the manager of the programme. The data were analysed by the first author. First the narratives were read thoroughly to get an overview of the data. The data were questioned and contemplated to identify and explicate themes, patterns, similarities and dissimilarities, events, perceptions, understandings, and practices that illuminated the participants' perceptions of the programme. Emerging interpretations were discussed and debated at meetings with other authors, but no formal attempt was made at establishing reliability or validity. However, the main interpretations were presented to the

participants at the end of the programme, and they approved of them in unison. The questionnaire was analysed using descriptive statistics.

Results

The responses (n=15) to the questionnaire were very uniform, i.e. the perceptions of the participants were quite the same. Their perceptions on the applicability of the content varied the most (means from 3.00 to 4.60). The perceptions on the scope of the understanding gained in the modules varied almost the same (means from 3.27 to 4.47). The perceptions of the lectures given during the programme varied the least (means from 4.00 to 4.67). The expectations were also met very well (means from 3.87 to 4.50). Regarding their own activeness and motivation for learning, the participants were quite critical to themselves (means from 3.33 to 4.33).

Altogether 302 statements were expressed in the narrative assessments (n=19). The perceptions on the education programme are presented in the following, according to the research questions.

Personal achievements

Almost all participants (90%) expressed their personal achievements from the education programme. The most common expression was "my understanding of information systems used in health care has deepened". Many participants used their personal learning objectives when analysing their own learning outcomes. Despite the different backgrounds of the participants, the objectives were quite similar. Change in the participants' own work environments was a very common challenge for education. The change was defined in many ways: new positions, new tasks, new requirements for expertise, new information systems. The Year 2000 change, which occurred during the programme, gave many participants some extra stress to seek knowledge and skills. The personal achievements can be summarized as follows:

- New capabilities to adapt to change in the work environment.
- Project management knowledge and skills.
- Knowledge and skills in usability testing.
- Skills to study and work in a web-based environment.
- Possibilities for new positions in work.

The motivation during the programme was very high. Most of the participants (70%) were present on every contact day. Although some regarded themselves as listeners, discussions during the lessons and meetings were very highly valued. Two participants assessed the discussions as the most rewarding part of the education programme. Especially the different backgrounds of the participants gave very much variance to the discussions, and the participants were inspired by new viewpoints for their thinking.

The impact on changes in work environment

The impact on work environment was expressed by 13 respondents. The expressions were mostly positive. Only a few negative matters were mentioned, e.g. a couple of participants regarded that their manager neglected the new abilities they had gained in the education programme. Due to the indifference of their employers, some of the participants also paid the programme fee (about US$ 1700, in addition to travelling and accommodation during contact days) by themselves and used their spare time for education. However, opposite expressions were also stated: "The IT manager has given me possibilities to express my opinion". The positive expressions of the impact on work environment were as follows:

- New strategies for negotiating with system vendors.
- New strategies for the implementation of hospital information systems.
- Readiness for changes, both technical and social, in the work environment.
- New means for managing IT implementation projects.
- New strategies for data protection and security.

Although the participants worked in different environments – hospitals, nursing colleges, software enterprises, etc. – the impact on work was regarded the same. The most useful knowledge and skills were acquired during the team project.

Perceptions on the learning environment

The participants assessed the teaching arrangements very good and the contact days – Fridays and Saturdays – were regarded as the best possibility. Although the programme had a very tight schedule, the participants were supposed to be committed to studying. This caused some stress because most of the participants had families and they also had their daily work to do. The group's atmosphere was felt very supportive. Many participants had different areas of expertise, and they shared their knowledge and skills to other in informal meetings after the lectures.

The WebCT open learning environment was not used enough for teaching and learning according to the participants. Despite the introduction to the WebCT environment that was in the beginning of the programme in a computer laboratory, the skills for using it sufficiently were poor. Tutoring was available, but in the process of the programme some members of the group acted as mentors to others. This was assessed very rewarding among the participants. Email was also regarded more easy and flexible to use during the project work than the WebCT.

Challenges for future programmes

Some participants gave also new ideas about how to

develop the programme. More time for conclusions at the end of each module was proposed, to enable more thorough discussions of the knowledge and experiences gained during the learning process. International co-operation was also suggested, to get new ideas for work. The programme contained only one site visit, and more visits were wished, to provide a wider picture of the information system usage in different health care institutions.

Discussion

The purpose of the evaluation was to find out the outcomes of the continuing education programme and to get ideas for the next programme. The participants' perceptions of the programme content were very positive. The objective of the programme was to give an overview of information management and information systems in patient care, and the participants felt that they had got a wide outlook and a deep understanding in this respect. The programme focused especially on national development projects as well as changes in the health care environment and working life. The knowledge about ongoing national health informatics projects was also seen as an advantage in work. The programme also provided a picture of international co-operation, which was regarded a challenge for future development projects.

The personal objectives compiled at the beginning of the programme gave a good basis for learning. The opinions on the personal learning outcomes were very similar, despite the different backgrounds of the participants. The multi-professional composition of the group was felt extremely stimulating, and many new aspects of common as well as new matters were learned during the many discussions. The social network among the participants was very tight and the group had also many email discussions during the self-learning periods. In addition to the textbook in Finnish [6], international references [2] [3] [4] were utilized during the programme and appreciated by the participants.

The programme's impact on work environment can be valued by the participants' new abilities to manage the hectic change in the informatics field. According to the participants, the programme also had an impact on career planning and personal development. The length of the programme was appropriate for professionals studying alongside their daily work. The home exercises for self-directed learning periods, which were usually about applying the theoretical knowledge from the lectures to the participants own work environment, were seen very useful.

The challenges for future programmes that the participants expressed were reasonable and can be adopted into the next programme. The latter should have a more flexible module structure and more time for discussions. International co-operation would give new possibilities both for the programme content and the structure.

The participants will also take part in a second evaluation study to be carried out one year after the programme's completion.

Most importantly, the evaluation strongly supported the two innovative aspects of the programme – the multi-professional composition of the group, and the "almost real-life" projects. These two features together provided for the multiplicity of viewpoints, many ideas, rewarding discussions, and the close linkage with practice. The multi-professional team project was assessed very valuable for many reasons, including the topics themselves, the team members, and the project management tools.

In conclusion we suggest that it is important to include different professions – healthcare and technical – into the same continuing education programmes in health informatics, and to include real life-like team projects.

It is not self-evident without further research that the results were valid to undergraduate education programmes as well. The experiences and contents of this continuing education programme have been utilized, however, in planning and implementing a new Master's Programme in *Information Management in Social and Health Care* at the Department of Health Policy and Management, University of Kuopio. It is the first Master's programme in health informatics in Finland, and attracted over 400 applicants in summer 2000 (of which a multi-professional group of 26 could be admitted). The experience of the Master's programme will be evaluated later and compared with that of the continuing education programme.

Conclusion

The IMIA recommendations for health informatics education gave a good basis on the continuing education programme presented here. The overall outcomes of the education programme in healthcare information systems were very satisfying. The content and the arrangements met the participants' expectations and learning needs very well. Particularly the multi-professional composition of the group and the real life-like team project, the two main innovations in the programme, were strongly supported by the evaluation.

On the basis of the results, a new continuing education programme has been designed. The next programme content will be more flexible so that it will be possible to participate in one, some or all of the modules according to one's particular interests and educational needs. The experience has been used in implementing a new multi-professional Master's Programme, too. The authors willingly share the ideas and experiences of the programmes with others interested in health informatics education.

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