Collaboration and the Knowledge Economy: Issues, Applications, Case Studies
Paul Cunningham and Miriam Cunningham (Eds)
IOS Press, 2008 Amsterdam
ISBN 978-1-58603-924-0

ECDL Health in Italy

Luca BUCCOLIERO[1], Fulvia SALA[2]
[1]*CERGAS –SDA Bocconi University,Via Roentgen 1,Milan, 20136, Italy*
Tel: +390258362590, Fax: +390258362593, Email: luca.buccoliero@unibocconi.it
[2]*AICA, P.le Morandi 2, Milan, 20121, Italy*
Tel: +39 0276455026, Fax: + 39 0291293112, Email: fulvia.sala@aicanet.it

Abstract: This paper is focused on the issue of IT training in the health sector and describes the experiences developed within the Italian NHS. In particular, in 2005 a preliminary survey was carried out to measure the potential value of IT training for health professionals. The results of this research lead to the development of an initiative for the certification of acquired competences in this particular field. The combination of Italian experience with the perspectives and the work of the ECDL Foundation produced a specific certification named ECDL Health. The paper also describes the results of the pilot schemes carried out during 2007 and provides some considerations for future developments.

1. Introduction

There is increasing agreement in all countries on the future major role of health informatics systems in enabling national health systems to be more effective, efficient, and evidence-based. What is so often overlooked is the fact that systems are only as good as their users' understanding and capacity to use them appropriately.

The success of projects involving information systems depends on a consistent approach in dealing with three key variables:

- People
- Processes
- Technology [1]

Consequently, failure inevitably concerns focusing inadequately on one or more of these variables – for example excessive concentration on the technological factor at the expense of the others is not an infrequent occurrence.

This paper is clearly focused on the evaluation of health professionals' training and education needs related with the introduction of new (IT powered) information systems in healthcare organizations. According to these needs, the new "ECDL Health" computer skills certification program is presented, as far as its Italian developments are concerned. Both the Authors have been directly involved in ECDL Health certification project since 2003, both at international and local level.

The paper is structured as follows:

- In section 2, some specific features of people (professionals), processes and technologies in healthcare are highlighted;
- In section 3, ECDL Health computer skills certification program is presented;
- In section 4, ECDL Health pilot experiences in Italy are discussed;
- In section 5, some conclusions are drawn from the ECDL Health initiatives developed in Italy.

2. People, Processes and Technology in Healthcare

With regards to the health sector, a few aspects of the three variables mentioned above must be briefly discussed here [2].

2.1 People (Health Professionals)

As far as "people" (health professionals who are users of informatics systems) are concerned, it is important to take into account the following characteristics:

- Health professionals with more than 10 years experience received their education before the e-health "revolution": thus their university and specialisation studies usually did not include analysis and use of information technology;
- Health professionals' activities heavily depend on IT, although the amount of time specifically dedicated to their use doesn't exceed 20% of total time and is usually perceived as a low added-value "ancillary" activity (to be delegated to others, if possible);
- There is a widespread perception of clinical information systems as "appendages" of administrative, accounting and control functions.

2.2 Processes

The planning of ICT systems and the planning of organisational processes are becoming increasingly convergent activities within health organisations. The concept of "process" is now at the centre of focus in information systems both at the clinical level (clinical and diagnostic and therapeutic processes), and at the administration/accounting level. The concepts of "vertical" or "best of breed" planning of information systems is therefore gradually declining in importance.

2.3 Technology

The introduction of innovative technology in health organisations:

- Doesn't merely represent a technical aid to clinical activities, on the contrary it is often tightly integrated with them [3];
- Usually requires revising organisational processes; in many cases it obliges the introduction of the process concept within organisations which are usually functional;
- Requires new practical competences but also a "cultural" change and new shared models of organisation. [4]

2.4 Risk Factors

A few elements of risk linked to the introduction of new technologies emerge from the context described above. They can be briefly described as follows:

- The health profession requires new abilities which often lack adequate training schemes;
- Emergence of new constraints: for example that of "structured" and categorised information in substitution of "free text" fields;
- New ethical and legal issues arise.

3. ECDL Health

To overcome all the risks it seemed self-evident that an appropriate end-user educational programme, and related qualification, for health informatics systems needed to be developed and that a qualifications framework and regulation had to be provided. This approach has already been taken with respect to general computer use, with the development of the European Computer Driving Licence (ECDL), which has become a

standard international curriculum, as most of the issues of using computers safely and effectively are generic and universal.

It therefore seemed logical to develop a specific supplement or module for the ECDL, given the risks and responsibilities inherent in using health systems. This concept was first promoted in 1999, at the Third European Conference on Electronic Health Care Records.

As a result of several consultation workshops, involving key opinion leaders in health informatics from different European countries, the European Computer Driving Licence Foundation agreed to consider formalising the development process. In 2005 an Expert Group was set up comprising representatives of six European countries and of the United States of America. The resultant recommended syllabus was signed off by the Expert Group in early 2006.

The final EDCDL/ICDL Health Supplement consists of a competencies framework defining knowledge and skills the candidate needs to possess in order to operate a health information system safely. The core contents of the syllabus are copyright of the ECDL/ICDL Foundation, and comprise the following topics:

- Concepts
  - Health Information Systems
  - HIS Types
- Due Care
  - Confidentiality
  - Access Control
  - Security
- User Skills
  - Navigation
  - Decision Support
  - Output Reports
- Policy and Procedure

The content is designed to accommodate specific national language and terminologies, organisations, and legal and professional frameworks. It is based on the assumption that the candidate is already competent in basic computer user skills.

Since the specification phase, rapid progress has been made in different countries, with very different health systems, different languages, and also different terminology and nomenclature. In the United Kingdom, the British Computer Society organised pilots of the syllabus in six different sites, involving 84 persons. The American Medical Informatics Association (AMIA) and the national ICDL licensee, ICDL-US, worked closely during 2006 to create a US-version curriculum which adapted the syllabus developed by the ECDL Foundation group; the US version was then reviewed by the ECDL group. The test has been piloted in early 2007. This initiative is part of its AMIA “Got EHR?” Campaign. AMIA also seeks to educate the general public about electronic health records and especially integrated personal health records, particularly as an integral part of the electronic medical record.

4. The Italian Experience: Pilot ECDL Health Initiatives

4.1 The Preliminary Survey in the Health Sector

The Italian experience stands out for its special focus on the preliminary planning of the initiative, which was also based on a scientific research project conducted by AICA and Bocconi University (both the authors were involved in the research activities) aimed at measuring the potential benefits of information education and training in the healthcare sector. The INHS was established by law in 1978. The INHS aims to grant universal access according to a uniform level of care and is responsible for approximately 59 million

citizens. The public sector is the main source of funding (76.4%) and most of the beds (78.1%) are managed by public structures. The INHS has three tiers: the Central National Government, 21 Regional Governments (hereafter referred to as 'Regions'), and several different subjects responsible for service delivery.

The survey involved around one hundred health organizations and hospitals, a sample of around 1000 general practitioners and 500 pharmacies. Following is a summary of the primary findings of the survey [5]

4.1.1 Digital Literacy

In hospitals, 45% of employees make use of information systems, therefore also in the health sector the use of IT seems to be spreading at a satisfying rate. There are however also some negative aspects that this data will reveal with further analysis.

Firstly, around half of these users are technical and administrative personnel. The number of actual health professionals using IT is rather limited despite the increasing focus placed on making use of ICT within clinical processes (figure 1).

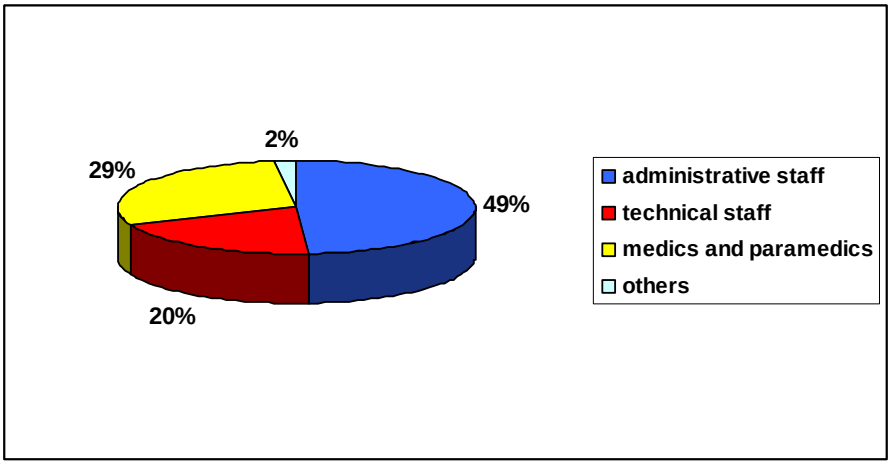

Figure 1: Distribution of ICT Users by Activity

Furthermore it has been estimated that within health organisations and hospitals – which account for around 1 million employees - users of individual IT instruments amount to around 250,000. Only 7% of these, however, claim they are expert users of Personal Computers. This means that within the Italian health system about 200,000 employees use information technology without adequate training. To this we must add a further 400,000 workers who do not use IT at all in carrying out their daily tasks.

The survey also involved general practitioners. Beyond shedding light on a situation which sees a generalised use of PCs among this group, the survey also revealed some contradictory aspects in the ways these systems are used. On the one hand, GPs show a strong receptivity towards innovative technology with 70% using Internet for professional updating. On the other within this doctor-computer relationship it is apparent that limited use of PCs is made and mainly just for specific applications such as printing prescriptions or managing patient records. Furthermore, only half of GPs use spreadsheets, and barely 10% uses databases despite the fact that most doctors – and this is an apparent contradiction - acknowledge the importance of not dispersing or losing the information and experience gained in the course of their activity. The reasons for this state of affairs are related, once again, to a lack of adequate training. The majority of these professionals completed their education or started their professional activity in a context which did not imply or require the use of information systems. Moreover 80% of them state they haven't had access to digital literacy programmes, and therefore have not received an organic explanation of the fundamental knowledge that a generic user of PCs should possess.

The lack of training can therefore limit doctors in taking advantage of the full potential of IT in solving specific problems connected to their profession.

4.1.2 The Cost of Poor Computer Literacy

In a context where 50% of hospital employees and almost 100% of general practitioners are users of informatics systems, the amount of unproductive time due to limited knowledge in the use of computers entails significant costs. The phenomenon is particularly critical when a strong emphasis is put on health expenditure control while maintaining standards in service quality.

The research estimated the costs related to unproductive time determined by limited knowledge of the informatics systems . To evaluate this cost, information was gathered through direct interviews to users asking how much time on average was lost due to problems in using computers (table 1); in addition, average labour costs per individual professional segment were taken into account. The estimate of the annual cost of unproductiveness for the Italian system resulted in 900 million euro, 1% of total health expenditure in Italy. This figure must obviously be viewed simply as a broad indicator, but its significance shows that a problem does exists and that it must be addressed in order to reduce the effects of the phenomenon. But how can training investments contribute to this?

Health professionals	% of time lost per working day
Doctors and medical professionals	0,9%
Nurses	2,8%
Technical personnel	3,6%
Administrative personnel	7,9%
General practitioners	3,4%

Table 1: % of Unproductive Time Owing to Inadequate Knowledge of ICT

4.1.3 The R.O.I of Basic IT Training

The research also included a test which was carried out on a sample of 50 medical doctors and nurses working in an Italian hospital in order to evaluate the ROI of basic IT training. The participants answered 30 questions regarding practical problems and tasks related to individual use of PCs, before and after a basic IT training course.

The results showed that after the course unproductive time decreased by around 20%. This allowed to quantify the annual spare of costs per individual at around € 4,000 which, considering the total number of users in the health system, reaches the staggering sum of over € 2 billion per year. Also this figure must be viewed just as a broad indicator, but it shows the level of potential ROI that can be attained with basic IT training, such as that provided by the ECDL certification.

On the basis of the outcome of the research, AICA (the Italian Computer Society), which is the Italian ECDL licensee, decided to announce ECDL Health in the Italian market too, and instructed Bocconi University in Milan and La Sapienza University in Rome to work out and complete the Italian health syllabus, based on the core syllabus and the test structure.

4.2 The Pilot Courses in Italy

In April 2007, two pilot editions of ECDL Health courses were addressed to medical doctors and nurses of the Dolo (Venice) and Milan Local Healthcare Units. Both the authors were involved in teaching activities. Participants were offered four courses of ECDL Start (24 teaching hours), plus a specific course of ECDL Health (8 teaching hours). At the end of the courses, final exams were held through an electronic pattern of assessment, a testing framework available on line, and skill cards were issued accordingly.

4.2.1 Participants' Feedback

After the ECDL Health pilot course, a questionnaire was handed out to participants to evaluate the experience.

83% of participants believed the course provided the IT competences necessary for increasing their efficiency at work; 83% believed it was important in helping to understand the main areas of ICT applied to health and the structure and terminology of the various relevant information systems and documents in use; finally, 87% claimed that the course and the ECDL Health certification provided greater awareness of health clinical data management and the legal and ethical implications of clinical data management (figure 2).

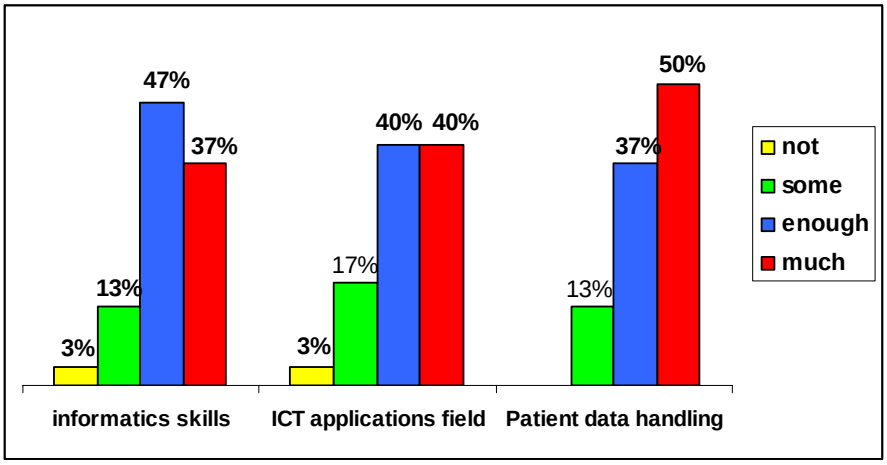

Figure 2: Achievement of Expected Objectives

The most significant results of training, according to the participants, were: improvement in the ability to use the PC and better knowledge of health informatics systems (52%); acquisition of competences that proved useful in carrying out work and tasks associated with their professional role (29%); greater competence in using ICT tools for computing and archiving health information (19%) (Figure 3).

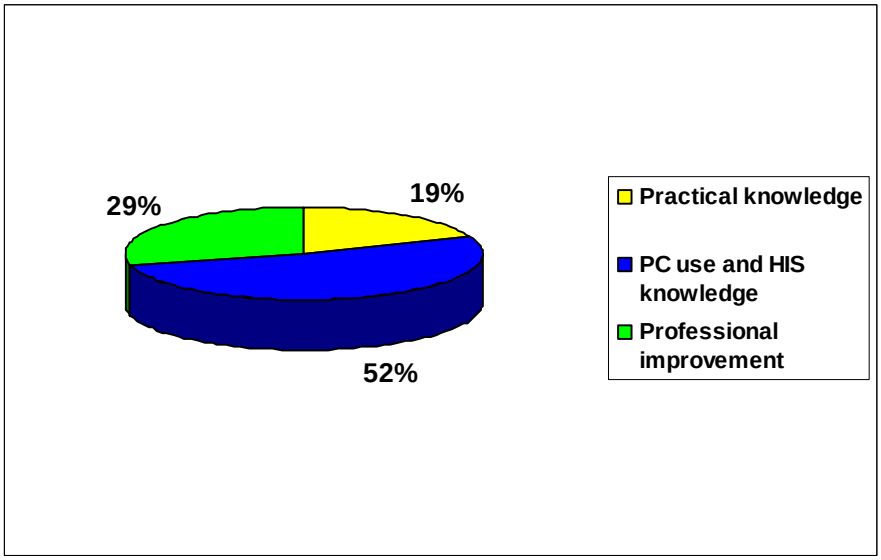

Figure 3: Learning Outcomes

On a scale from 1 to 5, the areas where greatest improvements in skills and ability following the course were measured are: the "strategic" perception of the role of technology in health and the comprehensive knowledge of the legal framework regarding security and privacy (Figure 4).

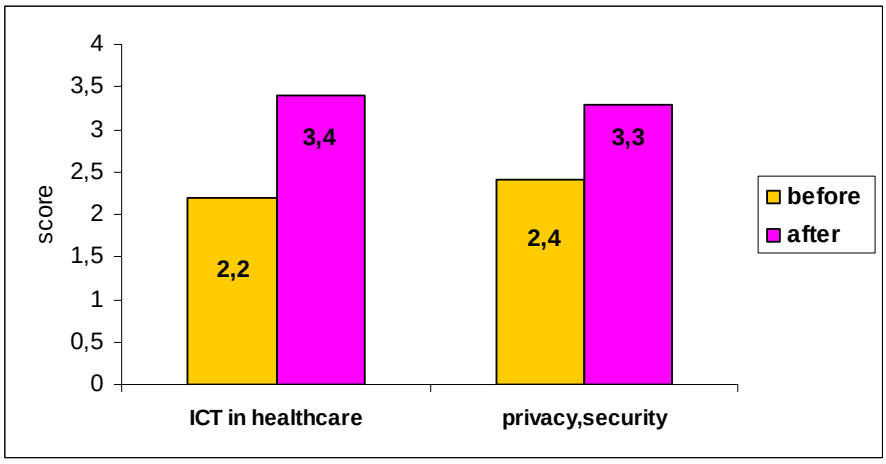

Figure 4: Competence Increase After ECDL Health Class

A final question also concerned the level of perceived usefulness associated with the ECDL Health certification: 88% of participants indicated very high or high (Figure 5).

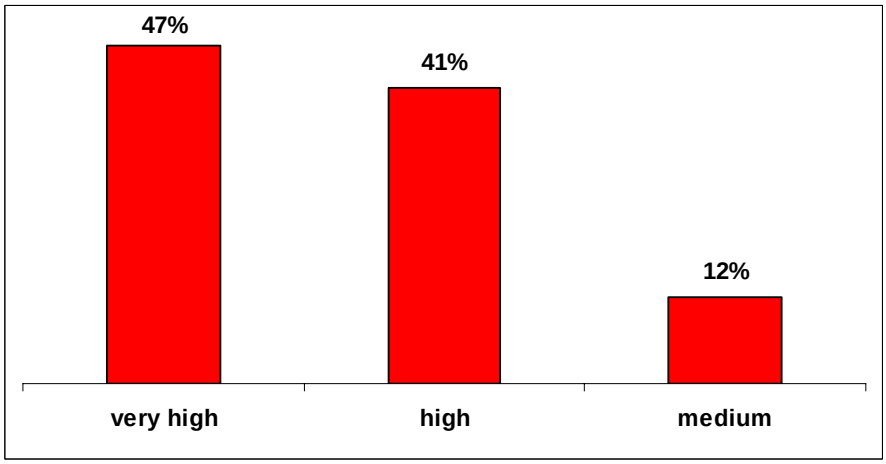

Figure 5: Perceived Usefulness of ECDL Health

5. Conclusions

In June 2007 AICA announced ECDL Health to the Italian market. AICA (who is in charge of ECDL initiatives in Italy) is actually getting in touch with Italian local governments (at the regional level) in order to enhance the institutional awareness regarding the development of targeted educational programs; the objective is to include ECDL Health courses in regional programs aimed at the continuous education of medical personnel and thus to enable medical doctors to obtain some of the compulsory education credits by attributing points to the ECDL Health.

So far, the project developed in the Italian NHS had a preliminary function, aimed at validating contents and defining the exam structure. However, this preliminary research together with the first pilot courses has clearly proved the existence of a demand for health personnel training with regards to the use of ICT within clinical process. Therefore, ECDL Health is believed to be a valid answer to such a need. ECDL Health certification, in fact, combines the validation of technical skills with the evaluation of the level of "cultural change" reached by the candidate in the use of health informatics systems. This is based on a clear understanding of the fact that a critical success factor in ICT spreading in the health sector depends on the ability to maintain at all levels a reasonable balance between a high tech perspective and a high touch one, based also on paying close attention to the aspects of

human “contact” while taking into account the multiple sensibilities that the process of diagnosis and cure must have in order to attain success. [6]

References

[1] Buccoliero, L., C. Caccia, and G. Nasi, *E-he@lth. Percorsi di implementazione dei sistemi informativi in sanità*. Management in sanità. 2005, Milano: McGraw-Hill. 210.

[2] Rigby, M.J., et al., *Enabling the Safe and Effective Implementation of Health Informatics Systems – Validating and Rolling Out the ECDL/ICDL Health Supplement*, in *MEDINFO 2007 Proceedings of the 12th World Congress on Health (Medical) Informatics*, K.A. Kuhn, J. R.Warren, and T.-Y. Leong, Editors. 2007, IOS PRESS: Amsterdam. p. 1347-1351.

[3] Buccoliero, L., et al., *Picture, archiving and communication system in the NHS: a primer on diffusion and evaluation analysis.* Journal of Digital Imaging, 2008: p. in press. Published online in SpringerLink (www.springerlink.com) 22/02/2008.

[4] Buccoliero, L., S. Calciolari, and M. Marsilio, *A methodological and operative framework for the evaluation of an e-health project.* International Journal of Health Planning and Management, 2008. 23(1): p. 3-20.

[5] Borgonovi, E., P.F. Camussone, and G. Occhini, eds. *L'Ignoranza informatica: il costo nella sanità*. 2004, Mc-Graw-Hill: Milano.

[6] Buccoliero, L., et al., *Verso l'ospedale virtuale. Aspetti socio-sanitari ed economico-gestionali della teleassistenza domiciliare*. Collana di Studi Gigi Ghirotti, ed. C.N.G. Ghirotti. 2001, Milano: Franco Angeli. 122.