The impact of computerization on the health enterprises of Lombardy, and the implications for the training of practitioners

This part of the research project investigated the level of computerization in the health care structures of Lombardy. It examined in particular the effects of this change process on the work of administrative and care personnel. The report divides into two parts. The first reconstructs the current situation as regards the computerization of the Italian health system by drawing on a series of nation-wide studies and the conclusions of national and international publications. The second part describes the impact of the introduction of I&CT in Lombardy, presenting the results of interviews conducted with informants representing nine organizations: two Local Health Enterprises (*Aziende Sanitarie Locali*, ASL), two Hospital Trusts (*Aziende Ospedalieri*), three Scientific Care Institutes (*Istituti di Ricovero e Cura a Carattere Scientifico*, IRCCS), and two Accredited Nursing Homes.

The survey of the literature evidenced the effects produced by the use of information systems in health care: increases in efficiency, productivity, and in the cost/efficacy ratio, constant improvements in quality, results and safety, a reduced number of medical errors, improved quality of patient care, and better working conditions for personnel. The literature therefore emphasises the need for Italy's health sector structures to be computerized on the basis of a 'systemic' model. In fact, the computerization of the Italian health system displays considerable disparities among regions, among health facilities, and even among the services furnished by the same organization. The majority of health organizations initially considered the introduction of I&CT to be necessary only in administrative services. The progressive 'corporatization' of public health facilities had forced all of them to adopt information systems so as to improve the management of their internal complexity, but this restricted the advantages of computerization only to greater process efficiency (reduction of costs). The positive effects of web capabilities (e-Health) were largely overlooked, and they have only recently become priorities. The reasons for this heterogeneous situation have been identified as (i) the absence of a common national framework, and (ii) the differing levels of I&CT awareness among managements of health enterprises.

The research also shows that successful computerization does not depend on the active involvement of 'institutional' actors alone; it also requires the fostering of an IT culture among all practitioners in the sector, doctors in particular. The latter are increasingly required to work with information systems so that the new technologies can combine cost cutting with improved health care delivery.

The second part of the report examines the health care system in Lombardy. This reveals a number of similarities with the situation in the rest of the country: marked inequalities in computerization levels among individual organizations and among services within them; priority given to the computerization of administrative services rather than clinical ones; the same top-down approach in the implementation of projects (input from the national and regional institutions taken up by general managers and implemented by information services, with the involvement of service heads for functional analysis); the infrequent creation of work groups comprising personnel involved in innovative projects.

The research then concentrated on describing the repercussions of new technologies on administrative, medical and IT personnel.

Administrative personnel are accustomed to using PCs, and they view computerization as a natural evolution of the tools of their profession. This is even more the case of younger employees, and also

of more recently-created health care structures, since these have been able to use the recruitment process to take on human resources more culturally oriented to the use of information technology. However, a number of technical difficulties are reported (for example, the switch from using the cursor to the mouse), as well as behavioural problems. Among the latter is the difficulty of changing from an office automation logic (the writing of letters or the compiling of spreadsheets) to use of the PC for the exchange and sharing of information (by means of e-mail messages rather than telephone calls or physical movements around the office). Another difficulty is replacing the system of 'work by tasks' (where each office manages its own tasks independently of the others) with the process-based organization of work made possible by electronic tools (so-called 'enterprise resource planning'), which requires the closer integration and coordination of the working time of different offices.

With some self-taught exceptions, nursing staff are largely unfamiliar with information technology. They consequently have greater difficulty in learning how to use it. In some cases the results have been the opposite of those expected. Following introduction of the new technology, they often performed operations twice: first by applying the new procedures, and then by repeating the operation, doing it in 'the old way' to which they were accustomed and which they thought was more reliable. Moreover, in some cases, the use of an information system and the data entry operations that they had to perform changed the nature of the nurses' jobs into administrative activities. For nursing personnel, therefore, this was a change that was not restricted to the learning of new techniques with regard to instruments used in their work, as in the case of administrative personnel. It was a cultural change which required them to learn how to do their work using information and virtual support instead of manual or paper-based operations.

An effect of I&CT to be emphasised is the change brought about in the role of information system heads. Initially, as the complexity of health facilities increased with the simultaneous requirement to reduce spending, the tasks of the information systems function shifted from providing support for information management to participating in the design and management of administrative processes. The role of information system personnel became that of acting in partnership with senior management. Latterly, awareness that computerization enables the delivery of better services has given rise to a situation in I&CT professionals are essential not only as partners to senior management but also as partners to medical personnel. The competencies required of them now encompass knowledge of the health sector's aims, objectives and services, and knowledge of organizational management processes.

Doctors encountered difficulties in the use of information systems when they were first introduced. They did so in relation to time. It is time, in fact, which causes theoretical models to fail, and it is the main obstacle against the full integration of IT tools. When workloads are excessive, or when the ratio between medical staff and patients is tipped against the former, doctors have less time to process and record data and tend to resort to traditional methods. This behaviour is not dissimilar to that of nurses, but in this case the sensation of wasting time arises, not from having to learn to use the instrument but from failing to recognize its advantages. Resistance is also caused by the fact that doctors are often provided with pre-packaged systems and solutions without prior analysis being made of their needs. As said, projects are often initiated by senior management and implemented according to a top-down logic which in many cases encounters the resistance of those who still believe that computers have no place in the medical profession. Amongst other things, because they are compelled to learn how to use I&CT, doctors are dependent on information system personnel, a situation which is at odds with a culture born with connotations of independence.

Closer involvement of doctors in functional analysis, and in definition of the specifications that all appliances must possess, therefore seem obligatory for organizations if they are to foster cross-

fertilization between two professional cultures – those of health care and information technology – with profoundly different languages and mentalities.

Doctors are required to make another major step forward in the gradual change of their professional role from specialist to manager. Alongside their indisputable specialist expertise in a strictly scientific domain, if doctors are to govern a computerized health system rather than submit to it, they must also deploy their managerial knowledge (of business processes) and their IT knowledge (in the strategic use of I&CT), and also develop their relational skills (management of assistants, fostering the diffusion of an IT culture among nursing personnel). It is for doctors that computerization entails the most radical change: indeed, it is their role identity itself that must evolve.