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# Preparing staff for information technology

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The health system is expanding its use of IT to complete tasks within the health system. To manage these changes, staff education, staff attitudes and the management of changes require addressing. This chapter aims to identify the impacts of change on staff and the organisation.

There are many barriers in the path of Information Technology. The health system relies heavily on the visible print and paper culture, the Gutenberg Culture. Biscoe (1986) states, the key to overcoming this is the recognition that computers merely act as a mechanism for the storage and retrieval of information. Other factors that influence the health system stem from the fear of losing control over the power of knowledge and confidence. To succeed, computers need to be irresistible (Walker 1993).

## Staff education

It is essential to the success of an IT implementation that all staff obtain sufficient training, to quell the fear of losing control and the loss of confidence. The health sector has recognised this (Purcell, 1993). The education not only encompasses training in the new software, it also includes the introduction of new terminology and basic computer skills to all staff. On commencement of employment, new staff are introduced to computer terminology or jargon. Terminology education relevant to the hardware configuration in use is provided for new employees through the orientation program., for example terminal or client server environment. The first session does not require hands on by the participants and aims to alleviate some of the technophobia that relates to computer jargon. A second education session, involves hands on experience for the participants. This second session introduces first time computer users to concepts and terminology, specifically related to the hardware environment including the logging on procedure. Switches and lights on a terminal and personal computer are described together with what these mean to the user. A practice session using the keyboard allows the users to put into practice what they have learnt. Troubleshooting problems is also covered. For example, how to solve problems with printing and when to contact the Help Desk and what to tell them. Data security and privacy consideration, such as password security and detecting security violations are covered as are ergonomic and occupational health and safety issues that relate to computers. Advances in information technology provide exciting opportunities for education in the health sector

(McPherson 1993). Future courses must direct user education at several levels. The emphases being on courses that provide practical, hands-on approach (Purcell and Feeney 1994).

## Change

Change is continuous and necessary to respond to internal and external changes in technology, attitudes, organisational structures, policies, consumer expectations and many other internal and external factors. These factors initiate change. Change is becoming a more common event in the work place. The changes in technology in the past twenty years have been enormous. 'Technology has realized such wonders as penicillin, open heart surgery and the birth control pill' (Kotler Chandler Gibbs & McColl 1989). Changes in the size and cost of computers allow users to have a computer in the work place or at home. The changes in technology have occurred with increasing frequency and speed, 'every new technology is a force of creative destruction' (Kotler et al 1989). The transistors displaced the vacuum-tube industry and videos have displaced the movies. It is, of course, futile to fight the fact that change is going to occur.

External forces for change like government cutbacks, rapidly increasing costs of labour, and services can impact on the health system. Internal forces, particularly from new strategies, technologies are pressures for change (Stoner Collins Yetton 1985). Service changes influence organisational changes. Some service changes ' involve radical reconfiguration of the service' (Kotler et al 1989). For example, the Domiciliary Midwifery Program has remodelled obstetric nursing, changing its focus from the traditional health institution to caring for the patient at home ( James, Hudson and Gebski 1987). The introduction of fresh business ideas such as day surgery has radically changed the face of health services by decreasing the length of stay (National Health Strategy, Issue paper number 1 1991). This has relieved some of the time pressures that are prevalent in society. 'All of these forces for change come about because of changes in the business requirement' (Ferraby 1991).

Many changes in the health system are coming about because of the development of an increasing number of clinical computing systems. The systems range in size from a PC stand alone to a full scale hospital information system. Recognition of the changes by the health system is already evident (Sittig, 1993). The technology revolution has traditionally brought in technology to fit around the work. Now work practices need to change to maximise the potential benefits of technology. In conjunction with Information Technology changes to the health care system can be radically rethought, from the current work practices to the delivery of service (Fitzpatrick, 1993).

## Attitudes

Resistance to change has not lessened with the introduction of Information Technology. Indeed the pace of the technology revolution has heightened fears that users are becoming subservient to machines and stiffened user resistance to technology (Hussain & Hussain 1988). Detecting resistance to a computer environment may be noticed by a drop in service, failure to meet service requirements, increased absenteeism, high staff turnover, complaints and low morale and a reluctance to learn new job skills. Resistance to information technology at the managerial level can be that managers feel hemmed in by information technology, and

that the computer systems limit their choices because they are central to important decision making.

The use of behaviour alteration strategies facilitates the changes in attitude. The first of these is the directive change, imposed by management. Compulsory sessions performed that all staff are to attend. Resistors co-opted, play an active role, for example, identifying problems and planning solutions. Hussain et al. 1988, state that a climate receptive to change is vital when new information technology is being introduced to an organization. Without human cooperation, the new technology is unlikely to live up to its productivity potential.

## Organisational culture

The philosophy that underlies organization policy determines organizational culture (Vecchio, Hearn and Southey p.575). There are three levels of organisational culture and each has its own interaction with the organization. Every organization, regardless of size, has a formal and clearly defined set of relationships (Fulmer 1989). The first level of an organization's culture is its artefacts and creations. This includes the physical layout of the premises, the technology, the signs, rituals and stories. The second level of organizational culture consists of the values. These being the sense of what ought to be, as distinctive from what is. The third level of organizational culture reflects the basic underlying assumptions. These assumptions develop when organizational values become entrenched, taken for granted, and assumed to be unchanging. To achieve an understanding of the organization's culture there is a need to collect information. Efficient and effective communication is a requirement for the gathering and distribution of information (Vecchio, Hearn and Southey 1992).

## Fact finding tools

The most important element of an information system is people, (Whitten et al. 1989 p736). More important than anything else, people want inclusion regarding things that are going to effect their work. 'Consulting the staff on decisions ' (Thorn 1989) prior to implementation is the reason for interviewing employees. As employees are most knowledgeable about their work, they have many good ideas that need acknowledgement and respect. In this process one needs to determine who performs the work, what and when the work is being done, where the information goes, why does it happen that way, and how complete it is.

There are many different evaluation tools employed to effect the gathering of information. There is no single source that describes in detail the steps and numerous tools available to help the investigator carry out and interpret the documentation collected (Sittig 1993). Some of the tools available are:

- Sampling existing documentation, forms, and files, (Burch 1992).
- Research and site visits
- Observation of the work environment
- Interviews and group work sessions, (Whitten Bentley & Barlow 1992).
- Time - motion analysis
- Personal Record of Activities
- Subjective Evaluations (Sittig 1993).

The documentation required to gain an understanding of workflow includes documents that describe the business function being studied. These documents may include, policy manuals that place restraints on the information flow. Completed forms that represent transactions at various points of the process. Standard operating procedures, job descriptions, task instructions from procedure manuals that specify day-to-day operations. The second fact-finding tool includes the researching of the processes. This involves visiting other sites, other companies or departments that have completed implementation to assess potential for implementation in the health system. The objective of the visit is to document the delivery of patient care and monitoring quality of delivered patient care (IRMC - Nursing Consultants 1992). Observance of the work environment is one of the most effective tools for data collection and for obtaining an understanding of the work flows. The use of this technique is to validate data collected through these methods. Complex tasks are often difficult to explain clearly. The use of observation to identify the complex tasks of workflow alleviate the difficulty of clear oral explanation. At this time the collection of data describing the physical environment, such as physical layout, traffic, lighting, noise level, etc will complete the observation study. Workflows identify how and by whom the system is used. How much time is spent using the system. Before commencing any observation permission from the appropriate supervisor or managers is obtained. Inform the people that you are intending to observe and state the purpose of the observation. There are three rules to strictly follow when observing workflow. These are:

- Do not under any circumstances interrupt individuals at work,
- Do not focus on trivial activities,
- Do not make any assumptions (Whitten et al 1989).

Interviews are another beneficial and often used fact-finding technique. The purpose of interviews is for fact verification and clarification of workflows. To generate enthusiasm and get the user involved. Identify user requirements and solicit ideas and opinions from users. The structured interview has some planned questions and others are spontaneous to clarify the answers provided by the interviewee.

Time - motion analysis provides a direct measurement of activities (Sittig 1993). There are a number of work measurement techniques available. The benefit of time and motion study is that these provide accurate time values regarding how long a qualified worker should take to perform the selected activity to achieve the desired result. The disadvantages of time and motion studies are that they require qualified people to conduct them.

Alternatively the self reporting of activities and the time required to perform them rely heavily on the subject’s memory and are prone to error. This method is a subjective evaluation of time estimates. Self reporting and the use of questionnaires are useful for job analysis purposes and relatively easy to administer, interpret and obtain valuable information concerning work activities. Such methods provide imprecise measurements of work activities but the use of questionnaires in conjunction with one or more of the other fact finding methods, do provide important information (Sittig 1993). It is essential that the user provides the most appropriate and relevant information using one or all of the methods discussed.

# Business process re-engineering

The health system is endeavouring to take full advantage of the potential offered by new technologies. One method that provides an opportunity to radically rethink health care delivery is business process re-engineering (Fitzpatrick 1993). This uses an enterprise wide approach to identify key business outcomes and to determine both the value and the quality of services (Fitzpatrick 1993). Business process re-engineering approaches projects from a three pronged viewpoint, (1) the personnel, (2) the technology, (3) the process itself. Business process re-engineering controls change at three levels in the organization. The sponsor levels determine the scope of the changes, (Morris & Brandon 1993). The executive of the organization sponsors the enterprise-wide changes (Thorn 1989). Enterprise wide changes initiated by the executive of the organization are usually components of the organizational strategic plans. A single executive steering committee oversees the enterprise wide projects and address issues that cross departmental boundaries. Process improvement changes proposed by the teams involved with change, for example, departmental managers or supervisors. Process improvements initiated can improve a single process or a group of interrelated processes. Finally, the users initiate the task level changes, with some management co-ordination. Task level changes are creative responses to the need to get the job done. These are often subtle changes or modifications to existing workflows (Morris & Brandon 1993). One or more objectives drive the re-engineering effort. The organization drives each objective linked to the business goal. The common criteria for re-engineering objectives are that they support the organization business plan. The objectives reduce time in completing tasks, reduce the number of staff to complete the task or establish a new service. They also improve standards and the quality of a process and or improve service. Put simply, workflow completes tasks the way the organization expects. There are three main types of work flow contingencies. The organization must choose the most appropriate workflow system to achieve its objective. The first of these workflows is the sequential workflows, which complete the work in a strict order. The second workflow is the pooled workflows that are unrelated but contribute to the work group objective. The third workflow is the reciprocal workflows, that produce an output that is an input for other jobs.

The design of work should have two objectives. (1) Functional effectiveness, that increase the productivity and to enhance the effectiveness of work. (2) Human values, focussing on the maintenance or enhancement of job satisfaction and health and safety (Thorn 1989). The two objectives closely relate to one another and to achieve one without the other is virtually impossible. The question is how to design work that will achieve these objectives.

It is impractical to consider the whole organisation can be re-engineered at one time (Fitzpatrick 1993). It is therefore necessary to increment the changes. There are nine steps to business process re-engineering.

- identify possible efforts for business process re-engineering.
- identify workflow categories and conduct the initial impact analysis.
- select an effort and define the scope of the changes.
- identify business and work processes.
- define alternatives, simulate new work processes and workflows within the department.
- define potential impact of each alternative.
- select best alternative.
- implement the selected alternative.

- update the positioning baseline models and information (Morris & Brandon 1993).

Once there is the need to commit any plan to paper a suitable notation must be chosen. Plans can be drawings, specifications or flow diagrams, these must all be regarded as a means of communicating information. Several notational methods and languages have been devised for timescale planning, (Lock 1988 p148).

## Project management

Project management functions are, planning, organizing, controlling and leading. The planning function states the activities, estimates how long it will take, and projects what it will cost. The organising function staffs the project team and brings together team members, users, and managers to achieve the project plan. The controlling function monitors progress reports and documents deliverables. It compares plans with what actually happens (Burch 1992). Two popular project management tools are the program evaluation and review technique (PERT) and Gannt, named after Henry Gannt. A PERT chart estimates, schedules and controls numerous interdependent tasks. The PERT chart determines the minimum amount of time required to complete the project or a phase. A Gannt chart, , is a bar chart that illustrates phases or tasks. On the left hand side of the Gannt chart the tasks or phases are shown, whilst the number of days, weeks, months are shown across the top of the chart. The Gannt chart compares planned performance with actual performance, to determine whether the project schedule is on time. Gannt charts are simple to understand, however, they fail to show relationships with interrelated tasks. This is why the Gannt chart schedules a complete system project, while the PERT chart schedules interrelated tasks (Burch 1992).

Records kept by the project management, inform users how the business process has changed. These records will detail the design of the change and construction of the changes. For ease of access and physical security the project library houses this documentation.

The aim of the project leader is to “bring the project to a successful conclusion.” “Successful” being, giving the user what they want, working on time and to budget. Project leadership is out of the scope of this chapter, except in so far as it affects business process re-engineering.

The role of confidant is a proper one for the Business process engineer and can be useful, provided the Business process engineer performs it well. Effecting a relationship, where users can approach the Business process engineer and discuss matters in confidence concerning, for example, mistakes made, can only benefit the project.

There are two types of delegated authority that can be given to the Business process engineer (Morris and Brandon 1993). First is formal delegation.

- Authority to effect small changes; (small defined by cost and resources)
- The deployment of resources within well defined limits
- Initiating studies and formulating cost benefit analysis
- Halting any changes that are established as a waste of effort.

The second type of authority is informal delegation. The effect of informal delegation is to protect the project leader from unnecessary stress and an excess of information, by the Business process engineer reporting to the project leader on a regular basis.

The task of identifying change will inevitably come the way of the Business process engineer, particularly to fulfil the role of confidant. If a change is too large or will clearly use a substantial amount of resources even before the identification of cost benefits, then the business process engineer submits a brief. This brief is to estimate the amount of time and resources to complete the analysis before commencement on the changes.

The Business process engineer will at times act as an instructor, carrying out a great deal of informal education and training for users and their departments. Thorn (1989) states that staff require adequate training and gain the skills and knowledge required to perform the jobs changed by the redesign. If the organization has not had access to computers prior to the implementation then a new education program as outlined previously, will need to be developed. The Business process engineer needs to continue to perform walk-thrus and subsequent follow up discussions with user departments and or individual users.

## Hardware installation

We have discussed at length the process for change in relation performance of work. The final discussion with the user is where to install the hardware for the new system. The involvement of the Occupational Health and Safety Officer is essential to this process as they will provide the expert knowledge concerning ergonomically sound placement of the hardware. The Business process engineer will have completed studies of the work flows and the collection of data in the earlier phases of implementation. Securing the change decisions as close to the action as possible. That knowledge will also assist in the appropriate placement of the hardware. Without the essential aspect of this process, communication, the enabling role of information technology becomes redundant.

## Conclusion

In summary, when an organization is looking at changing, the work environment and work practices, the major tool used is communication. Business process re engineering fits with the continuous quality improvement concept where commitment for change must be fully supported the executives. A system for informing everyone about any planned changes needs to be set-up. Information is ideally disseminated on a regular and frequent basis. This will ensure that the organization is up to date and really knows what is happening. It is important that the business process engineer performs regular visits to the areas where change is having the greatest impact. This will ensure the involvement of the staff in the decisions that need to be made, for these are the people who will be using the system. The provision of training to these people will ensure that they receive adequate training to gain the new skills and knowledge. Providing the ability to work in the changed work environment and perform the job affected by change. Finally, the changes made require monitoring and evaluating to ensure development of best work practice. In so doing, learn from changes, both successful and failures. The expected outcomes from business process engineering are, first, faster delivery of patient care services, second, a higher quality of care. The third expected outcome, reduced costs and finally greater patient and employee satisfaction (McQueen 1993).

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