Managing technological change in nurse education.

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We are living in a climate of radical change and re-adjustment, the results of which are far reaching, affecting every area of society. The domains of education and nursing are particularly affected by technological change, and many writers have put their views into print. Here is a significant quote from Papert (1980).(1)

"We are at the point in the history of education when radical change is possible, and the possibility for that change is directly tied to the impact of the computer. Today what is offered in the educational market is largely determined by what is acceptable to a ... conservative system. But this is where the computer ... is in the process of creating an environment for change."

Seymour Papert's statement suggests that the computer is in the vanguard of change and innovation in education. It is particularly the traditional areas which are being challenged. Perry & Henderson (1981)(2) encapsulated these sentiments when they remarked that "revolutions in science and technology have been basic to the rapid changes in our society". These statements are certainly true when applied to the South West College of Health Studies, where there has been a proliferation of computer systems since their introduction in 1984. Of course, with any change, and in particular with technological change comes a period of uncertainty, upheaval and sometimes even overt resistance. Managing these changes and minimising the adverse effects on individuals is not an easy task. It demands many diverse solutions.

The South West College of Health Studies (SWCHS), spans two health authorities, Plymouth Health Authority, and Cornwall & Isles of Scilly Health Authority, and is the result of an amalgamation in 1989 of two schools of nursing and two schools of midwifery. SWCHS is also the training base for operating department practitioners for the South Western Region. The College currently employs around 80 teaching staff and has approximately 500 pre- and post registration nurses and midwives undertaking courses at any one time.
Identifying the problem

The first computer system to be introduced into the College was a nurse allocation system based on a multi-user local area network. This system was replaced in 1988 by a stand-alone personal computer (PC) equipped with a large capacity hard disk. Other PCs were quickly introduced and administrative staff, after a short period of uncertainty, gradually came to accept the new technology. All administrative staff have since conceded that the PC based word processors have revolutionised their whole way of working and radically improved productivity.

Parallel to this innovation came the introduction in 1985 of the first BBC 'B' educational computers and the inception of a Computer Assisted Learning (CAL) project. After an initial period of casual interest by teaching staff, the CAL project was left very much in the hands of the Audio Visual Technician and a core of interested nurse teachers, who had some computer knowledge.

Learners began to take an interest and soon it was agreed that further systems and additional software should be purchased to meet the rising need. The students welcomed this, and soon the BBC computers were being used on a regular basis by all levels of learners and also by qualified nursing staff from the clinical areas. Along with this innovation came a progressive development and refinement of nursing related software, of varying usefulness.

Resistance to change

Some nurse teachers, however, made little or no contribution to these developments, and one or two even openly resisted the new technology, labelling it as 'overpriced' or a 'novelty' with a limited educational value. One or two teachers expressed the concern (no doubt tongue in cheek) that they might eventually be made redundant by the new technology. The obvious reply was "absolutely not" It was emphasised to teachers that the computer was here to enhance the learning environment, not in any way to replace the teacher. The Dreyfus brothers (1986)(3) having already encountered this concern, suggested a major reassurance as to why the computer would never supplant the teacher. They claimed that although the computer was successful in reinforcing drill and practice elements of learning, it fell hopelessly short where situational elements of learning and judgement were concerned. Suppes (1980)(4) concurred with three reasons, namely:

- Computers cannot listen to students talking, nor observe non-verbal reactions - vital functions for a teacher.
- Computers cannot communicate to students in the many ways a human teacher can.
- Teaching is more than just 'information giving' - it is the facilitation of learning. (NB: CAL packages can to a limited extent aid in this process)

The final word in the argument came from the celebrated science fiction writer and scientist Arthur C Clarke who was reported as saying "any teacher who can be replaced by a computer ... should be."

It gradually became apparent that other schools and colleges of nursing across the country were experiencing similar difficulties in achieving a general acceptance by teachers of CAL. Annett (1970)(5) had predicted that the major blockage to CAL
research would not be the lack of funds but rather a lack of competent workers willing to devote their time and energy to developing such systems.

When seen in the context of nurse education in the UK this prediction proved fairly accurate, for it emerged in the early eighties that only a small percentage of nurse teachers across the nation seemed to have any interest in using, let alone developing computer assisted learning. At a N.U.M.I.N.E. conference in 1986 someone dryly remarked to delegates that if one attended health computer conferences around the country it would be easy to form an impression that there were many nurse teachers interested in developing CAL as a teaching resource. This was far from the truth however. What one would really be witnessing would be the same small dedicated circle of nurse teachers 'doing the rounds at each conference.

It appears then that although computers have radically changed the working lives of administrative staff and provided new educational opportunities for student nurses there seems to be scant evidence, where CAL is concerned, of the technology being utilised by the majority of teaching staff at this or in other similar colleges of nursing.

The software gap

In the late eighties it became increasingly obvious that the CAL tool in which most schools had invested, (the BBC micro) had become to all intents and purposes, obsolete. IBM compatible personal computers were becoming available at little extra cost, offering faster and more flexible computing power. Unfortunately, most of the health related software, used for educational purposes, had been written for the BBC micro. There now exists a 'software gap', a void for which at present there is not enough material available to bridge. Schools and colleges of nursing are holding on to machines which are now ageing rapidly, malfunctioning with increasing frequency, and which have ever decreasing hardware support from the manufacturers.

Furthermore, it is apparent that whilst most nurse teachers do not overtly reject CAL, there is a noticeable reluctance from several to become actively involved in the development of computer based learning systems. If CAL is to continue to survive and develop as a serious teaching resource, a vast investment of time and energy investment is needed.

What are the reasons for lack of teacher involvement in CAL? Can apathy or lack of knowledge be considered as prime causes of this reluctance? Is it purely a case of lack of time? Should other factors be taken into account? To address these important questions the author decided to undertake some research on the subject. A questionnaire was devised and distributed to 80 SWCHS teaching colleagues to gauge attitudes.

Results of the survey

There was an encouraging 82.5 per cent return (66 respondents) from the survey, and a fairly clear picture began to emerge.

Several questions were asked about teachers uses of computers both in teaching (ie Computer Assisted Learning, or CAL packages) and administration (word processing, data bases, spreadsheets).
44 teachers (55%) said that they had never directly used computers for teaching purposes. Out of these, 32 (approximately 75%) had never been on a computer course and 30 (approximately 70%) had never owned a home computer. Only five teachers admitted to using CAL on a regular basis.

![Bar chart showing teacher response to areas of learning on offer.](image)

**Fig 1. Teacher response to areas of learning on offer.**

One section of the questionnaire asked teachers what areas of computing they would like to learn more about, as a part of their personal development. Figure 1 shows responses to the six areas on offer.

Word processing was considered to be the most useful area, followed closely by databases. It is interesting to note that these packages are used more as an aid for the teacher in administration and research. CAL came lower down on the list of teacher's priorities for personal development.

When asked about why they didn’t use or were wary of using computers, teachers identified five typical problem areas. Figure 2 shows an analysis.

![Bar chart showing problems experienced by teachers.](image)

**Figure 2 - problems experienced by teachers**

The problem of lack of knowledge was the most familiar problem experienced, as was the degree of embarrassment experienced by some teaching staff when faced with the prospects of knowing less about computers than their students. Another problem experienced was that of lack of on-site expertise when things ‘go wrong’. The SWCHS
is geographically spread across 80 miles, incorporating five main teaching centres from Plymouth, Devon to Redruth in Cornwall. There are not enough technical staff to service all sites at all times. When teachers continually come up against problems either in lack of knowledge, or equipment which malfunctions for whatever reason, they will undoubtedly, as Neumann (1988)(6) suggests, experience frustration which can ultimately lead to a rejection of the technology.

A strategy for change

The first move towards helping teachers to accept CAL must therefore be to help improve skill and knowledge bases. This can only be effected by initiating a training programme. Writing about change and its associated stress factors, Cox (1986)(7) maintains that "many workers are inadequately trained to use new technology and need help in coping with the stress arising out of change". In order to carry out a cost effective programme, it would be desirable to employ a 'cascade' teaching approach, ie training certain key people within each peripheral area, who in turn would be able to teach colleagues informally whilst at the same time providing a level of in-house expertise. Such courses would employ a high degree of 'hands on' content as there is no substitute for practical experience. Rowntree (1981)(8) advocates a good participative element in any learning situation involving media, 'as we learn not from reading about them, . . . but by using them' for ourselves. Such participation will allow the person to interact with the computer, increasing familiarity, exploring the possibilities, and thus creating greater confidence.

Secondly, training will probably not be sufficient on its own. It is well documented by Alvin Toffler (1970)(9) that "when change is accelerated, more and more novel, first time problems arise", and, he says, new methods of solving these problems must be formulated simply because traditional forms of Organisation prove inadequate. If Toffler is correct it will be necessary, after courses have been delivered, for CAL user support groups to be set up to deal with individuals' computer problems.

The third move should be to attempt, in the long term, to integrate CAL packages (particularly in-house produced items) into the preregistration curriculum. Isolated innovations are known to become rapidly redundant through non acceptance and lack of use. Changes will always cause problems, and thus, according to Davies (1972)(10) such innovations are "characteristically separated from the rest of the Organisation instead of incorporated within it". It is essential then, to ensure that CAL is not isolated but rather integrated in every way.

In order to achieve this objective, course managers, or at the very least, key teachers need to be convinced of the validity and effectiveness of CAL. This may be accomplished by large numbers of teachers increasing their computer awareness and improving their computer literacy. This will improve teacher involvement with CAL, and according to Bush (1986)" "support for change is more likely to be forthcoming where teachers have been able to contribute to the process . . ." This in turn must exert pressure upon education managers to include elements of CAL within future curricula. of CAL within future curricula. In the SWCHS all students on pre-registration courses, and the majority studying as post-registration students, receive instruction in information technology, with the emphasis on self directed study. The introduction to CAL is always well received by the students, who often return regularly to practise with the computer simulations and free- form text programs on offer.
Conclusion

Teachers must be presented with the facts regarding the use of computers in education. They are already aware that computers are making an impact and will not 'go away'. Kelly (1986) (12) has said that 'Computers are here to stay and are being given an ever increasing funding in ... further and higher education, even in the present economic climate' This statement has become much more valid half a decade later.

Teachers would be attracted to using computers for more than just administration if they could see all the possibilities. Romiszowski (1981)(13) maintains that computers are ideal to execute a particular instructional strategy faithfully" and that "the collection, storage and analysis capabilities ... make the computer an ideal base for research Rowntree(1981)(8) agrees that the computer is an ideal tool, providing valuable interactive learning, not just by basic instructional text delivery but also in the use of elements of assessment, remedial material and instant Feedback to the student. He says that computers offer "learning opportunities . . . that cannot be provided in any other way"

Computers, and in particular computer assisted learning, must be seen by the teacher as both a complex yet flexible educational technology, and also as a basic tool with which to enhance the student's learning experience. The computer will never replace the teacher, but can release him or her from certain mundane or tedious tasks in order to perform more necessary Functions. Perry & Henderson (1981)(2) have said: "Today few things in our world are certain. If there is one certainty, it is that whatever the future holds, it must be different from anything we can now imagine. That change, not stability, will be the one sure force in our society." Computers can be viewed by teachers either as a great opportunity to be welcomed with open arms, or as a threat against long established traditions in education. Radical change will continue as long as society exists. The most radical changes of all, yet often those most difficult to achieve, are the changes in peoples' minds and attitudes.

References


