

Are We Ready for Computers ?

Ms. M. DAWN FARIS

WITHIN the next ten years, nurses in India will be using computers in their everyday work. This is a very conservative prediction ! The electronics industry is moving ahead so rapidly in this country that we may be laughing at this statement just a few years from now. It is time to consider how this new technology will affect us.

In May 1985 I was privileged to attend the International Symposium on Nursing Use of Computers and Information Science, in Calgary; Alberta, Canada. The objectives for the symposium were to :

1. Provide an opportunity to explore current trends, recent developments and new innovations in the use of computers and information science in a variety of Nursing settings including practice, education, administration and research.
2. Provide an opportunity for international multi-disciplinary sharing of ideas and approaches to the use of computers and information science by nurses.
3. Examine legal, ethical, moral problems and issues related to the use of computers and information including practice, education, administration and research.
4. Increase the level of awareness and understanding of nurses and information scientists about the use of computers and information science in health care, Nursing education and Nursing research.

Presenters at the conference were from Canada, USA, many European countries, Cuba, Japan, China, Australia, New Zealand. An exhibit was also provided, where nurses could view and "test run" many of the new products and services that are now being widely used in some countries.

What I learned from the symposium, combined with what I have been learning about computer skills using a little portable microcomputer in my own home in India, has convinced me that we are just a short step away from being able to use computer technology to improve nursing care in this country.

The Advent of the Microcomputer

Until five years ago, access to computers was limited to those people who worked or studied at institutions where large, expensive, "mainframe" computers were installed. Access to the computer required a password, and users were allotted brief periods of time because each second of use was expensive. Therefore, only certain key personnel with special training had the luxury of sufficient "hands-on" time to develop their skills, and the rest of us felt rather overwhelmed by the mystique of this strange new beast. We fed in our punched cards,

prayed that the programme we ordered up would run, picked up our output sheets and disappeared quickly before anyone could discern our fear and ignorance.

All that has changed. The beast has been demystified into friendly little creatures that sit on one's desk and are no more difficult to operate than a sewing machine or an electric typewriter. In the large institutions, the electronic data processing department managers have had to concede that purchasing several small machines with their accompanying pre-packaged programmes is cheaper and more flexible than hiring and training more operators and programmers to update the mainframe's capabilities. The new programmes (i.e. "software") are so easy to use that special training required to run them is minimal, and therefore the technology is becoming widely available.

This revolution was made possible by the development of the microchip, a tiny wafer of silicon that could be altered so that it can perform the function of various electronic components that would otherwise have to be wired together. Circuit paths are added so the chip can communicate with other devices, the whole thing is mass produced, and over the past 10 years the price has dropped 99.9 per cent. We could explain the process in terms of Boolean logic, binary math, and the vacuum tube, but why bother, as long as it works when we turn it on ?

Applications in Nursing

A few applications for which software is already available will be reviewed briefly :

Hospital administration and patient care delivery systems :

—Automated nurse staffing office system with comprehensive scheduling, productivity reporting, management reporting, staffing system for the Nursing office.

—Operating room scheduling office system providing case scheduling, preference cards, privileges, inventory, daily and periodic utilisation and volume statistics, surgeon time and procedure.

—Interactive, problem-oriented or source-oriented medical record system which facilitates administrative functions, care plans, worklists and displays medical information.

—Nursing careplan generating system which provides individual printed reports describing the patient's medical symptoms, management goals, Nursing interventions and health objectives in conformance with standard hospital practice. Pre-built professional source libraries are also supplied, and reference data can be easily modified and updated to suit the specific

needs of the institution. Statistical analysis and epidemiological research data can also be produced by this programme, and neither computer skills nor programming knowledge are required of the user!

Nursing education

—Computer Assisted Instruction (CAI). Variations of CAI have been widely used in many education systems. The student studies a lecture or unit of pre-programmed tutorial material and is led through various steps such as watching a video or slides, looking up specific resources, and then takes a test to determine whether she has mastered the material. This method has completely replaced doctors' clinical lectures in many Nursing education programmes. These materials usually supplement in-class activities with outside-class learning and reinforcement. Drill-and-practice exercises with immediate individualised feedback allow students to apply concepts, review material based on measured learning needs, and take different approaches to broaden her learning experience.

—Computer Managed Instruction (CMI). CAI is taken a step further, by presenting the whole course in self-learning modules. The student progresses at her own speed and at her own convenience, and must achieve a certain standard on each module test before the computer will present the next module. Remedial material is suggested, the instructor has access to progress records for the whole class, and intervenes with special instruction when necessary. A recent research evaluation of a CMI course for teaching Physical Assessment concluded that nurses taught by this method learned equally as well as nurses taught by conventional lecture-demonstration-practice method.

—Simulations. These present variations of case-studies, and students are required to go through stages of decision-making, with the results of each decision presented at each step. These can also be time-related, so that the effects of delays are made available. For example, "Your patient just died" may show on the screen if the correct intervention was not specified within the appropriate time limit. Some simulations are very realistic. The new "Mrs. Jones" used for teaching cardio-pulmonary resuscitation and dysrhythmia will respond with appropriate vital signs according to the correctness of the procedure applied.

—Authoring systems. These are programmes which lead the instructor through the various stages of composing CAI lessons with minimal computer familiarity. No original programming is necessary, and the time required to prepare a 1-hour lesson can be as little as 4 hours. In the past the Nursing instructor and a programmer would work together for up to 100 hours to do the same job. Completed lessons are stored for repeated use and can be modified and updated at any time.

Community health support systems

—Because computer systems can be linked together

and can access each other's information via special telephone connections, remote clinics can receive rapid support and expertise from large specialised centres. One such system sends messages or forms from any standard telephone to any other, and can also be a terminal to any attached or remote computer. Another programme allows the transmission of any visual image, e.g. X-ray or CT Scan from any standard telephone point to any other.

Nursing research

—The familiar applications in Nursing research are statistical analysis, literature, and word-processing for report and thesis generation, so these will not be elaborated upon here.

Problems in instituting computer technology

Cost: A good microcomputer system costs about Rs. 50,000 at the present time, and if present trends continue, this will decline over the next few years. We may be tempted to use the example of video sales abroad—machines that sold for \$ 1000 in 1982 now sell for less than \$ 300. Computers will not decline as rapidly but we will be getting more for our money. The amount of computer memory available per rupee has been doubling every year for over ten years. One possibility may be leasing a system; this costs about Rs. 1000 per month, which can be applied to the cost of the system. This may make small specially-funded demonstration projects feasible.

Constant, uninterrupted power source: Computers can be damaged by irregularities in power supply, and material currently in use will be lost if the power back-up devices are now available, but justifying their cost may be difficult. Also the machine should not be subjected to extreme heat, so air-conditioning is required for temperatures over 38 degrees Centigrade. These are very real obstacles at the present time.

Attitudes: How do you feel about using a computer in your work? Too much technology will take us even farther from the bedside? You are too old to cope with new machines and now everyone will find out? You believe that computers are potentially harmful and you might make a catastrophic mistake? The computer can do so much of your work that you may be out of a job, so let's close the door before he gets in? These are all natural reactions that have been studied, and so far none of these fears have been justified. The computer merely provides us with a tool for efficient information management, so we can spend more time where we belong, at the bedside, giving better patient care. If you can follow a recipe you can use today's software packages, and they are getting easier every year. The machine will not bite. My instruction manual encourages the timid with "When in doubt, do something."

Getting Ready

All new software designed for microcomputers comes with instruction manuals prepared with the

provice in mind. When large programmes such as hospital information systems are purchased, the company selling the package takes responsibility for the inservice training of personnel who will be using the system.

"Computer literacy" is a jargon term that currently has no accepted definition. Ordinary touch-typing skills are a decided asset, and the ability to read and write simple English is also helpful, although programming is now being done in China using Chinese characters and IBM manufactures Chinese-language microcomputers.

Specialised training is not necessary. Programming will not usually be done by nurses, so learning a programming language is not advisable. The language used for writing one's own programmes on microcomputers is almost exclusively BASIC, so although you may have seen FORTRAN used in university settings, the new trend toward decentralised systems suggests that if you really want a programming language, you should learn BASIC. If one has the opportunity to take formal training, then data-base-management concepts would be most useful. The problem with computer courses is they are very expensive and they don't give enough practice time for students to master the skills. Often the money would be better spent on a leased machine and a do-it-yourself manual.

The best preparation for nurses is to re-examine the ways in which we think and teach, and to strive to improve our expert knowledge base in our own field. We need to develop standardised problem-solv-

ing approaches to clinical situations, arriving at clear-cut Nursing diagnoses, rather than merely following doctors' orders. The computer will enable nurses to make use of much more individualised data about patients in a much shorter time period. The programme will integrate material related to age, sex, nutritional and socio-economic factors into a comprehensive Nursing care plan. The bedside nurse will be able to evaluate the care she gives in relation to specified outcome goals.

Nursing teachers can help prepare their students by encouraging them to think in "branching patterns," or "if-then" situations. How are problems broken down into sub-problems, and what is the relationship between the sub-problems? What was one's data-base for a proposed solution? Guess work isn't good enough! Intuition and experience may be helpful at times, but students and teachers need to be aware of how they derive the information that influences their decisions. How can we organise the information we already possess, so it can be accessed by the new tools?

The nurse's best preparation will therefore be in her own expert training and experience, in being clear in her own mind about the facts she is using and how these facts relate to patient care.

We are not going off into the realms of science fiction here. We are describing today's realities and tomorrow's possibilities. Effective Nursing care delivery and the computer revolution are not incompatible. Computer technology is merely a new tool to help us give better Nursing care.

IMMUNIZATION

Oh ! harken parents, to World Health Organization's Voice,

For the health of your Child is left to your choice.

And immunization is the key to all real success,

So save your child from infectious disease and distress.

Here is an immunization schedule for you to see,

Abide by it and free from disease your baby will be.

Ante-natal mothers bearing four to six months tetanus toxoid you will take,

And six to eight months a booster dose for your child's sake.

When your baby is three to nine months, not more

BCG vaccine and 3 doses of D.P.T. and Polio drops is ideal for him, you know.

At nine to twelve months give him measles's vaccine, a single dose.

And at eighteen to twenty four months D.P.T. and Polio's booster dose.

At the age of five or six when he goes to school,

Diphtheria Tetanus and Typhoid vaccine is given as a rule.

Then Tetanus and Typhoid vaccine he receives at age of ten,

And at sixteen another same booster dose for our young men.

Miss Mary Rozario Juliet