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ABSTRACT

This report describes a 3-year project funded by a grant from the Division of Nursing, Health Resources and Services Administration to provide continuing education in computer technology for nursing faculty in college-based nursing programs in the 15 Southern Regional Education Board (SREB) states. The report begins with an overview of computer technology in nursing education, noting that there has been a significant increase in computer use in college-based nursing programs from 1983 to 1987. The relative advantages of computer use for instruction and in communication networks are discussed, and guidelines and tips for deciding whether to use computers are provided. Software selection and development are also addressed, and a form for software evaluation is included. The importance of faculty commitment is also discussed. The activities of the project are then summarized, including descriptions of the basic workshops, conferences, and seminars; their settings; the participants and their plans for implementation; and participants' progress reports. Examples of statements included on plans and responses from progress reports are included. Eight appendixes provide the results of surveys of computer use by nurse administrative heads and software holdings in the SREB states; two versions of a master plan for the basic workshops; a model for the systematic implementation of computer supported nursing education; a questionnaire designed to obtain information on basic workshop participants; and forms for developing a plan to enhance computer supported education and a 6-month's progress report. (DB)

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MOVING INTO THE AGE OF COMPUTER-SUPPORTED EDUCATION

A Regional Experience in Nursing Education

Prepared by Eula Aiken, Project Director
Continuing Nursing Education in
Computer Technology
Grant #D10NU24198

April 1988

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Foreword

The idea for the Continuing Nursing Education in Computer Technology project emerged in early 1983 during a conference sponsored by the University of Texas at Austin School of Nursing. The need for a regional activity to help nurse educators become proficient in the use of computers to support and strengthen nursing education was apparent in the informal discussions about the rapid expansion of computer use in health care settings, the need for graduates who were computer competent, and the potential of computers to help faculty use time more efficiently in the learning environments. The computer could relieve faculty of many tedious tasks, freeing them to become more creative in their interactions with students.

Following the informal discussions during the conference in Texas and more focused presentations at the 1983 annual meeting of the Southern Council on Collegiate Education for Nursing, the Southern Regional Education Board (SREB) submitted a proposal and was awarded a Special Project Grant by the Division of Nursing, Health Resources and Services Administration, U.S. Department of Health and Human Services in March 1985. This publication provides (1) a summary of key issues addressed by workshop and conference speakers and (2) an overview of some of the activities, ideas, and concerns explored during the three-year project period.

Acknowledgments

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Project consultant:

Kathleen J. Mikan, University of Alabama at Birmingham

Six coordinators who, collectively, conducted 30 basic workshops for faculty with little or no experience in using computers:

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Computer Technology in Nursing Education

Throughout the project activities, experienced computer users challenged nurse educators to use computers, but to use them wisely, and to give serious attention to their roles in developing and shaping the information systems of tomorrow. Nursing leaders were charged to do more than manage--the charge was to set direction and allocate resources. In a similar vein, speakers urged that issues regarding the technology be considered in terms of "when and how" rather than "if." The increased use of computer technology in general education and in health care delivery systems makes it imperative that nurse educators become proficient in the use of computers. The rapid expansion of the technology in health care settings increases the need for nurse educators to become competent, as well as prepare graduates who are competent, in the use of computers. Use in other disciplines for instructional purposes demonstrates the potentials of this technology to increase efficiency and effectiveness in nursing education.

Data from three surveys, directed specifically to college-based nursing programs in SREB states, reveal significant increases in computer use. In 1983, informal reports showed a "surge of interest in computer technology" and a formal report documented concerns, needs, and a high level of interest among nurse educators regarding computer technology. A majority of the administrators of college-based nursing programs had little or limited knowledge about computers. Most reported that nursing majors used the computer for some of their pre-nursing instruction; less than 15 percent reported nursing majors using the computer for nursing instruction.

However, the results of surveys in 1985 and 1987 indicate that more computers had become available and were being used by nurse educators and students. In fact, the results of a questionnaire (Appendix 1) administered to the nurse administrative heads at the 1987 annual meeting of the Southern Council on Collegiate Education for Nursing indicated a majority (87 percent) of the respondents (n=55) were currently using computers and had a personal computer at home. Most respondents reported between 25 and 50 percent of their work being done with the microcomputer. Although a majority still claim to have "limited knowledge," 31 percent asserted they were "highly knowledgeable."

Relative Advantage of Computer Use

Perceptions of the relative advantage of computers vary. Skeptics, cautious optimists, and enthusiasts are terms that characterize most educators. Awareness of the significant roles of the computer influences its use to a great extent. Three important areas merit attention. First, computers are critical tools in the acquisition and generation of information. Secondly, computers have important instructional roles, in class and out, to help people learn. The third area concerns increased personal productivity of faculty and staff in professional work and of students in academic work and subsequent careers. Project activities directed attention primarily to the roles of computers as tools to enrich personal productivity and to deliver instruction.

Instructional Purposes

Nationwide studies of the impact of computers indicate that computer-assisted instruction (CAI) and computer-managed instruction (CMI) have a positive influence on learning. The most frequent instructional uses of computers are drill and practice sessions, tutorial programs, and other applications (Figure 1).

FIGURE I

Instructional Uses of Computers

Drill and practice applications	Provide opportunities for students to review and repeat information as many times as they need.
Tutorial applications	Guide learning to correct interpretation of the information. Students can take charge of their own learning—proceeding at their own pace.
Other applications (programming, word processing, games, graphic packages, and mathematical modeling)	Help students develop critical thinking skills and intellectual comprehension

The advantages of the computer as an instructional tool include its high motivational value and capacity to generate positive interest in classrooms and informal learning situations and its interactivity. When using good computer-based learning modules, because they work at their own pace, students can progress to new materials faster. Computers free faculty from repetitive tasks so that they can rechannel their abilities to new areas and interact with students–helping them stretch their minds.

Communication Networks

This technology can be used to transmit instruction (and other information) beyond the boundaries of an institution. For example, with a long distance hook-up and the flick of a modem switch, instruction in a particular discipline flashes on a screen. A professor over a hundred miles away explains problems and how to solve them. The system sends a still frame video image from one classroom to another. Teachers and students speak to one another, send information back and forth, and change the graphics which appear on a television monitor. This interface of technology and education can help placebound students and faculty attain goals easier. Test results indicate students perform as well or better with this modality as with the traditional methods.

The University of Southwestern Louisiana College of Nursing at Layfayette, the University of Texas at Austin School of Nursing, and the University of Texas Medical Branch at Galveston School of Nursing demonstrate computer capabilities in the dissemination of information via electronic bulletin boards. These institutions have equipped computers with a modem that allows a connection to be made via telephone. Thus, a person—many miles away—can activate the systems. Since these activities can occur at any time, users are not time bound.

NIX (318-231-5621). The University of Southwestern Louisiana College of Nursing established an electronic bulletin board to facilitate the exchange of computer-related information among nurse educators within the SREB states. NIX provides information about software reviews and computer-assisted instruction used by faculty in the College of Nursing. For example, the McGraw-Hill Authoring System program was used to develop in-house drill and practice programs in basic mathematics skills and pharmacology.

Faculty throughout the region are invited to share software reviews via this board. The board, located in the Learning Resource Center of the College of Nursing, uses an IBM/PC with 256 kb, two disk drives, an Avatex 1200HC modem, IBM DOS 2.10, and RBBS-PC Version CPC 14.1C communications software. The required baud rate for the modem is from 300 to 1200. (See Figure 2 for information essential for use.)

FIGURE 2

Parameters for NIX

Dial 318-231-5621

Set communications software to: 8 data bits/1 stop bit/no parity

Enter these parameters during sign-on to bulletin board:

FIRST name (return)
LAST name (return)
Type of system (return)
City, State (return)

Enter the following to connect to the bulletin board:

R (Press return) for <R>egister
1st Password: RAGIN CAJUN (return) [use caps]
2nd Password: RAGIN CAJUN (return) [use caps]

Respond Y (return) if your terminal can display lower case or N (return) if your terminal cannot display lower case.

Respond N (return) for <n>one graphics wanted
Respond X (return) for <x> modem file transfer
Respond N (return) for want nulls? = "No"

The user will be logged into the Bulletin Board Service and should follow system menu prompts to use the program effectively. The system operator is Bryan Guilbeau. (Voice communication is via 318-231-5643.)

SON•NET (512-471-7584). A national (actually international) bulletin board is now available through the University of Texas at Austin School of Nursing for public use. (See Figure 3 for the necessary parameters for use.) This board enables communication among numerous points in the United States, South America, and Canada. In addition, it can be used for announcements of continuing education events, research symposia, and other conferences or workshops. The following national conferences are available:

AIDS/AIDS-Related Complex
Medical Grand Rounds
Abled-For-Disabled Individuals
Questions and Answers About Nursing
Educator-For-Professional Educators
Apple-For-Apple 2E & 2C Users

FIGURE 3

Parameters for SON•NET

BAUD RATE: Any modem up to 2400 bauds
Communications software parameters: 8N1/8 data bits/no parity/1 stop bit

Dial 512-471-7584

The SON•NET Logo will appear on the screen. The computer will ask the following questions. Supply the necessary information.

What is your first name?

What is your last name?

<The computer will confirm this information. [y,n]?>

Please type your city and state

Select your secret password [A password must be a single word (no spaces). It can be as long as 15 characters and can include letters, numbers, or punctuation. There is no difference between upper case and lower case letters.] Follow instructions on the screen. The computer will verify the response.

Does your system support ANSI Screen Controls? [y,n,? = Help] If you do not know, press ? for help. Read the explanation and answer y or n.

Does your system support OPed full screen editor [y,n,? = Help] This question may be asked depending upon your answer to the last question. OPUS has two built-in message editors. The system wants to know which one will be used. You may choose either—usually line-oriented editing is sufficient.

y = OPed is a full-screen message editor. It is similar to a text editor. If you find a mistake, you just move the cursor to the mistake and correct it.

n = LORE is the line-oriented editor familiar to most bulletin board subscribers. You type one line of message at a time. You cannot move around on the screen and make changes.

Use OPed full-screen editor? [y,n,? = Help] (Type y to use OPed (full-screen message editor) and n to use LORE (line-oriented editor). You may use either, but for most applications one-line editing is adequate.)

The SON•NET logo screen should appear. Help menus can be accessed by typing ? on most menus. The help menus assist users in learning to move around the bulletin board more quickly.

If you have any problems contact the system operator. The system operators (SYSOP) are Betty Skaggs or John Fritz. (Voice communication is via 512-471-7311.)

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PRN U.T. Net (409-761-1802). The *PRN U.T. Net* Bulletin Board system provides a means for students and faculty at the University of Texas Medical Branch School of Nursing at Galveston to communicate using computers with the existing telephone system. It currently operates with an Apple IIe computer, an Apple 300/1200 baud modem, four disk drives, and Applenet software. After dialing 409-761-1802, the "connect" matches the user's modem' baud rate. The user will be asked to type the password and to follow instructions. Since the board is used by a variety of people, some parts are not available to everyone. If a user types B, a list of the available boards will appear on the screen. Typing "bye," "off," or "end" results in a fast log-off.

Users can scan boards, leave private messages, post public messages, download and upload files, and leave other written communication.

The *PRN U.T. Net* system also provides announcements, features of interest, a voting booth, and other types of information exchange. For example:

Students can "pick up" a private comment from an instructor concerning an assignment.

An instructor can leave additional work for a group of students.

Faculty can add support to a peer's arguments in the "round table" discussion on a prearranged topic.

Participants obtained information and registered for the regional project's basic workshops.

Voice communication is currently through the Center for Educational Computing of the School of Nursing. The system operator is Douglas Haskin (409-761-4807).

Approximately 100 institutions in the region have access to national and international networks via the BITNET system. Others have local area networks through which faculty in different locations can communicate with one another. Several deans of nursing read their "electronic" mail daily.

These examples demonstrate a few of the capabilities of the computer as part of a growing telecommunications network which has worldwide reach. Other more creative uses will be developed as nurse educators learn to use the networks and realize the potential of this method of communications.

Deciding Factors

Instructional Uses

The decision to use computers as instructional tools should be based on sound educational principles. If incorporation of computer technology in a curriculum is a desired goal, then the following questions need to be considered:

What are the expected educational outcomes? Are these realistic?

Does the instruction require computer technology?

What other teaching strategies work best with computer-assisted instruction (CAI)?

How can CAI be used creatively?

What mix of CAI and other instruction is optimal?

What kind of learners do best with CAI?

How many microcomputers are necessary for student use?

Who is developing courseware?

Who should develop courseware?

Is it really worth all the time, expense, and effort?

The disadvantages associated with computer use cannot be ignored. For example, the tool may not be appropriate for all learners or all learning activities. Some materials may be presented more efficiently and effectively with other teaching modalities. Therefore, faculty are encouraged to "proceed with caution."

Installation and maintenance expenses can prohibit extensive use. In addition to determining the number of computers needed to accomplish the desired outcomes, electric power supplies, disks, paper, ribbon, furniture, repairs, and replacements are items to be remembered before installation. Also, support personnel and security measures cannot be overlooked.

Legal and ethical issues are inevitable as faculty (and students) plan and use the technology. Copyright and copy protection are important issues in software purchase and use. Software ownership may become a problem for developers in some settings if institutional policies are not clearly delineated or publicized. Protection of privacy is a concern where many individuals have access to the same data base.

Non-instructional Uses

Plans for non-instructional uses demand the same kind of careful scrutiny of who-what-where issues as those for instructional uses. The kinds of non-instructional uses must be clearly delineated. The computer can be an efficient way to generate reports, maintain records, prepare documents for publication, or prepare course lectures.

In sum, the advantages and disadvantages of computer use must be examined carefully. Decisions should be based on sound rationale specific to the needs of a particular institution rather than marketing hype and efforts to "keep up with everyone else." Ideally, the purposes of computer use dictate the type of equipment—software and hardware—needed. Some tips (Figure 4) regarding purchases and decisions can help prospective users avoid some pitfalls.

FIGURE 4

Tips For Prospective Computer Users

List all possible uses of the computer. The purpose of using the computer is an overriding issue to be addressed at many levels. Careful delineation of the potential uses establishes the promise for decisions regarding software and hardware. Prospective users with a "blueprint" can avoid making some unnecessary software purchases.

Learn the components of a system to communicate effectively with peers and sales representatives. Overuse of computer jargon is not a sign of computer competence, especially if used inaccurately. However, some basic terms—central processing unit, monitor, disk, hard drive, graphics board, cables, disk operating system (DOS)—should become a part of a user's language when discussing problems and needs. Appropriate use may save time and money.

Identify existing systems to avoid unnecessary duplication or difficulties with campus support because of differences in type of equipment. It is helpful to list the advantages and disadvantages of using the same system that the institution has adopted. The institution may have available labs and other resources that will assist the nurse educator (and student). Other computer users within the institution might share their experiences regarding those inevitable hurdles to be encountered as the technology is installed and used.

Review information and ask questions about hardware and software requirements. The documentation that accompanies hardware and software packages is written by and for technicians. The omission of one word can create havoc during installation procedures or actual use of the equipment or application. (It is helpful to have an "interpreter" to decipher some of the instructions.)

Inquire about company policies regarding updates and replacements. Some parts may need to be replaced before (and after) the warranty. Some dealers provide rebates and extended warranties.

Determine before "upgrading" if the new "whistles and bells" are really necessary. New releases of software packages will make the most recent purchase obsolete. It is cost-saving to differentiate between "nice to have" and "need to have" features.

Check for available support services following the purchases. Does the 800-number work? Is there a local number? Are proficient computer users available on the campus or in the nursing program?

Talk with other experienced users to learn about their good and bad experiences. Through meetings, publications, and joint efforts, computer users can learn much from one another. It is not always necessary to re-invent the wheel.

Budget for maintenance costs. The "hidden" costs of computer use cannot be ignored. Electric power supplies, space, paper, ribbons, furniture, and personnel are some items to be remembered before delivery of the computers.

Test products, if possible, to determine if these fit particular needs. Users need to "experiment" before final installation to see if the product meets the manufacturer's claims as well as user requirements.

Include prospective users—teaching and non-teaching—in discussions about possible purchases. User involvement is a critical factor in successful implementation later. The overall purpose of computer use and size of the staff dictates, to a great extent, who will have the greatest involvement.

Software: Selection and Development

Software Selection

Time and money are inevitable constraints for many nursing faculty who want to examine software packages before "adoption." Few publishers permit a complete review prior to purchase of software packages; most limit review to a demonstration disk. Therefore, questions about the "best" software came up during all project activities as faculty sought courseware (and hardware) recommendations from the "experts" in efforts to avoid making "bad" choices. The "hands-on experiences" of the project were valued because they allowed faculty some opportunity, though limited, to "try" equipment and computer applications.

The need for standard criteria to assess the computer applications became evident at the first workshop. (A number of evaluation forms—of varying length and content depth—were available for use [or modification].) However, most faculty agreed that decisions were based too often on informal and disorganized evaluations. What is quality software? Kathleen J. Mikan proposed the following definition at the first seminar (Natchez, Mississippi):

> "...a computer program which provides a purposeful, valued, well-designed, interactive, content-accurate, motivational learning experience that capitalizes on the potentials of the computer, responds to a variety of user input, and facilitates the achievement of desirable predetermined outcomes by a target population efficiently, effectively, and creatively."

This definition was shared with nurse educators throughout the SREB region. It established the parameters for the evaluation tool that was developed at a second seminar in Atlanta, Georgia (Figure 5). (This tool, representing the thinking of nurse educators throughout the SREB states, has been widely distributed.)

Ideally, decisions about software should be based on desired outcomes. Recommendations for software purchases--utility and generic--should not be left to the discretion of one or two individuals. All faculty who plan to use the computer as an instructional (or non-instructional) tool should help to assess and select software. Group reviews may be the most efficient method in some settings.

Software Development

Although recent technological advances have made development of courseware easier and cheaper to do now than several years ago, the amount of time needed to develop a program remains a major obstacle. If faculty decide to develop an application, some hints about development (Figure 6) emphasize the need to have well-defined educational goals before beginning the project. As one developer advised, "Figure out what the problem is before trying to solve it." A software package should be fun, have wide applications, challenge people, and catch the imagination of users.

Publishers should be given honest appraisals of software packages. Identifying problem areas and the desired characteristics of software packages can help to eliminate ineffective products. Written appraisals are likely to receive better responses than verbal exchanges with sales representatives during conventions or site visits.

FIGURE 5

COMPUTER SOFTWARE EVALUATION

Quality software is a computer program which provides a purposeful, valued, well-designed, interactive, content-accurate, motivational learning experience that capitalizes on the potentials of the computer, responds to a variety of user input, and facilitates the achievement of desirable predetermined outcomes by a target population efficiently, effectively, and creatively.

Title of program: _____

Source: _____ Address: _____

Date produced: _____ Cost: _____ Program version: _____

Suggested running time: _____ Type of computer: _____

DOS [ ] OS 2 [ ] Other [ ] Memory: _____K Number disk drives required: 1 [ ] 2 [ ]

Hard disk: Required [ ] Preferred [ ] Monitor/Display: Mono [ ] Color [ ] [Required Adapter: _____] Printer: Yes [ ] No [ ]

Videodisc: [ ] Video Interface [Manufacturer]: _____ Videotape player: [ ] Other equipment required: _____

Additional instructional materials required: _____

Program copyrighted: Yes [ ] No [ ] Back-up copy: Yes [ ] No [ ]

COMMENTS OF REVIEWER

Program type (i.e., tutorial, drill, and practice): _____

Student Level: AD [ ] BS [ ] Higher Degree [ ] Other [ ]

Program runs with minimal difficulty: Yes [ ] No [ ]

Appropriate use of computer: Yes [ ] No [ ]

Problems encountered: _____

Comments: _____

Recommend to others: Yes [ ] No [ ]

Reviewed by: _____ Date: _____

Institution: _____

A. CONTENT

Please circle either Y (Yes), N (No) or NA (Not Applicable).

1. Key concepts defined	Y	N	NA
2. Learning objectives clearly stated	Y	N	NA
3. Content accurate and current	Y	N	NA
4. Content relevant	Y	N	NA
5. Content free of stereotypes and cultural bias	Y	N	NA
6. Content organized and clearly presented	Y	N	NA
7. Scope and depth of content appropriate for intended use	Y	N	NA

Comments:

B. SUPPORT OF THE LEARNING PROCESS

1. Consistent with curriculum	Y	N	NA
2. Instructional design evident	Y	N	NA
3. Instructional design acnieves purpose	Y	N	NA
4. Student participation promoted	Y	N	NA

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5. Evaluation provided:
   - Formative — Y N NA
   - Summative — Y N NA
6. Feedback:
   - Objective — Y N NA
   - Helpful — Y N NA
   - Varies with user input — Y N NA

Comments:

C. USER APPEAL

1. Captures and sustains user interest — Y N NA
2. Can be used independently with minimal instruction — Y N NA
3. Adapts to user input — Y N NA
4. Speed of presentation under control of user — Y N NA
5. Is efficient of user time — Y N NA
6. Protects privacy of user responses — Y N NA

Comments:

D. TECHNICAL ASPECTS

1. Program runs smoothly without glitches and blind loops — Y N NA
2. Screen display is clear with consistent format — Y N NA
3. Color/sound/animation/video/graphics used appropriately — Y N NA
4. Capable of producing hardcopy, if needed — Y N NA
5. Able to enter and exit program as needed — Y N NA
6. Able to make minor modifications in content to match curriculum — Y N NA
7. Able to adapt hardware/software to make program operational — Y N NA
8. Record keeping capacity adequate to meet future needs — Y N NA
9. Documentation is clear and complete — Y N NA

Comments:

E. PURCHASE CONSIDERATIONS

1. Benefits/frequency of use worth cost now and in future — Y N NA
2. Duplicates existing materials available (i.e., filmstrip) — Y N NA
3. Has mechanism for keeping content updated as needed — Y N NA
4. Requires additional instructional materials (i.e., workbooks) — Y N NA
5. Vendor support available — Y N NA
6. Purchase options:
   - sale [ ]
   - lease [ ]
   - site license/network [ ]
   - discount on multiple copies [ ]
7. List institutions currently using: _____

ADDITIONAL COMMENTS:

Revised 1988

Note: This Software Evaluation Tool was developed by: **Linda Speranza** (seminar leader), Valencia Community College, Orlando, Florida; **Kathleen C. Brown**, University of Alabama at Birmingham; **Frances C. Henderson**, Alcorn State University, Natchez, Mississippi; **Kathleen J. Mikan**, University of Alabama at Birmingham; **Marilyn Ann Murphy**, University of Texas Health Science Center, San Antonio; **Rose Marie Norris**, Georgia State University; **Maribeth K. Traer**, Lynchburg College, Lynchburg, Virginia; **Carol M. Wiggs**, Baylor University, Dallas, Texas.

FIGURE 6

Guidelines for Courseware Development

Overview	Describe briefly program content and major objectives. Explain why using the computer will be significantly better than other ways of achieving the same objectives.
Experience	Provide description of author's background in content area—attach vita. What is the author's experience in instructional design in general, and software design in particular? Has the author worked on other software projects in any capacity? If the author is an experienced programmer, what languages are used? If the author has developed any software, even if it is on a completely different topic, attach a copy.
The audience	Who will be using the program? What skills or knowledge are users expected to have related to content and computer use?
Instructional design	Describe the instructional strategies and program designs to achieve objectives and make effective and creative use of the computer. Give as much detail as possible about the objectives and instructional design of the program. What type of program— tutorial, drill and practice, simulation—will it be? What kinds of feedback, prompting, or other help will the program present to the user? What kinds of responses, for example, multiple choice, fill-ins, open-ended, will the program accept? How will the program "branch" based on learner's responses? If applicable, differentiate between feedback and evaluation provided in the teaching and the testing parts of the program. What will be the basis for evaluation? Describe differences, if applicable, in evaluation information provided students and that supplied instructors. Provide examples of the screens the users will see including the use of color and graphics.
Hardware	What language will the author use to write or have the software written in? Will the author be able to program specifically for both the IBM-PC and Apple IIe? Others?
Documentation	What manuals or instructions will need to be provided to the instructor and/or student? Will the documentation require figures and color?
Innovation	Give free rein to the imagination. Describe how the program will use the capabilities of the computer to produce a new approach to learning the content.

Source: Jeanne Hallanhan, J. B. Lippincott Company, 1986.

Software Holdings

In 1987, a questionnaire, which contained 119 selected computer applications (Appendix 2), was administered to determine the software holdings of undergraduate college-based nursing programs. The results indicated that the schools (n=156) owned and used a variety of packages. The packages reported most frequently were related to clinical applications (Table 1).

Several institutions had extensive holdings-more than 100 different applications; the holdings at most institutions numbered between 2 and 15. Twenty of the questionnaires (not included in the count) indicated computer software was not available for student or faculty use. A few of these programs were reviewing applications; however, most lacked funds for any purchases.

Faculty Commitment and Involvement

Successfully incorporating computer technology in a nursing curriculum depends on its "fit" with faculty images of themselves, their perceived (and actual) roles, and their prior experiences with different instructional media. Technophobia (fear of machines in general and of computer technology in particular) cannot be ignored. It is

TABLE 1

Software Holdings Reported Most Frequently by College-Based Nursing Programs in SREB States

	Percent of Programs (n = 156)
Nursing Diagnosis (Lippincott)	38%
Nursestar (Mosby)	36
Clinical Simulations (MEPC)	33
Apple Works (Apple)	31
Mr. Jones: Indigestion (Saunders)	29
Calculate with Care (Lippincott)	27
CAI Nursing Research (Mosby)	26
Mr. Richardson: Newly Diagnosed Diabetes (Saunders)	24
Mrs. Shilkraut: Terminal Stages of a Malignant Disease (Saunders)	23
Mrs. Gates: First Hospitalization (Saunders)	22
Mrs. Sims: Hemorrhoidectomy (Saunders)	22
Mrs. Merra: Liver Disease (Saunders)	22
Apple Writer (Apple)	20

ultimately related to fear of unemployment or job displacement, dehumanization, and depersonalization. Thus, it is important to discern faculty beliefs and attitudes about computer technology early.

The computer may represent status, authority, power, or increased workloads. For some faculty, being "informed" is sufficient. These individuals never tend to use the computer to any great extent; yet, it must be visible in their offices. Other faculty believe the computer will only increase their workloads because they will be expected to perform more of their typing tasks. Of course, there are those persons who value the technology as a personal and professional tool and, easily adaptable to technological advances, have little, if any, difficulty using a keyboard.

Commitment to computer use as an instructional and personal tool depends upon the state of readiness of the individual user. When the individual decides the technology "fits," participation in various learning activities will be more meaningful. Therefore, it is important to determine the variations in states of readiness of faculty (and student) groups when planning for the introduction of computers.

Prospective users must be able to operate the equipment and feel comfortable in doing so. Therefore, computers must be accessible and available for users to have hands-on experiences and opportunities to practice some of the basic steps of computer use under the tutelage of more experienced computer users in nonthreatening

environments. The novices need to inquire about "things they want to know and are too embarrassed to ask"; slightly more experienced users may need to affirm what they have learned by trial and error.

Although all faculty will not be at the same level of readiness to use the computer, the total faculty needs to be kept informed of the various phases of implementation. This strategy helps to prevent the establishment of "powerhouses" within faculty groups. "Early adopters" are important people who can help others recognize the relative advantages of computer use by demonstrating the usefulness of the technology. However, their enthusiasm and interest in computers can be overwhelming and threatening to other faculty.

Often, faculty interest in computer use is stimulated and sustained if they can observe and participate in some of the activities that will help them become more efficient and productive. Word processing is an extremely useful tool that helps faculty capture an important resource—time. Being able to focus on the tasks of written expression rather than on those of getting papers typed, corrected, and retyped is an easily recognized time-saver. Few faculty writers who are comfortable with a keyboard are likely to give up a computer willingly.

The time-saving benefits of computers, however, are not instantaneous. Too often, faculty and administrators set unrealistic performance expectations because they fail to allow sufficient "training" time. Even proficient computer users need time to learn how to use different computer systems and special applications. Yet, there is a tendency to expect substantial output from the novice computer user after one workshop. The pressure—real or imagined—to produce impedes mastery of necessary computer skills.

Competency in word processing also provides a good introduction to other computer applications. Faculty may venture into other software applications (graphics, spreadsheets, communications) as a result of their positive experiences with word processing. Developing competence in using the tool and experiencing some of the benefits of the technology encourage individuals to seek expansion of its use.

Incentives for becoming computer-competent are important elements in the promotion of faculty involvement and commitment. These should be visible and appealing to faculty. Institutional policies influence the extent to which some incentives can be granted. However, acknowledging the accomplishments of nurse educators who strive to become competent, providing release time, demonstrating interest in faculty achievements, identifying and securing resources to help faculty become competent, and becoming computer-competent are examples of the measures some administrators use. Promotion, tenure, and salary increases are other factors faculty believe should be considered.

The tools of the trade in an information society are computers and keyboards. People who don't know how to use computers will be at a disadvantage. The activities and reports of faculty participants in the regional project indicate movement toward a future when computers will have a more prominent role in the delivery of nursing education. Incorporation of this technology into the curriculum demands a focused direction, willingness on the part of administration and faculty to take risks, and sufficient staff to monitor programs and support staff training.

The sustained interest in the continuing education activities sponsored by the regional project affirms the interest and commitment of nurse educators in the SREB states. It also confirms the need for strong networks—national, regional, and

local—to promote and assure development of computer competence. Assessments of project activities highlight the networking opportunities that are available at all levels. Often, these opportunities were viewed by individuals as the most significant activities. The *Resource Directory,* first published by the project in 1986 and revised in 1987 and 1988, helped to facilitate the development of "networks" throughout the region. Through meetings, publications, projects, and contact with other computer users, nurse educators will continue to extend their imaginations, recognize the opportunities the technology can create, and use the technology to achieve educational and personal goals.

Summary of Project Activities

The SREB proposal, funded March 1, 1985, addressed the diverse applications of computers in nursing education. The major purpose of the three-year project was to provide continuing education in computer technology for nursing faculty in college-based nursing programs in 15 Southern states (Alabama, Arkansas, Florida, Georgia, Kentucky, Louisiana, Maryland, Mississippi, North Carolina, Oklahoma, South Carolina, Tennessee, Texas, Virginia, West Virginia). Specific project objectives were to:

Provide basic decentralized continuing education workshops on the use of computer technology in nursing education.

Conduct assessment of the regional need for computer programs to support the curriculum in associate degree and baccalaureate programs in Southern colleges and universities.

Provide advanced seminars on the use of computers as an instructional tool for specific topics.

Establish a regional and local network for sharing information about the systematic implementation of computer-supported nursing education.

Activities

Basic Workshops

The design for the basic workshops was based on a master plan and "model" developed by Kathleen J. Mikan, Professor and Director of Learning Resources, University of Alabama at Birmingham School of Nursing. The master plan (Appendix 3) contains objectives and suggested content for each of the five basic workshops conducted at six host institutions. (Following discussions with the coordinators, the plan was modified [Appendix 4]. The revised plan is built around three basic workshops instead of the original five.)

Collectively, the 27 basic workshop objectives address major implementation issues—resources, faculty development, support services—related to incorporating computer technology in nursing education. Upon completion of the series of workshops nurse educators were expected to be able to:

Identify the impact of computer technology on society, health care, and nursing care.

Identify major trends in nursing's use of computers in administration, practice, research, and education.

Identify factors to consider in setting realistic goals for computer use.

Apply a model for systematic implementation of computer-supported education.

Incorporate computer technology as a tool to strengthen teaching and learning activities in nursing education.

The "model" for systematic implementation of computer-supported education (Appendix 5) consists of the following 12 necessary actions:

Establish need.
Organize early adopters.
Survey local computer resources.
Establish computer-user support group.

Conduct faculty development sessions.
Determine faculty and administrative commitment.
Determine curriculum applications.
Select software and hardware.
Plan for user interaction.
Manage computer support services.
Evaluate benefits and effectiveness.
Expand computer applications.

The basic workshops were planned to meet the needs of faculty with little or no experience in using computers. A key activity was the "hands-on" experiences for the workshop participants to practice some of the exercises discussed in workshop sessions, become more familiar with the components of computer systems, and to overcome some of the "fears" about handling the equipment. This feature of the workshops was valued highly by participants, who could "experiment" in a nonthreatening environment with assistance from colleagues and proficient users. Since computers were limited at most of the host sites, participants worked as teams of two (sometimes three by choice). The team approach seemed to be an effective way to assist individuals who might otherwise be hesitant to use the equipment.

Conferences and Seminars.

Two regional conferences and four seminars were planned for faculty with experience in using computers. These activities were designed to address broad implementation issues and concerns specifically related to computer use in nursing education. For example, concern about the evaluation of software for instructional purposes in nursing, development of software using existing authoring programs, and expanding networking capabilities via electronic systems formed the basis for the seminars. Regional conference themes focused on the use of computers as personal and professional tools to enhance teaching and learning activities.

Settings

Thirty basic workshops were hosted at the following six institutions which were selected on the basis of available resources to conduct the required activities and geographical location.

University of Alabama at Birmingham
University of Florida (Gainesville)
University of South Carolina (Columbia)
University of Tennessee (Memphis)
University of Texas Medical Branch at Galveston
Virginia Commonwealth University at Richmond

The nurse administrative head at each site appointed a nurse educator who was a proficient computer user to coordinate the five two-day workshops. The coordinators invited many nursing and non-nursing faculty to help implement workshop plans.

The two regional conferences were held in Atlanta, Georgia, at the Terrace Garden Inn. Two of the four seminars were held at SREB headquarters in Atlanta; the remaining two—one each—were at Alcorn State University (Natchez Mississippi) and Louisiana State University Medical Center (New Orleans).

Profile of Participants

The activities were designed for, but not limited to, faculty teaching at the undergraduate level in college-based nursing programs. Workshop attendance included representation from the 15 SREB states as well as five non-SREB states. More than 1,200 people (collectively) attended project activities, i.e., workshops, conferences, seminars; over 5,000 nurse educators received publications and reports.

Initially, the basic workshops were limited to three faculty from each program--based on anticipation that this team would attend the entire series. However, the constraints of scheduling and budgets prevented strict adherence to this requirement. Release time and funding were major deterrents influencing "repeat" attendance. However, there was a high level of faculty interest and participation throughout the project.

Data from a "profile form" (Appendix 6), administered at the first and last workshops, provide information about the participants' level of computer experience and perceptions of their computer skills. The majority of the participants were faculty, though some deans and directors attended the workshops, conferences, and seminars. Although the range of computer use varied, the level of computer skills within this group was higher than expected (Table 2). Many of the nurse educators were proficient computer users who attended the basic workshops to document their skills and "network" with other computer users in the region.

Word processing was the most frequent use reported by a majority of the workshop participants in 1985 and in 1987. Other uses included test scoring, record-keeping, and calculation of grades.

The primary reasons for workshop attendance (cited on the 1985 forms) refer to the need for knowledge about computer use and computer applications, for example, "become more computer literate," "identify specific computer applications for nursing

TABLE 2

Levels of Computer Use by Percent

	1985	1987
	n = 315	127
Unfamiliar	17%	4%
Beginning familiarity	31	14
Operate	34	33
Instruct others	2	14
Beginning programming skills	6	8
Own computer/use at home	32	55
Own computer/use at work	5	13
Use (school-owned) at work	41	65
Expect students to use in:		
nursing courses	28	42
clinical settings	10	15

education courses," "learn about available software." These reasons are manifest in the kinds of questions asked during formal and informal workshop sessions. In 1987, participants mentioned post-project activities to "upgrade my skills" and plans to "take a formal course" or "attend workshops" as measures to become more informed and proficient in the use of computers as professional tools.

Participants' Plans for Implementation

Workshop participants developed a plan (Appendix 7) that delineated those objectives and activities to be achieved following each basic workshop. This activity served several purposes. First, it helped to promote faculty involvement and commitment to the project. Secondly, it encouraged faculty participation in the design of a systematic plan, since the content outline for the plan related to concepts of the "model." The action statements could be classified according to the broad headings of the plan.

Frequently, several faculty from the same institution worked on the plan as a team—an action encouraged to promote continued faculty involvement in the home setting. The coordinators allotted time at each workshop for individuals to report on their progress—hurdles overcome, problems unsolved, successes realized. (The coordinators agreed to provide phone consultation as needed between workshops.)

Overall, the plans reflect the enthusiasm, frustrations, and aspirations of the participants. A primary concern evident in most statements of objectives focused on a need for training sessions to help faculty learn how to use the computer, how to select software, and how to incorporate the technology in the curriculum. Initially, the objectives centered on outcomes for the nursing program. Later, the focus shifted to "personal" development, i.e., self improvement with courses, scheduled practice sessions, and mastery of specific software packages. Few, if any, plans referred to curriculum revision or review to determine an appropriate "fit" with the technology. The constraints of time and money are inherent in all plans. Examples of responses according to the major headings (Figure 7) document some of the prominent themes.

Progress Reports

Workshop participants submitted a progress report (Appendix 8) at six-month intervals. This form requested information about accomplishments, problem areas, and the unintended outcomes. Collectively, the reports indicate the participants were trying to achieve their objectives. Because of unforeseen circumstances a few participants revised some objectives. Examples (Figure 8) from some of the reports attest to the accomplishments.

Faculty interest was greater than expected. One report indicates there "was more faculty interest in a campus workshop than space would accommodate." The reports indicate that "personal initiative," "receptiveness of faculty," " administrative support," spatial arrangements," and "available funds" were factors facilitating the accomplishments.

Conclusion

In conclusion, this regional effort confirms the need for strong networks to promote and assure development of computer competence. The appropriate use of the technology in educational and health delivery setttings will benefit educators. students, and consumers of health care. Through meetings, publications, and special projects, nurse educators will continue to extend their imaginations, recognize the opportunities the technology can create, and use the technology to achieve educational and personal goals.

FIGURE 7

Examples of Statements Included on Plans

Action Statements From "Model"	Need	State-of-Affairs	Objectives	Resources	Activities
Establish need	Computer competence Hardware for faculty use Software for instructional use Support services Faculty and administrative commitment Means to maintain currency of knowledge				
Organize early adopters Survey local computer resources Determine faculty and administrative commitment Determine curriculum applications		Unavailable equipment Inaccessible equipment Limited access to computers-"36 students required to use one computer" Irregular use of computers Inconvenient lab hours for student and faculty use Limited support for training Limited administrative and faculty commitment-"not a priority item on [their] agenda" Computer lab in place for student use Computers available for staff use		Computer science departments Data processing departments Local computer-user support groups Professional journals, e.g., *Computers in Nursing* National organizations, e.g., American Nurses' Association Council on Computers National League for Nursing Forum on Computers Association for the Development of Computer-Based Instructional Systems Symposium on Computer Applications in Medical Care Southern Regional Education Board	
Establish computer-user support group Conduct faculty development sessions Select software and hardware plan for user interaction			Recommend workshops Establish networks with peers Identify resources on campus Conduct local workshops Obtain equipment-"purchase additional hardware" Inventory existing resources Review computer-assisted instruction Locate funds to make necessary purchases Use a spreadsheet Use [the] computer to record and calculate grades Enroll in a formal course Read *Computers in Nursing*		Meetings "Buddy systems" Mini-workshops Special training sessions—"hands-on" learning experiences Establishment of ad hoc committees "Show-and-tell" sessions Special demonstrations of specific applications

FIGURE 8

Examples of Responses from Progress Reports

OBJECTIVES	OUTCOMES
Use a test authoring system for three tests in orientation by May 1987	Purchased (based on recommendation of some participants at SREB workshop) and installed Test Authoring Program (TAP) on the hard disk. Hired an outside consultant to write test questions because of time/staff constraints. Received help from hospital computer staff, i.e., questions regarding disk operating system, software installation. Can print 70 test questions and create a variety of tests.
Use the computer to maintain permanent grade records	Initiated a request in writing including objectives regarding need for a computer. Obtained an Apple II. Used software that was available on campus and received assistance from other faculty computer users. Am using computer to develop simple forms to assist me in my teaching activities. Am closer to achieving objective as familiarity with computer increases.
Develop a systematic plan to begin implementation of computers into nursing curriculum	Formed a three-member committee. Established short- and long-term goals. Designed plan for software evaluation. Discussed plans at faculty meetings. Faculty have been willing to preview software—using SREB forms.
Develop a computerized clinical scheduling with TWIN spreadsheet (Lead..., Edge)	Discussed plans with nursing faculty. Made arrangements with college computer programmer to begin work. Was unable to complete plans because of time contraints and increased workload.
Increase resources	Formed ad hoc computer committee for nursing and prepared following description of functions: 1. Advise administration on the acquisition and use of computers for academic purposes. 2. Plan and implement programs, workshops, seminars, and other means to improve level of faculty expertise in the use of computers in nursing education. Coordinate plans with Faculty Affairs Committee Chair. 3. Promote appropriate utilization of CAI in the academic programs.
Utilize CAI in my classes	Developed an orientation piece for the first nursing class. Included group and individual activities. Students liked the experiences.
Use computer to increase scholarly output	Purchased MacIntosh. Completed one chapter for book and an article.
Develop a mini-course (2 to 3 hours) on computer applications for nursing students	Prepared draft [of course plan] and circulated to faculty for comments. Must refine.
Attempt to develop a simple program	Tried to understand basic programming (only slightly successful). Bought Super Pilot. Encountered problems with time management.

Appendix 1
Survey Results

Computer Use by Nurse Administrative Heads (by Type Program)

1. Check the response that indicates the extent of YOUR knowledge about computers.

	A	AB	B	BH	Total number	Percent of total
	n=10	18	11	16	55	
Highly knowledgeable	20%	28%	45%	31%	17	31%
Limited knowledge	60	61	36	56	30	55
Little knowledge	20	11	18	138	8	15

2. Have you used the microcomputer for any purpose?

	A	AB	B	BH	Total number	Percent of total
	n=10	18	11	16	55	
Yes responses	90%	89%	91%	94%	50	91%

3. Are YOU currently using a microcomputer in the nursing program?

	A	AB	B	BH	Total number	Percent of total
	n=10	18	11	16	55	
Yes responses	80%	89%	91%	94%	49	89%

4. If yes, do YOU use microcomputers for any of the purposes listed below? Check all that apply to you.

	A	AB	B	BH	Total number	Percent of total
	n=10	18	11	16	55	
Word processing	70%	78%	91%	88%	45	82%
Spreadsheets	40	44	55	63	28	51
Reports	60	56	55	69	33	60
Data management	20	56	55	56	27	49
Data analysis	20	44	36	63	24	44
Recruitment	-	17	45	38	14	25

5. Do you have a computer at home?

	A	AB	B	BH	Total number	Percent of total
	n=10	18	11	16	55	
Yes responses	50%	39%	55%	88%	32	58%

6. What percent of your work is done with a computer?

	A	AB	B	BH	Total number	Percent of total
	n=10	18	11	16	55	
None	10%	6%	9%	6%	4	7%
Less than 5%	30	11	36	31	14	25
Between 25 and 50%	30	72	55	25	26	47
Between 51 and 75%	20	11		25	8	15
Between 76 and 95%	10		9	19	5	9
Between 96 and 100%				13	2	4

7. If you are not using a computer, do you plan to use one?

	A	AB	B	BH	Total number	Percent of total
	n=10	18	11	16	55	
Yes responses	10%	6%	9%	6%	4	7%

8. Circle the response that indicates your level of interest in using computers (0=none; 5=high)

	A	AB	B	BH	Total number	Percent of total
	n=10	18	11	16	55	
1				6%	1	2%
2		6%			1	2
3	20%	6		6	4	7
4	20	22	9	19	10	18
5	60	67	82	69	38	69

Title position

	A	AB	B	BH	Total number	Percent of total
	n=10	18	11	16	55	
Dean	10%	17%	18%	44%	13	24%
Director	80	44	36		20	36
Chairman		6	9		2	4
Program director		28		44	12	22
Faculty	10	6	27	13	7	13
Associate dean			9		1	2

Note: A = Associate Degree Programs
AB = Associate and Baccalaureate Programs
B = Baccalaureate Programs
BH = Baccalaureate and Higher Degree Programs

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Appendix 2
Survey Results
Software Holdings in SREB States

	A		B		AB		Total Number	Percent of Total
	81		69		6		156	
Administer (Mosby)	8	10%	9	13%	3	50%	20	13%
Aerosol Therapy (Medi-Sims)	1	1	0		1	17	2	1
Algebra Volume I-IV (Eduware)	0		0		1	17	1	1
Algebra Review (Microcomputer Software)	1	1	0		1	17	2	1
Apple Works	23	28	25	36	1	17	49	31
Apple Writer	16	20	14	20	1	17	31	20
Apple Writer II	9	11	11	16	1	17	21	13
Arterial Blood Gas Interpretation (Medi-Sims)	13	16	5	7	1	17	19	12
Bookends (Sensible Software)	0		3	4	1	17	4	3
Building Medical Vocabulary (Saunders)	5	6	5	7	1	17	11	7
CAI Nursing Research (Mosby)	2	2	20	29	2	33	24	15
CAI Pharmacology (Mosby)	6	7	11	16	3	50	20	13
Calculate with Care (Lippincott)	26	32	13	19	3	50	42	27
Care of Pediatric Patient with Head Injury (Educational)	3	4	0		0		3	2
Care of Patients with Diabetes (Educational)	2	2	1	1	0		3	2
Chemistry (Compress)	0		0		1	17	1	1
Chest Suction (Nursing Education Software)	1	1	6	9	1	17	8	5
Chest Physiology (Medi-Sims)	0		0		1	17	1	1
Chest Trauma Assessment (Medi-Sims)	0		1	1	1	17	2	1
Clinical Simulations (MEPC Software)	33	41	15	22	3	50	51	33
Computer Animated CPR (Debra Case)	0		2	3	0		2	1
Computer Review for NCLEX-RN (National Nursing Review)	13	16	10	14	0		23	15
Computer Simulations in Clinical Nursing (Saunders)								
Mr. Jones: Indigestion	26	32	17	25	2	33	45	29
Mr. Richardson: Newly Diagnosed Diabetes	23	28	13	19	2	33	38	24
Mrs. Shilkraut: Terminal Stages of a Malignant Disease	20	25	14	20	2	33	36	23
Mrs. Gates: First Hospitalization	19	23	14	20	2	33	35	22
Mrs. Sims: Hemorrhoidectomy	19	23	14	20	2	33	35	22
Mrs. Merra: Liver Disease	19	23	14	20	1	17	34	22
Computerized Nursing Skills Simulating (Lippincott)	9	11	10	14	2	33	21	13
CPR Drugs (Educational)	1	1	1	1	1	17	3	2
Dosecal (Mosby)	4	5	6	9	1	17	11	7
Dose Calculation (Saunders)	2	2	2	3	1	17	5	3
Drug Calculations (Computer Resources)	1	1	0		0		1	1
Drug Interactions (Saunders)	1	1	2	3	0		3	2
Elements of Medical Terminology (Applied Micr Systems)	2	2	2	3	0		4	3
Enbasic: Authoring System (Compress)	0		0		1	17	1	1
Encephalon (Andent, Inc.)	0		1	1	0		1	1
Exploring Medical Language (Mosby)	3	4	2	3	0		5	3
5 Computerized Nursing Skills Simulation (Lippincott)	10	13	7	10	1	17	18	12
Fluid and Electrolyte Expert (Saunders)	1	1	0		1	17	2	1
Food and Nutrition (Heshi Computing)	3	4	1	1	1	17	5	3
GRE (Krell)	0		1	1	0		1	1
Health Education: Measuring BP (AJN)	1	1	0		1	17	2	1
Healthy Living (Heshi)	1	1	3	4	0		4	3
Humidity Therapy (Medi-Sims)	0		0		1	17	1	1
Indirect Blood Pressure Measurement (AJN)	0		0		1	17	1	1
Infection Control (Heshi)	2	2	1	1	1	17	4	3
Introduction to: (Lippincott) Behavioral Objectives	8	10	12	17	1	17	21	13

	A		B		AB		Total Number	Percent of Total
	81		69		6		156	
Nursing Diagnosis	32	40	26	38	2	33	60	38
Nursing Orders	11	14	15	22	1	17	27	17
Patient Data	7	9	11	16	0		18	12
Patient Problems	9	11	7	10	0		16	10
Nursing Goals	11	14	8	12	0		19	12
IV One & Two (Nursing Education)	4	5	6	9	1	17	11	7
Keota (Nursing Education)	1	1	6	9	1	17	8	5
Managing Acute Problems in Patients with Chronic illness (Saunders)	2	2	2	3	0		4	3
Maternal Child Health Nursing (Lippincott)	2	2	5	7	1	17	8	5
Math Diagnostics (Krell)	1	1	0		1	17	2	1
Math Skills (EAV)	0		0		1	17	1	1
Microinstructor (Mosby)	3	4	6	9	2	33	11	7
McGraw-Hill Authoring System (McGraw-Hill)	2	2	2	3	1	17	5	3
Medical Surgical Nursing (Lippincott)	4	5	5	7	1	17	10	6
Medical Surgical Nursing II (Lippincott)	1	1	3	4	1	17	5	3
Med Math (Lippincott)	5	6	2	3	0		7	4
Mental Health Concepts (Barbara Thomas)	0		2	3	0		2	1
Metric Skills I & II (EAV)	0		0	0	1	17	1	1
Microtest (Lippincott)	12	15	7	10	1	17	20	13
Mr. Friday (Concepts Unlimited)	1	1	0		0		1	1
Mr. Jay (Concepts Unlimited)	0		0		0		0	
Nasogastric Suction (Nursing Education)	2	2	6	9	1	17	9	6
Nemas (Lippincott)	3	4	5	7	1	17	9	6
Nursestar (Mosby)	24	30	28	41	4	67	56	36
Nursing Examination Review (Addison-Wesley)	0		2	3	0	0	2	1
Nursing Management Simulations: Patients Undergoing Surgery (Saunders)	0		2	3	0	0	2	1
Nursing Research (Mosby)	3	4	12	17	2	33	17	11
Overdue Matter (EAV)	0		0		1	17	1	1
Oxygen Therapy (Medi-Sim)	2	2	0		1	17	3	2
Urinary Elimination (Lippincott)	8	10	5	7	1	17	14	9
Patients with Neurologic Problems (Lippincott)	1		1	1	0		2	1
Pediatric Nursing (Lippincott)	4	5	4	6	1	17	9	6
Pediatrics in Primary Care (Saunders)	0		0		0		0	
PFS File (Software)	7	9	15	22	1	17	23	15
Pharmacology I & II (Barbara Thomas)	0		1	1	0		1	1
Pharmacology (Mosby)	3	4	5	7	0	0	8	5
Pie Writer (Heyden)	0		0		1	17	1	1
Post Op Care Simulation (Concepts Unlimited)	0		1	1	0		1	1
Psychiatric Nursing (Lippincott)	2	2	5	7	1	17	8	5
Pulmonary Function (Medi-Sim)	1	1	3	4	1	17	5	3
Questbank (Mosby)	10	12	8	12	2	33	20	13
Reading Diagnostics (Krell)	1	1	0		1	17	2	1
Respiratory Anatomy (Medi-Sim)	0		1	1	1	17	2	1
Respiratory Expert (Saunders)	0		0		1	17	1	1
Sensible Speller (Sensible)	1	1	3	4	2	33	6	4
Sight Through Sound (Saunders	0		0		0		0	
Statistical Concepts (Heshi)	0		0		0		0	
Statistics (Human Systems)	1	1	1	1	1	17	3	2
Sugar (Nursing Education)	2	3	7	10	1	17	10	6
Superpilot (Apple)	2	3	6	9	1	17	9	6
Swan-Ganz Catheter Simulation (American Edwards-Laboratories)	2	3	2	3	0		4	3
Test Authoring Program (Addison-Wesley)	8	10	8	11	0		16	10
Test Generator (Big G)	0		1	1	1	17	2	1
Test Master (Mosby)	0		0	0	1	17	1	1
Teststar (Mosby)	10	13	12	17	3	50	25	16
Test Writer (Tommy Holton)	0		0		1	17	1	1
Thora: Assessment (Medi-Sim)	2	3	0		1	17	3	2

Note: A = Associate Degree Programs
B = Baccalaureate Programs
AB = Associate and Baccalaureate Programs

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Appendix 3

Continuing Nursing Education in Computer Technology

Master Plan for Basic Workshops
(Original Plan, 1983)

WORKSHOP #1

TITLE: Moving into the Age of Computer-Supported Nursing Education

OBJECTIVES:
- Identify impact of computer technology on society, health care, and nursing care.
- Identify major trends in nursing's use of computers in administration, practice, research, and education.
- Identify specific applications of microcomputers in education in general and nursing education in particular.
- Apply a model for systematic implementation of computer-supported education.
- Recognize problems and issues inherent in computer implementation.
- Describe basic components of a computer system.

TOPICS:
1. Computerization: A Society in Transition
2. Computers in Health, Education, and Nursing
3. Systematic Implementation of Computer-Supported Education
4. Concurrent Sessions
   - Basic computer literacy
   - Tour
   - Hands-on Experiences
5. Facilitating Computer Implementation
6. Implementation: Establish the Need
7. Implementation: Administrative Considerations
8. Implementation: Faculty Development
9. Future Visions - Future Offerings

WORKSHOP #2

TITLE: Computers as Instructional Tools

OBJECTIVES:
- Identify advantages and disadvantages of microcomputers as instructional devices.
- Describe applications and potential uses of computers in nursing education.
- Delineate factors to consider in setting realistic goals for computer utilization.
- Examine existing computer programs appropriate to nursing education.
- Determine factors influencing decisions about computer hardware and software.

TOPICS:
1. Nursing Education Applications: The State of the Art
2. Computer Implementation: Getting Started
3. Getting Started: Software Decisions
4. Concurrent Sessions
   - Available Nursing Programs (Demonstration and Lecture)
   - Basic Computer Literacy (repeat from Basic Workshop #1)
   - Hands-on Experiences
5. Getting Started: Hardware Decisions
6. Getting Started: Faculty Involvement
7. Getting Started: Some Success Stories
8. Emerging Needs
9. Planning for continued implementation

WORKSHOP #3

TITLE: Software Selection, Production, and Evaluation

OBJECTIVES:
Identify factors to consider in selecting instructional software.
Delineate computer program characteristics that facilitate learning.
Articulate the pros and cons of developing computer programs using local resources.
Describe the process of developing computer programs.
Identify ways the computer can be used as an instructional design of evaluation tool.
Formulate an approach to evaluating computer software.
Recognize legal and ethical issues related to publications of computer programs.

TOPICS:
1. The Instructional Interaction–How People Learn from Computers
2. Selecting Software that Facilitates Learning
3. Modifying Programs to Meet Learning Needs
4. Developing Instructional Programs: The Pros and Cons
5. Program Development: Process, Decisions and Designs
6. The Computer as an Instructional Design Tool
7. The Computer as an Evaluation Tool
8. Evaluation of Computer Programs
9. Ownership and Publication of Computer Programs
10. Planning for Computer Implementation and Program Development

WORKSHOP #4

TITLE: Special Computer Applications in Nursing Education

OBJECTIVES:
Describe diverse instructional uses of the computer.
Relate databases, electronic spread sheets, and word processing programs to instructional needs in nursing.
Formulate plans for implementing specific applications in nursing education.
Identify computer applications that interact with other media.
Identify curriculum problems and issues relative to computer applications.

TOPICS:
1. Expanding the Instructional Capabilities of Computers
2. Database Information Systems for Nursing
3. Electronic Spreadsheet Applications in Nursing
4. Special Applications of Word Processing in Nursing Education
5. Computer Courses within Nursing
6. Interaction of Computers with Other Media
7. Integrating Diverse Types of Computer Programs Within Nursing Curricula
8. Expanding Computer Implementation

WORKSHOP #5

TITLE: Managing Computer-Supported Education

OBJECTIVES:
Identify problems and issues in managing computer-supported instruction.
Assess barriers to computer integration within nursing education.
Describe research on effectiveness of computers in health care, education, and nursing.
Identify cost and learning effectiveness of computerized instruction.
Recognize management principles inherent in managing computer-supported nursing education.

TOPICS:
1. Managing Computer-Supported Nursing Education Successfully.
2. Getting the Most from Available Resources.
3. Diversifying the Use of Computers in Nursing
4. Creative Applications of Computers.
5. Computer Impact: Changing Role of the Nurse.
6. Computer Impact: Changing Role of the Educator.
7. Educational Administrative Programs.
8. Nursing Information Systems.
9. Effectiveness of Computerized Instruction.

Appendix 4

Continuing Nursing Education in Computer Technology

A Master Plan for Basic Workshops
(Revised April 1987)

WORKSHOP #1
Facilitating Computer-Supported Nursing Education
Why, Where, and How To Begin

OBJECTIVES

Identify impact on society, health care, and nursing care.
Identify major trends in the use for nursing administration, practice, research and education
Apply model for systematic implementation.
Describe applications and potential uses.
Recognize implementation problems and issues.
Determine factors influencing hardware and software decisions.

CONTENT

Computerization: Society, Health Care, Nursing Practice, and Education in Transition
- Overview—History of computers
- Uses in society
- Impact on nursing practice and education

Systematic Implementation of Computer-Supported Education
- A model for systematic implementation of computer-supported nursing education

Computer Implementation: Getting Started
- Key factors
- Setting realistic goals
- Organizing resources

Software Hardware Decisions
- Options
- Location
- Support services
- Security factors
- Personnel

Faculty Involvement
- Commitment
- Access
- Training
- Incentives

Implementation Issues and Problems
- Equipment
- Access
- Training
- Resources

WORKSHOP #2
Computers As Instructional Tools

OBJECTIVES

Identify advantages and disadvantages.
Identify software considerations.
Delineate characteristics that facilitate learning.
Formulate an approach for software evaluation.
Examine existing programs.
Consider pros and cons of developing your own software.
Observe legal and ethical practices related to ownership and publication.

CONTENT

Nursing Education Applications
- Computer-assisted instruction
- Computer-managed instruction
- Educational effectiveness
- Specific applications

Software Selection
- Characteristics of quality software
- Available nursing applications
- Compatibility: equipment, curriculum, users

Software Evaluation
- Criteria
- Peer review system
- Learner interaction
- Forms

Software Development
- Advantages and disadvantages of developing own programs
- Selection of content
- Necessary resources

Legal and Ethical Issues of Computer Programs
- Copyright
- Contracts
- Institutional policies
- Faculty rights

WORKSHOP #3
Special Computer Applications in Nursing Education

OBJECTIVES

Describe diverse instructional uses.
Identify ways to use the computer for instruction and evaluation.
Integrate computer applications within the curriculum.
Identify cost and learning effectiveness of computerized instruction.

CONTENT

Computer-Supported Nursing Education: Expanding the Applications
- Generating information
- Research
- Increased productivity

Nursing Information Systems
- Existing databases
- Electronic bulletin boards

Computers as Instructional Tools
- Design considerations (graphics, slides, transparencies)
- Evaluation purposes
- Philosophical and ethical issues
- Interaction with other media

Integrating Diverse Computer Applications in the Nursing Curriculum
- Faculty acceptance
- Testing the new approaches
- Cost/benefits analysis
- Learner/benefits analysis

Appendix 5

Model for Systematic Implementation of Computer-Supported Nursing Education

1. Establish need

   The need for computer-supported nursing education will be evident when it meets local educational needs and provides learning opportunities beyond those currently available. Basic knowledge about computers and their operation is essential for understanding computer applications in nursing education.

2. Organize early adopters

   Faculty involvement is essential for computer integration within the curriculum. Change is facilitated by early involvement of individuals who have demonstrated interest in computers.

3. Survey local computer resources

   Knowledge about local computer resources and applications is vital to establishing support for school of nursing computer utilization.

4. Establish computer-user support group

   The ever-changing nature of computer technology and of educational applications demands continual sharing of information. Support groups help to keep individuals informed of evolving changes.

5. Conduct faculty development sessions

   The more knowledgeable faculty are about computers the less threatened they will be by them. Faculty understanding is essential to successful use of computers for educational purposes.

6. Determine faculty and administrative commitment

   Faculty and administrative commitment to the use of computers is necessary if computer use is to be schoolwide. Administrative commitment of capital and staff resources is essential. Adequate faculty time to select/develop/modify programs is paramount to successful computer use within a curriculum. Faculty incentives and rewards influence personal development productivity.

7. Determine curriculum applications

   Multiple educational applications are possible within the various components of nursing education. Goals and operational objectives that clearly define the mission of computers within the overall educational program must be established. Potential computer applications need to be assigned priorities based on curriculum needs and the resources available to implement them.

8. Selection of hardware and software

   The purposes for which the computer will be used determine the types of hardware and software needed. Purchase decisions about hardware and software need to be based on selection criteria and on plans for user interaction.

9. Plan for user interaction

   How computer resources will be made accessible to learners' use must be determined. Users need to be motivated to use computers and be provided guides to facilitate ease of learning. User orientation and ongoing assistance are essential in maintaining proper and effective use.

10. Manage computer support services

    Organizational resources are needed to keep the computer support system functioning efficiently and effectively. Funds must be budgeted annually for computer personnel, materials, equipment, and maintainance.

11. Evaluate benefits and effectiveness

    Continuation of computer development and use is dependent upon cost and benefits. Documentation of costs and of benefits gained in terms of time, productivity, learning, and/or better use of resources is vital for continued growth and sustained use.

12. Expand computer applications

    Computer-supported education will continue to grow. Computers will be used in conjunction with other technologies to strengthen learning. New, innovative applications of computers in nursing education will be forthcoming. Computers will change the way nurses work and learn in an information society.

Appendix 6

Basic Workshop Participant's Profile

* Name of participant_____ Title _____

Name & address of school _____ Telephone ( )_____

_____

_____

Type of Nursing Program(s) at your institution:

_____ AD
_____ Baccalaureate
_____ AD/Baccalaureate

1. My reason for coming to this workshop is:

2. My primary relationship with computers in my school is: (Select best response)
   _____ Dean/Director of School of Nursing
   _____ Director/Coordinator of Media or Learning Resources
   _____ Nursing Faculty Member
   _____ Media Personnel
   _____ Computer Programmer
   _____ Computer Coordinator
   _____ Other-please specify _____

3. Check the phrase which best describes your present level of computer expertise. (Check only one)
   _____ Unfamiliar with computers
   _____ Have beginning familiarity with computer literacy
   _____ Can operate the computer (load and run some programs)
   _____ Can load and run most computer programs
   _____ Able to instruct others in the use of computers
   _____ Have beginning programming skills
   _____ Can write nursing programs
   _____ Am experienced nursing programmer
   _____ Other-please specify _____

4. Which of the following statements is/are true for you? (Check all that apply)
   _____ Used a computer as part of my course work as a student
   _____ Own a personal computer, use it at home
   _____ Own a personal computer, use it at work
   _____ Use a school-owned personal computer at work
   _____ Use a mainframe computer at work
   _____ Use a minicomputer at work
   _____ Assign/expect nursing students to use the computer as part of nursing course work
   _____ Assign/expect nursing students to use the computer in the clinical setting
   _____ Am developing a computer literacy course for nursing students
   _____ Am teaching a computer literacy course to nursing students
   _____ Am developing computer programs for use by nursing students
   _____ Am developing computer programs for sale, eventually to a publishing firm
   _____ Other-please specify _____

5. Does your university or college have microcomputers available for use by students enrolled in majors other than nursing (e.g., math, science, engineering)?	YES ___	NO ___	DON'T KNOW ___
6. Do nursing majors at your school receive any of their pre-nursing or non-nursing instruction through the use of microcomputers?	YES ___	NO ___	DON'T KNOW ___
7. Do nursing majors at your school receive any of their nursing instruction through:			
a. microcomputers?	YES ___	NO ___	DON'T KNOW ___
b. minicomputers?	YES ___	NO ___	DON'T KNOW ___
c. mainframe computers?	YES ___	NO ___	DON'T KNOW ___
If yes, please identify the number of undergraduate nursing courses that require students to use a computer.			

*Responses are confidential. No individual or school will be identified by name in any report of this project.

8. Do staff nurses in the clinical agencies used by your school of nursing use computers for nursing purposes on a regular basis, e.g. order entry, nursing notes, care plans, scheduling, lab reports? YES NO DON'T KNOW

If yes, what percent of these clinical agencies currently expect staff nurses to use computers for nursing purposes?

None	51-70%
1-10%	71-90%
11-30%	91-99%
31-50%	100%

9. Do your nursing students use computers in the clinical agencies during their clinical learning experiences? YES NO DON'T KNOW

10. Does your nursing program currently have its own microcomputers available for instruction in nursing courses? YES NO DON'T KNOW

If yes, please identify where the microcomputers are located that support instruction in nursing courses:

	Name (Apple, etc.)	Number
Within Nursing bulding		
Part of campus computer facility		

11. If you do not have computers available now, do you expect to have microcomputers available for nursing instruction within the next year? YES NO DON'T KNOW

If expected, please identify:

Name (Apple, etc.)	How Many?

12. Does your school of nursing have microcomputers available for indirect instructional uses, e.g, administrative? YES NO DON'T KNOW

If yes, what indirect instructional uses are being made of microcomputers in your school?

- Word processing
- Student data/records
- Electronic spreadsheets
- Calculation of grades
- Preparation of graphics transparencies slides
- Test scoring/grading
- Recruitment data
- Test construction
- Generation of reports
- Forecasting/projections
- Data management
- Data analysis
- Authoring programs
- Others—please specify

13. What percentage of your undergraduate nursing programs is currently taught through the use of microcomputers?

None	Between 51% and 75%
Less than 5%	Between 76% and 95%
Less that 25%	Between 96% and 100%
Between 25% and 50%	

Appendix 7

Plan to Enhance Computer-Supported Education

DIRECTIONS: By responding to each of the items below, develop a plan to enhance the utilization of computers in your School of Nursing during the next six months as a result of your participation in this basic workshop. **All information will be kept confidential. No individual or institution will be identified in any report.**

Name of institution: _____

PROBLEM OR NEED (Identify a problem or need related to the implementation of computer-supported education which you would like to resolve/meet in the next six months.)

STATE OF AFFAIRS (Briefly describe what the problem/need is like at this particular time.)

PROPOSED OBJECTIVES (State in measurable behavioral terms what you hope to accomplish in the next six months.)

PROPOSED ACTIVITIES (Describe what you intend to do to achieve **each** objective listed above.)

RESOURCES (Describe what resources--local or national—you think you might use to help you accomplish each objective listed above.)

DIRECTIONS: Please complete one page for EACH of your objectives. tives. Use back of page or attach additional pages if needed. *All information will be kept confidential.*

Six Month's Progress Report

YOUR ORIGINAL OBJECTIVE: (Please copy in this space one of the original objectives from your "PLAN TO ENHANCE COMPUTER-SUPPORTED EDUCATION" form.)

Has this objective changed in the last six months? Yes____No____If yes, please restate new objective here:

ACTIVITIES	RESOURCES	DOCUMENTATION/ EVIDENCE	UNINTENDED OUTCOME(S)	FACILITIES	DIFFICULTIES
Describe what was done to achieve this objective:	Describe what resources you used to achieve this objective:	Describe what evidence (outcomes) you have to document the accomplishment of the objective:	Describe what unintended outcomes emerged:	Describe what facilitated your achievement of this objective:	Describe what difficulties you encountered in attempting to achieve this objective:

Developed by Kathleen J. Mikan, 1978.