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ABSTRACT

This report provides a summary of the activities of the Continuing Nursing Education in Computer Technology project conducted by the Southern Regional Education Board (SREB) in response to changes created by microcomputer use in health care. In addition to a discussion of the workshops offered to nurse educators, an outline of project outcomes is provided which includes the establishment of a computer software inventory, a professional directory, and regional and local information networks. The statistical results of the 1990 survey of computer use in SREB states are also presented, along with a statement on student attitudes toward computer assisted instruction and a discussion of project evaluation. Recommendations for future regional activities are noted. The appendices contain master plans for teacher workshops, implementation activities, a software evaluation tool, and the statistical summaries. (DB)

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**Continuing Nursing Education
in Computer Technology
A Regional Experience**

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Continuing Nursing Education in
Computer Technology
Grant # D10NU24198**

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INTRODUCTION

In 1983, the Southern Council on Collegiate Education for Nursing (SCCEN), in affiliation with the Southern Regional Education Board (SREB), responded to the challenges of rapid changes created by computer use in the health care delivery systems and on college campuses with a regional proposal to help nurse educators become more proficient computer users. The need for the regional activity was apparent in the informal discussions during a conference sponsored by the University of Texas at Austin in early 1983, more focused presentations at the 1983 annual meeting of SCCEN, and the results of a survey of college-based nursing programs in the SREB-member states (*Alabama, Arkansas, Florida, Georgia, Kentucky, Louisiana, Maryland, Mississippi, North Carolina, Oklahoma, South Carolina, Tennessee, Texas, Virginia, West Virginia*).

In March 1985, the proposed project--*Continuing Nursing Education in Computer Technology*--became a reality when the Division of Nursing, Health Resources and Services Administration, U. S. Department of Health and Human Services, awarded a three-year Nursing Special Project grant to the Southern Regional Education Board. An extension of this grant in March 1988 allowed the regional effort to continue another two years.

Since 1985, the *Continuing Nursing Education in Computer Technology* project has conducted over 40 basic workshops, 3 regional conferences, and 12 seminars to help nurse educators in the 15 SREB states become competent in the use of computers and to promote the incorporation of the computer into the nursing curriculum. The project objectives were to:

Promote systematic implementation of computer-supported education in nursing.

Provide basic decentralized continuing education workshops for faculty with little or no experience with computer technology.

Establish regional and local networks for sharing computer-related information in the region.

Conduct assessments of regional needs for computer programs to support the curriculum in associate and baccalaureate nursing programs in the region.

This publication provides a summary of project activities, including the statistical results of the 1990 survey of computer use in SREB states, and recommendations for future regional activities.

SCOPE OF WORK

Basic Workshops

A master workshop plan provided the conceptual framework for each of the five basic workshops conducted at six host institutions. A modified plan (Appendix 1), based on recommendations of the coordinators during the implementation of the original plan, was built around three instead of five basic

encouraged faculty participation in the design of a *systematic* plan. The six coordinators at the host institutions were available for phone consultation as needed between workshops.

Table 1

Profile of 440 Nurse Educators

	% Yes Responses
Computer Experience	
Can operate a computer	36
Beginning familiarity with computers	26
Unfamiliar with computers	13
Can load/run most programs	9
Beginning programmer	9
Computer Use	
Use institution's microcomputer at work	49
Own a microcomputer and use it at home	41
Own a microcomputer and use it at work	20
Use mainframe at work	12
Expect students to use computers for class	34
Expect students to use computers for clinical	12
Have developed computer programs	11
Have developed "computer literacy" course	8
Teach "computer literacy" course	3
Primary Role at Institution	
Nursing faculty	86
Chief administrative officer (nursing education)	6
Computer coordinator	3
Director of learning resource center	2
Media personnel	1

Generally, participants indicated that hardware, software for instructional purposes, support services, faculty and administrative commitment, faculty development, and faculty release time were needed or should be increased. A lack of equipment and support services was evident in most descriptions of the *state of affairs*. Hence, a majority of the objectives centered on the acquisition of equipment and faculty development activities. Although six-month progress reports indicated that some nurse educators were unable to achieve stated objectives, enthusiasm and interest in project activities remained high. The

workshops. This plan was implemented at three of the host institutions during the extension period (1988-90).

The workshop objectives addressed major implementation issues related to computer use in nursing education, for example, resources, faculty development, support services. 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 computer use by nurse educators for administrative, educational, and research purposes.

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.

Although the workshop structure varied, a key activity of the basic workshops at all host sites was the *hands-on* experiences. The hands-on experiences were planned to give faculty an opportunity to experiment with computers, to observe others use the equipment, and to review selected computer software in a nonthreatening environment. Participants gave a high rating to this feature. Since access to computer equipment at the host institutions was limited, the team approach, i.e., two to three participants at one computer, was used. This strategy was an effective way to assist individuals who were hesitant to use computer equipment.

The level of computer-related experience of most participants was higher than that predicted in 1983. A profile, developed in 1985, showed that most of the 440 nurse educators who provided information about their computer skills and experience could operate a computer or had beginning familiarity with computers (Table 1). Many of the nurse educators owned and used microcomputers at home. Nearly half (49 percent) used the microcomputer at work. Nevertheless, many of these individuals participated in the basic workshops, which were designed for faculty with little or no experience, to reaffirm their knowledge and skills and to "network" with other colleagues across the region.

Before leaving each workshop, participants developed a plan for beginning (or building upon) computer-related activities within their respective settings. Each participant attending the first workshop completed a form that served as a guide for planning the local activities. The 12 critical actions (Appendix 2), identified by Kathleen J. Mikan, Project Consultant, provided the conceptual framework for the plan.

The plan presented the problem to be resolved, a description of the current *state of affairs* related to the specified problem, statements (in behavioral terms) of objectives to be accomplished during the specified time frame, and a description of activities and available resources to achieve each objective. The development of the plan promoted faculty involvement and commitment to the regional project and

pressures of teaching loads and financial constraints were frequent reasons given for not achieving stated goals.

The workshop design was based initially on the anticipation that a team, up to three faculty from each nursing program, would attend the entire series. However, the constraints of time and budget prevented strict adherence to this design. In most cases, different nurse educators (frequently from the same institution) participated in the workshop series. Applications exceeded the number of participants that could be accommodated by the six host institutions during the 1985-88 period. However, attendance decreased during the extension period. A number of uncontrollable variables caused this decline in attendance, for example, financial constraints, release time. Of approximately 5,000 nurse educators in the 15 SREB states, over 1,200 participated in one or more of the basic workshops during the five-year period.

Seminars

During the five-year period, 10 seminars were held for faculty with experiences in using computers. The seminars addressed some of the critical issues related to software development, selection, and evaluation, communication systems, computer-assisted instruction, and data base management. Discussions at the seminars resulted in a number of unanticipated outcomes, for example, a software evaluation tool, a definition of quality software, and a resource directory.

Each seminar, planned for 20 participants, was held at selected institutions across the region. The following institutions were host sites: Alcorn State University (Natchez, Mississippi), Louisiana State University Medical Center (New Orleans), Troy State University (Montgomery, Alabama), University of South Carolina at Aiken, and the University of Texas at Austin; two seminars were held at SREB headquarters in Atlanta.

Collectively, over 200 nurse educators attended the seminars over the five-year period. The evaluations were positive and substantiated the need for focused continuing education activities that provided demonstrations and hands-on experiences.

Conferences and Symposia

The project sponsored three regional conferences and two symposia. (The latter were designed for the chief administrative officer of the nursing programs.) These activities provided opportunity for nurse educators to address computer-related issues and concerns with colleagues in formal and informal settings. They shared experiences regarding the appropriate use of computers in conjunction with other technologies in the nursing curriculum and discussed the influence of computers on quality and efficiency in a nursing program.

Conference speakers included nurse educators on the cutting edge of computer technology. Among the speakers were: Donna Larson (Michigan), Carol Romano (Maryland), Kathleen J. Mikan (Alabama), Susan Grobe (Texas), Sheila Ryan (New York), Virginia Saba (District of Columbia), Dianne Skiba

(Massachusetts), Judith Graves (Utah). These individuals, and many others, challenged nurse educators to become *drivers of the technology*.

Collectively, over 300 nurse educators attended the regional conferences; approximately 250 participated in the symposium for the deans and directors. Again, the overall evaluation ratings were high.

SELECTED OUTCOMES

Definition of Quality Software

During a seminar in 1986 at Alcorn State University 60 nurse educators agreed that a standard tool for software evaluation was needed and that a definition of *quality software* was a critical factor in the development of a tool. This group, and later, nurse educators across the 15 SREB states, adopted the following definition of quality software:

... 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.

Software Evaluation Tool

The need for standard criteria to assess the computer applications became apparent at the first basic workshop. A number of forms (of varying length and content depth) were available for use (or modification). However, most faculty agreed that purchase decisions were based too often on informal and disorganized evaluations. The work on developing a software evaluation tool, which was begun during the 1986 seminar, was completed in 1987. The final outcome of this seminar (Appendix 3) represented the thinking of nurse educators throughout SREB states. The tool was widely distributed for review and was published in the *American Journal of Nursing* (February, 1989).

Resource Directory

A directory was published in 1986 to help nurse educators develop linkages with their colleagues across the 15 SREB states. The *Directory*, listing over 100 nurse educators, provided information about persons in SREB states who used computers for personal and professional purposes. It was updated annually to reflect the changes in each citation regarding special computer interest or experiences and to add new citations.

Software Inventory

Ideally, the purposes of computer use dictate the type of equipment (software and hardware) needed. Workshop speakers urged participants to base their decisions on sound rationale specific to the needs of a particular institution rather than marketing "hype" and efforts to *keep up with everyone else*.

Nevertheless, the question most frequently asked at project-sponsored activities was: *What is the best software to buy?* Project staff decided to find out *what* faculty were recommending for purchase. A questionnaire, listing 119 programs in 1987 (and nearly 200 in 1989), was mailed to the chief administrative officer of nursing at 436 institutions. The list, by no means exhaustive, was compiled from assorted references, including the *1988 Directory of Educational Software for Nursing* by Christine Bolwell.

The results of both surveys indicated that the nursing programs owned and used a variety of software packages. Several institutions had extensive holdings--more than 100 different applications; however, the holdings at most institutions numbered between 2 and 15. Only 22 of the applications listed on the 1989 questionnaire were not available at any of the institutions. (Most of these applications [N=16] were for non-instructional purposes.)

When 1989 and 1987 data were compared, a slight decrease was observed in responses for some applications at 20 percent (or more) of the institutions (Table 2).

Table 2

Selected Software Holdings at 20% of the Institutions
(Percentage of Responses)

	1989	1987
N=	135	156
Calculate with Care	24	27
Computer Simulations Volume 2	33	20
Computerized Nursing Skills:		
Taking Blood Pressure	24	0
Calculating Medication	25	0
Testing Urine	22	0
Preparing Insulin	25	0
Introduction to Nursing Diagnosis	34	38
Maternity Nursing Simulations I	30	0
Medical Surgical Nursing Simulations	23	6
Nursestar	33	36

In most cases, the extent of software use was minimal. Of 120 educational applications for nursing, only 20 were rated 4 or 5, that is frequent use, by at least 25 percent of the educators (Table 3). Most ratings were either 1 or 2--signaling minimal use.

Table 3

**Selected Software Rated 4 or 5 by at Least 25% of the Institutions
(Percentage of Responses)**

	1989 N= 135
CAI Pharmacology	40
Clinical Simulations Pharmacology	38
Computer Simulations Volume 2	33
Computerized Nursing Skills: Taking Blood Pressure	25
Fluid and Electrolyte Expert	50
Food and Nutrition	33
Infection Control	50
Managing Patients with Neurological Problems	25
Maternal Child Health Nursing	33

Telecommunications

In 1988, a survey of computer communications systems was conducted to determine the availability and accessibility for nurse educators. The results indicated that access to the systems was limited. A majority of nurse educators at 34 of the 70 institutions that responded did not use the system (Table 4). However, the nurse educators recognized potential uses for a system at the regional level (Table 5).

Table 4

**Communications Systems: Extent of Use by 34 Nursing Programs
(Percentage of Responses)**

	None	Somewhat	Moderate	Great
Electronic mail	54	30	7	3
Instruction	66	15	13	7
Messages	58	15	3	2
Transfer of files	51	21	3	6

Table 5

Computer Communications: Potential Regionwide Uses
(Percentage of 34 Nursing Programs)

	None	Somewhat	Moderate	Great
Software reviews	6	12	30	50
Announcements	11	20	35	27
Faculty vacancies	19	30	27	19
Enrollment/graduation patterns	8	20	33	30
Share CAI	6	23	26	58
Share research:				
Findings	11	19	22	64
Projects	11	19	25	48

The existing electronic bulletin boards at the University of Southwestern Louisiana (Lafayette), University of Texas at Austin, and University of Texas at Galveston will be important links to future developments at the regional level. The University of Southwestern Louisiana College of Nursing started its electronic bulletin board in 1987 to facilitate the exchange of computer-related information among nurse educators within SREB states, e.g., information about software reviews and computer-assisted instruction used by faculty in the College of Nursing. The electronic board at the University of Texas at Austin School of Nursing began operating in 1988. It is actually an international board that facilitates communication among numerous points in the United States, South America, and Canada. The University of Texas School of Nursing at Galveston has provided this medium of expression and education for students and faculty since 1986. (Appendix 4 contains the parameters for the three electronic boards.)

Expected Computer Competency

Forty nurse educators were challenged to think carefully about the nature and purposes of courses in which computers will be used for instructional purposes during the 1988 seminar at Troy State University. Attention was directed toward the relationship between desired learning outcomes and modes of computer delivery. As a result, these educators formed work groups during the seminar and developed five or more statements that reflected their perceptions of the computer-related behaviors expected of undergraduate nursing students.

The reports were compiled into the eight statements and mailed to the 40 seminar participants and the chief administrative officer of nursing at 436 institutions. Over 103 nurse educators, representing 52 four-year and 45 two-year institutions in the 15 SREB states, provided feedback about the stated computer competencies. Reactions varied from . . . *competencies are realistic expectations for entry-level practitioners to work in today's world* to . . . *competencies were written at a level too high for generic*

nursing students. Generally, the reactions indicated concerns about the appropriateness of some competencies for baccalaureate and associate degree graduates. The following statements of competency resulted from a synthesis of the feedback:

Identify the historical evolution of technology on information processing in nursing.

Discuss the function, benefits, and trends of computer technology in nursing and health care.

Demonstrate knowledge of relevant legal, ethical, and professional issues related to computer applications in nursing and health care.

Use information resources and information-handling tools to support personal, scholarly, and practice activities.

Use a variety of computer hardware and software for instructional, research, and practice purposes.

Maintain integrity and security of data files.

The kinds of learning experiences planned and implemented to help students become competent computer users will vary according to the level of the program and the approaches faculty select to place specific computer-related content in the curriculum. It is anticipated that the statements will complement existing frameworks and assist faculty in establishing parameters for learning experiences that are congruent with program goals and resources. The challenge to nurse educators, according to one dean, is to provide positive experiences for faculty so that they value these objectives enough to make computer technology an integral part of instruction instead of isolating the technology in a laboratory or separate course.

Computerized Test Bank

The *idea* for establishing a computerized test bank emerged during the seminar at Troy State University. The participants believed the development of a test bank at the regional level warranted exploration. Following the seminar, project staff discussed the advantage and disadvantages of the proposed action with several nurse educators who were knowledgeable about test construction and technology. Although the idea did not become a reality during the project period, its relevance to nursing education cannot be ignored. It is anticipated that this will be a component of any ongoing regional computer-related activity. As one consultant pointed out, the underlying philosophy for test construction must be explored so that the technology can be used judiciously. Faculty will need to re-think their approaches to test development before considering the use of the technology. The *re-thinking process* can result in stimulating and productive faculty development endeavors at the regional level.

Inventory of Student Attitudes

Computer-assisted instruction (CAI) has considerable potential as an instructional medium, though it is not suitable for *all* students. Budgetary constraints and acceptable software are among the major reasons cited for the lack of use. Another factor that warrants attention is the attitude of users. Four

nurse educators in the South agreed to invite senior level nursing students in undergraduate programs to participate in a study. (Participation was voluntary and unrelated to any course requirements.) The *Attitude Toward CAI Tool*, developed by Lois Ryan Allen (Widner University, Chester, Pennsylvania) was used to measure the meaning computer-assisted instruction had for nursing students at four institutions. David Bennett (Kennesaw College, Kennesaw, Georgia), who used this tool in another study, assisted with the data analysis.

Collectively, 227 students returned the questionnaire; 77 percent completed the section related to CAI attitudes. The findings indicated a more positive evaluation of the functional capabilities and less positive evaluation of the creative aspects and personal comfort with CAI use. (A range of 14 to 98 points was possible, with a score of 14 being least favorable. The mean score of three subscales was 68.58. This score occurred at the 69.9 percentile of possible scores. The mean scores for the three subscales [comfort, creativity, function] were 66.4, 64.1, and 76.3 respectively.)

The impact of the level of computer development and use in the nursing program on student CAI attitudes, though not a variable considered in this inventory, should not be ignored. Nearly half of the students reported that they used computers in nursing courses (Table 6). Most students used computers primarily to prepare papers (32 percent). Less than 10 percent of the students used computers for skills or simulations.

Only 24 percent of the students owned or had access to a microcomputer at home. Less than one percent used a microcomputer *almost every day*; most reported *less than once per week* (47 percent) or *not at all* (41 percent).

Table 6

Computer Use in Selected Courses

	% of 277 Responses
Nursing	49
Biological sciences	19
English	15
Mathematics	11

ASSESSMENT OF COMPUTER USE

In addition to the continuing education activities, the project staff conducted an annual assessment of computer use in nursing education. The annual survey, conducted first in 1985 in the 15 SREB states to establish a baseline, was replicated throughout the nation. Since 1987, a 55-item questionnaire has been mailed to the chief administrative officer of nursing programs at 1,311 institutions of higher education across the nation, including 436 institutions in SREB states.

The overall national response rate to the 1989 survey was 39 percent, with returns from 49 states; the response rate for the 15 SREB states was 48 percent. Since the same questionnaire was administered four times in SREB states during the five-year project period, it was possible to compare the responses from the 1989 data with those from 1985. (Of the 210 questionnaires returned in 1989, 119 were from institutions [54 four-year and 64 two-year] that participated in the 1985 survey.)

Although data were analyzed by type institution (four- or two-year) and revealed differences in percentage of responses, statistical significance was not determined because any number of variables--other than type institution--may have contributed to the differences.

Summary of Returns*

	1985	1987	1988	1989
2-year (N=245)	194	150	103	107
4-year (N=191)	130	113	95	103

**Number of institutions*

A summary of the aggregate compilations for the returns from institutions in SREB states follows. The statistical summary includes aggregate compilations for each of the four years (Appendix 5) as well as by type institution and region, i.e., non-SREB and SREB states (Appendix 6), and the controlled group (Appendix 7).

Access and Availability

The adequacy of and access to computer resources are critical determinants of computer use in nursing education. The results of four surveys documented the availability of microcomputers for undergraduate (nursing and non-nursing) student use and for instructional purposes in pre-nursing, non-nursing, and nursing courses. Overall, comparison of the 1989 data with 1985 data revealed definite improvement in access to computers for faculty, students, and staff. When the data were controlled for 119 institutions (institutions participating in both the 1985 and the 1989 surveys), a slight increase was noted. Few institutions reported plans to purchase or expand existing computer resources for instructional purposes.

- The number of nursing majors using microcomputers for pre-nursing instruction increased over the four-year period.
- The percentage of responses regarding access to microcomputers was higher in 1989, with one exception, than in previous surveys. In contrast, access decreased slightly in all categories when the 1989 data were controlled and compared with 1985 data.
- The availability of computers in the nursing education facility increased slightly in 1989. Comparison of 1985 with 1989 data, while controlling for 119 institutions, revealed slight increases, which may represent the projections made in 1985.
- Only 5 percent of the responses from institutions where computers were *not* available indicated plans for initial purchases within the year. Of the 148 programs with existing computer resources, only 27 percent planned to expand. When the data were controlled for 119 institutions, comparison of 1989 and 1985 data revealed that in 1985 a higher percentage of the institutions planned to make initial purchases.

Major Uses and Purposes

The top five computer uses, purposes, and nursing-related content areas remained constant over the five-year period. Slight increases in percentage of responses were observed in most categories. When the data were controlled and compared, a decrease was observed in the percentage of 1989 responses that specified tutorials and simulations as a major type of learning activity. However, there was an increase in the 1989 responses for testing, word processing, games, statistical analysis, and interactive videodisc.

- The top five non-instructional computer uses were: word processing, student records, calculation of grades, test scoring, and test construction.
- Computers were used primarily to enrich and supplement learning experiences in the classroom and clinical settings.
- The top five learning activities were: tutorials, drill and practice, simulation, testing, and word processing.
- Less than five percent of the undergraduate nursing curriculum was taught with microcomputers (or mainframe computers).
- Of 24 possible nursing-related content areas taught, in whole or in part, with microcomputers, the top five were: calculations, clinical case studies, adult nursing, maternity nursing, and the nursing process.
- A majority of the responses indicated that staff nurses in the clinical agencies used by undergraduate students were expected to use computers for nursing purposes.
- Less than 50 percent of the undergraduate student enrollment was expected to use a computer in clinical facilities.
- A majority of the college-based nursing programs were not involved at all in six of the 29 items related to the key implementation activities of evaluation (cost effectiveness and cost benefits), provision of incentives, and expanded use of the technology.

When the data were controlled for type institution, the results indicated that the percentage of responses from the four-year institutions were higher than those from two-year institutions relative to availability

of, access to, and major uses of computers. Slight differences--the majority less than 10 percent--occurred in the responses elicited in SREB states and in non-SREB states.

PROJECT EVALUATION

How did nurse educators perceive the influence of computers and, more specifically, the effect of project activities on their teaching behaviors? A questionnaire, designed to elicit the perceptions of individual faculty who participated in project activities, was mailed to over 800 faculty. The form included a rating scale (0 = not at all true; 6 = great) for faculty to use in reporting their perceptions. The same questionnaire (with appropriate editing) was mailed to the chief administrative officers of the nursing programs to obtain their perceptions of how faculty used computers. The response rate, less than 25 percent for both groups, represented 169 institutions. (Appendix 8 contains a statistical summary of the responses.)

Opinions About Selected Project Activities

The ratings (Table 7) indicated that faculty believed the materials were relevant and that the activities afforded networking opportunities. A majority of the faculty indicated the project activities helped them become computer competent and to learn more about computer technology. On the other hand, the project did not prompt faculty to develop software for local use or commercial purposes. These reactions were consistent with unsolicited faculty feedback at workshops and conferences.

Table 7

Faculty Ratings of Selected Activities (Percentage of 148 Responses)

*Rating:	0	1	2	3	4	5	6
<i>Project provided:</i>							
Relevant publications?	4	4	12	35	48	51	38
Networking opportunities?	5	3	5	14	22	26	22
Software evaluation tool?	2	2	6	11	18	30	28
<i>Project influenced:</i>							
Computer competence?	3	2	4	12	24	24	30
Software development?	49	7	9	11	7	9	5

*0 = not at all; 6 = great

Promotion of Computer Use

It was anticipated that faculty attending the various project activities would use the experiences to facilitate computer use in the nursing program. The evaluation results indicated that most of the faculty participants had engaged in some local activities to promote computer use (Table 8). The percentage of faculty who had *not* attended other computer-related workshops or national meetings may reflect the significance of the project for faculty. A majority of the faculty did not hold membership in local support groups or the professional computer-related groups, for example, the American Nurses' Association (ANA) Council, National League for Nursing (NLN) Council, Association for the Development of Computer-Based Instructional Systems (ADCIS).

Table 8

Faculty Activities To Promote Computer Use (Percentage of 148 Responses)

<i>*Rating:</i>	0	1	2	3	4	5	6
<i>Faculty:</i>							
Gave reports	4	5	8	22	24	20	16
Shared handouts	9	5	11	11	30	18	16
Conducted workshops	57	9	5	7	8	7	7
Attended workshops	27	10	14	13	15	11	9
Attended national meetings	59	7	7	7	6	6	5
Made decisions	5	1	7	9	16	29	31
Used SREB Evaluation Tool	27	2	13	13	14	11	18
<i>Faculty joined:</i>							
Support group	66	7	3	3	1	5	7
ANA Council	72	3	0	2	1	1	6
NLN Council	71	3	0	1	1	1	8
ADCIS	80	0	0	1	0	1	1

**0 = not at all; 6 = frequent*

Did faculty use computers to supplement or replace clinical experiences, orient students to the clinical environment, or make clinical assignments? A majority of the faculty did not use computers for these purposes (Table 9).

Table 9

Faculty Perceptions of Computer Use
(Percentage of 148 Responses)

<i>*Rating:</i>	0	1	2	3	4	5	6
<i>To what extent is computer used as a:</i>							
Teaching machine (CAI)?	17	8	9	19	19	14	14
Simulator?	28	8	12	17	19	10	5
Resource (communication network)?	39	10	7	12	13	5	12
Tool (word processing)?	8	3	4	4	9	19	51
<i>To what extent is computer used to:</i>							
Supplement clinical?	32	14	6	16	17	9	4
Replace clinical?	78	9	5	1	2	3	0
Orient students to clinical?	79	3	7	4	3	3	0
Make clinical assignments?	91	1	1	1	0	3	2
Generate tests?	32	4	6	14	9	12	22
Instruct?	56	10	9	8	4	6	5

**0 = not at all; 6 = great*

Responses to the question regarding the availability of selected measures to help faculty use computers for instructional purposes indicated that release time, extra payment, and teaching overload were not available at a majority of the institutions. In contrast, a majority circled 6 (indicating great) to report the extent of need in the nursing program for more software and support of continuing education activities to help faculty become more proficient computer users (Table 10).

Generally, the ratings of the chief administrative officer for nursing education were similar to those indicated by the faculty. The most startling difference was noted when the percentage of chief administrative officers (18 percent) indicated the extent to which they perceived faculty using the computer as a tool was compared with the responses of the faculty.

Although the changes in computer use were not dramatic during the past five years, the increases observed in several categories would support the thesis that computers had some impact on nursing education in the 1980s. A number of factors have influenced decisions about computer use (and participation in project activities) in the various types of nursing programs over this five-year period. Some of the major deterrents--reported by nurse educators repeatedly--include: financial constraints, inadequate resources (hardware and software), and lack of commitment. All are critical factors in the implementation of computer-supported education.

Table 10

Faculty Perceptions of Needs
(Percentage of 148 Responses)

<i>*Rating:</i>	0	1	2	3	4	5	6
Purchase more hardware	3	1	3	11	11	19	49
Purchase more software	0	0	2	5	10	19	64
Offer more technical assistance	2	1	6	16	15	16	43
Support continuing education	1	1	4	3	16	24	51
Participate in communication networks	3	1	2	18	16	20	39
Establish task force	9	6	4	20	16	11	30
Offer courses for students	3	3	7	14	14	22	36

**0 = not at all; 6 = great*

In addition to the practical and intellectual issues (fear of using the technology), the impact several professional issues--nursing shortages, licensing issues, decline in student enrollment, and concerns about faculty promotion and tenure--had on nursing education cannot be ignored in any decision that would involve change in teaching and learning strategies. Administrators, as well as faculty who are not computer enthusiasts, will be less inclined to consider expenditures for an *innovation* when faced with the issues mentioned above.

FUTURE DIRECTIONS

The regional project has provided a variety of activities to help faculty become more comfortable with the technology, to value its contribution to education, and to address some of the challenges it offers. However, the need for continuing education activities persists. Future efforts must be designed to help faculty include the technology as an integral part of the nursing curriculum so that graduates will be prepared to manage and use the technology for problem-solving purposes.

In planning for the year 2000, and the new century now just 10 years away, nurse educators must address the practical and intellectual issues related to including computers as an instructional delivery medium in the curriculum. The challenge to nurse educators will be to change their focus from an emphasis on the technology to what the learner can do with the technology. Whether or not the computer should be used as an instructional delivery medium is not the priority issue. Rather, the issue is whether faculty will be capable of using the technology to empower students to learn the information processing skills that will be required for efficient practice in the 21st century.

Nurses are the *thinking link* between the definition of meaningful data and the meaning that may be derived from the data. Graduates at all levels must be prepared to demonstrate this critical skill. Therefore, nurse educators must be aware of the information processing skills critical for practice, assess the levels of learning experiences necessary in nursing education, and plan the curriculum to foster these outcomes. The Southern Council on Collegiate Education for Nursing, in affiliation with the Southern Regional Education Board, is in a strategic position to help shape the role of nursing in a computerized health care world. Its structure, purpose, and *connections* with higher educational institutions will be useful in sustaining the collegial relationships established during the five-year grant period and in promoting activities that facilitate the judicious use of computers in nursing education.

The networks established during the project period, though intangible and difficult to measure, are most significant outcomes of this regional effort. Nurse educators in the SREB states identified networking as a key factor in this project in all of the evaluations of different activities. Staff received letters and unsolicited comments. The networks extend across regional boundaries as a result of presentations at national and international meetings, for example, National League for Nursing Convention, 31st International Conference of the Association for the Development of Computer-Based Instructional Systems, Annual Symposium on Computer Applications in Medical Care, International Research Congress in Edinburgh, Scotland. It is anticipated that the established regional networks will be sustained and provide the foundation for future activities.

In 1983, speakers at the annual meeting of the Council charged nurse educators to conceptualize the role of computers and to maximize its potential as a *tool* in the provision of services. Although that charge remains a challenge in 1990, it is anticipated that nurse educators in the South will remain on the *cutting edge* of the technological advances in education and health delivery services.

Appendix 1

Master Plan for Basic Workshops

Workshop #1: Facilitating Computer-Supported Nursing Education (Why, Where, and How To Begin)

- Objectives:**
- Identify impact of computers on society, health care, and nursing care.
 - Identify major trends in the use of computers 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.

Workshop #2: Computers As Instructional Tools

- Objectives:**
- Identify the advantages and disadvantages of computers as instructional tools.
 - Identify software considerations.
 - Delineate characteristics that facilitate learning with computers.
 - Formulate an approach for software evaluation.
 - Examine existing software applications.
 - Analyze the pros and cons of developing software.
 - Recognize the legal and ethical issues regarding publication and ownership.

Workshop #3: Special Computer Applications in Nursing Education

- Objectives:**
- Describe diverse instructional uses.
 - Identify computer applications that interact with other media.
 - Identify cost and learning effectiveness of computerized instruction.
 - Examine strategies to facilitate incorporation of computer technology in the nursing curriculum.

Appendix 2

Key Implementation Activities*

Establish need. The need for computer-supported education in a nursing curriculum 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.

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

Survey local computer resources. Knowledge about local computer resources and applications is vital to establishing support for computer use in the nursing program.

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.

Conduct faculty development sessions. Faculty will be less threatened by computers if they are knowledgeable about the technology. Faculty understanding is essential to successful use of computers for educational purposes.

Determine faculty and administrative commitment. Faculty and administrative commitment to computer use is necessary if computer use is to be incorporated in the nursing curriculum. Administrative commitment of capital and staff resources is essential. Adequate faculty time to select, develop, and/or modify software programs is paramount to successful use of computers within the curriculum. Faculty incentives and rewards influence faculty productivity.

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. Decisions about potential computer applications need to be based on curriculum needs and the resources available to implement them.

Select software and hardware. 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.

Plan for user interaction. Access to computers must be planned. Users need access and should be given guides to ease their learning. User orientation and ongoing assistance are essential in maintaining proper and appropriate use.

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 maintenance.

Evaluate benefits and effectiveness. Documentation of costs and of benefits gained in terms of time, productivity, learning, and better use of resources is vital for continued growth and sustained use.

Expand computer applications. Computers can be used in conjunction with other technologies to enhance learning. Innovative applications will change the way in which nurses work and learn in an information-oriented society.

**Developed by Kathleen J. Mikan, Professor and Director, Learning Resources Center, University of Alabama, Birmingham School of Nursing*

Appendix 3

SREB COMPUTER SOFTWARE EVALUATION TOOL

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 achieves purpose	Y	N	NA
4. Student participation promoted	Y	N	NA

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.

Appendix 4 Parameters for Selected Electronic Bulletin Boards

NIX

Telephone: 318-231-5621
 System operator: Gay Miller
 University of Southwestern Louisiana
 Lafayette, LA 70504-2490
 318-231-5614
 Baud: 300 to 1200
 Software parameters: 8 data bits/1 stop bit/no parity

SON*NET

Telephone: 512-471-7584
 System operator: Betty Skaggs
 University of Texas at Austin
 1700 Red River
 Austin, TX 78701
 318-231-5649
 Baud: Up to 2400
 Software parameters: 8 data bits/1 stop bit/no parity

PRN UT NET

Telephone: 409-761-1802
 System operator: Jerry W. Lester
 University of Texas Medical Branch
 Route J-29
 Galveston, TX 77550
 409-761-4801
 Baud: Up to 2400
 Software parameters: 8 data bits/1 stop bit/no parity

Appendix 5

1989 Annual Survey of Computer Use: Statistical Summary

Questions: (1) Does the university have microcomputers available for use by undergraduate students enrolled in majors other than nursing?
 (2) Do the undergraduate nursing majors receive any of their pre-nursing or non-nursing instruction with microcomputers?
 (3) Do undergraduate nursing majors receive any of their nursing instruction with microcomputers?

Question: (11) Who has access to the microcomputers in the nursing education facility?
 (Check all that apply.)

Questions: (6) Does the nursing program have its own microcomputers available for instruction in nursing courses?
 (7) Does the nursing program have terminals connected to a mainframe computer available for instruction in nursing courses?

Questions: (8) If computers are not available, will microcomputers be available for nursing instruction within the next year?
 (9) If computers are available, will the number of microcomputers available for nursing instruction be expanded within the next year?

Table 11

Computers in Nursing Education (Percentage)

	1985 N= 324	1987 253	1988 198	1989 210
Uses				
Non-nursing	96	95	97	98
Pre-nursing	31	43	52	55
Instruction:				
Mainframe	7	4	6	9
Microcomputer	40	60	69	75
Access				
Faculty	77	80	89	90
Administrators	77	78	82	77
Nursing students	48	61	69	71
Staff	72	78	75	83
Availability				
Microcomputers	40	60	69	71
Terminals	14	17	18	13

Table 12

Plans for Computer Purchases (Percentage)

	1985	1987	1988	1989
Initial purchase	36	11	21	5
	N= 145	89	56	60
Expand resources	46	26	36	27
	N= 173	164	136	148

Question: (10) Does the nursing program have computers available for non-instructional uses? If yes, check all that apply.

Table 13

Non-instructional Use of Microcomputers (Percentage)

	1985 N = 277	1987 248	1988 177	1989 199
Word processing	90	93	95	94
Student records	65	74	82	72
Test construction	50	58	63	66
Calculation of grades	43	52	54	59
Test scoring	34	42	45	53

Question: (14) Check the major instructional uses of microcomputers. (Check all that currently apply.)

Table 14

Major Instructional Uses and Purposes (Percentage)

	1985 N = 173	1987 162	1988 136	1989 157
Uses				
Enrichment	38	69	70	78
Remedial	36	45	51	53
Testing	37	35	32	31
Self Help	25	37	31	35
Diagnosis	6	12	14	16
Purposes				
Classroom				
Enrichment	54	70	69	76
Supplemental	63	81	47	93
Replacement	-	12	13	12
Clinical				
Enrichment	34	54	48	56
Supplemental	39	57	36	65
Replacement	-	8	4	6

Question: (15) Check the major instructional purposes for which microcomputers are being used. (Check as many as appropriate.)

Question: (12) Check all types of learning activities currently provided by microcomputers in undergraduate nursing courses.

Table 15

Major Type Learning Activities (Percentage)

	1985 N= 173	1987 162	1988 136	1989 158
Tutorials	55	80	80	84
Drill and practice	53	72	76	81
Simulations	33	88	81	85
Word processing	28	43	46	60
Testing	38	52	42	37
Games	18	22	19	31
Statistical analysis	6	20	19	31
Spreadsheet	-	12	11	13
Interactive videodisc	4	4	4	16
Interactive videotape	5	7	5	11
Programming	9	5	3	6

**Yes responses to Item #3: Do undergraduate nursing majors receive any of their nursing instruction with microcomputers?*

Question: (16) What percent of the undergraduate nursing curriculum is taught with microcomputers?

Table 16

Undergraduate Nursing Curriculum Taught with Microcomputers (Percentage)

	1985 *N=173	1987 164	1988 136	1989 158
None	84	88	85	12
Less than 5%	8	7	7	57
Between 5 and 25%	-	1	2	34
Between 25 and 50%	-	-	-	4
Between 50 and 75%	-	-	-	-
100%	-	-	1	3

**Yes responses to Item #3: Do undergraduate nursing majors receive any of their nursing instruction with microcomputers?*

Question: (13) Check all content areas (nursing-related) taught, in whole or part, by microcomputers.

Table 17

Nursing-related Content Areas* Taught with Microcomputers (Percentage)

	1985 N= 173	1987 162	1988 136	1989 158
Calculations	41	64	66	75
Adult nursing	24	54	58	65
Clinical				
Studies	33	55	52	61
Decision-making	25	51	44	54
Maternity nursing	17	34	43	51
Basic mathematics	33	49	50	51
Clinical topics	9	29	38	48
Nursing leadership	-	13	7	48
Mental health	15	30	40	45
Nursing process	14	44	47	44

**Top 10 of 24 possible selections*

Questions: (4) Do staff nurses in the clinical agencies used by the undergraduate nursing program use computers for nursing purposes on a regular basis, e.g., order entry, nursing notes, care plans, scheduling lab reports? (5) Do undergraduate nursing students use computers in the clinical agencies during their clinical learning experience?

Table 18

Computer Use in Clinical Settings (Percentage)

	1985 N= 324	1987 263	1988 198	1989 210
Staff nurses	67	75	84	86
Student nurses	35	38	52	49

Questions: (7) Are incentives (financial, promotions, tenure, merit raises, release time) provided nursing faculty to use computers within the undergraduate nursing curriculum? (15) Are nursing faculty involved in developing software programs? (24) Is evaluation being conducted on the cost effectiveness of computerized instruction within the undergraduate nursing program? (25) Is evaluation being conducted on the benefits (time, productivity, learning, better use of resources) of computerized instruction within the undergraduate nursing program? (26) Besides administrative uses, are computer applications, such as online information, data base searches, electronic mail, electronic bulletin boards, within the nursing program expanded beyond those directly related to instruction? (27) Are computers within the undergraduate nursing program used in conjunction with other new technologies?

Table 19
Selected Perceptions* of Key Computer-related Activities
(Percentage)

	N =	1985	1987	1988	1989
		324	263	198	210
Incentives		65	64	53	50
Software development		61	57	60	66
Evaluation:					
Cost effectiveness		75	70	61	62
Cost benefits		67	62	54	62
Expanded use		69	60	53	52
Extended use		81	75	73	65

**Not true at all*

Appendix 6
1989 Annual Survey of Computer Use: Statistical Summary
(By Type Institution and Region*)

Questions: (1) Does the university have computers available for use by undergraduate students enrolled in majors other than nursing? (2) Do the undergraduate nursing majors receive any of their pre-nursing or non-nursing instruction with computers? (3) Do undergraduate nursing majors receive any of their nursing instruction with microcomputers?

Question: (11) Who has access to the computers in the nursing education facility? (Check all that apply.)

Questions: (6) Does the nursing program have its own computers available for instruction in nursing courses? (7) Does the nursing program have terminals connected to a mainframe computer available for instruction in nursing courses?

Questions: (8) If computers are not available, will microcomputers be available for nursing instruction within the next year? (9) If computers are available, will the number of microcomputers available for nursing instruction be expanded within the next year?

Table 20

Computers in Nursing Education (Percentage)

	4-year N= 103	2-year 107	SREB 210	Other 303
Use				
Non-nursing	100	96	98	98
Pre-nursing	61	49	55	55
Instruction:				
Mainframe	16	3	9	14
Microcomputer	79	70	75	78
Access				
Faculty	96	84	90	91
Administrators	86	69	77	79
Nursing students	80	62	71	70
Staff	92	75	83	82
Availability				
Microcomputers	79	70	75	74
Terminals	22	5	13	24

Table 21

Plans for Computer Purchases (Percentage)

	4-year	2-year	SREB	Other
Initial purchase				
	5	5	5	5
N=	21	39	60	73
Expand resources				
	32	22	27	30
N=	81	75	156	230

*"Other" in tables throughout Appendix 6 refers to Non-SREB states.

Question: (10) Does the nursing program have microcomputers available for non-instructional uses? If yes, check all that apply.

Table 22

Non-instructional Use of Microcomputers (Percentage)

	4-year N= 102	2-year 97	SREB 199	Other 292
Word processing	95	93	94	97
Student records	74	70	72	75
Test construction	69	63	66	65
Calculation of grades	70	47	59	55
Test scoring	49	58	53	48

Question: (15) Check the major instructional purposes for which microcomputers are being used.

Table 23

Major Computer Uses and Purposes (Percentage)

	4-year N= 81	2-year 76	SREB 157	Other 236
Uses				
Enrichment	81	74	78	72
Remedial	53	53	53	48
Testing	37	24	31	30
Self Help	37	33	35	30
Diagnosis	22	9	16	9
Purposes				
Classroom:				
Enrichment	74	79	76	69
Supplemental	95	91	93	89
Replacement	14	11	12	18
Clinical:				
Enrichment	54	58	56	51
Supplemental	60	70	65	72
Replacement	9	4	6	11

Question: (12) Check all types of learning activities currently provided by microcomputers in undergraduate nursing courses.

Table 24

Major Type Learning Activities (Percentage)

	4-year *N= 81	2-year 76	SREB 157	Other 236
Tutorials	83	84	84	82
Drill and practice	84	77	81	77
Simulations	84	87	85	84
Word processing	76	43	60	61
Testing	45	28	37	43
Games	34	28	31	34
Statistical analysis	42	4	24	23
Spreadsheet	23	3	13	11
Interactive videodisc	20	12	16	19
Interactive videotape	13	8	11	11
Programming	7	4	6	8

**Yes responses to Item #3: Do undergraduate nursing majors receive any of their nursing instruction with microcomputers?*

Question: (16) What percent of the undergraduate nursing curriculum is taught with microcomputers?

Table 25

Undergraduate Nursing Curriculum Taught with Microcomputers (Percentage)

	4-year *N= 81	2-year 76	SREB 157	Other 236
None	10	14	12	6
Less than 5%	54	59	57	51
Between 5 and 25%	40	29	34	41
Between 25 and 50%	4	5	4	3
Between 50 and 75%	0	0	0	0
100%	2	3	3	3

**Yes responses to Item #3: Do undergraduate nursing majors receive any of their nursing instruction with microcomputers?*

Question: (13) Check all content areas (nursing-related) taught, in whole or part, by microcomputers.

Table 26

Nursing-related Content Areas* Taught with Microcomputers (Percentage)

	4-year N= 81	2-year 76	SREB 157	Other 236
Calculations	68	82	75	69
Adult nursing	60	70	65	65
Clinical				
Studies	64	57	61	59
Decision-making	58	51	54	51
Maternity nursing	43	12	51	51
Basic mathematics	44	57	51	47
Clinical topics	43	53	48	39
Nursing leadership	12	3	48	39
Mental health	40	10	45	43
Nursing process	37	23	44	44

*Top 10 of 24 possible selections

Questions: (4) Do staff nurses in the clinical agencies used by the undergraduate nursing program use computers for nursing purposes on a regular basis, e.g., order entry, nursing notes, care plans, scheduling lab reports? (5) Do undergraduate nursing students use computers in the clinical agencies during their clinical learning experience?

Table 27

Computer Use in Clinical Settings (Percentage)

	4-year N= 103	2-year 107	SREB 210	Other 303
Staff nurses	85	86	86	77
Student nurses	52	46	49	42

Questions: (7) Are incentives (financial, promotions, tenure, merit raises, release time) provided nursing faculty to use computers within the undergraduate nursing curriculum? (15) Are nursing faculty involved in developing software programs? (24) Is evaluation being conducted on the cost effectiveness of computerized instruction within the undergraduate nursing program? (25) Is evaluation being conducted on the benefits (time, productivity, learning, better use of resources) of computerized instruction within the undergraduate nursing program? (26) Besides administrative uses, are computer applications, such as on-line information, data base searches, electronic mail, electronic bulletin boards, within the nursing program expanded beyond those directly related to instruction? (27) Are computers within the undergraduate nursing program used in conjunction with other new technologies?

Table 28

**Selected Perceptions* Regarding Key Computer-related Activities
(Percentage)**

	4-year N= 103	2-year 107	SREB 210	Other 303
Incentives	55	62	59	50
Software development	59	73	66	54
Evaluation				
Cost effectiveness	52	73	66	54
Cost benefits	45	66	52	43
Expanded use	37	72	52	43
Extended use	57	73	65	51

*Not at all true

Appendix 7
Statistical Summary for 119 Institutions
(Participated in 1985 and 1989 Surveys)

Questions: (1) Does the university have microcomputers available for use by undergraduate students enrolled in majors other than nursing?
 (2) Do the undergraduate nursing majors receive any of their pre-nursing or non-nursing instruction with microcomputers?
 (3) Do undergraduate nursing majors receive any of their nursing instruction with microcomputers?

Question: (11) Who has access to the microcomputers in the nursing education facility? (Check all that apply.)

Questions: (6) Does the nursing program have its own microcomputers available for instruction in nursing courses?
 (7) Does the nursing program have terminals connected to a mainframe computer available for instruction in nursing courses?

Questions: (8) If computers are not available, will computers be available for nursing instruction within the next year?
 (9) If computers are available, will the number of computers available for nursing instruction be expanded within the next year?

Table 29

Computers in Nursing Education
(Percentage of 119 Institutions)

	1985	1989
Use		
Non-nursing	96	99
Pre-nursing	44	56
Instruction:		
Mainframe	3	11
Microcomputer	60	78
Access		
Faculty	97	92
Administrators	6	80
Nursing students	26	18
Staff	98	87
Availability		
Microcomputers	62	74
Terminals	17	18

Table 30

Plans for Computer Purchases (Percentage)

	1985	1989
Initial purchase		
	13	5
	N= 39	30
Expand resources		
	24	30
	N= 80	88

Question: (10) Does the nursing program have computers available for non-instructional uses? If yes, check all that apply.

Table 31

Non-instructional Use of Microcomputers
(Percentage of 114 Institutions)

	1985	1989
Word processing	92	96
Student records	72	73
Test construction	82	66
Calculation of grades	76	65
Test scoring	65	57

Question: (14) Check the major instructional uses of microcomputers. (Check all that currently apply.)

Question: (15) Check the major instructional purposes for which microcomputers are being used. (Check as many as appropriate.)

Table 32

Major Computer Uses and Purposes
(Percentage)

	1985	1989
N=	71	91
Uses		
Enrichment	37	73
Remedial	29	55
Testing	28	32
Self Help	24	40
Diagnosis	10	18
Purposes		
Classroom		
Enrichment	42	73
Supplemental	49	96
Replacement	6	8
Clinical		
Enrichment	42	73
Supplemental	39	65
Replacement	3	7

Question: (12) Check all types of learning activities currently provided by microcomputers in undergraduate nursing courses.

Table 33

Major Type Learning Activities (Percentage)

	1985 *N= 71	1989 91
Tutorials	94	84
Drill and practice	77	82
Simulations	99	89
Word processing	11	58
Testing	6	38
Games	28	34
Statistical analysis	15	31
Spreadsheet	21	18
Interactive videodisc	7	14
Interactive videotape	8	7
Programming	4	9

**Yes responses to Item #3: Do undergraduate nursing majors receive any of their nursing instruction with microcomputers.*

Question: (16) What percent of the undergraduate nursing curriculum is taught with microcomputers?

Table 34

Undergraduate Nursing Curriculum Taught with Microcomputers (Percentage)

	1985 *N= 71	1989 91
None	10	9
Less than 5%	37	62
Between 5 and 25%	23	33
Between 25 and 50%	4	3
Between 50 and 75%	-	-
100%	1	2

**Yes responses to Item #3: Do undergraduate nursing majors receive any of their nursing instruction with microcomputers.*

Question: (13) Check all content areas (nursing-related) taught, in whole or part, by computers.

Table 35

Nursing-related Content Areas* Taught with Microcomputers
(Percentage)

	1985 N= 71	1989 91
Calculations	68	74
Adult nursing	52	65
Clinical		
Studies	68	62
Decision-making	56	57
Maternity nursing	30	57
Basic mathematics	56	47
Clinical topics	30	47
Nursing leadership	30	47
Mental health	30	47
Nursing process	46	42

**Top 10 of 24 possible selections*

Questions: (4) Do staff nurses in the clinical agencies used by the undergraduate nursing program use computers for nursing purposes on a regular basis, e.g., order entry, nursing notes, care plans, scheduling lab reports? (5) Do undergraduate nursing students use computers in the clinical agencies during their clinical learning experience?

Table 36

Computer Use in Clinical Settings
(Percentage of 119 institutions)

	1985	1989
Staff nurses	75	87
Student nurses	46	47

Appendix 8

Statistical Summary of Project Evaluation

To what extent do you use the computer as a teaching machine? simulator? resource? tool?

To what extent do you use computers to supplement clinical experiences? replace clinical experiences? orient students to a clinical environment? supplement lab instruction? replace lab instruction? generate tests? keep records? make clinical assignments?

Table 37

Faculty Perceptions of Computer Use (Percentage of 148 Responses)

*Rating:	0	1	2	3	4	5	6
Machine	17	8	9	19	19	14	14
Simulator	28	8	12	17	19	10	5
Resource	39	10	7	12	13	5	12
Tool	8	3	4	4	9	19	51
<i>Clinical:</i>							
Supplement	32	14	6	16	17	9	4
Orient	79	3	7	4	3	3	0
Replace	78	9	5	1	2	3	0
Assignment	91	1	1	1	0	3	2
<i>Lab:</i>							
Supplement	38	4	10	16	18	7	5
Replace	77	6	5	5	3	2	1
Tests	32	4	6	14	9	12	22
Records	22	4	7	10	10	16	30
Homework	42	10	8	13	9	9	9
Use to teach	56	10	9	8	4	6	5

*0 = Not at all; 6 = great

To what extent do faculty use the computer as a teaching machine? simulator? resource? tool?

To what extent do faculty use computers to: supplement clinical experiences? replace clinical experiences? orient students to a clinical environment? supplement lab instruction? replace lab instruction? generate tests? keep records? make clinical assignments?

To what extent are the following measures available to help you use computers for instructional purposes: release time? extra payment? reimbursement of expenses? overload? technical support? equipment?

Table 38

Deans' Perceptions of Computer Use
(Percentage of 97 Responses)

<i>*Rating:</i>	0	1	2	3	4	5	6
Machine	9	10	20	24	21	5	6
Simulator	21	14	10	20	20	5	4
Resource	48	10	9	9	9	5	3
Tool	12	8	9	20	10	19	18
<i>Clinical:</i>							
Supplement	24	12	23	25	6	3	2
Orient	71	10	8	4	1	0	0
Replace	78	9	5	1	2	3	0
<i>Lab:</i>							
Supplement	23	18	13	18	16	5	2
Replace	77	6	8	3	0	0	0
Tests	21	12	8	10	15	13	14
Records	21	12	8	10	15	13	14
Homework	44	23	7	6	5	7	2
Use to teach	55	15	10	5	4	1	2

**0 = Not at all; 6 = great*

Table 39

Faculty Perceptions of Available Incentives
(Percentage of 148 Responses)

<i>*Rating:</i>	0	1	2	3	4	5	6
Release time	74	6	4	3	5	3	5
Extra pay	92	3	1	0	1	1	1
Expenses	20	10	9	8	4	6	5
Overload	77	3	3	3	1	3	1
Technical support	21	5	15	13	11	20	15
Equipment	14	9	10	18	16	14	19

**0 = not at all; 6 = great*

To what extent are the following measures available to help faculty use computers for instructional purposes: release time? extra payment? reimbursement of expenses? overload? technical support? equipment?

Table 40

Deans' Perceptions of Available Incentives
(Percentage of 97 Responses)

<i>Rating:</i>	0	1	2	3	4	5	6
Release time	65	7	6	6	4	2	2
Extra pay	80	4	4	3	2	0	1
Expenses	10	12	9	19	13	16	14
Overload	65	7	5	3	4	0	3
Technical support	20	4	9	16	16	19	10
Equipment	16	7	11	15	9	18	18

*0 = not at all; 6 = great

To what extent would you like the nursing education program to: Purchase more hardware? Purchase more software? Offer more technical assistance to faculty? Offer more courses in which students use computers to learn about noncomputer subject matter? Establish a task force to organize and direct uses of computers in instruction? Support continuing education activities aimed to help faculty become more proficient users of computers? Participate in communication networks (intra- and interinstitutional)?

Table 41

Faculty Perceived Needs
(Percentage of 148 Responses)

<i>*Rating:</i>	0	1	2	3	4	5	6
Purchase							
Hardware	3	1	3	11	11	19	49
Software	0	0	2	5	10	19	64
Offer more:							
assistance	2	1	6	16	15	16	43
courses	3	3	7	14	14	22	36
Establish a							
task force	9	6	4	20	16	11	30
Support CE+	1	1	4	3	16	24	51
Communication							
networks	3	1	2	18	16	20	39

*0: Not at all; 6: great
+ Continuing education

To what extent would you like the nursing education program to: Purchase more hardware? Purchase more software? Offer more technical assistance to faculty? Offer more courses in which students use computers to learn about noncomputer subject matter? Establish a task force to organize and direct uses of computers in instruction? Support continuing education activities aimed to help faculty become more proficient computer users? Participate in communication networks (intra- and interinstitutional)?

Table 42

Deans' Perceived Needs
(Percentage of 97 Responses)

<i>*Rating:</i>	0	1	2	3	4	5	6
Purchase							
Hardware	3	1	3	12	11	21	42
Software	1	0	3	6	8	22	55
Offer more							
assistance	1	2	7	13	13	21	37
courses	4	2	10	15	24	13	26
Establish a							
task force	5	1	1	14	13	19	19
Support CE+	2	4	5	13	19	14	38
Communication							
networks	6	4	9	16	21	13	26

**0 = Not at all; 6 = great*

+CE: continuing education