

MICROCOMPUTERS AS A TOOL IN
GRADING SUBJECTIVE PAPERS

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DEDICATION

Dedicated in memory of my highly esteemed,
gentle, unassuming and loving Daddy,
who went to be with his Lord
on December 15, 1977.

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Typically the authors name on a professional paper does not reflect the teamwork involved. Some very special people deserve recognition for their contributions. I feel so overwhelmed with gratitude that words seem insufficient when trying to express my deep appreciation.

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CHAPTER 1

INTRODUCTION

When nursing students are being educated to participate in the health care delivery system the importance and full implications of the word delivery is often ignored. Good health care requires more than just passing the knowledge to treat and utilizing the system to provide treatment. Delivery requires communication, more specifically the ability to communicate.

Nursing students must acquire well developed verbal and written communication skills for several reasons. First, written nurses' notes demand accurate and concise data regarding patient progress. Second, prognosis is significantly affected by communication between health care practitioner and client. Since the needs of the client dictate communication style, the nurse needs to know how and when to approach a client. Third, clients may be reticent to discuss some problems or to ask certain questions. The nurse needs to hear what is not being directly stated and to know how to gently probe for more specific information. All of the aforementioned require well developed communication skills.

People have not been programmed to ask the objective true-false or multiple-choice type questions. Yet for nursing students the test instruments, including state board examinations, are most often written in the objective mode. Further, the efficiency requirement of nursing curricula dictates objective examinations. With this background, the graduate nurse is more likely to possess finely programmed skills in objective communication while subjective skills generally remain untested. Students need to practice both written and verbal subjective communication skills in preparation for a rewarding career in nursing. Nurse educators need to find ways to efficiently and effectively assess, develop and evaluate those skills.

Education in this regard requires consideration of three questions. One, has the graduate nurse had sufficient practice developing subjective communication skills to effectively state essential information contingent on client health? Two, can the graduate nurse surmise the substance of client questions and direct responses accordingly? Three, can the nurse determine if the client is ready to learn at the moment of teaching? Until the student learns to plan and deliver productive subjective presentations, the client is burdened with the responsibility of asking all the

right questions at the right time. This may be expecting too much of the client.

The ratio of subjective versus objective test and practice instruments used in preprofessional curricula needs to be changed. Perhaps the objective test form has been overused because it is more convenient, efficient, precise and unbiased. While these are admirable objectives, the questions remain. Are traditional objectively constructed exams setting the trend for a limited response system in student education? Should the student have an opportunity for subjective self expression to supplement or defend a position in answering an objective examination? If subjective examinations were easier to grade in a more precise manner taking less time, would the questions above be answered differently?

A largely untapped resource that is precise, efficient and unbiased is the microcomputer. The capabilities of this device are numerous, varied and limited only by the creativity of the user. In manipulating vast amounts of data, this instrument is exact, fast and proficient. The microcomputer is a tool that can be used by educators to greatly enhance their effectiveness in the teaching process.

Since the microcomputer is an accurate and time saving tool it seems natural to ponder whether this relatively

small machine can play an effective role in the grading of subjective papers. If this could be accomplished instructors would be able to increase the use of subjective assignments and examinations.

Problem of Study

The problem of the study was to determine if the microcomputer can serve as a tool in enhancing objectivity and in saving time grading nursing care plans by nurse educators. Objectivity was measured by high reliability.

Purpose

The four primary purposes of the study are listed below.

1. To test microcomputer software programs used as tools in facilitating the process of grading nursing care plans.
2. To test the reliability of grading nursing care plans via the nurse educator and microcomputer versus the nurse educator without the use of a microcomputer.
3. To compare time frames using a mechanicohuman system versus a human system.
4. To determine the length of time required to learn how to use the microcomputer effectively utilizing this software.

Justification of the Problem

The ability to write is an extremely important skill for individuals enabling them to perform effectively in various adult roles (Steele, 1979). Some surveys have shown that the task most desired by employers of fresh college graduates is the ability to express themselves subjectively. Yet when writing proficiency is evaluated three problems persist. These difficulties are 1) unreliability of grading (Steele, 1979; Nyberg, 1968), 2) choosing factors to appraise while scoring and 3) selecting weights to be given to each factor (Nyberg, 1968). The underlying purpose in early studies was to develop a method by which reliability of grading might be improved. Studies regarding low reliability were reported by Starch and Elliot (1912), Darsie (1922), Hulten (1925), Cast (1939; 1940), Morrison and Vernon (1941), Coward (1952), Torgerson and Green (1952), Huddleston (1954), Remondino (1959), Diederich, French and Carleton (1961), and Coffman and Kurfman (1968) to name a few.

Nursing students need to practice refinement of their subjective communication skills. Patients have a right to expect nurses to provide them with pertinent subjective information regarding their condition. State and Federal regulations, as well as American Hospital Association,

American Nurses Association, and National League For Nursing guidelines, exist to assure patient rights. In fact there is a requirement that the client has a right to information about his health care (Ellis & Hartley, 1980) presented in terms he can understand (Minnesota Statutes Section 144.651, 1982). Skilled professionals with refined subjective communication skills are more likely to meet the intent of this law.

Medical record requirements stated in the law intend that records should be accurate and concise (Medicare/Medicaid Regulation 405.1132 (c), 1976). The health professional must be competent in the ability to document in the subjective mode. Seldom do medical record forms allow for objective responses to describe patient data.

In today's legal environment, communication carries the weight of protection against tort liability. The client chart not only serves as a link between health professionals for continuity of care but also as a legal document, subject to being subpoenaed at any time in the case of court action. Students must be given the opportunity to practice writing skills in order that these records be complete, clear and coherent.

Accurate and just evaluations of their work are essential to nursing students. These evaluations influence

them as they set career goals. Appraisals also affect students future employability. Additionally, nursing students often use grades to personally evaluate themselves. Good grades signify worthiness. Poor grades somehow reflect a significant personal deficiency. Understandably students express dissatisfaction if they believe the grading system to be unfair. Their most frequent complaint is that instructors are arbitrary or random in their method of assigning of grades (Becker, Geer, & Hughes, 1968). The development of a system whereby the greatest amount of objectivity is apparent in the grading of subjective papers is an important endeavor. The microcomputer is a potential catalyst for the establishment of such an unbiased method to appraise intangible type assignments.

Nationally there is a trend toward greater computerization in our society. Educational practices are included within this trend that is rapidly changing education. The number of companies involved in data processing is increasing rapidly and existing companies are expanding. Predictions are that nursing curriculums will become computerized for both the technical and cognitive skills that students must learn (Silva, 1973).

This issue has significance internationally. The United States is attracting foreign medical students with

its capabilities in computer technology. Just as Americans go to Europe to study, there are now foreign students coming to U.S. medical schools. Computer based technology is giving the U.S. an edge in education. Nursing education can also be enhanced internationally with the use of the microcomputer. This requires a redevelopment of contemporary education.

The field of computer science is relatively new. Chronologically speaking, the pioneers in the field are still living. Technological frontiers are being established on a daily basis. Because it is so new, there are still many possible applications that have not been examined. For example, computers have not been widely used in nursing or in health education. This is the time for nurses to control their technological destiny by taking action to acquire computer literacy and to develop and implement computer based tools that will enhance their profession.

One of the chief problems facing institutions that educate nurses is that nursing education appears to be very expensive in relation to the number of nurses graduating. The high cost of low student-teacher ratios in clinical instruction may not be supported under changing financial conditions. The technologies that exist offer some hope of alleviating the labor-intensive role of nurse educators.

The computer and other technologies can be expected to take over many of the teaching functions, specifically the storing and processing of student data. This will free nursing faculty to spend more of their time in clinical teaching and practice and to individualize teaching.

There will likely be a proliferation of programs developed in nursing for both computer-assisted instruction and computer-managed instruction. Computer programmers consider nursing a rich untapped resource for selling their skills. Nurses must articulate their needs so that computer experts can effectively assist nursing educators. Better yet, nurses themselves should become well-versed in computer science. The question becomes not *whether* to computerize but *how* to foster further use in teaching and in *what* particular direction.

Theoretical Framework

One of the general theories of behavior organization is cybernetics. Norbert Wiener, author of this notion, wrote his first book in 1943. Cybernetics is most simply defined as the study of control and communication in machines and living beings (Wiener, 1950). However, cybernetics is considerably more complex than just the concepts of input, output, transformation, feedback and learning.

Input or data is transmitted in time series patterns. Information is arranged in such a way that the components are disseminated in time. As facts are conveyed, order can be lost spontaneously but cannot be gained. Exact translation with precise equivalence is not possible. Control refers to the idea that messages are sent in such a manner that the recipient's performance is changed. Cybernetics is the scientific study of these effective messages of control. The term "cybernetics" symbolizes the art of pilot or steersman (Wiener, 1950).

Wiener (1964) postulated that input is recast into output in accordance with the notion of transformation. Transformation is the change in a system after factors have blended. The occurrence of transformation may be illustrated by the shift in scale when viewing substances under the microscope (Wiener, 1961). When input is processed the various elements are incorporated leading to output which shows evidence of transformation.

Responses are then inspected to detect success or failure leading to feedback for future altered behavior. Feedback is the actual reinsertion of the results providing further input (Wiener, 1950).

The additional modified input may result in learning. However, this is dependent on two factors. First, criteria

must exist so that the efficacy of the conduct can be ascertained. Second, transformation must occur (Wiener, 1964). In other words, when outcomes are utilized as mere numbers for disparaging the system, this is simple feedback. However, when altered data produces a modified general method and behavior pattern, then learning has occurred (Wiener, 1950).

Machines can be utilized to change input to output (Wiener, 1964). An amalgamation of data is introduced into the machine. This is the input, which is then combined with memory or previously stored data prior to providing the output referred to as the effect on the outer world. A machine must be controlled on the basis of its actual conduct, not its expected performance. This control is the feedback (Wiener, 1950).

Wiener (1950) drew a parallel between the operation of individuals and some of the communication machines. Language is an attribute of machines as well as man (Wiener, 1950). Wiener (1950) considered man to be a special type of machine. There are three distinct levels of communication in people. The first level is the phonetic aspect pertaining to sound. The second level is the semantic facet relating to meaning. Third is the behavior level, concerned with the conscious and unconscious experiences of humans.

The only way humans can tap the internal meditations of other individuals is through observation of actions and through coded actions known as written or spoken language (Wiener, 1950).

Both individuals and machines receive input and process data based on elements already stored in memory. Both provide output and require feedback dependent on their authentic performance, not their intended behavior. The feedback then becomes input for further action (Wiener, 1950).

A well designed machine is more consistent, accurate and expeditious than a human being. Man is more complex and liable to considerably greater fluctuating actions. The human brain is capable of treating nebulous concepts that computers repudiate as unstructured (Wiener, 1964). However, the computer is the most complex machine made that converts input into output (Wiener, 1950). Consideration must be given to the best possible collaborative utilization of machine and man (Wiener, 1964).

The thrust in today's society is for automation. There is even a demand for mechanical translation or using machines to convert messages, as opposed to processing data. To mechanize translation would necessitate the application

of a multitude of objective axioms in ascertaining the quality of the input.

Wiener (1964) suggested that the most desirable alternative for a logically acceptable mechanical translation is to first substitute a mechanicohuman system for the pure mechanical one. The mechanicohuman system uses an expert human translator as a critic to teach the machine much the same as an educator instructs students. This strategy would permit the human expert to process a substantially larger body of data than is possible without mechanical assistance (Wiener, 1964).

Wiener (1964) extended this notion to making medical diagnoses. Machines are capable of storing facts that the physician uses in making the final diagnosis. In fact, Wiener (1964) believed that the uses for a mechanicohuman system greatly exceed those for a purely mechanical system.

The important questions for today are not concerned with man *or* machine or even whether man and machine are equal. The relevant query is consideration of how man *and* machine can solve problems working together as a team or single unit. As a result people will be liberated to execute missions which no machine can nab from humans (Fuchs, 1971). This is precisely what Wiener (1950) was

describing with the phrase the "human use of human beings" (Wiener, 1950, p. 2).

According to Wiener (1964), there are specific tasks that are more suitable to be executed by humans and certain others that are more amenable to machine processing. Adoption of this intelligent policy is important when humans and computers are utilized in common undertakings. In the present research, the microcomputer stores large amounts of data and calculates the statistical analyses. However, the nurse educator makes the decisions concerning the adequacy of student performance, preserving the important human element.

Students receive input from instructors. For example, material may be presented to students regarding the five step nursing process incorporating Roy's Model of Adaptation (1981). The Ziegler, Vaughan-Wrobel and Erlen (1985) criteria may be presented as one method of direction for writing nursing diagnoses. Students then process this material and provide the requested feedback to instructors. Feedback is often in the form of written papers, tests and quizzes. Instructors then evaluate the efficacy of this feedback in accordance with predetermined criteria, providing further input for the students. In other words, what is feedback for students becomes input for the

instructor who then processes and evaluates it. The instructor's feedback becomes input for the student (see Figure 1).

Simple feedback ensues when the instructor provides a summary of points earned with no explanations. When comments and rationale are offered, students are then provided with the opportunity to alter performance. Teachers have the control to send messages in such a way that student conduct may be modified. Wiener (1950) believed that learning occurs when feedback has produced changed behavior. As papers are graded, educators learn not only how well students have synthesized data but also how effectively the material was presented to students.

As Wiener (1950) pointed out exact translation of messages is unrealistic. There will always be a slight déviance in semantics. The goal is for as precise a conversion as is possible. Machines can store and manipulate huge amounts of data; they are unchanging but require structure. Humans will waver and are capable of processing abstract notions. The two can complement each other. The present research demonstrates such complementary teamwork between a microcomputer and nurse educators, representing the effectiveness of the mechanicohuman system.

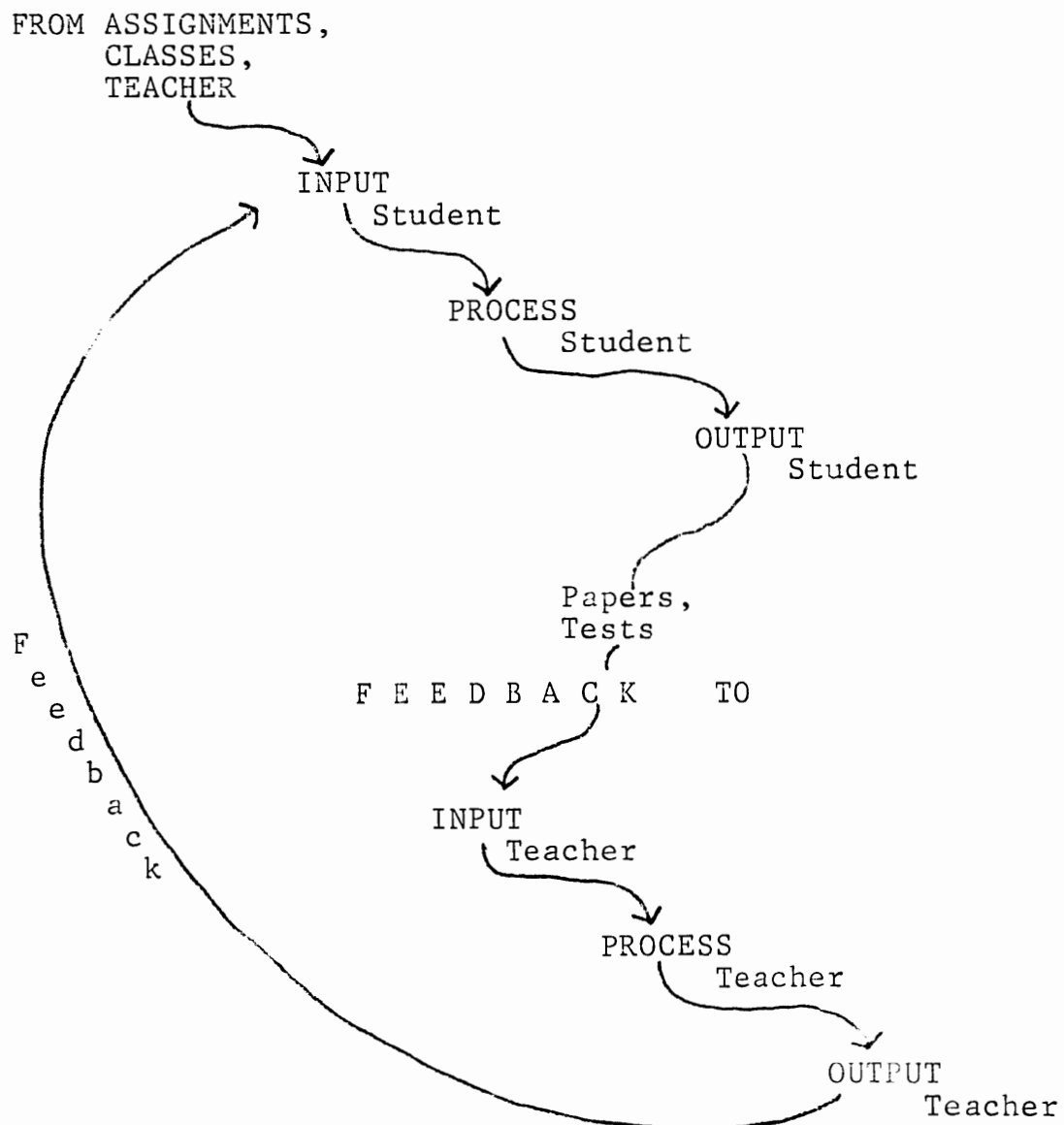


Figure 1. Data Processing Feedback Loops

Considerably more data can be processed by humans if they are assisted by a machine. Machines are faster than people and infallible (Wiener, 1964). In the present study, objectivity and speed were tested by comparing scores and time frames of tasks completed by hand versus the microcomputer. Scores were subjected to reliability analyses.

The proposition of the study was that nurse instructors and microcomputers (mechanicohuman system) can work together more effectively than the teacher alone (human system) to improve objectivity and to save time in the grading of written compositions. By using the mechanicohuman system and permitting the machine to execute mechanical tasks, teachers ought to be free to nourish students in the human element in nursing, building interpersonal relationships. This is a mission which no machine can snatch from people. Nursing can then make advances in the "human use of human beings".

Assumptions

Several assumptions were made prior to implementation of the research. They are:

1. The reliability of evaluating written papers can be assessed by calculating interrater reliability from nurse educators with diverse backgrounds.

2. The method in which Roy's Model of Adaptation (1981) is applied and Ziegler, Vaughan-Wrobel and Erlen's (1985) criteria for writing nursing diagnoses is used can be understood and correctly utilized by nursing faculty, regardless of past experiences.

3. Willing participants are open to microcomputer use and will be motivated to enthusiastically test the software since it is a prime period of time for exploring means by which the microcomputer can assist nurse educators.

4. The logistics of conducting the seminars can be accomplished.

5. The applicable software programs can be demonstrated and explained in one hour or less.

6. Participants will become familiar enough with the microcomputer keyboard to be able to accurately test the software programs.

7. Timing of tasks will be sufficiently accurate to determine statistical significance.

Hypotheses

The following null hypotheses were tested.

1. There will be no difference in reliability of scoring of nursing care plans graded by a mechanicohuman system and those graded by a human alone.

There will be no difference in the amount of time taken to grade nursing care plans by the mechanicohuman system and by the human alone.

Definition of Terms

The following terms were defined.

Reliability of scoring - the consistency with which educators rate matched written compositions.

Nursing care plans - written responses to a quiz administered to nursing students. The quiz is based on a nursing care study provided for them.

Mechanicohuman system - the procedure whereby a human will evaluate written compositions using the microcomputer as a tool to facilitate the process. This is contrasted with the grading by a nurse educator without the utilization of the microcomputer.

Amount of time to appraise student papers - recorded in minutes.

Limitations

The following limitations were noted.

1. The sample may have been biased because it consisted of those who had the time and were willing to participate.

2. Instructors had varied educational backgrounds and years of experience both teaching and practicing nursing.

3. Participants were diversified in their familiarity with microcomputers and specifically with the Apple II Plus, the microcomputer used in the present study.

4. Variations in typing skills and grading practices existed.

Summary

The importance of well developed subjective communication skills in nursing personnel must not be overlooked. The prime time to practice these skills is as a nursing student. Instructors need to find ways to improve the reliability of grading and to reduce the amount of time taken in evaluating subjective material. The microcomputer is a tool that may aid the entire grading process. The theory of cybernetics supports collaboration between the person and machines but with retention of the human element.

CHAPTER 2

REVIEW OF LITERATURE

This chapter contains material concerning subjective assignments and computer use in nursing education. These two topics were considered separately since the researcher found very few links between the two in the literature.

The pioneer work on essay analyses by main frame computers was done by Ellis B. Page in 1964 and 1965. Page and Paulus conducted an extensive study in 1968 and found the computer to perform about as accurately as did the typical human judge. They outlined a plan of attack for future investigators. Whalen (1971) did a study in which he indicated that the machine scoring of essays was worthy of further attention. H. B. Slotnick (1971) examined the computer grading of essays for his dissertation. Since the early 70's, there appears to be a paucity of literature on this topic.

The attempts that have been made to analyze essays via the computer have focused on content analysis and on numbers of words, letters and punctuation used. Essays are entered into the computer which is programmed to evaluate the

composition according to predetermined criteria. However, these programs have all used main frame computers.

Very little, if any, research has been done connecting subjective assignments and microcomputer use in nursing education. This researcher did not find any microcomputer software program that hails the purpose of analyzing essays. Thus consideration of background and review of the literature including theoretical and empirical support involves these two distinct areas. They will be addressed separately.

Subjective Assignments

Assignments and exams can be both objective and subjective. Objective tests are preferred by some individuals because of the speed and impersonal nature by which they can be scored. The main disadvantage cited is that good items are difficult to prepare. Critics believe that the brighter students will often detect some correctness in a wrong option or spot some fault with a right option. There is some speculation that objective exams can test only surface thoughts and not deep understanding (Green, 1981).

Subjective items, such as the essay, are easier to construct (Blood & Blood, 1972; Green, 1981) but much more difficult to score objectively. Written compositions may

offer the student an opportunity to display a more thorough comprehension of the topic. However, student remarks can also be misinterpreted (Green, 1981).

Nevertheless, the essay form is considered to be the most superior of all the methods of testing. In fact, this was the only form of testing a century ago. Objective exams were first introduced in the twentieth century. In spite of the superiority of essays, there is a hesitancy on the part of instructors to assign subjective papers or administer subjective exams because of the time and effort involved in evaluating them. Grading essay exams involves considerably more time than rating objective tests (Blood & Blood, 1972). The greatest weakness in subjective assignments, however, is the unreliability of the scoring (Blood & Blood, 1972; Green, 1981).

Communication modes may be subjective or objective. The subjective mode is defined as the personal, emotional and biased state of mind. The ideas, thoughts and feelings are perceptible only to the individual himself and are incapable of being checked externally or verified by other persons. The objective mode is described as the impersonal, detached and unbiased phenomenon. The features and characteristics are independent of the mind and can be verified by others.

The adjectives subjective and objective are antonyms. Table 1 shows comparisons in terminology.

Subjective and objective terms also designate types of tests. Objective exams ask true-false or multiple-choice questions. Tangible factors in answering and grading are maximized. Subjective exams may be characterized as essays. Written assignments in the form of term papers are also classified as subjective. Grading is more dependent on intangible factors.

Responding to an essay item requires writing and recall. Recall is considered by many experts to be superior to recognition as a form of memory (Blood & Blood, 1972) thus contributing to learning for the student.

There are basically two methods used to score essays. They are the 1) holistic or global approach and 2) the analytical approach (Reiser, 1980).

The global approach is highly subjective. This technique involves forming general opinions with no explicit criteria for evaluating the worth of the essay answer (Reiser, 1980).

The analytical approach is more objective and involves four steps. These are: 1) delineate the features the answer ought to include, 2) specify criteria for determining the adequacy of each feature, 3) assign points to each of

Table 1
Synonyms and Antonyms For
Subjective and Objective

Antonyms in Rows	Synonyms in Columns	
	subjective	objective
	personal	impersonal
	biased	unbiased
	abstract	concrete
	prejudiced	unprejudiced
	unjust	just
	unfair	fair
	theoretical	practical
	partial	impartial
	influenced	uninfluenced
	emotional	detached
	intangible	tangible

the criteria, and 4) use the criteria to determine the student's score (Reiser, 1980). Reiser (1980) adds some principles to be applied. These include the following: rate each essay prior to identification of author; score each student's answer to one question before reading answers to the second essay question; change the order in which papers are read from one essay question to the next.

Teachers are clearly very vulnerable when grading essay items. The evaluation must be defensible and accurate. Still subjective assignments can be valuable learning experiences for students. Evidence from the literature clearly specifies that rather than the abandonment of subjective assignments, a better solution to the low reliability problem is to attempt to increase reliability in some way. To do this would involve further education offering tips that will likely lead to more uniformity between raters. Suggestions have been made in the existing literature.

Criteria need to be clearly delineated prior to the evaluation of any paper. In a study conducted by Meredith, Dunlap and Baker, it was found that narrative data can be reliably coded and that objective and subjective features are distinct, identifiable structures (Meredith, Dunlap & Baker, 1982).

Computer Use in Nursing Education

The first electronic computer was put into use less than thirty five years ago on the campus of the University of Pennsylvania. Today academic computing is a billion dollar business. Most institutions of higher learning have their own computer or remote access to a computer facility. A survey conducted in the 1974-75 academic year indicated that 58% of the nation's secondary schools had some access to a computer (Gold & Duncan, 1980).

The use of the microcomputer was first introduced in nursing education in 1972. The significance of this machine lies in its capabilities, its relatively low cost and its mobility (Mirin, 1981). The computer is an important basic tool for education.

Knowledgeable observers have indicated that various uses of the computer in nursing should be explored. Peter Olivieri, Chairman of Boston College's Computer Science Department, has worked with educators in the Boston College School of Nursing to develop their skill in computer use. He lists a variety of uses for both students and faculty. Computer applications in education are limited only by the creativity and imagination of the teacher (Mirin, 1981).

Nursing education faces the same demands as other areas in higher education. With the information explosion,

teachers are expected to provide more substance and at the same time to tailor their instruction to the specific preparation and motivation of a given student (Mirin, 1981). Nursing has traditionally planned a low student-teacher ratio making the education labor-intensive and more expensive. Also, teachers have encouraged students to be dependent upon them, since instructors determine objectives to be met, the sequence and courses of study and the like (Silva, 1973). Methods to increase educators' proficiency need to be explored.

Mary Cipriano Silva was among the first nurse educators to write about computer use in teaching. Silva (1973) stated that "History has shown that man's vision in regard to the outcomes of new technologies is frequently limited" (p. 94). She further stated that nurses need to prevent a computer technology crisis by examining "critically the effects of computerized curriculums on the teaching-learning process" (Silva, 1973, p. 94). "Computers have great potential for helping students to learn and freeing teachers to teach. But they must be used prudently and intelligently so that the profession of nursing is enhanced and human dignity and autonomy are not sacrificed" (Silva, 1973, p. 98).

In 1979 Allen, a professor of urban education and former Dean of the School of Education at the University of Massachusetts, projected five major changes in education during the next fifty years. Among them were technological breakthroughs in electronics/computers/communications and in biomedical/genetic areas. These major forces will dictate change. There will likely be new types of computers every five years and greater numbers of home computers. The key that may revolutionize education is the computer's ability to control, store and retrieve data and to execute lightning-quick calculations (Ackerman, 1982).

Interestingly enough, computers have been linked to reduced budgets. Winona B. Ackerman (1982) says that shortage of dollars may force the use of greater technology in education. Human labor is one of the most expensive commodities in an organization and education is labor-intensive. Computers can supplement instruction as well as aid the instructor in various ways. Teacher acceptance is the greatest challenge to increasing use of computers. But he adds that increased use of technology may force better instruction: "It does not presuppose a less humanistic education (Ackerman, 1982).

Ackerman (1982) says, "It is not technology for technology's sake, however, that will force acceptance of

the newer technologies, but the principle of the substitution of capital for labor" (p. 62). Since nursing education is expensive, it is important that "pro-action" is taken now instead of reaction later. Nursing must control the use of computer technology instead of computer technology controlling nursing.

Many nurse educators are admittedly technologically illiterate. Upcoming students will be more knowledgeable than nurse instructors on uses of the computer. Some individuals claim that the rate of productivity change in higher education has not kept pace with the rate of productivity change elsewhere in the economy (Ackerman, 1982). Gold and Duncan (1980) conducted a survey of university and college programs in health. Questionnaires were sent to the 179 schools on the American Association of Health Education (A.A.H.E.) list of health education programs. There was a 53% response rate. Results indicated that health education has made very little use of the computer.

The predominant theme in the literature for computer use in nursing education focuses on computer-assisted instruction (CAI). Though the advantages of CAI are many, this method has been criticized in that the human element is lacking. The student interacts with a machine, not another

person. There are other ways to use the computer in education. The computer can be used by the instructor to enhance his/her effectiveness in the teaching process. Student-teacher time could be used for clarification and discussion rather than transmission of data.

Basically there are two broad categories of computer utilization. They are 1) computer-assisted instruction (CAI) and 2) computer-managed instruction (CMI).

Computer-assisted instruction is sometimes referred to as computer-assisted learning (CAL). This consists of all the methods by which students may use the computer to enhance their learning. These techniques are classified into a) drill and practice sessions, b) tutorial programs or simulations, and c) artificial intelligence.

Computer-managed instruction are techniques that aid the instructional process. Microcomputers can be used in a number of ways to enhance classroom lectures and to reduce the amount of time spent by instructors on menial tasks, thus allowing more time for students. A list of some of these techniques follows:

- preparing exams from a test bank

- scoring of exams and papers, computing averages while weighting scores, and assigning grades at the end of the course

- codifying group trends so that teaching may be focused on the most troublesome areas

individual instructional prescriptions for each student in a class, based on a pretest, achievement test scores and other relevant input

graphic material and computer-controlled slide shows for classroom lectures

record keeping

statistical analysis and research

word processing

as a tool in grading subjective papers

Nursing education might consider a new philosophy in planning computerization for curriculums and for instructors. As always the philosophy would certainly need to include the nature of mankind, health, nursing and learning. In addition the philosophy should address the function of computers in each of these areas.

Faculty roles may need to be redefined. In the past computers have been criticized because the human element is lacking. An instructor's task may need to be reconsidered in terms of the human affiliations involved. The skill most needed in using a microcomputer in teaching is to minimize the mechanization and maximize the human relationships.

Microcomputers will have significant implications primarily in their increased availability, ease and diversity of use and decreased cost. Educators can only conclude that it is time to learn to know and like and use

computers. Creativity in program use will contribute to a more productive and gratifying professional life.

Linking Microcomputer Use With Subjective Assignments

An untested option for facilitating the process of grading subjective papers is to develop a microcomputer software program. Instructors would still read students work but their evaluation would be very structured by a computer guided outline. Students would then receive a copy of the printout containing instructor comments and points earned. The instructor will have an identical copy of feedback he/she gave to the student. To the extent that the criteria reflect a student's writing ability and to the extent that the measurement is sensitive enough and analysis powerful enough to identify positive and negative capabilities, the feedback will be objective. In addition, the computer program could do a cross analysis between any number of papers, total number of points earned, and calculate all grades. This would offer additional data and save instructor time.

The microcomputer program may reduce the allowance of irrelevant factors that influence grading. Instructors will be faced with addressing each criteria and only that criteria as points are assigned. Without the computer there

may be a temptation to place too much emphasis on other factors. For example, if spelling, grammar and syntax are three criteria, they ought to be evaluated once and ignored while content is being rated. This may be more apt to occur using the microcomputer as a tool than if no other aid were used to grade the paper.

As noted earlier, a few studies have reported on the analysis of essays by main frame computers involving content analysis. While this might be a desirable goal for the future, it is not realistic at this time. Papers would need to be entered into the computer either by the student or a secretary, adding to time frames. Terminology is too vast and requirements for nursing papers too diverse to program the computer to read and evaluate content for a variety of assignments.

Additionally, this researcher's experience has been that students become very upset to think that the instructor has not even read their paper, after all the effort they have put into it. Students do not want the results of their endeavors to succumb to a machine. Using the microcomputer as a tool to facilitate the grading process is the most logical step at this time. Future circumstances may reveal expansion of this notion.

Summary

Subjective assignments and computer use in nursing education were each reviewed as two distinct areas. Attempting to combine these two concepts is futuristic and essential. Written compositions are clearly valuable aids for student learning. Teachers defense of their grading process of these subjective papers must be invincible.

Microcomputers are accurate and time saving instruments or tools. Nurses must devise useful ways in which these instruments can serve them, rather than being controlled by the computer industry. Utilizing the microcomputer as a tool to grade subjective papers is but one technique of many that need to be developed.

CHAPTER 3

PROCEDURE FOR THE COLLECTION AND TREATMENT OF DATA

Chapter Three addresses the methodology used in the project, including setting, population and sample, and instruments. The process used for the data collection is explained, along with a synopsis of the pilot study. Finally, treatment of data is presented.

The characteristics of an experimental study are manipulation, control and randomization. Quasi-experiments lack at least one of these three characteristics (Polit & Hungler, 1978). This study was quasi-experimental since randomization was lacking. Subjects served as their own control but were not randomly chosen. Interested individuals who could schedule the required time served as subjects. Treatment was the demonstration and subsequent use of the microcomputer software programs to grade subjective papers.

Setting

The setting was in various rooms at 24 different baccalaureate nursing schools in the states of Minnesota and Texas. The researcher collected data at 25 schools but

missing information from participants necessitated the deletion of one institution. Physical environment varied somewhat depending on the resources of each school. All rooms had good lighting and at least one electrical outlet.

Population and Sample

A feasibility survey was conducted during the fall of 1983 among faculty members of National League for Nursing (NLN) accredited baccalaureate nursing programs in the states of Minnesota and Texas. The purpose of the survey was to determine if instructors would be interested in participating in a study on the use of microcomputers as a tool that can serve them in their role as nurse educator. See Appendix A for cover letters and instrument utilized. Light blue paper was used and self-addressed stamped blue envelopes were enclosed. Stamps were commemorative with a floral design spelling the word "love". Survey packets were sent to the deans of each school with the request that the packets be distributed to each faculty member. The number of faculty members at each school was obtained from the *American University and Colleges Book*, Twelfth Edition, 1983. Two extra packets beyond that number were enclosed for each school. A total of 870 questionnaires were sent to 29 schools, 11 in Minnesota and 18 in Texas. As of January 10, 1984, 424 questionnaires (or 48.74%) were returned from

25 schools. Of those returned, nine were unusable. Thus the results of the survey are based on an N of 415 respondents.

Based on the feasibility survey it was determined that a sufficient number of faculty members were willing to participate in a project designed to refine computer software used in the grading of written papers. Two hundred forty-six (59.3%) agreed to participate and two hundred twenty-nine (55.6%) furnished their names and addresses. Several individuals requested further information. Many of those who would not participate explained that they were doctoral students and had no extra time. The resulting sample used in the project was convenience.

Continual planning occurred but still considerable time elapsed between first contact with willing participants and their final activity in the study. Therefore, a letter (see Appendix B) was sent to these faculty members in February, 1984 in the hope of retaining them for the project which was to be conducted in the fall and early winter of 1984-85.

Protection of Human Subjects

The Human Subjects Review Committee of Texas Woman's University examined a description of this study and determined that no special provisions apply. See Appendix C for a copy of the letter received from the Committee.

Instruments

According to the Feasibility Survey, 68.9% of the respondents had access to a microcomputer. Of those, 73.1% had access to either an Apple II Plus or an Apple II e. Therefore, these instruments were used. The researcher traveled with two Apple II Plus microcomputers for use in schools that did not own an Apple or had none available.

The software was written in Applesoft Basic intended for an Apple II Plus machine with 48K and one disk drive. The programs were named OLGA(c) which is an acronym for the

O riginal
L arson's
G rading
A ssistant.

OLGA encompasses the entire process of grading subjective papers using the microcomputer as a tool. Three separate software programs, two of which share common text files, were utilized by the subjects. In the first program named "OLGA(c)", the participants were introduced to OLGA and viewed a list of objectives. In the second referred to as "OLGA's Entry System(c)", individuals entered their evaluation of four student papers. The third program, called "OLGA's Stat Evaluator(c)", statistically analyzed the grading.

A videotape was developed to demonstrate use of the software. Each school provided a videocassette recorder for

viewing the videotape by the participants. The videotape was reproduced on both 1/2 and 3/4 inch tapes to accommodate different systems. Since the amount of experience operating a microcomputer varied considerably, the material was presented in nontechnical terms. Thus, individuals who had little or no experience running microcomputer software could still participate in the project. See Appendix D for a narrative of the videotape demonstration.

An evaluation tool was developed for subjects to complete at the close of their participation in this study. The purpose of the tool was to assess the instructors' reactions to this approach for grading subjective papers, to the software programs used, and finally, to the presentation itself (see Appendix E).

Data Collection

Additional information about the current use of subjective assignments in nursing education was obtained in the feasibility survey. Of the 415 respondents, 96.9% felt that subjective assignments can be valuable learning tools for nursing students. Of the 93.3% who required students to write subjective papers, 77% assigned nursing care plans. Thus, selection of the client care plan was deemed appropriate for the subjective grading process used in the study.

The next step was to develop the necessary materials for subjective evaluation. These materials included a quiz (see Appendix F), nursing care study (see Appendix G), nursing care plans from eight students (see Appendix H), and aids for the participants. The instructions that evaluators were given for grading the papers were based on the five step nursing process (Carlson, Craft & McGuire, 1982), Roy's Model of Adaptation (1981) and the Ziegler, Vaughan-Wrobel and Erlen (1985) criteria for writing nursing diagnoses (see Appendix I).

To obtain interrater reliability on the eight nursing care plans, seven individuals who were past or present members of nurse faculties served as raters. Two of these nurses had earned a doctoral degree and the other five were students currently enrolled in a doctoral nursing program. Both psychiatric and medical-surgical backgrounds were represented. Geographically they were from five different states. Interrater reliability varied from .714 to 1. Those items that rated lower than .714 were modified.

Student papers were then divided into two sets of four. Papers #1 and 5, 2 and 6, and 4 and 8 were matched for total points earned. Students #3 and 7 are identical. The first set of papers #1 through 4 were graded by humans only and

the second matched set of papers #5 through 8 were evaluated by the mechanicohuman system.

Four care plans and criteria for grading were sent or delivered to each participant approximately two weeks (or less for special requests) prior to the grading workshop. In the cover letter (see Appendix J), participants were requested to rate the four care plans and to document the amount of time it took them. Additional material (see Appendix K) describing the grading criteria was enclosed. Participants were also sent a "Summary of Grades" (see Appendix L) to assist them in calculating descriptive statistics. This packet of material was returned to the researcher at the grading workshop.

The seminar on grading subjective papers using the microcomputer began with a 43:35 minute videotape in which the use of the software programs was demonstrated. In all, 67 separate seminars were conducted. Subjects were provided with the opportunity to actually practice on the microcomputer while viewing the demonstration in 46 of the 67 showings. This practice run was not possible in the other 21 instances because the videocassette recorder could not be used in the same room with the Apple microcomputers. In those 21 cases, a xerox copy of the Apple keyboard was

provided to subjects for easy and periodic reference throughout the demonstration.

Participants were then given the second set of four student papers to grade using the microcomputer software programs. These papers were based on the same nursing care study as the first set and were evaluated using identical criteria. This task was timed by the researcher.

At the close of the session, participants were asked to provide a written evaluation of this approach to subjective grading, the microcomputer software and to the presentation itself (see Appendix E). Suggestions for improvements were solicited.

The two sets of nursing care plans were compared for reliability and for time frames. The research hypotheses were that there would be greater reliability and that there would be a reduction in required time to complete the task using the mechanicohuman system. In the null hypothesis form these would be stated as follows:

1. There will be no difference in reliability of scoring of nursing care plans graded by a mechanicohuman system and those graded by a human alone.

2. There will be no difference in the amount of time taken to grade nursing care plans by the mechanicohuman system and by the human alone.

Pilot Study

One school was selected for the purpose of conducting a pilot study during the month of March, 1984 to test the hypotheses. Potential participants were contacted and given further information (see Appendix M). A convenience sample of ten was obtained. There was a considerable amount of missing data from one subject so results are based on an N of nine. A minimum amount of data was lacking from three additional subjects. The Biomedical P Series (BMDP) program Procedure AM (PAM) was utilized to obtain an estimate of the missing data. PAM was used because the missing information was variables that covary.

Years of teaching experience of participants ranged from one and one-half years to twenty years. Four of these instructors had earned a Ph.D.; the other five had completed their Master's.

On the basis of the pilot study, there was a failure to reject the first null hypothesis concerning reliability of scoring of written papers. The second null hypothesis regarding differences in time was rejected at the .01 level.

All nine subjects felt the demonstration was adequate and all nine believed the software would be of use to them in the future. Six faculty members indicated they enjoyed the exercise.

Five subjects stated they had difficulty with the criteria for the written papers. Comments reflected differing views concerning nursing models and nursing diagnoses. Based on this feedback, the packet of material provided to participants was revised.

The researcher also discovered various ways in which the demonstration of the microcomputer software programs could be improved. For example, written instructions in abbreviated form enhance verbal directions. Also, oral explanations must include familiar terminology and convey clear but concise information.

Treatment of Data

The mean and standard deviation of the first set of four papers was compared with the mean and standard deviation of the second set of four papers graded by each faculty member. A *t*-test provides the level of significance of the difference between the two means (Hays, 1981).

Correlations were calculated for each of the matched sets of papers. A table that places subjects in rows and student scores in columns reveals how aspects of the written papers correlate from student to student. In other words, the reliability of the grading of that participant is ascertained. A table with student papers in rows and scores in columns illustrates the correlation between raters, as in

interrater reliability. Each of these correlations was calculated.

The total amount of time taken to grade four papers and calculate the formulas for a statistical analysis by hand was compared to the same tasks using the software programs. Time was recorded in number of minutes. The level of significance was determined by the *t*-test. Additional comparisons that were made include the following:

1. Number of minutes required to evaluate four papers excluding the statistical analysis by hand versus using the microcomputer.
2. Number of minutes to calculate the descriptive statistics by hand with amount of time using the microcomputer.
3. Number of words and letters written by hand versus number written when using the software program.
4. Number of errors in summing grades by hand with the microcomputer programs.

Many variables existed for which there was no control. The multiple regression equation provides an index of the significance of two or more predictor variables on a dependent or criterion measure (Hays, 1981). The square of the multiple correlation coefficient or *r*-squared reveals the variation on the dependent variable that can be

explained by the predictor variables (Edwards, 1979). Therefore, a multiple regression was done to discover if experience using a microcomputer might be an accurate predictor of the amount of time used to grade papers excluding statistical analysis. Other predictor variables that were examined were typing skills, length of teaching experience and highest degree earned.

CHAPTER 4

ANALYSIS OF DATA

This chapter contains a report of the results of the data analysis. A description of the sample and the findings are presented, concluding with a summary of the findings.

Description of Sample

A total of 128 individuals participated in the study. Various types of data were missing from several individuals so the results are based on N's of 113 and 94. Findings related to grading papers without concern for the time requirement are based on an N of 113. The results that are dependent on the amount of time required to complete the tasks are based on an N of 94.

The following description of the sample is based on an N of 113. One hundred ten were females and three were males. Seventy three individuals represented fifteen schools in ten different cities in Texas while forty subjects were from nine schools in eight different cities in Minnesota. The length of time participants had taught ranged from six months to thirty five years, with a mean of 11.099 and a standard deviation of 7.099. The figures for

years of teaching experience are based on an N of 111 since two subjects failed to provide this information. The highest degree earned by subjects ranged from doctoral to bachelor. Sixteen subjects held a Ph.D. and eight had earned an Ed.D. Six faculty members indicated they had completed all the course work for a Ph.D. and had only the dissertation remaining. Seventy eight individuals had earned a master's degree and five held a bachelor's degree.

Findings

The first hypothesis was stated as follows: There will be no difference in reliability of scoring of nursing care plans graded by a mechanicohuman system and those graded by a human alone. This was tested by comparing the mean and standard deviation of the second set of four papers graded using the microcomputer with the mean and standard deviation of the first set of four papers graded by hand. There was an N of 113. The *t*-test revealed a nonsignificance; therefore the first null hypothesis failed to be rejected at the .05 level (see Table 2).

Correlations between each of the three sets of matched papers varied from .243 down to .178. The correlation between the two papers that were identical, papers #3 and 7, was somewhat higher at .576 (see Table 3). Additionally, there were 27 criteria questions addressed by each subject

Table 2
Comparison of Mean and Standard Deviation
By The Two Grading Methods

Grading Method	Mean	Standard deviation	t
Mean by human system	21.334	1.998	.589 NS
Mean by mechanicohuman system	21.179	1.948	
Standard deviation by human system	4.396	1.298	1.054 NS
Standard deviation by mechanicohuman system	4.025	1.423	
Tabled $t .95 (224) = 1.960$ 2 tail probability			

Table 3
Correlations Between The Matched Sets Of Papers
By Total Score Earned

Student papers	Student papers			
	#5	#6	#7	#8
#1	.178			
#2		.243		
#3			.576	
#4				.223

as they graded student papers. Correlations of each of these 27 items between the two identical papers varied from .664 down to $-.039$ (see Table 4). All of these calculations are based on an N of 113 and demonstrate the reliability of the grading by the participants.

Interrater reliability was determined through division of the number of agreements by the number of agreements plus the number of disagreements. According to Polit & Hungler (1983), this formula does tend to provide higher estimates of grader agreement. Based on an N of 113, the quotients reveal an interrater reliability varying from .762 down to .571 (see Table 5).

The second hypothesis was stated as follows: There will be no difference in the amount of time taken to grade nursing care plans by the mechanicohuman system and by the human alone. This was tested by comparing the number of minutes required to grade eight student papers, four by each method. There was an N of 94. The t -test showed a significance at less than the .001 level; therefore, the second null hypothesis was rejected (see Table 6). Eighteen of the 94 subjects, or 19.149%, did not complete the statistical analysis by hand. Of the 113 subjects, 33 or 29.204% did not complete the statistical analysis by the human system. All subjects ran the software program which

Table 4
Correlations Between The Identical Papers
By Each Criteria Question

Student paper #7						
Student paper #3	Item1	Item2	Item3	Item4	Item5	Item6
Item1	.627					
Item2		.195				
Item3			.501			
Item4				.401		
Item5					.339	
Item6						.286

Student paper #7			
Student paper #3	Item7	Item8	Item9
Item7	.621		
Item8		.664	
Item9			.644

Student paper #7					
Student paper #3	Item11	Item12	Item13	Item14	Item15
Item11	.062				
Item12		.311			
Item13			.222		
Item14				.203	
Item15					-.012

(table continues)

Student paper #7					
Student paper #3	Item16	Item17	Item18	Item19	Item20
Item16	.321				
Item17		.231			
Item18			-.039		
Item19				.169	
Item20					.159

Student paper #7					
Student paper #3	Item22	Item23	Item24	Item25	Item26
Item22	.170				
Item23		.408			
Item24			.290		
Item25				-.022	
Item26					.256

Student paper #7			
Student paper #3	Item28	Item29	Item31
Item28	.321		
Item29		.176	
Item31			.357

Table 5

Interrater Reliability On The Eight Student Papers
By Total Points Earned

Reliability On Student Papers			
#1	#2	#3	#4
0.762	0.571	0.591	0.714

Reliability On Student Papers			
#5	#6	#7	#8
0.706	0.600	0.632	0.714

Table 6

Comparison of Time Requirements Including Statistical
Analysis By The Two Grading Methods

Grading Method	Mean	Standard deviation	t
Minutes by human system	82.819	26.670	7.344 *
Minutes by mechanicohuman system	60.032	13.919	

*p < .001 d.f. = 186 1 tail probability

calculated the statistics. If individuals had finished the statistical tasks by hand, this would have lengthened the number of minutes required to complete the tasks by the human system leading to an even greater savings of time by the mechanicohuman system.

The number of minutes to grade each set of four nursing care plans excluding the statistical analysis was also compared. With an N of 94, the 2 tail null hypothesis was rejected at the .05 level and failed to be rejected at .001 (see Table 7). In other words, in comparing the human with the mechanicohuman system of grading papers, there is a difference in the amount of time required to grade the four papers at the .05 level while there is no difference in time at the .001 level, when the statistical analysis is excluded. The mean of the number of minutes to grade the set of four nursing care plans by hand was 50.862 compared with a mean of 58.043 minutes using the microcomputer.

The number of minutes to calculate the descriptive statistics by hand versus running "OLGA's Stat Evaluator(c)" was compared. With an N of 94, the *t*-test revealed a significance at less than the .001 level (see Table 8). In other words, there is a considerable amount of time saved using the mechanicohuman system for the statistical analysis.

Table 7

Comparison of Time Requirements Excluding Statistical
Analysis By The Two Grading Methods

Grading Method	Mean	Standard deviation	t
Minutes by human system	50.862	21.091	2.764
Minutes by mechanicohuman system	58.043	13.779	
Tabled t .95 (186) = 1.960	2 tail probability	*	
Tabled t .99 (186) = 3.090	2 tail probability	NS	

Table 8

Comparison of Time Requirements To
Statistically Analyze Grading

Grading Method	Mean	Standard deviation	t
Minutes by human system	31.957	13.746	21.112 *
Minutes by mechanicohuman system	0.680	0.462	

*p < .001 d.f. = 186 1 tail probability

The number of letters and words written by hand was compared with the quantity written when using the microcomputer. With an N of 113, there was a total of 32927 letters making up 6724 words written by hand, compared with 64289 letters comprising 11041 words written when utilizing the mechanicohuman system. Subjecting these figures to a *t*-test, there is a significant difference at less than .001 between the number of comments made by the human system versus the microcomputer (see Table 9). Using an N of 94, a total of 30525 characters making up 6161 words were written by hand versus 55507 characters comprising 9546 words written as comments with the mechanicohuman system. The *t*-test reveals a significance at less than .001 in number of letters and a significance at .005 in number of words written (see Table 10).

Since faculty members wrote more comments using the microcomputer, this will obviously affect the amount of time required to grade the papers. For a difference in mean time of 7.181 minutes, the student received almost twice as much feedback from the mechanicohuman system. While there was no significant saving in time at the .002 level with microcomputer assisted evaluation of subjective papers, the student received a significantly greater quantity of feedback.

APPENDIX G
NURSING CARE STUDY

Table 9
Comparison of Letters and Words Written
By The Two Grading Methods N = 113

Grading Method	Mean	Standard deviation	t
Letters written by human system	291.389	381.701	4.059 *
Letters written by mechanicohuman system	568.929	618.654	
Words written by human system	59.504	73.098	3.164 *
Words written by mechanicohuman system	97.708	105.489	
*p < .001 d.f. = 224 1 tail probability			

Table 10
Comparison of Letters and Words Written
By The Two Grading Methods N = 94

Grading Method	Mean	Standard deviation	t
Letters written by human system	324.734	407.254	3.381 *
Letters written by mechanicohuman system	590.500	644.224	
Words written by human system	65.543	77.298	2.594 *
Words written by mechanicohuman system	101.553	110.207	
*p < .001 d.f. = 186	1 tail probability	letters	
*p < .005 d.f. = 186	1 tail probability	words	

In analyzing the data, the researcher was interested in discovering the tendency for errors in totaling grades by hand. Using an N of 113, there were 452 student papers graded by the human system. Of those 452, 57 papers or 12.611% had errors in adding the total number of points earned. This involved 38 of the 113 subjects or 33.628%. Forty nine criteria questions were not addressed by the hand method involving 20 evaluators and affecting 29 student papers. Of the 452 student papers graded by the mechanicohuman system, there were no mathematical errors in scoring nor were there any criteria questions which were not addressed. This was due to the design of the software program. Each grader completed all evaluation items and total points earned were accurately calculated by the microcomputer.

A multiple regression was used to determine the effect of variables for which there was no control but which may have influenced the amount of time required to grade the four papers by the mechanicohuman system. Complete data for this statistical test was available from 94 subjects. Using the number of minutes to grade four papers excluding the statistical analysis as the criterion variable, the following four items were examined for significance as predictor variables: 1) experience operating a

microcomputer, 2) typing skills, 3) length of teaching experience, and 4) highest degree held. Results of the statistical tests revealed that only 20% of the variation in timing can be explained by the four predictor variables (see Table 11). Using just two predictors, nine per cent of the variation may be explained by experience operating a microcomputer and typing skills (see Table 12). The regression was rerun using single predictors. The results of these tests show that five per cent of the variation in time to grade four papers by the mechanicohuman system is explained by experience operating a microcomputer (see Table 13) and seven per cent of the variation is explained by typing skills (see Table 14). In other words, individuals with no experience operating a microcomputer and poor typing skill could utilize the mechanicohuman system as effectively as persons with considerable experience operating a microcomputer and excellent typing skills.

The relationship between the effective use of the microcomputer and the experience of the user is particularly interesting when one considers that most of the participating faculty members indicated very little or some experience operating a microcomputer. The breakdown is as follows: twenty six stated they had no experience operating

Table 11
Multiple Regression Using Four
Predictor Variables

Four predictor variables:
 experience operating a microcomputer (expmicro)
 typing skills (typesk)
 length of teaching experience (yrstchg)
 highest degree earned (hideg)
 Criterion variable:
 minutes to grade second set of four papers
 excluding statistical analysis - by the
 mechanicohuman system

Analysis of Variance				
Source	<i>df</i>	<i>SS</i>	<i>MS</i>	<i>F</i>
Regression	4	3574.541	893.635	5.676
Residual	39	14011.458	157.432	
Total	93	17586.000		

r-squared = .2032 *p* = .000

Regression Coefficients			
Variable	<i>Weight</i>	<i>F</i>	<i>p</i>
Expmicro	-2.453	2.333	.126
Typesk	-1.894	1.930	.164
Yrstchg	.653	10.543	.002
Hideg	-3.334	5.030	.025

Table 12

Multiple Regression Using Two
Predictor Variables

Two predictor variables:
 experience operating a microcomputer (expmicro)
 typing skills (typesk)
 Criterion variable:
 minutes to grade second set of four papers
 excluding statistical analysis - by the
 mechanicohuman system

Analysis of Variance

Source	<i>df</i>	<i>SS</i>	<i>MS</i>	<i>F</i>
Regression	2	1620.569	810.284	4.618
Residual	91	15965.430	175.444	
Total	93	17586.000		

r-squared = .0921 *p* = .012

Regression Coefficients

Variable	<i>Weight</i>	<i>F</i>	<i>p</i>
Expmicro	-2.429	2.151	.142
Typesk	-2.949	4.499	.034

Table 13

Multiple Regression Using One
Predictor Variable (Expmicro)

Predictor variable:
 experience operating a microcomputer (expmicro)
 Criterion variable:
 minutes to grade second set of four papers
 excluding statistical analysis - by the
 mechanicohuman system

Analysis of Variance				
Source	<i>df</i>	<i>SS</i>	<i>MS</i>	<i>F</i>
Regression	1	831.244	831.244	4.564
Residual	92	16754.755	182.116	
Total	93	17586.000		

r-squared = .0472 *p* = .033

Regression Coefficients

Variable	<i>Weight</i>	<i>F</i>	<i>p</i>
Expmicro	-3.449	4.564	.033

Table 14
Multiple Regression Using One
Predictor Variable (Typesk)

Predictor variable:
 typing skills (typesk)
 Criterion variable:
 minutes to grade second set of four papers
 excluding statistical analysis - by the
 mechanicohuman system

Analysis of Variance				
Source	<i>df</i>	<i>SS</i>	<i>MS</i>	<i>F</i>
Regression	1	1243.118	1243.118	6.997
Residual	92	16342.881	177.640	
Total	93	17586.000		

r-squared = .0706 *p* = .009

Regression Coefficients			
Variable	<i>Weight</i>	<i>F</i>	<i>p</i>
Typesk	-3.542	6.997	.009

a microcomputer, 42 had very little, 39 had some and 6 had considerable experience operating a microcomputer.

All subjects received the same instructions for running the OLGA programs via the videotape, regardless of their past experiences with microcomputers. According to the evaluation tool completed at the close of the grading session, 110 participants indicated that the videotape demonstration of the software programs was adequate for them to proceed on their own. One person said it was not adequate, one was unsure and one subject did not complete the evaluation tool. There are at least three advantages in having used the videotape to instruct participants in the use of the microcomputer as a tool to grade nursing care plans. They are:

1. All subjects received exactly the same information.
2. All faculty members had the opportunity to actually see OLGA's responses to user input on the video screen.
3. The length of time in minutes of the demonstration was the same for all participants. The videotape was 43 minutes and 35 seconds long.

When asked if the OLGA programs might be useful to them in the future, 99 participants said yes, 13 were unsure and one evaluation tool was not completed. No faculty member indicated that the programs would not be useful. Of the 13

who were unsure, some stated that "OLGA's Entry System(c)" would be beneficial if they could use their own criteria for grading papers. In the videotape demonstration, the researcher indicated that faculty members would be able to develop their own criteria when using OLGA programs in the future. In this study the criteria used by the evaluators had to be identical.

Summary of Findings

In analyzing the data for the first hypothesis with a *t*-test, the results indicated that there was no significant difference in reliability of scoring of nursing care plans graded by a mechanicohuman system and those graded by a human alone. This was tested by a comparison of the mean and standard deviation of the two sets of papers.

The correlations between the three matched sets of papers by total points was low at .178, .243 and .223 with the correlations between the two identical papers being somewhat higher at .576. The correlations between each item on the two identical papers ranged from -.039 up to .664. Interrater reliability ranged from .762 down to .571.

The *t*-test for the second hypothesis revealed that there was a difference in the amount of time taken to grade nursing care plans by the mechanicohuman system and by the human system at less than .001, when a minimum of

descriptive statistics are calculated. When the statistical analysis is excluded from the number of minutes to grade by each method, there is no significant difference at the .002 level. Yet instructors wrote a significantly greater number of letters in the form of comments by microcomputer than by hand at less than the .001 level. There is a significant saving of time using the mechanicohuman system for the statistical analysis.

Errors in totaling points earned were made by 33.628% of the subjects and on 12.611% of the papers graded by hand. Forty nine questions were not addressed by 20 subjects on 29 papers graded by the human system. None of these errors were made using the mechanicohuman system.

Multiple regression tests revealed that four predictor variables did not explain a significant level of the variation in the amount of time required to grade a set of four papers using the microcomputer, when statistical analysis is excluded. The four predictor variables were experience operating a microcomputer, typing skills, length of teaching experience and highest degree held by each subject. Individuals with varying amounts of experience operating a microcomputer and diverse typing skills can utilize the mechanicohuman system effectively.

CHAPTER 5

SUMMARY OF THE STUDY

Chapter Five summarizes the methodology relative to the study and to the hypotheses. A discussion of the findings, conclusions and implications, and recommendations for further study are also included.

Summary

The focus of the study was to determine if the microcomputer might serve as a tool to increase the objectivity and to save time when nurse educators grade students' nursing care plans. Objectivity was to be measured by a high reliability.

The theoretical framework on which this study was based was Norbert Wiener's theory of behavior organization called cybernetics. Wiener proposed a mechanicohuman system in which humans and machines can complement each other. Since some specific tasks are more suitable to be executed by humans and others are more amenable to machine processing, the way in which machines and humans can work together effectively must be ascertained. In this study, the microcomputer stored large amounts of data and calculated

all the necessary arithmetic formulas. The nurse educators or subjects made decisions concerning the adequacy of student performance; the important human element was preserved. Thus, humans and machines complemented each other functioning as a mechanicohuman system.

The population for this research was obtained by contacting interested faculty members at 28 NLN accredited baccalaureate nursing programs in the states of Minnesota and Texas. Interested individuals had responded earlier to a feasibility survey and had furnished their names and addresses. Results of the study are based on N's of 113 and 94. Missing data necessitated varying sample sizes.

Packets of material containing instructions and homework were sent to each subject prior to a scheduled grading session where microcomputers were used. Faculty members were requested to grade a set of four nursing care plans by hand and to calculate some descriptive statistics prior to the session. At the workshop, participants viewed a videotape demonstration of the software programs after which they graded a set of four more nursing care plans and performed statistical analysis using the microcomputer as a tool.

Discussion of Findings

The results of the t -test did not support a greater reliability in grading nursing care plans by the mechanicohuman system. The first null hypothesis failed to be rejected.

One obvious reason for obtaining a nonsignificant statistical result concerns the establishment of criteria for evaluating papers. In order to effectively evaluate subjective papers by either the human or mechanicohuman system, educators must clearly specify the criteria for assignments prior to administering them. If each of the criterion is assigned a one or two point value, the objectivity of the evaluator increases. This is because the instructor is less likely to be influenced by extraneous factors. Students will easily comprehend the measures by which their paper was graded and will develop the ability to communicate concrete information.

In this project, instructors were asked to grade nursing care plans using researcher assigned criteria that may have been unfamiliar to them. Conceivably the sheet of descriptions provided for them was not sufficient even though one and two point values were assigned to each of the criterion. The question was raised about scoring a multiple point section in which one or two items were not met. For

example, in the first section of the quiz students were asked to identify a priority, a mode of adaptation and rationale, each worth one point but totaling three points. If the student identified a problem that the instructor felt was not a priority, then should the student earn points for identifying the mode and providing rationale? These types of uncertainties need to be resolved by the instructor teaching the course prior to assigning the subjective papers to the students.

Some faculty members took issue with the criteria used. Possibly this affected the manner in which they scored student papers. This factor would be eliminated if the instructor established his/her own criteria.

While the mechanichuman system of grading papers is not irrefutably more reliable in and of itself, acquaintance with requirements to establish such a system can contribute towards greater objectivity in subjective evaluations. Perhaps using and becoming familiar with microcomputers will encourage more critical thinking. Machines must be instructed in minute detail prior to productive output. Educators made aware of this will perceive the necessity for a more thorough description of expectations and will provide a more meticulous analysis of student papers.

The t -test did support the research hypothesis that there is a reduction in required time to grade nursing care plans using the mechanicohuman system. The second null hypothesis was rejected. This was tested by comparing the total amount of time taken to grade a set of four papers and calculate the formulas for a statistical analysis by hand with the same tasks using the software programs.

One limitation regarding the second hypothesis needs to be noted. The number of minutes required to complete the tasks by hand was furnished by the subjects themselves. There may have been a variation in the manner in which individuals timed themselves. For example, some may have included the reading of the student paper in the duration of the task while others may have recorded only the minutes needed to complete "Feedback on Quiz II". The researcher did include the reading of the student paper as well as writing comments and entering points when timing by the mechanicohuman system. Further, some participants were more precise than others in recording the time used in grading papers by hand. In all of these cases the participants themselves calculated the amount of time.

A second limitation concerns the evaluator's proficiency in using the different methods at the point where timing began. The number of minutes required to read

the quiz and become familiar with the nursing care study was excluded in the time that was tested statistically.

Subjects were already conversant with the criteria when they began grading papers using the microcomputer. However, the period of time that elapsed between the hand grading and mechanicohuman system varied greatly, with some subjects completing the evaluation just hours prior to the scheduled session and others finishing several days before the workshop. Prior to using the microcomputer for evaluation of student papers, faculty members needed to become acquainted with the software program itself in order to effectively utilize it. This time was not included in the statistical test. While preparation was essential prior to grading papers by either method, the requirements were not identical.

In testing the difference in amount of time to grade the four nursing care plans excluding the statistical analysis, there was a difference at the .05 level but no difference at the .002 level of significance. However, the quantity of feedback provided for the student was significantly greater using the mechanicohuman system and this feedback was provided in approximately the same length of time. No judgment was made as to the quality of the feedback.

A majority of subjects indicated that they ordinarily do not analyze their grading process as they were requested to do for this study. Of the 113 participants, 29.204% did not complete the two page "Summary of Grades" sheet. Yet statistical analysis is precisely what will aid educators in improving the reliability of grading criteria. The microcomputer provides the means for quick, easy, and accurate compilation of statistics.

Using the microcomputer as a tool provides educators with at least seven advantages. First, comments can be easily changed. Second, there is no need to be concerned about legibility. Third, students are furnished with a clean copy of the instructor's evaluation. Fourth, the teacher will have an exact record of what she/he told the student. Fifth, instructors may address criteria questions in any order and even score one section of all papers at one time. Sixth, total points and assigning grades will be calculated accurately. Seventh, the item analysis will assist the faculty member in determining the validity of the criteria questions. There is no doubt but that the microcomputer can serve as a tool in evaluating subjective papers.

Conclusions and Implications

The major conclusion resulting from the research is that nurse instructors and microcomputers can work together more effectively than the teacher alone to save time in the grading of written compositions. After just a 43 minute and 35 second demonstration, subjects utilized the mechanicohuman system in a productive manner. In a reduced amount of time, faculty members graded four nursing care plans *and* ran the statistical analyses software. The statistics program is unequivocally the technique that will assist educators in analyzing their own criteria. Requirements for subjective papers may or may not need to be modified depending on the results of the statistical tests.

Since there is a savings of time after only a 43:35 minute videotape demonstration of the software programs, the researcher must conjecture whether this instruction time may also be reduced. Additionally, faculty members graded just four nursing care plans. When users become more acquainted with running the OLGA programs there may be an even greater savings of time as more papers are evaluated.

The implications of economizing on menial tasks are important. Nurse educators will be free to spend more time with students and to nourish them in the human element in nursing. Wiener's theory of cybernetics will be

exemplified. Advances can be made in the "human use of human beings."

The research did not support the proposition that the mechanicohuman system would be more effective than the human system in improving the objectivity of the grading of subjective papers. This may be partly explained by the fact that faculty members were not free to develop their own criteria or grade their own student assignments. One can only speculate as to the outcome had the subjects been allowed to evaluate material which they themselves had taught. The study does corroborate Meredith, Dunlap and Baker's (1982) findings that narrative data can be coded and that subjective features are distinct, identifiable structures.

Almost all of the participants were enthusiastic about the future use of OLGA. Of the 113, 89 subjects wrote additional favorable comments and helpful suggestions regarding the use of the mechanicohuman system.

With the written feedback and time saving potential, learning at prime times will be more feasible. Instructors may be able to have more flexibility in scheduling and planning grading chores at a prime time for them. Students will be able to review written microcomputerized comments at a prime time for them.

The efficaciousness of this software program has numerous implications regarding the assignment and grading of subjective papers. Increased familiarity with grading by the mechanicohuman method will improve the proficiency of the evaluators which, in turn, will lead to a more efficient software tool. The potential for growth exists for students, for evaluators, and for OLGA when:

THE MICROCOMPUTER IS A TOOL - NOT A TOY.

THE MICROCOMPUTER SERVES THE USER-

THE USER DOES NOT SERVE THE MICROCOMPUTER.

*THE MICROCOMPUTER SAVES TIME ONLY IF IT IS
USED PROPERLY.*

Recommendations For Further Study

Further research is recommended based on the results of this study. They are:

1. Replicate the present study utilizing user created criteria for evaluating papers and for determining the grade earned by the student.
2. Conduct a longitudinal study using individuals who are using the mechanicohuman system to determine if there is a greater time savings with increased familiarity running the software programs.

3. Conduct a study to determine the average length of time required to learn how to run the OLGA programs before the payoff in time savings begins.

4. Replicate the present study with the addition of the discriminate function test to the statistical analyses.

5. Repeat the research using a glossary function for comments made frequently and for referring students to literature sources for correct responses.

6. Conduct a longitudinal study utilizing individuals who are using the mechanicohuman system to determine if reliability improves.

APPENDIX A
COVER LETTERS AND QUESTIONNAIRE USED
FOR FEASIBILITY SURVEY

October, 1983

To the Dean or Director of the Nursing Program:

Your assistance is requested in seeking the views of nursing instructors regarding the use of microcomputers as a tool for nurse educators. I have enclosed several copies of a cover letter and survey instrument. The cover letter describes the purpose of this survey.

Since I do not have access to the names of faculty members and because some individuals may wish to remain anonymous in their responses, I felt it would be appropriate to send material to you. I would appreciate your distributing one copy each of the cover letter, Feasibility Survey, and self-addressed stamped envelope to each member of the nursing faculty at your school, including yourself. The questionnaires can be returned separately in the envelopes provided. I would like to receive the completed surveys by October 24, 1983.

If you need more copies, I would be most happy to send additional sets of survey material. Thank you for any help you give me in this project.

Sincerely,

Carol E. Larson, RN, MPH
2221 North Bell Avenue, Apt. 101
Denton, Texas 76201
Phone: (817) 387-1817

October, 1983

Dear Nurse Educator:

Are you hesitant about giving essay-type assignments because of the time and effort required to grade them? Are you interested in learning how you might facilitate the process of evaluating subjective papers? As a nursing instructor and computer enthusiast, I have asked myself these questions. I am intrigued with the manner in which microprocessors can be of assistance to educators and am developing a program for computer managed instruction. Your ideas are essential in attempting to establish a quality program. The purpose of this survey is to determine if you are interested in participating in a study on the use of microcomputers as a tool that can serve the nurse educator.

The enclosed questionnaire should take less than ten minutes to complete. It is the preliminary portion of a study to be conducted during the school year 1984-85. The purpose of the 1984-85 project is to establish the feasibility of using a microcomputer for assistance in grading subjective papers in nursing. Your opinions are important in helping to design computer software that may be of use to you in the future.

Presently I am a full-time doctoral student in the nursing program at Texas Woman's University. This preliminary survey will fulfill partial requirements for one of my nursing classes. I plan to conduct a pilot study during the spring semester, 1984. If all goes as anticipated, the final portion of this study will take place during the fall semester, 1984 and will serve as my dissertation topic.

Your input will be of value in refining computer software that will aid nursing educators in evaluating essay-type assignments. Responses will be treated anonymously. The code number on the questionnaire indicates only the name of the educational institution. Ideas are being sought from faculty members of NLN accredited

Nurse Educator

-2-

October, 1983

baccalaureate nursing programs in the states of Minnesota and Texas. If you are interested in participating in further activities relating to this study, it would be necessary to obtain your name and address for future mailings. Enclosed is a self-addressed stamped envelope for your convenience in replying. It would be appreciated if the questionnaire could be returned by October 24, 1983.

Thank you for any consideration that you may give to my survey.

Sincerely,

Carol E. Larson, RN, MPH
2221 North Bell Avenue, Apt. 101
Denton, Texas 76201
Phone: (817) 387-1817

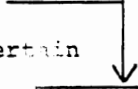
FEASIBILITY SURVEY

Your responses to the following questions will help to determine the practicality and design of future microcomputer software that may streamline the grading of written papers in nursing and prove to be an effective time-saver.

Instructions: Please circle the appropriate number in response to each pertinent question.

1. Do you have access to a terminal which can be linked to a main frame computer?

1. Yes
2. No
3. Uncertain

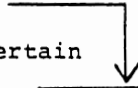


If Yes: What model is the main frame?

1. IBM
2. DEC
3. Other (Please Specify) _____
4. Uncertain

2. Do you have access to a microcomputer?

1. Yes
2. No
3. Uncertain



If Yes: What model microcomputer is it?

1. Apple II-Plus
2. Atari-800
3. Texas Instruments
4. TRS-80 (Radio Shack)
5. Other (Please Specify) _____
6. Uncertain

3. Have you had experience operating a microcomputer?

1. Considerable
2. Some
3. Very Little
4. None (If None: Please skip question 4 and go directly to question 5 on page 2.)

Feasibility Survey (Cont'd)

Page 2

4. Have you used the microcomputer in your position as a nurse educator?

1. Yes
2. No

If Yes: How have you used it?
(Circle as many as appropriate)

1. To grade objective exams
2. To grade subjective exams or papers
3. Other (Please Describe) _____

5. Do you feel that subjective assignments can be valuable learning tools for nursing students?

1. Yes
2. No

6. Do you require your students to write subjective papers?

1. Yes
2. No

If Yes:

- a. What method of writing is assigned?
(Circle as many as appropriate)
1. Essay exams
2. Nursing care plans
3. Client case studies
4. Nutrition papers
5. Other (Please Specify) _____

- b. What approach do you use in evaluating written compositions?
1. Holistic (Analysis for total impression it creates)
2. Analytic (Specification of and assigning points to criteria)
3. Combination of Holistic and Analytic
4. Other (Please Describe) _____

Feasibility Survey (Cont'd)

Page 3

7. If you were in a position to use a microcomputer as a tool and if there were a program available to assist you in rating subjective student assignments, would you use such a program?

1. Yes
2. No
3. Uncertain

If Yes: Would you assign more subjective papers than is your current practice?

1. Yes
2. No
3. Uncertain

8. Does this trend-setting concept intrigue you to the point where you wish to be an active participant in the preliminary testing of microcomputer software during the next year?

1. Yes
2. No

If Yes: You may be invited to attend a 5-6 hour one day session to be held on or nearby your campus. Prior to the seminar, you will be given homework that will take approximately 2-3 hours to complete. Given this information, please respond to the following item:

Could you devote approximately 7-9 hours of time to this project?
1. Yes
2. No

If you aspire to being a pioneer in this field and wish to participate and/or desire further information, please indicate your name and address for future contacts. If you desire that your response to this survey remain anonymous you may send your mailing address in a separate envelope.

If you have any additional comments or suggestions, please feel free to write them on the back of this sheet. Thank you for your opinion and time.

Sincerely,

Carol E. Larson

APPENDIX B

FOLLOW-UP LETTER OF FEBRUARY, 1984

February, 1984

Dear Nurse Educator:

It is with much enthusiasm that I write this letter to you following your response to my "Feasibility Survey." You are one of many who are willing to participate in the preliminary testing of microcomputer software that may streamline the grading of written papers in nursing and prove to be an effective time saver. Your responses and comments have been very helpful.

Current plans are to conduct the bulk of the one day sessions during the fall term of 1984. A pilot study will be conducted this spring. This message is to convey my sincere appreciation for your response. You may expect to hear from me later this year concerning details of your participation. Your willingness to be of assistance is very important to me; therefore, if you should change your address kindly notify me at one of my addresses listed below.

Thanks again.

Sincerely,

Carol E. Larson
2221 North Bell Ave., Apt. 101
Denton, Texas 76201
Home Phone: (817) 387-1817
Until May 15, 1984

After May 15, 1984
Carol E. Larson
Route 4 Box 29
New Ulm, Minnesota 56073
Home Phone: (507) 354-8907

APPENDIX C

LETTER FROM HUMAN SUBJECTS REVIEW COMMITTEE

TEXAS WOMAN'S UNIVERSITY
Box 22939, TWU Station
RESEARCH AND GRANTS ADMINISTRATION
DENTON, TEXAS 76204

HUMAN SUBJECTS REVIEW COMMITTEE

Name of Investigator: Carol E. Larson Center: Denton
Address: Route 4 Box 29 Date: 7-20-84
New Ulm, Minnesota 56073

Dear Ms. Larson

Your study entitled Microcomputers As A Tool In Grading Subjective
Papers

has been reviewed by a committee of the Human Subjects Review Committee and it appears to meet our requirements in regard to protection of the individual's rights.

Please be reminded that both the University and the Department of Health, Education, and Welfare regulations typically require that signatures indicating informed consent be obtained from all human subjects in your studies. These are to be filed with the Human Subjects Review Committee. Any exception to this requirement is noted below. Furthermore, according to DHEW regulations, another review by the Committee is required if your project changes.

Any special provisions pertaining to your study are noted below:

 Add to informed consent form: No medical service or compensation is provided to subjects by the University as a result of injury from participation in research.

 Add to informed consent form: I UNDERSTAND THAT THE RETURN OF MY QUESTIONNAIRE CONSTITUTES MY INFORMED CONSENT TO ACT AS A SUBJECT IN THIS RESEARCH.

 The filing of signatures of subjects with the Human Subjects Review Committee is not required.

 Other:

XX No special provisions apply.

cc: Graduate School
Project Director
Director of School or
Chairman of Department

Sincerely,

Donald E. Stahl
Chairman, Human Subjects
Review Committee

at Denton

8/10/82

APPENDIX D
NARRATIVE OF THE VIDEOTAPE DEMONSTRATION

Narrative of Videotape Used For Demonstration
of OLGA Software Programs

Welcome to the wonderful world of microcomputer use. Today you will have an exciting opportunity to test microcomputer software that may be a useful tool in grading essays or subjective papers. I believe that the skill most needed in using a microcomputer in teaching is to minimize the mechanics of its use and to maximize human relationships. Hopefully this can be demonstrated today.

Thank you for being so willing to help in this project. I really appreciate all the time you've invested and your expert opinions. At the close of today's session, you will be given an opportunity to offer further comments on your experiences. Please feel free to share your ideas. Each of you possess a wealth of knowledge and it is gratifying when you contribute your insights.

The impetus to initiate this project came in the fall of 1980 with the purchase of an Apple II Plus microcomputer. I was a faculty member of the School of Nursing at Mankato State University in Mankato, Minnesota. The discovery was soon made that microcomputers could be used in numerous ways.

One aid that I felt would really be useful is if there would be some way to decrease the amount of time spent on grading subjective papers. I'm sure all of you have had experiences similar to mine. There were approximately 65 students in class. There were some objectives that I felt could best be met by assigning students to write a paper - or best tested with essays. Yet the burden of grading 65 papers seemed insurmountable. A speculation was made that the microcomputer could be of assistance. A colleague wrote a program for me and I have used it ever since. The program has been modified many times and that has led to this point today.

One of my fears is that you may believe that the microcomputer will read the papers and do all the work. At this point that is not a realistic expectation. I believe we need to retain the human element but economize on the time consuming menial tasks. Additionally, my experience has been that students who think that their efforts have succumbed to a machine become very upset. Students expect instructors to offer a fair evaluation based on objective personal opinions - not that of a machine.

I know that the amount of experience operating a microcomputer varies greatly for each of you. I beg the

indulgence of those of you who have had more experience for just a few brief moments while I define the units.

This is the keyboard unit which contains the microprocessor that is connected to the disk operating system sometimes referred to as the DOS. The DOS is like a tape recorder with the potential to search out and play back materials that have been saved on magnetic disks. These files are saved on 5 1/4" floppy diskettes and are analogous to files that you keep in your filing cabinet. Material is viewed on a monitor similar to this. This monitor is larger than many. A blinking cursor shows you the point at which you enter information.

The xerox copy of the Apple keyboard is provided for you for easy and periodic reference during this demonstration. As you can see, the keyboard is similar to a typewriter. You will be entering data much like you would type but you will not need to use the shift key for uppercase letters. All letters will appear in the capital form. You will need to know the location of the return key and maybe the two arrow keys and the control key. The return key is on the right side of the keyboard. The arrows are also on the right side of the keyboard. The arrow pointing left is similar to a backspace key and when pressed moves the blinking cursor to the left. The arrow pointing

right moves the cursor to the right. The control key is labeled "ctrl" and is located on the left side of the keyboard and will be explained later.

To begin using a program, it must first be loaded from the floppy diskette into the microcomputer. To do this, simply insert the diskette into the disk drive, close the disk drive door and turn the machine and monitor on. You will see a catalog which gives you a choice of files or programs to run. As previously stated, you may think of these programs as containing information you might have in file folders in your filing cabinet.

The acronym, OLGA, appears in the name for three separate programs and symbolizes the

O riginal
L arson's
G rading
A ssistant,

referring to the entire process of grading essays. The form in which the OLGA programs are presently written allows for the control of many variables for tighter testing.

Note also that a "c" in parenthesis appears behind many of the programs. This is the legally acceptable symbol made by the microcomputer representing the copyright sign.

The first program we will run is OLGA(c) listed beside number 2 in the catalog. This program is an introduction to

the grading tool. You will be introduced to OLGA and view a list of objectives.

I'm sure you are all familiar with the cabbage patch dolls. Well, OLGA is Scandinavian and is really a "lefse patch scholar." Lest anyone not know about lefse - it is a Norwegian unleavened bread made with potatoes and flour and some seasonings. Now let's see OLGA(c).

Run OLGA(c). When finished state - And that concludes OLGA(c).

The two programs or files that you will be given the opportunity to utilize today are OLGA's Entry System(c) and OLGA's Stat Evaluator(c). Let me demonstrate each of them for you. After the demonstration and a trial run, you will be provided with four more papers to grade using OLGA's Entry System(c). These papers are from the same assignment of which you have already graded four papers by hand. The papers you evaluate today are based on the same Nursing Care Study and the same criteria as the ones you evaluated prior to this seminar.

First, you will need to know that when the disk drive light is on, requested material is being loaded from the floppy 5 1/4" diskette into the microprocessor itself. Please wait until the disk drive light goes off and then a message will appear on the screen. You will want to watch

the screen carefully as you press keys in response to messages from OLGA via the Apple. OLGA suggested we run OLGA's Entry System(c) next. This is the program or file which assists you in evaluating the student papers.

To run, simply follow the instructions on the screen. Press the number next to the program you wish to run. When we ran the OLGA(c) program I pressed the number 2 which is next to OLGA(c) in the catalog. In this case, I will press the number 3 which is next to OLGA's Entry System(c) in the catalog. Notice that the disk drive light is on so OLGA's Entry System(c) is being loaded into the microcomputer. When the light goes off, you will find a message on the screen.

First OLGA needs to know what student you are evaluating. You are requested to input a student number - or names will be acceptable also. I suggest student number for anonymity. I'll type in the number 10 just as an example. Press return. As you note, a message appears on the screen that OLGA has searched to determine if this student already has a file on this diskette. This is a safeguard so you will not inadvertently write over an existing file. If a file does exist for this person, you will be given the opportunity to edit it or make modifications.

If no file exists, one will be created for this student. In this case we will create a new student file. You will be creating files for each of the four student papers that you grade today. After a file has been created, you may begin entering data - much like you place data in a student file folder. So press return as the instruction states.

Next what I term the "work screen" appears. In the middle of the monitor on the right side OLGA has identified that this file is for student #10.

Note where the blinking cursor is placed as you respond to various items. First let's call up a criteria question. The cursor is in the middle of the monitor in a carat box calling for a number of a criteria question. Notice that you must use two digits or left justify. So for question #1, enter 01. The criteria question appears immediately without pressing any other key such as the return key. The criteria question will look familiar to you. It is the very same criteria as you used to evaluate the papers by hand. In the future when you run OLGA(c) you will be able to enter your own criteria questions. However, for this study the criteria needed to be controlled.

Read the Question.

Notice the blinking cursor is now at the bottom of the screen. This is the point where the "helps" on top of this work screen will assist you. The letters within the carats are the letters you will press to enable you to enter your evaluations. So if you press a C you may enter a comment.

Press a C. Notice that a question mark appears behind the space provided for comments. You may now type any comment you desire. For demonstration purposes I will type the comment "Good choice for priority." Note that all words will appear in capital letters. I deliberately misspelled a word so you can see how easy it is to correct errors.

If I make an error in spelling I simply use the left arrow key to backspace to the point where the error was made. I must retype anything after the error however.

To demonstrate - I will now correct my spelling of "priority." Use the left arrow key to backspace the cursor to the letter in error. Then simply type the correct letter. If the rest of the line remains the same, you may use the right arrow key to type over the remaining letters. If not, just retype the rest of the comment using letters on the keyboard.

You might want to remember that you may not use commas in the comment line. Anything that you type after a comma will be ignored by OLGA.

When I have finished making my comment, I press return and the cursor appears at the bottom of the page. I can now view my comment to make sure it is stated the way I desired. Suppose I do not like what I said. I can simply press the C again and a question mark reappears behind the comment line. Now I can redo the entire comment. (Type "Your selection of a priority is good.") Remember to press return after entering the comment, which places the cursor at the bottom of the work screen again.

Now I'm ready to address criteria question #2. The cursor must be up in the carat box which calls for the number of criteria question. To move the cursor to the appropriate place, simply press return. Other keys will work also but it is good practice to use the return key. Apple Company instructs users that when in doubt, press return. As you can see, the cursor is now in the carat box calling for the next two digit number. To call for criteria question two, press two digits - 02. Remember that return is not necessary for calling up the criteria questions. The question appears on the screen the moment you press the second digit.

Again this will be familiar to you. It is the identical criteria question that you have already used.

Read the Question.

Now suppose this time I wish only to enter points earned and no comment. In the help box on this work screen, it says that a P allows one to enter points. So I simply press P for points and a question mark appears behind the "points earned" line. I can now enter the number of points. In this case I'll enter 1. Again press return so the cursor appears at the bottom of the screen and you can view your input.

Now I am ready for criteria question #3. So I press return to move the cursor to the carat box. Then press 03 remembering that return is not necessary for calling criteria questions. The questions appears and just a reminder that it is identical to the ones you have already addressed by hand.

Read the Question.

This time I wish to enter both a comment and points earned. Now I can press C, enter my comment, press return to place the cursor at the bottom of the screen, then press P and enter points earned, then press return to get the cursor at the bottom of the screen and return once more to place the cursor in the carat box for the next two digit criteria question. However, there is a much easier way. Note that in the help box by pressing a B, both comments and points may be entered. So I press a B. First a question

mark appears behind the comment line. I'll enter my comment. (Enter "Lacking rationale.") When I have entered the comment, I press return and a question mark appears behind the points earned line. I can now enter an appropriate number. (Enter "0".) Then press return to place the cursor at the bottom of the screen and to view your input. I'm satisfied so now I press return to place the cursor in the two digit box calling for another criteria question.

Oops! Now I cannot remember how many questions I have answered or which criteria question I just completed. Note in the help box that an X recalls all criteria questions for which points have not been assigned. In other words, you as evaluator must address those items and assign points earned by the student. So I press an X. The criteria questions which I still need to address are listed in order. In this case I see that the first criteria question is listed but not the second and third. I remember calling up criteria question #1 and even entering a comment but alas - that can only mean that I neglected to assign points earned to the first criteria question. So I will recall criteria question #1 and then proceed with criteria question #4.

Note also that criteria question numbers 10, 21, 27 and 30 do not appear because those items simply give you as an

evaluator the opportunity to make additional comments. They are worth zero points.

Press return to place the cursor in the two digit carat box. I press 01 to call for the first criteria question. It reappears and the comment is as I entered but I see that indeed I did forget to enter points earned. So now I can press P and enter point 1 for points earned. Again press return to place the cursor at the bottom of the screen and view your input.

Now I call for criteria question number 4. Press 04. Now we are ready to evaluate the second priority problem which the student identified.

Read the Question.

Again, I can press C to enter a comment, P to enter points earned, or B to enter both comments and points earned.

You need not worry about pressing keys in error. OLGA is very forgiving and will allow you to make mistakes. For example, if I forget to press return to place the cursor in the two digit box, this is easily rectified. Suppose I wish to call for criteria question #6 and do not look at the screen between pressing the two digits. I'll press the key 0 now and note that the cursor moves to the carat box. Suppose I was not watching the screen and I also pressed the

number 6. Now a 6 is in the first digit blank. To correct this I can simply press the left arrow or backspace key and try again. Now I can call up criteria question number 6.

If I call for a criteria question that does not exist, OLGA gives a message. For example, I'll call for number 60. The message appears that that question is not in this program and without your having to press any other key brings you back to your work screen.

If you enter input in error, simply watch the screen for a few seconds. If nothing happens, press return. Remember when in doubt press return.

On the rare occasion when you may press a combination of keys and suddenly an asterisk appears on the left side of the screen and you get no response from any key, simply press the control key and the letter C together. You will be returned to your file and will not have lost any information.

Now you've entered what you feel is all the information for one student and are ready to proceed to the next student. First press X to doublecheck that you have addressed all criteria questions. No numbers should appear on the screen. Simply a return. In this case we did not complete data for student #10 so incomplete items are

listed. After viewing, press return to place the cursor in the appropriate place.

OLGA sums points earned so you may press a T just to view the total number of points earned by this student. You also receive a message about printing the results. You may print a copy for the student and for yourself or simply keep your copy on the diskette. You will then have an identical copy of comments you provided for the student. Since we are not hooked up to a printer, we cannot print them today. However, I have a sample printout for your perusal. (Pass copy around.) Now I will press N for printing results and the work screen reappears.

Remember that it is very important to save each student file when you have finished entering data. There are some safeguards in this program to remind you to save. In the help box you will note that a D allows you to save the student file on the floppy diskette. Press D to save to disk. You will be given a second chance just in case you accidentally pressed D and really didn't care to save yet, although it is wise to save periodically. If I press N, OLGA simply returns to the work screen again. Now I'll press D again and this time press Y in response to the message from OLGA. Notice now that the disk drive light is on and the material entered for this student is being saved

to disk. When the light goes off I am ready to create a new file for the next student.

I have prepared instructions on a 5 x 8 index card that will assist you as you create new student files for each paper today. After you have saved one completed student file you need to create a new file for the next student. Press an A to add another student. A message appears on the screen to remind you to be sure to save your present file if you have not already done so. This is another safeguard so you do not lose any information. Now I could press S to save but I have already saved this student's file when I pressed the D so now I am going to press return and OLGA asks me for another student number for which a file will be created. I'll enter the number 89 this time. Press return and a message again appears that a file does not yet exist for number 89 so I can proceed without worrying about writing over an existing file. After pressing return the work screen again appears and you can proceed as before. Remember to check the helps at the top of the work screen for assistance.

A quick review about how to proceed between students. Press D to save to disk and Y to message from OLGA about whether you really want to save. Then press A to add another student and return in response to the message if you

have already saved. Then enter new student number to create a new file.

When you have graded as many papers as you care to in one setting, which today will be the four student papers provided for you, the next step is to end OLGA's Entry System(c) and proceed to the next program, OLGA's Stat Evaluator(c). These instructions are also written on the 5 x 8 index card provided for you. Press E to end this program. Again, you are given a second chance in case you accidentally press E and haven't yet saved all the material you have entered into the microcomputer. You may press any key EXCEPT Y to return to the work screen. OLGA suggests that you press N. You will then be returned to the work screen and will not have lost any information.

However, if you really meant to end, then press Y and again the disk drive light goes on. When the light goes off, the catalog appears and now you will notice that you will have a file for all the students you entered. This catalog contains a file for student #10 because we saved that file but not for student #89. Remember we did not save that file. Today your student files appearing in the catalog will be the numbers 5, 6, 7 and 8.

Now we wish to learn some interesting data about the papers you just evaluated. Press 4 to run OLGA's Stat

Evaluator(c). The disk drive light is on and the program is being loaded into the microcomputer. When the light goes off, we are ready to enter student files for analysis.

You must enter at least two student files since you cannot compare only one. You may enter any number of students. I have analyzed up to about 70 papers. For demonstration today, I have prepared four student files and identified them as numbers 1, 2, 3 and 4. You will be analyzing files 5, 6, 7 and 8 today, the same four papers you will grade using OLGA's Entry System(c). Carefully watch the screen for messages as you will be entering the student files one at a time. In the future you will be able to enter all files at once if you so desire. But today enter the four files, one at a time.

First we wish to analyze student number 1. So in response to the message, press 1. Be sure to enter the number exactly as it appears in the catalog. If you named a student file 01, then enter this as a 01. Press return and the disk drive light is on, representing the loading of this student file. When it is completed, a message appears that asks you if you desire to enter another student's data. We do, so press Y. Again, it asks for the number of the student file. So I'll enter the number 2. Press return and this student file is being loaded. When the loading of

student file 2 is completed, the same message appears and yes, we wish to enter another student's data. This time we enter 3. The same procedure is repeated until we have entered student file number 4. Now when the message asks us if we wish to enter another student we say N for no. A message appears that OLGA is calculating.

Soon data appears. This is a summary of points earned for each criteria question and each student. This is identical to one of the tasks you were requested to do on your "Summary of Grades" sheets prior to this session. Note how easily you can cross compare two students or any number of students. Here we are limited to four students but you can print this information on paper and compare any number of students. Or you may wish to check just a few students to determine if they seem to have handed in very similar papers. Notice that student files appear in columns and the item numbers in rows. So for item number 1, student number 1 earned zero points while students number 2, 3 and 4 each earned one point. The last column gives you an idea about the validity of your criteria questions. If the average per item is one, that means everyone earned one point for that item. You may wish to modify that criteria if you believe it is too easy or maybe it is an important item that everyone is expected to respond to accurately. If the

average per item is zero - that obviously means that no one earned a point for that particular criteria. Perhaps that criteria question was too difficult and you may consider changing it in the future. Naturally, .5 means that is the average score earned by the group of students and so forth. This may be compared with possible points. In this manner you can analyze your own criteria.

Remember that items 10, 21, 27 and 30 are worth zero points. Those items simply give you as the evaluator an opportunity to make additional comments if you so desire. Press return or any key to view the rest of the criteria question analysis.

Next OLGA has listed the totals per student and calculated the mean, variance and standard deviation for the group of papers.

Press return or any key and OLGA has now placed the scores in order. This is an easy task to complete by hand with only four students but very helpful if you have many students.

Again press return or any key. OLGA relists the totals and calculates the number and letter grade and tells you how many students earned each grade. This could be used for posting also if that is allowed in your school.

The message at the bottom of the screen states that you may view this again on the screen or print the results. We cannot print the results today because we are not hooked up to a printer. I do have a printout to show you as an example. (Pass copy around.)

To view on the screen again, simply answer Y to the message and press zero in response to the question. As you can see, you need to wait momentarily until OLGA recalculates and then the identical data reappears.

When you have completed the statistical analysis, you may answer N to the question of desiring to view the results again and that will take you out of the OLGA programs. You may then turn the machine off and I will collect the diskettes.

In the future, OLGA will perform many tasks. This is simply an introduction. Your comments and opinions will be very helpful for making OLGA useful in the future. And thanks again for your time and assistance.

APPENDIX E
EVALUATION TOOL

EVALUATION

1. Was the videotape demonstration of the OLGA programs adequate enough to allow you to proceed on your own?
Yes No
2. Do you feel that the OLGA programs could be useful to you in the future?
Yes No Unsure
3. Any further comments regarding OLGA?
4. Any additional comments regarding this experience?
5. How do you rate your skills at the typewriter keyboard?
Excellent Good Average Poor
6. How many years teaching experience have you had?
7. Highest Degree Held

Thanks again for your help.

APPENDIX F

QUIZ

ANYWHERE UNIVERSITY
SCHOOL OF NURSING
Nurs 382 Nursing Process
Quiz II

TIME BEGAN _____

Objectives: To apply the nursing process to a nursing care study.
To utilize the modes of adaptation when identifying client problems.
To write nursing diagnoses according to specific criteria as discussed in class.

Scoring Read the Nursing Care Study and answer these questions.

- 9 points I. Identify two priority problems which nurses can address and give rationale for your decision. Indicate which mode of adaptation encompasses each problem. Identify the mode in which there appears to be no problem and state why. The above activity requires you to apply which step of the nursing process?
- 10 points II. For one of the priority problems you noted in I. above, write one nursing diagnosis, using the criteria as discussed in class.
- 5 points III. For the one nursing diagnosis, write a measurable objective including a time frame and list one independent nursing intervention. The objective and intervention should be specific to the etiology.
- 2 points IV. Identify and define the component of the nursing process that was not applied in this exercise.
- 2 points V. Format - It is expected that correct grammar, punctuation, and spelling will be used.

TIME ENDED _____

APPENDIX G
NURSING CARE STUDY

Mrs. B. is a 76 year old white married female who lives with her husband in a modern brick home. In the past she enjoyed her occupation as a homemaker and took pride in her independence. Family ties are close and members support each other. At the present time no one has an immediate health need except for the client.

Mrs. B. was hospitalized on 11-16-83 and discharged on 12-5-83 with a diagnosis of CVA with left hemiparesis. Nursing history obtained from the hospital indicated that Mrs. B. has had a 13 year history of very labile hypertension. Blood pressure range has varied from 170 to 200/90 to 100. As far as is known, she has been compliant with her medication regime but not with a low salt diet, appearing to lack knowledge about specific foods prohibited or permitted. Family members are committed to caring for Mrs. B. at home even though none of them have had any experience in working with the ill.

Client was admitted to home health care on 12-6-83. She is independent in activities of feeding, bed motions and locomotion via wheelchair. She is able to perform sitting and standing transfers. She needs assistance with dressing and bathing, including dental hygiene. She is continent and

Nursing Care Study - cont'd

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voluntary and is able to toilet transfer except for managing the dressing step. She has a hospital bed with rails. The bedroom is small but also contains a single bed for client's husband, and 2 chairs plus a bedside commode. The bathroom is across the hall from the bedroom but the door is too small for a wheelchair.

A home visit was made at 10 a.m. on 12-6-83. Nursing assessment yielded the following data. Height: 5'2". Weight: 118 lbs. Vital signs within normal limits except for blood pressure. Right arm 198/86 - Left arm 196/94. Is oriented as to place, person, and time. Has upper and lower ill-fitting dentures. Right lower gum is irritated. No lesions on tongue but unable or unwilling to place tongue in left or right cheek. Left hand grip fair - right hand grip good. Leg strength is fair to good. Keeps eyes closed much of time. Reluctant to look directly at another person. Is cooperative and answers questions but does not volunteer any information.

As a registered nurse, you will visit Mrs. B. on a regular basis. Based on this data, address the questions in Quiz II.

TIME ENDED _____

APPENDIX H
NURSING CARE PLANS

Paper from Student # 1

I. The two problems which I feel are priorities are elevated blood pressure and irritated right lower gum. Both of these problems fit the physiologic mode. Even though Mrs. B's blood pressure problem is long standing, it should be controlled. The reason I listed sore mouth as a priority is that this will likely affect her eating and her appetite.

There appears to be no problem with the interdependence mode - based on the fact that family members are supportive.

Identifying client problems involves the assessment component of the nursing process.

II. A nursing diagnosis for the cited priority problem of elevated blood pressure is:

Systemic blood pressure above 160 possibly related to noncompliance with a low salt diet and lack of knowledge.

III. One nursing plan or goal for the above diagnosis is to teach patient about low salt diets. Patient will be able to state specific foods that may and may not be included on a low salt diet within two months.

A nursing intervention would be to make a list of foods which are permitted and prohibited by the physician on a low salt diet. Leave the list with the client and discuss actual diet eaten each day to determine compliance.

IV. The component of the nursing process that was not applied in this quiz is evaluation. Evaluation is defined as the continuous appraisal of goals, also considering the nursing diagnosis. It may result in a modified plan and intervention.

Paper from Student # 2

I. The first priority problem is sore mouth. This is a priority because it will likely affect Mrs. B's ability to eat and even her appetite. She needs to eat well so her body can continue to repair.

The second priority problem is Mrs. B's inability to bathe herself. It is probably affecting her self image because there is an indication that she prized independence. Her inability to bathe herself necessitates dependence.

There appears to be no problem with the interdependence mode since family members are supportive.

This activity is the evaluation component of the nursing process because all problems were evaluated before being prioritized.

II. A nursing diagnosis for the problem of bathing is:

Inability to bathe related to left hemiparesis.

III. An objective for the above nursing diagnosis is that the client will be able to bathe independently.

The nursing intervention will be to ask patient to squeeze a soaking wet washcloth with her left hand three times per day. Washcloth is to be soaked in 1/2 cup water.

IV. The assessment phase of the nursing diagnosis was not applied in this quiz because a physical examination was not performed.

Paper from Student # 3

I. Two problems that ought to be priorities in dealing with Mrs. B. are her sore mouth and apparent altered role as homemaker.

The sore mouth is a priority because it will likely affect Mrs. B's eating and appetite. She needs good nutrition to continue the repairs in her body so it is important that the sore mouth be alleviated.

Her role as homemaker will necessarily be altered because of her left hemiparesis. Since she enjoyed her occupation it would be important to work on how she might perform some duties in a modified manner.

There is an indication that client is not experiencing any difficulties with the interdependence mode since family ties are close.

This activity is the first step of the nursing process, that of assessment.

II. A nursing diagnosis for sore mouth is:

Irritated right lower gum due to lax dental hygiene and ill-fitting dentures.

III. The plan is for the sore mouth to be healed in 2 weeks.

An appropriate intervention is to teach the family and client the importance of cleaning dentures after each meal. The nurse will suggest that client also rinse her mouth with a fluoride mouthwash.

IV. The component of the nursing process not applied in this quiz was evaluation of the plan and intervention.

Paper from Student # 4

I. The two priority problems are noncompliance with low salt diet and the inability to dress. Both of these fit the physiologic mode; however, the inability to dress could lap over into self-concept. Being unable to dress independently may contribute toward feelings of worthlessness and a lowered self-concept.

Noncompliance with low salt diet is a priority because it may be a negative force contributing to her hypertension.

Since family members are supportive there appears to be no problem with the interdependence mode.

This activity requires application of the assessment phase of the nursing process.

II. A nursing diagnosis for the priority problem of nonadherence to diet is:

Noncompliance with low salt diet related to lack of knowledge as to foods prohibited and permitted on a low salt diet.

III. An objective for this nursing diagnosis is that the patient will be able to specifically state 8 foods which should not be eaten and 3 foods which are acceptable for a low salt diet.

A nursing intervention for this goal is to discuss diet with client on each weekly visit. A reinforcer for discussion will be to leave colorful pictures and charts of acceptable and unacceptable foods.

IV. The evaluation component of the nursing process was not used for this quiz. Evaluation is the ongoing appraisal of the client's condition to determine if the goals have been met. The plan and intervention will be modified or remain the same based on the evaluation.

Paper from Student # 5

I. The first priority problem is the possibility that Mrs. B. is experiencing a lowered self-concept. This obviously fits the self-concept mode. The rationale for believing this to be a problem is that the client took pride in her independence prior to this illness. Now she keeps her eyes closed much of the time and is reluctant to look directly at another person. The fact that she needs assistance with dressing and bathing may contribute to a lower self-concept.

The second priority problem is her imposed altered occupation as a homemaker. This may also contribute to the first identified problem of lower self-concept.

The mode in which there is no apparent problem is interdependence because the case study states that family members are close and supportive.

The above activity is really the assessment phase of the nursing process.

II. For the problem of lowered self-concept a nursing diagnosis is:
Decrease in self-concept related to inability to bathe independently.

III. An initial objective is that patient will be able to bathe all but her back in six weeks.

The nursing intervention is to begin by having the nurse wring out washcloth for patient but ask patient to do the bathing. Gradually as client gains strength, ask her to wring out washcloth. Also instruct client to exercise daily and to build her strength.

IV. The only component of the nursing process that is lacking after doing this quiz is the evaluation step. Evaluation is an ongoing process and is done to determine if the objectives have been reached.

Paper from Student # 6

I. Two priority problems are possible depression and elevated blood pressure. Possible depression fits the self-concept mode and is a priority because it will affect her progress toward wellness. If Mrs. B. can improve her self-image there is a greater likelihood that she can overcome the other handicaps noted in the case study, such as physical inabilities in dressing and bathing.

Elevated blood pressure fits the physiologic mode. High blood pressure leads to cardiovascular problems and Mrs. B. has already experienced a CVA. If her blood pressure can be controlled there will be less chance of her suffering another CVA or other cardiac complications.

There seems to be no problem in the role mode.

The above activity requires application of the evaluation component of the nursing process.

II. For the depression problem, a nursing diagnosis is:

Feelings of lowered self-worth related to reluctance to look at people and keeping eyes closed.

III. A plan for the above diagnosis is that patient will look directly at the person who is speaking to her.

The nursing intervention is to observe and discuss with the client why she is not looking directly at people. Provide counter reasons and begin expecting client to look at nurse at least 50 % of the time and increase this each visit.

IV. The component which was not used in responding to the quiz items was actually assessing a patient.

Paper from Student # 7

I. Two problems that ought to be priorities in dealing with Mrs. B. are her sore mouth and apparent altered role as homemaker.

The sore mouth is a priority because it will likely affect Mrs. B's eating and appetite. She needs good nutrition to continue the repairs in her body so it is important that the sore mouth be alleviated.

Her role as homemaker will necessarily be altered because of her left hemiparesis. Since she enjoyed her occupation it would be important to work on how she might perform some duties in a modified manner.

There is an indication that client is not experiencing any difficulties with the interdependence mode since family ties are close.

This activity is the first step of the nursing process, that of assessment.

II. A nursing diagnosis for sore mouth is:

Irritated right lower gum due to lax dental hygiene and ill-fitting dentures.

III. The plan is for the sore mouth to be healed in 2 weeks.

An appropriate intervention is to teach the family and client the importance of cleaning dentures after each meal. The nurse will suggest that client also rinse her mouth with a fluoride mouthwash.

IV. The component of the nursing process not applied in this quiz was evaluation of the plan and intervention.

Paper from Student # 8

I. The first priority problem is the probability that client is experiencing a lowered self-concept. This is being manifested by her reluctance to look directly at another person and keeping her eyes closed much of the time. Self-concept obviously fits the self-concept mode of adaptation. This is a priority because a poor self-concept can negatively affect her progress in rehabilitation. Mrs. B. needs to believe that she is o.k. and this, in turn, will likely affect how much effort she puts into learning to use her left arm again.

The second priority problem concerns the mode of role and is Mrs. B.'s mandatory modified role as a homemaker. The case study indicates that she enjoyed being a homemaker. She will not be able to perform all these tasks with her left hemiparesis. This will, in turn, affect her self-concept.

Mrs. B. enjoys close family ties so the interdependence mode is not a problem.

II. A nursing diagnosis for the role problem is:

Inability to perform her prior homemaker role of washing dishes related to nonuse of left arm.

III. A measurable objective for the above nursing diagnosis is that patient will be able to use her left arm and hand sufficiently to be able to wash dishes in 2 months.

The nursing intervention will be geared toward increasing patient's strength in her left hand. She will be asked to squeeze a rubber ball with her left hand at least 3-10 times daily and more often if possible. The ball should

Student Number 8 - cont'd

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be a squeak ball and patient will attempt to make the ball squeak 4 out of 5 times.

IV. The evaluation component of the nursing process was not applied in this quiz. Evaluation is defined as the continuous appraisal of client's progress in relation to the congruence of the patient care outcome(s) with the nursing intervention(s).

APPENDIX I
FEEDBACK FORM

TIME BEGAN _____

Feedback on Quiz II for Student # 1

I. First Problem

1. Did student correctly identify what would be considered a priority problem? - 1 possible point
Comment
Points Earned
2. Did student correctly identify one of the modes of adaptation pertaining to the identified problem? - 1 possible point
Comment
Points Earned
3. Did student give pertinent reason for believing this to be a priority problem? - 1 possible point
Comment
Points Earned

Second Problem

4. Did student correctly identify what would be considered another priority problem? - 1 possible point
Comment
Points Earned
5. Did student correctly identify one of the modes of adaptation pertaining to the identified problem? - 1 possible point
Comment
Points Earned
6. Did student give pertinent reason for believing this to be a priority problem? - 1 possible point
Comment
Points Earned

Mode with No Problem

7. Did student correctly identify the mode of adaptation in which there appears to be no problem? - 1 possible point
Comment
Points Earned
8. Did student give adequate and pertinent reasoning for there being no apparent problem in this mode? - 1 possible point
Comment
Points Earned

Feedback - cont'd

Student # 1

Page 2

First Nursing Process Step

9. Did student correctly note which step of the nursing process is implemented when client problems are being identified? - 1 possible point

Comment

Points Earned

Other

10. Any other comments on Section I.?

II. For One Problem

11. Did student write a nursing diagnosis for one problem? - 1 possible point

Comment

Points Earned

Nursing Diagnosis Criteria

12. Was the diagnosis written in the proper format (i.e., first a client response (not etiology) - then "related to" (not due to) - then an etiology (not response)? - 1 possible point

Comment

Points Earned

Response Component

13. Is the response clearly unhealthy or potentially unhealthy? - 1 possible point

Comment

Points Earned

14. Is there only one (not two) response(s) identified? - 1 possible point

Comment

Points Earned

15. Is the response potentially modifiable? - 1 possible point

Comment

Points Earned

16. Is the identified response concrete enough to generate observable, measurable and desired outcomes? -

1 possible point

Comment

Points Earned

Feedback - cont'd

Student # 1

Page 3

Etiology Component

17. Is there only one (not two) etiology(ies) identified? -
1 possible point
Comment
Points Earned
18. Is the identified etiology potentially changeable? -
1 possible point
Comment
Points Earned
19. Is the activity required to modify the etiology within
the boundaries of nursing's independent function? -
1 possible point
Comment
Points Earned
20. Is the etiology concrete enough to suggest a specific
nursing activity? - 1 possible point
Comment
Points Earned

Other

21. Any other comments on Section II?

III. For the Diagnosis

22. Did student write an objective specific to the proposed
etiology and not the response? - 1 possible point
Comment
Points Earned
23. Is the objective measurable? - 1 possible point
Comment
Points Earned
24. Is there a time frame? - 1 possible point
Comment
Points Earned
25. Is there at least one nursing intervention indicated?
1 possible point
Comment
Points Earned
26. Is the intervention appropriate and specific to the
proposed etiology and not the response? - 1 possible point
Comment
Points Earned

Other

27. Any other comments on Section III?

Feedback - cont'd

Student # 1

Page 4

IV. Last Nursing Process Step

28. Did the student correctly identify the component of the nursing process that was not applied in this exercise? - 1 possible point

Comment

Points Earned

29. Did the student accurately define this component of the nursing process? - 1 possible point

Comment

Points Earned

Other

30. Any other comments on Section IV?

V. Style

31. Format acceptable? - 2 possible points

Comment

Points Earned

28 Total Possible Points - Total Points Earned _____

TIME ENDED _____

APPENDIX J

COVER LETTER FOR PARTICIPANTS

(DATE)

(NAME)

(ADDRESS)

(CITY, STATE ZIP)

Dear (FIRSTNAME):

Your agreement to participate in the preliminary testing of microcomputer software to grade subjective papers is appreciated. Our "hands-on" session is scheduled for (DATE) at (TIME) in (LOCATION: ROOM NUMBER AND BUILDING, INSTITUTION, CITY, STATE).

This packet of material provides you with the tools for the homework. You are requested to grade four hypothetical nursing care plans written by undergraduate nursing students and calculate some descriptive statistics. In the pilot study, the average amount of time taken for participants to complete this homework was 109 minutes.

This packet should contain the following:

- 1 - Quiz II
- 1 - Nursing Care Study
- 4 - Paper(s) from Students
- 4 - Feedback on Quiz II
- 1 - Descriptions
- 1 - Summary of Grades

Quiz II is an example of a quiz that might be administered to undergraduate nursing students who are learning to apply the nursing process and write nursing diagnoses. The students would be asked to complete the quiz items based on the Nursing Care Study. Your task is to grade the student papers after familiarizing yourself with the Nursing Care Study. The "Feedback on Quiz II" is merely a breakdown of points listed on Quiz II. You are requested to use that feedback guide as you grade each paper. Please indicate number of points you feel each student ought to earn for each criteria question. The "Comment" line is optional.

(NAME)

-2-

(DATE)

The sheet of "Descriptions" may be helpful as you evaluate student papers. They pertain to the four modes of adaptation and to # 19 criteria statement of the "Feedback for Quiz II." Number 19 asks that you evaluate whether the activity is an independent function of nursing. Independent functions have been described and are listed.

When all four papers have been graded, please complete the "Summary of Grades" sheet. Formulas have been provided.

So that the amount of time required can be determined, please complete the blanks for "Time Began" and "Time Ended" where requested. If it is easier and more accurate to enter number of minutes, as it might be if there are interruptions, please feel free to enter minutes instead of actual time began and ended.

It is very important that you bring all this material to the seminar on (DATE). At that session, you will be utilizing the microcomputer as a tool to grade four more student papers using the same "Nursing Care Study" and the same criteria.

If you have any questions, please feel free to call me at any time. Thanks for helping me and see you soon.

Sincerely,

Carol E. Larson
Route 4 Box 29
New Ulm, Minnesota 56073
Home Phone: (507) 354-8907

APPENDIX K
AIDS FOR GRADING

DESCRIPTIONS

The four modes of adaptation are:

1. Physiologic - commonly considered categories are exercise and rest, nutrition, elimination, fluid and electrolytes, oxygen and circulation, regulation of temperature, regulation of senses and regulation of endocrine system.
2. Self-Concept - physical and personal self.
3. Role - primary, secondary and tertiary positions in society - role identity, expectations and interactions.
4. Interdependence - aspects related to independence and dependence needs.
Roy & Roberts (1981).

Independent nursing functions may be characterized by verbs such as the following.

1. Caring - stay, be available, share, contact, reassure, have
2. Comforting - assist, provide, aid, perform, give, help, supplement, use, turn, monitor, manipulate environment, offer, maintain
3. Communicating - talk, discuss, listen, allow, ensure, express, inquire, alert, verify, reflect, consult
4. Coordinating - direct, organize, arrange, refer, obtain, advocate, select, supervise, initiate, assess, investigate, plan
5. Counseling - suggest, set goals, question, advise, discourage, propose
6. Supporting - reinforce, discover, encourage, approve, evaluate, explore
7. Teaching - list, explain, instruct, inform, show, describe, demonstrate, point out, identify, correct, guide, emphasize, review, promote, answer
Bush (1975, 1984).

APPENDIX L
SUMMARY OF GRADES SHEETS

TIME BEGAN _____

Summary of Grades

Total Points Earned

Student # 1	_____	Score squared	_____
Student # 2	_____	Score squared	_____
Student # 3	_____	Score squared	_____
Student # 4	_____	Score squared	_____

Grand Total _____ Sum of squared scores _____

Grand Total squared _____

Mean = Grand Total divided by 4 = _____

Variance =

$$\frac{\text{sum of squared scores} - (\text{grand total squared divided by } 4)}{3}$$

Variance = _____

Standard Deviation (SD) = square root of variance = _____

Arrange scores in order from highest to lowest

Determine letter grade.

A = top score down to scores above mean + 1 SD.

B = mean + 1 SD down to scores above mean.

C = mean down to scores above mean - 1 SD.

D = mean - 1 SD down to scores at mean - 2 SD.

F = all scores below mean - 2 SD.

	Score	Letter Grade
Student # 1	_____	_____
Student # 2	_____	_____
Student # 3	_____	_____
Student # 4	_____	_____

Determine number grade.

For this project the following number grades are used.

4.00 to 3.50 A

3.49 to 2.50 B

2.49 to 1.50 C

1.49 to 0.50 D

0.49 and below F

To calculate - Start with letter grade.

For A's

(4.00 times student score) divided by top score earned

For B's

(3.49 times student score) divided by (mean + 1 SD)

For C's

(2.49 times student score) divided by mean

For D's

(1.49 times student score) divided by (mean - 1 SD)

For F's

(0.49 times student score) divided by (mean - 2 SD)

Summary of Grades - cont'd

2

	Number Grade	Letter Grade	Score
Student # 1	_____	_____	_____
Student # 2	_____	_____	_____
Student # 3	_____	_____	_____
Student # 4	_____	_____	_____

To analyze instructor's criteria, compare each item by listing points earned by each student and computing the average score earned by the 4 students.

Item	Student1	Student2	Student3	Student4	Ave/Item
1	_____	_____	_____	_____	_____
2	_____	_____	_____	_____	_____
3	_____	_____	_____	_____	_____
4	_____	_____	_____	_____	_____
5	_____	_____	_____	_____	_____
6	_____	_____	_____	_____	_____
7	_____	_____	_____	_____	_____
8	_____	_____	_____	_____	_____
9	_____	_____	_____	_____	_____
10	_____	_____	_____	_____	_____
11	_____	_____	_____	_____	_____
12	_____	_____	_____	_____	_____
13	_____	_____	_____	_____	_____
14	_____	_____	_____	_____	_____
15	_____	_____	_____	_____	_____
16	_____	_____	_____	_____	_____
17	_____	_____	_____	_____	_____
18	_____	_____	_____	_____	_____
19	_____	_____	_____	_____	_____
20	_____	_____	_____	_____	_____
21	_____	_____	_____	_____	_____
22	_____	_____	_____	_____	_____
23	_____	_____	_____	_____	_____
24	_____	_____	_____	_____	_____
25	_____	_____	_____	_____	_____
26	_____	_____	_____	_____	_____
27	_____	_____	_____	_____	_____
28	_____	_____	_____	_____	_____
29	_____	_____	_____	_____	_____
30	_____	_____	_____	_____	_____
31	_____	_____	_____	_____	_____

TIME ENDED _____

APPENDIX M

COVER LETTER FOR PARTICIPANTS
USED IN PILOT STUDY

(NAME)
(SCHOOL)
(STREET)
(CITY, STATE ZIP)

It is with much enthusiasm that I write this letter to you following your response to my "Feasibility Survey." You are one of many who are willing to participate in the preliminary testing of microcomputer software that may streamline the grading of written papers in nursing and prove to be an effective time saver. Your responses and comments have been very helpful.

Carol E. Larson
2221 North Bell Ave., Apt. 101
Denton, Texas 76201
Home Phone: (817) 387-1817

Preferred Day of Week - Monday _____
Tuesday _____
Wednesday _____
Thursday _____
Friday _____

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