THE FEASIBILITY OF USING AN ADAPTATION OF THE MONTESSORI
METHOD TO TEACH BASIC NURSING SKILLS TO BEGINNING
GENERIC BACCALAUREATE NURSING STUDENTS

DISSERTATION

Presented to the Graduate Council of the
University of North Texas in Partial
Fulfillment of the Requirements

For the Degree of

DOCTOR OF PHILOSOPHY

By

Anthony Peter Paterniti, B.A, M.S.
Denton, Texas
August, 1992
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The purposes of this study are to determine the extent to which nursing education administrators accept the use of an adapted Montessori method in teaching basic nursing skills and to determine the feasibility of implementing such a method. Data were collected from 420 administrative heads of schools of nursing that offer generic baccalaureate programs accredited by the National League for Nursing; 256 usable questionnaires constituted a response rate of 60.95 percent.

The study reveals that nursing faculty in generic nursing programs are free to explore methods for teaching basic nursing skills that advocate independent learning, student centered activities, and flexible timetables for learning and mastery of skills. For the purpose of instruction, skills can be reduced to a series of basic sensory exercises which support the learning and performance of a skill. Nursing faculty interested in learning more about methods for instructing students in basic nursing
skills will most likely have to fund their own education or secure funds through a source other than the institution of higher education. Instruction in basic nursing skills appears to be affected by the economic condition of the supporting institution.

The recommendations for this study include regular and ongoing evaluation of the effectiveness of modes of instruction being used in on-campus laboratories for teaching basic nursing skills. Faculty are encouraged to become familiar with the basic tenets of the Montessori method, especially in relation to the education of the senses, and should determine what use they may serve in the teaching and learning process related to preparing beginning generic baccalaureate nursing students to safely and competently perform basic nursing procedures.
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CHAPTER I

INTRODUCTION

The health care industry in the United States is having to deal with two separate but related problems—delivery of quality care to patients in an efficient and expedient manner and filling large numbers of vacant registered nurse positions within health care facilities (Neuhs 1991). Because most care rendered to patients is either delivered or managed by registered nurses, the nursing shortage has a direct impact on the health care industry (Hassanein 1991).

With the advent of Diagnostic Related Groups, the federal government, through the medicare program, has exerted economic constraint on the health care industry which has resulted in shorter hospital stays for patients whose health care costs are subsidized by the government (Bostrom and Mitchell 1991, Easton, Cogen, and Fulcomer 1991, Gillies 1989). The need for well educated, clinically adept nurses has never been greater; thus, nursing educators in colleges and universities are having to become more responsible and accountable for insuring that graduates meet the goals and objectives of their nursing programs (Gien 1991).
The acquisition, practice, and mastery of basic nursing skills are important components of student learning and are essential to the performance of the practicing nurse. Nurse educators are charged with the responsibility of designing and developing educational programs for the teaching of basic nursing skills to beginning nursing students. This study was conducted in order to determine the acceptability, by nursing education administrators, of using an adaptation of the Montessori method to teach basic nursing skills to beginning baccalaureate generic nursing students.

Statement of the Problem

The problem of this study was the determination of the acceptability of nursing education administrators of an adaptation of the Montessori method for teaching basic nursing skills to beginning generic baccalaureate nursing students.

Purposes of the Study

The purposes of this study were (1) to determine the extent to which nursing education administrators accept the use of an adapted Montessori method in teaching basic nursing skills, and (2) to determine the feasibility of implementing such a method.
Research Questions

Based on the problem and purposes of this study, the following questions were developed:

1. To what extent do nursing education administrators of generic baccalaureate programs believe it is feasible to use an adaptation of the Montessori method to teach basic nursing skills.

2. To what extent do nursing education administrators believe it is possible to reeducate nursing faculty to use an adapted Montessori method for teaching basic nursing skills to beginning nursing students.

3. What percentage of administrators believe that an adapted Montessori method for teaching basic nursing skills is economically feasible.

4. To what extent do administrators vary in their responses based on region, institution size, funding, school of nursing size, number of full-time and part-time faculty, and number of generic students taking first skills course.

Definition of Terms

The following terms are defined as they relate to this study.

Administrators are the academic directors and deans of schools or departments of nursing who are responsible for the operations and the curricula of generic baccalaureate
programs in nursing in both private and public institutions of higher education.

**Montessori method** is a method of instruction based on the work of Maria Montessori, who designed a series of learning activities which encourage the spontaneous interest in learning of young children (Standing 1984).

**Adapted Montessori method** is an adaptation of the Montessori method which is designed to teach beginning generic baccalaureate nursing students to correctly match solution viscosity with needle gauge.

**Solution viscosity** is the degree of density of a solution.

**On-campus laboratory** is a designated area in nursing schools where basic nursing skills are taught to beginning nursing students in generic baccalaureate nursing programs.

**Basic nursing skills** are nursing techniques or procedures, often referred to as psychomotor skills, taught to beginning generic nursing students in on-campus laboratories during the first semester of generic baccalaureate nursing programs.

**Generic baccalaureate nursing program** is a nursing program in a college or university that is accredited by the National League for Nursing and is designed for students who have little or no education in nursing.
Limitations of Study

This study was limited to 420 generic baccalaureate schools of nursing that have been accredited by the National League for Nursing (1989) in the fifty states and the District of Columbia. Schools of nursing awaiting accreditation by the National League of Nursing were excluded from the study.

Background and Significance of the Study

The need to educate nursing students in a manner that insures mastery of basic nursing skills is of the utmost importance at a time when technology is rapidly advancing and patients are being moved quickly through the health care system. Shorter hospital stays result in some patients being discharged from hospitals who require follow-up nursing care in their homes or in extended care facilities (Wilson 1988). Whether newly graduated nurses seek employment in acute care health organizations or with home health care agencies, the need for mastery of basic nursing skills throughout the education process is paramount.

Nursing faculty are faced with the difficult task of insuring that the curriculum reflects rapid changes in the health care industry and that students are able to function safely in clinical practice (Lewis and Deans 1991). Faculty meet that responsibility by exploring new and different ways
to facilitate the teaching and learning processes. Program efforts to implement strategies in on-campus laboratories in order to facilitate the mastery of basic nursing skills have ranged from having greater numbers of nursing faculty teaching basic skills to evaluating student performance through the use of simulated patients or video recordings (Bach, Bell, and Fernandez 1979, Baldwin, Hill, and Hanson 1991, McDowell et al. 1984).

Investigative studies attempting to gain a clear understanding of how students learn and master skills, as well as studies related to student anxiety in different phases of the learning process, have been conducted by faculty members teaching in baccalaureate nursing programs (Megal, Wilken, and Volcek 1987, Speck 1990, Windsor 1987). Self-critique through the use of video recordings is another method that provides students with an opportunity to evaluate their own performance (Mathews and Viens 1988, McKay and Harrison 1972).

The learning and mastery of basic nursing skills are important to the safety of patients in all health care delivery systems, including those which extend into the patients' homes. The need to continually explore new strategies that facilitate students' abilities to acquire new skills are important to the well-being of patients, the
financial exigency of the health care industry, and to the profession of nursing.

Organization

This study is organized and presented in the following manner: Chapter I contains an introduction to the study and includes a statement of the problem, the purposes, research questions, definitions of terms, the limitations of the study, and the background and significance of the study. A review of related literature from the education of nursing students in basic nursing skills and a discussion of the basic beliefs and concepts of the Montessori method are presented in Chapter II. Methods and procedures for collecting and analyzing the data obtained for this study are included in Chapter III. Statistical analysis of the data is presented in Chapter IV. The summary, discussion, conclusions, implications, and recommendations derived from the analysis of the data obtained for this study are included in Chapter V.
CHAPTER II

REVIEW OF THE LITERATURE

A review of the literature was conducted in order to provide a basis for the significance of this study and to justify the criteria included in the instrument that was developed from the research questions. Because this study relates to the teaching of basic nursing skills to beginning baccalaureate nursing students and an adaptation of the Montessori method for the education of children, both topics are presented in this chapter.

**Early Nursing Skills Education**

The education of nurses originated with an apprentice type model in which students spent a considerable period of time under the supervision of an experienced nurse (Dolan, Fitzpatrick, and Herrmann 1983). Early nursing education programs were called diploma programs and were administered by hospital administrations under the direction of a nurse director (Kalisch and Kalisch 1978). Nursing arts laboratories were generally designated for the teaching and learning of basic nursing skills. Students gained expertise in performing skills in the laboratory setting and then
transferred what they had learned to patients in nursing units within the hospital (Jamieson and Sewell 1940).

As the fields of medicine and nursing advanced, and the costs of maintaining diploma programs increased, nursing education was gradually moved from hospital-based diploma programs to colleges and universities (Dolan, Fitzpatrick, and Herrmann 1983). In addition to the advances in technology and escalating costs, there was widespread concern regarding the use of nursing students as the primary work force in hospitals sponsoring diploma programs (Sholtis and Bragdon 1961).

On-campus laboratories were developed to simulate hospital wards and nursing units so that students had the opportunity to learn and practice basic nursing skills prior to performing procedures on actual patients. These on-campus laboratories were generally conducted by faculty members who taught in what was typically called the fundamentals of nursing course (Bullough 1990).

**Teaching of Basic Nursing Skills**

The movement of hospital-based programs to college and university settings caused a philosophical division between those in nursing service and faculty regarding the teaching of basic skills to nursing students (Deloughery 1977). Because hospital based programs dedicated a great deal of
time teaching basic skills, many nursing service administrators believed that it was impossible for university and college based nursing faculty to adequately prepare students in the area of basic nursing skills. A major concern was the limited number of hours dedicated to the preparation of students in pre-clinical education in on-campus laboratories (Duppstadt 1980).

The differences in opinions between professionals in nursing service and professionals in nursing education continued long after the movement of nursing education to the academic setting. In a study comparing the perceptions of head nurses and nurse educators concerning entry level nurses' abilities to perform 301 psychomotor skills, Garcia (1988) found that differences between the two groups have persisted. Both groups were surveyed for their opinions regarding the level at which graduate nurses should be able to function when performing nursing skills. Results of the survey showed that there was a considerable difference between the perceptions of the head nurse group and the nursing faculty group. The head nurses expected a higher level of functioning by graduate nurses than did nursing faculty members. A slight difference in perceptions was evident within the head nurse group, but a significant difference in perceptions was found within the faculty group. Although faculty had expectations similar to those
in the head nurse group, many of the faculty had much lower expectations of graduate nurses at the time of graduation.

The movement of nursing education programs to college and university settings placed nursing education in an environment in which change is initiated through systematic study. Nursing faculty, teaching in college and university programs, have become progressively more adept at conducting research and have explored new and better ways to teach beginning nursing students basic nursing skills (Akinsanya 1990). When designing activities for teaching psychomotor skills, it is important that educators be aware of the two major components of a skill. The first component, the cognitive component, requires that students have an understanding of the principles related to the skill and an understanding of anatomy, physiology, and pathophysiology. The second major component of a skill relates to the motor activity needed to execute the skill and includes technique and the proper sequencing of events (Oermann 1990).

The literature reveals a variety of recommended methods for teaching basic nursing skills to beginning nursing students. Proposed methods for teaching basic nursing skills range from strict adherence to the traditional, on-campus laboratory to complete independent study. Duprey and Patten (1986) advocate the use of competitive play among students for the purpose of teaching basic nursing skills.
After students using this method are given basic instruction in performance of the skill, they are divided into teams with each team member being timed during skill performance. Individual student times are added for a collective team time and the team with the shortest collective time is awarded a prize.

Regardless of the method used to teach nursing skills to beginning students, educators must continually be aware of the skills needed in nursing practice so that the teaching of skills to nursing students is reality-based (Alavi, Loh, and Reilly 1991). In order to remain aware of the important skills necessary in nursing practice, faculty must establish and maintain open communication with nurses practicing in clinical facilities (Best, Carswell, and Abbott 1990). The relationship between service and education should be developed in a way that promotes collaborative study between nurses in clinical and educational settings for the purposes of improving clinical practice and nursing education (Pittman et al. 1991).

**On-Campus Instruction Versus Clinical Instruction**

The advancement of patient rights necessitates the need for nursing faculty to responsibly develop methods for teaching basic nursing skills that allow students to refine psychomotor skills prior to their entry into the hospital.
environment (Cowan and Wiens 1986, Lessner 1990). In an attempt to achieve this goal, educators have attempted to simulate a hospital environment for teaching clinical skills to nursing students in on-campus laboratories. The intent of simulation is to help decrease student anxiety and, therefore, enhance students' abilities to perform in a clinical setting with actual patients (Cowan and Wiens 1986).

Hoff (1984) conducted a study related to on-campus versus clinical instruction and compared the anxiety levels of sophomore students in their first adult nursing course. A control group learned skills in a clinical setting, while an experimental group had six weeks of on-campus skills study followed by eight weeks of performing their skills in a clinical setting. General anxiety measures were taken at one, six, and fourteen weeks. Self-confidence and performance of actual skills were also measured. No difference was found in anxiety levels between the two groups; however, students in the experimental group scored higher on self-confidence and skill performance. The results of Hoff's study seem to support the belief that students should receive pre-clinical instruction prior to their first in-hospital clinical experience.

The use of a clinical setting as a means to teach beginning nursing students basic nursing skills is not a new
phenomenon in nursing education. Duppstadt (1980) traced the history of the teaching of nursing skills to beginning nursing students. She found that, historically, simulated clinical laboratories, known as nursing arts laboratories, were used in hospital-based diploma programs. The 1960s was the last decade in which nursing arts laboratories existed in the strictest sense. The use of actual clinical settings was more common by the 1970s (Duppstadt 1980).

Another study related to the use of the on-campus laboratories versus clinical settings for the purpose of instruction was conducted by Megel, Wilken, and Volcek (1987), who measured skill proficiency and anxiety levels in students who were learning to administer parenteral medications. One group of students was taught to administer injections in an on-campus laboratory while the other group learned the same skill in a clinical setting. The Spielberger State-Trait Anxiety Inventory was used to measure the anxiety levels of the students in both groups and a faculty-designed injection performance skill checklist was used to evaluate students' performance in preparing and administering injections. Students from both groups were evaluated while preparing and administering injections. No difference was found in error rates between the control and experimental groups in the preparation and administration of
injections. In addition, no relationship was found between skill performance and anxiety level.

In a similar study, control and experimental groups were used to measure differences in the proficiency of students practicing taking blood pressure on one another in an on-campus laboratory compared to students practicing the same skill on actual patients in a clinical setting (Gomez and Gomez 1987). A blood pressure proficiency test was used to assess the students' ability in both groups. The students in the experimental group, who practiced on patients in a clinical setting, had significantly higher proficiency scores than did the students who practiced on one another in the on-campus laboratory. After interviewing the students, Gomez and Gomez discovered that the students who performed the skill on actual patients in the clinical setting took their task more seriously than did students performing skills on one another in the on-campus laboratories. This study seems to support the use of the clinical setting as an effective arena for teaching.

Bell (1991) attempted to determine if pre-clinical evaluation decreased students' levels of anxiety in their first clinical performance. Students in control and experimental groups learned a skill in an on-campus laboratory. The students in the control group had no pre-clinical evaluation, while students in the experimental
group were evaluated in skill performance prior to their first clinical experience. The anxiety levels of students in both groups were measured at the time of their clinical experience. Students in the experimental group had significantly lower anxiety levels than did students in the control group. These results indicate that when students are learning a psychomotor skill, a pre-evaluation prior to the first time the skill is performed in a clinical setting helps to reduce the students' level of anxiety.

Some educators feel strongly that a clinical setting should never be used as the teaching arena for students who are learning basic nursing skills. Kermode (1987) argues that proper use of resources for preparing students should always include adequate pre-clinical instruction related to basic nursing skills, and that taking students into the clinical area prior to preparing them in on-campus laboratories should never be an option for faculty. Although selected studies seem to promote a clinical setting for teaching basic nursing skills, the pre-clinical student experience in an on-campus laboratory appears to be the most acceptable approach to teaching basic nursing skills to students.
Modes of Instruction

The early diploma programs were often referred to as nurse training programs (Kalisch and Kalisch 1978). Early skills instruction consisted of rote memorization of a series of steps to be strictly followed during the performance of a nursing procedure. Students were not rewarded for their abilities to synthesize information and draw conclusions. Instead, those processes were considered only within the purview of physicians (Deloughery 1977).

In a review of the literature conducted to determine the effectiveness of computer instruction in teaching nursing skills to students, Nyamathi et al. (1989) identified ninety-one basic nursing skills which baccalaureate nursing students needed to master prior to graduation. In their attempt to identify studies that included computer instruction to teach basic skills, the investigators found that the use of computer aided instruction was just as effective as lecture and classroom methods in relation to knowledge and skill acquisition. They found that students could attain the information they needed to learn about skills. They also determined that the primary concern with the use of computers was the expense of purchasing both hardware and software.

The use of guided imagery has been indicated to decrease anxiety and enhance students' ability to perform
basic nursing skills. Speck (1990) used scores on the State-Trait Anxiety Inventory, performance time, and performance scores to determine whether a significant difference existed between guided imagery and the traditional lecture demonstration mode in preparing students to perform their first injections. An experimental group participated in guided imagery exercises and a control group was given traditional instruction without the use of guided imagery. The results showed a significantly lower level of anxiety and higher overall performance scores in the group treated with guided imagery.

Other researchers have examined imaging exercises as a way of enhancing students' efficiency in skill performance. Eaton and Evans (1986) found that imaging was not only effective in teaching skills but that students' ability to image could be improved, allowing them to better visualize the performance of a skill. There is some evidence that mental imaging of a skill prior to performing the skill allows students to imagine all the steps in the process without any extraneous interference (Bachman 1990).

Windsor (1987) conducted a study of students' perceptions of learning in on-campus laboratories and in clinical settings. Windsor attempted to gain a better understanding of the phases of skill learning in both settings. Interviews were used to gain information
regarding students' perceptions of the learning process. Results of the study showed that the early or initial learning of basic skills constituted what Windsor called the first phase of learning and was characterized by anxiety, obsession with rules, and emphasis on performance. The results also showed that students felt that their abilities to learn were very much affected by the character of the individual instructor.

The extent to which students are able to practice a skill has also been investigated to determine if practice affects performance during an evaluation. Hegstad and Zsohar (1986) conducted a study to determine whether practice affected students' ability to perform venipuncture. Forty junior baccalaureate junior nursing students were evenly divided into control and experimental groups. Both groups were given didactic instruction which included a ten minute video demonstrating the entire venipuncture process. The experimental group was allowed to practice the procedure on a simulated arm while the control group had no opportunity to practice. Students from both groups were evaluated while performing an actual venipuncture. The results showed no significant difference in performance scores between the two groups. The study was repeated with a group of thirty-four students at the same university and the initial results were confirmed. Hegstad and Zsohar
concluded that the less-costly method of teaching venipuncture was equally effective.

The use of practicing nurses to supervise students during skill performance in a clinical setting has proven to be beneficial to students. Practicing nurses are often perceived as much less threatening to students because they have little influence on grades and are not perceived as being evaluators, as are nursing faculty (Peirce 1991).

Student and faculty input is an important component of the evaluation process to determine the effectiveness of different modes of instruction for teaching basic nursing skills. Fifty-nine baccalaureate students were surveyed to determine which methods of instruction they preferred for learning basic nursing skills. Twelve faculty were also surveyed for their preferred methods of instruction related to basic nursing skills. Self-directed learning was supported by both faculty and students. Students stressed that hands-on experience was essential and that adequate equipment was equally important. The faculty emphasized the need for adequate equipment and the importance of human resources (McAdams et al. 1989). A similar study conducted with second-year baccalaureate nursing students showed that students desired to learn basic nursing skills in a structured laboratory (Love et al. 1989).
A nation-wide study was conducted by Knippers (1981) to determine what modes of instruction were being used to teach basic nursing skills in National League of Nursing accredited baccalaureate nursing programs in the United States. Of 274 questionnaires mailed, 155, or 55 percent, were returned. The results showed that 90 percent of all respondents used some form of self-directed instruction to teach basic nursing skills to students. Sixty percent of the respondents used some type of module for learning, and most students studied in pairs or groups. Knippers concluded that self-instruction was being used as a primary method for teaching basic skills.

Modes of instruction for teaching basic nursing skills in baccalaureate nursing programs differ according to human and financial resources, faculty preferences, and student feedback. Many programs use some type of individualized instruction, and most programs use on-campus laboratories to prepare students pre-clinically.

Evaluating Student Performance

Evaluation is an important component of the teaching and learning processes. Faculty can provide students with feedback to enhance the students' ability to make appropriate changes when performing skills.
The effects of the presence and actions of instructors on students' behavior during skill performance has also been investigated. Kushnir (1986) interviewed a group of baccalaureate nursing students to determine the effect of the presence of instructors on student performance. The analysis of students' reports showed that the presence of an instructor added stress to an already stressful situation and that students tended to perceive instructors as evaluators rather than teachers. The students also believed that they made a greater number of errors when an instructor was present. The students attributed their increased stress and error rate to a fear of failure and embarrassment. Kushnir recommends that nursing instructors clearly distinguish between their roles as instructors and evaluators, and that a more supportive learning environment be created in order to help to reduce students' apprehension.

A similar study related to students' perceptions of faculty teaching in the clinical area was conducted by Beck (1991). Students were questioned about their clinical experiences and their perceptions of faculty teaching in the clinical area. Beck found that more than 50 percent of the students perceived the faculty as uncaring. The uncaring attitude of faculty was especially associated with performance evaluations. Beck emphasizes the need for
faculty, especially clinical faculty, to be more empathetic and to develop caring behaviors.

A review of the literature was conducted by Zimmermann and Waltman (1986) in order to determine which faculty behaviors were most effective in clinical instruction. Several of the studies reviewed were designed to elicit students' opinions regarding faculty behaviors. The investigators discovered that the most effective faculty behaviors were considered to be faculty availability to students, professional competence, interpersonal relations, and fairness in students evaluations. Very little evidence was found in the literature of faculty peer evaluation, which is considered to be an important part of the evaluation process.

Faculty attitudes toward students and faculty evaluation of students in on-campus and clinical laboratories seem to have a significant effect on students' performance. In order to make the evaluation process less difficult for students, faculty should consider differentiating between formative and summative evaluations (Higgins and Ochsner 1989). Formative evaluations help to give students on-going feedback in individual clinical situations, and summative evaluations provide a synopsis of student performance over a period of time. Summative evaluations counts more toward the students' final clinical
grade. The separation of the two types of evaluations provides students with an opportunity to receive feedback without being formally evaluated.

Teaching students to perform self-evaluations is another method of involving students in the evaluation process that can decrease student anxiety. When students share in the process of evaluation, they are more likely to feel in control. The collaboration with faculty can also help to improve the faculty student relationship (Best, Carswell, and Abbott 1990).

Another important factor related to nursing skills is the extent to which students are able to perform a skill. One hundred and ten baccalaureate nursing students were surveyed regarding their overall experiences in a program of nursing. A faculty-developed questionnaire was used which consisted of items related to didactic and clinical instruction. Results of the survey showed that students were satisfied with the didactic component of the curriculum; however, more than 45 percent of the students surveyed felt that clinical experiences should be expanded and that they should be assigned more patients for each clinical laboratory. The results also showed that the students desired more opportunities to perform their newly-learned skills (Ziv, Ehrenfeld, and Hadani 1990).
Securing relevant clinical instruction for nursing students is often affected by patient census, other schools of nursing competing for clinical positions for students, and the nature of a particular nursing unit. Frisch (1989) recommends the use of nursing homes for students' clinical experiences because much of the care needed by geriatric patients involves the use of basic nursing skills. Nursing homes also provide students with opportunities to gain experience in the care of geriatric patients.

Orientation and Preceptorship Programs

Teaching basic nursing skills to students in diploma programs in this country took place in nursing arts laboratories (Dolan, Fitzpatrick, and Herrmann 1983). Students practiced each skill repeatedly until mastery of the skill was achieved. The college and university programs shifted from a very pragmatic approach to a more conceptual approach to the teaching of basic nursing skills (Duppstadt 1980). The shift to a conceptual and less-pragmatic approach to teaching, led to the development of orientation programs for newly graduated students. The orientation programs, often referred to as preceptorship programs, last from one to several months, depending on the clinical area to which the graduate nurse is being oriented (Gillies 1989). Preceptorship programs were designed to provide
students with an opportunity to develop clinical competency beyond that provided by traditional baccalaureate education programs (Modic and Bowman 1989).

Scheetz (1989) who studied the effects of a summer preceptorship program on baccalaureate nursing students, compared students in a preceptorship program to students who worked as nursing assistants in non-structured clinical settings. Scheetz found that both groups of students perceived their summer work as valuable, but that students in the preceptor group gained greater levels of clinical competency.

Schempp and Rompre (1986) reviewed several preceptorship programs and studied the effects of those programs on students' ability to perform skills. They discovered that preceptorship programs were not only beneficial, but were very instrumental in assisting students with the transition from the academic to the service setting. A positive relationship was also evident between quality care and preceptorship programs.

The need for a structured program for transition from the academic to the clinical setting was clearly identified by Kramer (1974), who followed several graduate nurses from baccalaureate programs through their orientations. Kramer outlined a conceptual model and emphasized the important process of becoming oriented and socialized.
Paterniti (1987) designed a transitional orientation nursing unit which provided attention to the control and ordering of the environment as a way of enhancing graduate nurses' learning. Attention was given to nursing care assignments in order to insure that graduate nurses were exposed to a variety of clinical situations, including the performance of many basic nursing skills. He found that after three weeks of orientation, subjects were able to administer nursing care to a full complement of patients without assistance from the nursing staff.

Montessori Method

Maria Montessori, Italy's first female physician, dedicated most of her professional life to the development of methods used to educate small children (Standing 1984). Montessori's work began with defective children in the slums of Rome and was later expanded and adapted for use with normal children (Kramer 1976, Lillard 1972). Montessori's methods were influenced by two educators, Itard and Seguin. Itard believed that teachers should adjust their teaching methods to the needs of their students, and Seguin felt that there was a relationship between sensory perception and muscular activity (Fynne 1924, Gitter 1970).

Montessori believed that no human being could be educated by anyone other than himself or herself and that,
in relation to children, the system of education must be developed to fit the child. Her belief was based on the assumption that learning occurs from within the child (Fisher 1913). Montessori further believed that education arises from the study of watching free children; that the experimenter, the Montessori teacher, must divest himself or herself of every possible preoccupation and preconception, and that life should be observed without intervention. Another of Montessori's beliefs was that children seek to engage in real, purposeful activity (Ward 1971).

Orem and Stevens provide the following precise and succinct definition of the Montessori method by Holmes:

It [the Montessori method] is based on radical conception of liberty for the pupil; it entails a highly formal training of separate sensory, motor and mental capacities; and, it leads to rapid, easy and substantial mastery of the elements of reading, writing and arithmetic (Orem and Stevens 1970, vii).

The major principles of the Montessori method include training children to be independent; appealing to the senses of children rather than the intellect; identifying children's intense interests in learning, which are known as sensitive periods; and ordering and controlling the environment in which children learn (Rusk and Scotland 1979). In the learning process, children are presented with one concept at a time, and any incorrect response by a child is regarded as a premature presentation of the concept or
task to the child by the teacher (Rusk and Scotland 1979). According to Montessori (1981), the error is representative of a child not being ready or capable; therefore, a child should never be reprimanded or scolded for not being able to provide a correct response.

The education of the senses is considered very important in the Montessori method (Montessori 1976, Standing 1984). The rules governing the education of the senses include the isolation of a sense whenever possible, the development of didactic materials that initiate auto education so that the education does not depend upon the ability of the teacher, and movement from a few strongly contrasting stimuli to many stimuli in gradual differentiation (Montessori 1964). The materials used to educate the senses should be designed and developed in a way that enhances the child's orderly development (Kramer 1976).

**Chapter Summary**

This review of literature related to the teaching of basic nursing skills to baccalaureate nursing students indicates a need to adequately prepare students to competently perform basic nursing skills. Early hospital-based programs placed great emphasis on student preparation in what was referred to as nursing arts laboratories. The movement of education from a hospital-based setting to
colleges and universities brought about a shift from a pragmatic orientation to one that was more conceptual in nature.

Research in the teaching of basic nursing skills to beginning nursing students include studies of student and faculty relationships, student anxiety, independent study, computer-generated programs, and the use of a clinical area rather than traditional on-campus laboratories. The need for collaboration between clinicians and educators in order to enhance student learning and mastery of basic nursing skills, is also discussed in the literature.

The area of student and faculty relationships was also reviewed. Students often feel that every encounter with faculty involves an evaluation of student performance. The literature indicates a need for faculty members to clarify their roles with students and to incorporate students in the process of evaluation.

Literature related to the development of the Montessori method traces the beginnings of the method to the education of deficient children in the slums of Rome. The method was later adapted to the education of normal children. The need to allow children to develop in a free environment is stressed, and the observation of children is mentioned as one of the primary responsibilities of Montessori teachers.
CHAPTER III

METHODS OF RESEARCH

The methods and procedures used to obtain and analyze the data in this descriptive study are provided in this chapter. The survey method of research was used to accomplish the purposes of this study, which were (1) to determine the extent to which nursing education administrators accept the use of an adapted Montessori method in teaching basic nursing skills, and (2) to determine the feasibility of implementing such a method.

The survey method of research was used because it is the most efficient means for contacting members of a large and widely dispersed population (Brink and Wood 1989). This research method also makes it possible to obtain information related to a variety of questions (Seaman and Verhonick 1982). A questionnaire was used as the instrument to collect data. Questionnaires are among the instruments most commonly used in survey-type research (Borg and Merideth 1983).

Population

The population for this study consisted of all the administrators of generic baccalaureate nursing programs
accredited by the National League for Nursing in the United States. Schools of nursing were identified through official listings in *Baccalaureate Education in Nursing: Key to a Professional Career in Nursing* (National League for Nursing 1989).

The population was stratified according to the primary funding source of the institution (public or private) in the four geographic regions identified by the National League for Nursing as the North Atlantic region, the Midwestern region, the Southern region, and the Western region. The distribution of the 420 schools offering generic baccalaureate programs in nursing in the four geographic regions are shown in Table 1. Table 1 also provides a comparison of the number of returns required from the public and private sectors in each geographic region and the actual number received in each stratification.

**Survey Instrument**

The instrument used for the survey was designed and developed to provide answers to the research questions. The administrators were asked to complete the instrument, a questionnaire (Appendix A), after reading a summary of a study which used an adaptation of the Montessori method to teach beginning baccalaureate nursing students to match needle gauge with solution viscosity (Appendix B). Items on
Table 1
NUMBER OF ACCREDITED GENERIC BACCALAUREATE PROGRAMS
IN NURSING, NUMBER REQUIRED, AND NUMBER RECEIVED
IN FOUR GEOGRAPHIC REGIONS OF THE UNITED STATES
ACCORDING TO PRIMARY FUNDING SOURCE

<table>
<thead>
<tr>
<th>Region</th>
<th>Public</th>
<th>Private</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>N</td>
<td>NR</td>
</tr>
<tr>
<td>North Atlantic</td>
<td>42</td>
<td>21</td>
</tr>
<tr>
<td>(11 states and D.C.)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Midwestern</td>
<td>58</td>
<td>29</td>
</tr>
<tr>
<td>(12 states)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Southern</td>
<td>93</td>
<td>46</td>
</tr>
<tr>
<td>(15 states)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Western</td>
<td>26</td>
<td>13</td>
</tr>
<tr>
<td>(13 states)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>219</td>
<td>109</td>
</tr>
</tbody>
</table>

Note: N = number within the region, NR = number of responses needed to meet 50 percent rate, and R = number received.

the questionnaire concerned the administrators' beliefs regarding the feasibility of implementing the adapted Montessori method in on-campus nursing skills laboratories. The items addressed administrator support, faculty reeducation, and economic feasibility. It was predetermined that, in order to conduct a valid study, a 50 percent return of usable questionnaires in each geographic area was
necessary. A panel of experts was asked to assess the instrument prior to its nation-wide distribution.

**Pilot Study**

Four administrators in the State of Texas, two from private institutions and two from public institutions, served as a panel of experts to test the questionnaire for content validity. Each of the four administrators was asked to scrutinize the survey instrument for (1) appropriateness and validity of content, (2) clarity of the directions, (3) readability of the content, (4) availability of requested information to administrative heads of schools of nursing, and (5) the general format of the questionnaire.

The summary of the study using an adaptation of the Montessori method to teach matching needle gauge and solution viscosity was also reviewed by the panel of experts for content validity and clarity. Although the four schools of nursing for the pilot study were selected by convenience of location, an effort was made to duplicate elements of the target population. The selection criteria used were (1) two selections each from public and private sectors, (2) accreditation by the National League for Nursing, and (3) nursing program established for at least five years.

Suggestions and recommendations made by all participants in the pilot study were carefully reviewed.
Most of the changes were editorial in nature, clarifying ambiguous statements. At the experts' suggestion, the classes of numbers on the demographic sheet (Appendix C) used to identify the size of the schools of nursing were divided into eight rather than seven categories, and the summary of the adapted Montessori study was expanded to more clearly define the study results.

Testing the Research Questions

The revised summary of the adapted Montessori study and the questionnaires were mailed to administrators of all generic baccalaureate programs of nursing accredited by the National League for Nursing (1989). A population of 420 schools was surveyed. The summary of the adapted Montessori study and questionnaire were accompanied by a cover letter (Appendix D), which explained the purpose of the survey and assured the participants of confidentiality. A stamped, pre-addressed envelope was also enclosed. Because the initial mailing brought the necessary number of returns from each stratification, a second mailing was unnecessary.

Statistical Treatment of Data

The returned survey forms were categorized according to the primary funding source in each of the geographic regions and scrutinized for any major discrepancies in responses which would necessitate the questionnaires
elimination from the study. A total of 256 usable questionnaires was submitted to a computer service with expertise in the area of data tabulation.

Research questions 1, 2, and 3 concerned the administrators' opinions regarding a method or system of instruction. Data received in response to research questions 1, 2, and 3 were treated using frequency distribution in percentages. Data received in response to the fourth research question, regarding differences in response by demographic information, was treated using an analysis of variance and required a .05 level for statistical significance (Ferguson 1981).

Chapter Summary

The survey method of research was used in this study to determine the beliefs of administrators regarding the feasibility of using an adaptation of the Montessori method to teach basic nursing skills to beginning generic baccalaureate nursing students in schools of nursing accredited by the National League for Nursing. The target population consisted of administrators of colleges and schools of nursing in 420 baccalaureate programs in all fifty states and the District of Columbia.

Administrators were asked to read a one-page summary of a study that was conducted using an adaptation of the
Montessori method in the teaching of solution viscosity and needle gauge to beginning baccalaureate nursing students (Appendix E). Administrators were surveyed through the use of a questionnaire that was designed, developed, and pilot tested for the purpose of answering the research questions of this study. Two hundred and fifty-six usable questionnaires were returned, providing a 60.95 percent response rate. Results of the analysis of data are presented in Chapter IV.
CHAPTER IV

PRESENTATION AND ANALYSIS OF FINDINGS

The purpose of this chapter is to present the findings of the survey and analyze the statistical results obtained for this study. The analyzed data represent responses to the survey instrument and are based on the research questions provided in Chapter I. Research question 1 through 3 were analyzed by frequency distributions. Research question 4 was analyzed using an analysis of variance. A .05 statistical level was required for significance (Ferguson 1981).

Overview of the Study

Administrators of 420 National League for Nursing accredited baccalaureate nursing programs were surveyed in this descriptive study. A total of 256 usable questionnaires were returned, providing a response rate of 60.95 percent. The total number of responding institutions based on primary funding source (public and private) and geographic region is shown in Table 2.

Although considerable differences were evident in the number of private and public institutions responding within regions, it is notable that the total number of private and
TABLE 2
TOTAL NUMBER OF RESPONDING INSTITUTIONS BY GEOGRAPHIC REGION AND PRIMARY FUNDING SOURCE

<table>
<thead>
<tr>
<th>Geographic Region</th>
<th>Public</th>
<th>Private</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>N</td>
<td>%</td>
<td>N</td>
</tr>
<tr>
<td>North Atlantic</td>
<td>24</td>
<td>9.7</td>
<td>36</td>
</tr>
<tr>
<td>Midwestern</td>
<td>35</td>
<td>13.7</td>
<td>54</td>
</tr>
<tr>
<td>Southern</td>
<td>46</td>
<td>18.0</td>
<td>29</td>
</tr>
<tr>
<td>Western</td>
<td>24</td>
<td>9.3</td>
<td>8</td>
</tr>
<tr>
<td>Total</td>
<td>129</td>
<td>50.4</td>
<td>127</td>
</tr>
</tbody>
</table>

Note: N = number of responding institutions, % = percentage of total responding institutions.

Public institutions responding were almost equally divided, with a total of 129 (50.4%) public and 127 (49.6%) private institutions responding. The total for all responding public and private institutions was 256, which constitutes 60.95 percent of the total population of 420 for this study. The largest number of responding institutions was from the Midwestern region, with 89 (34.7%) questionnaires returned. The smallest number of questionnaires were returned from the
Western region, with 32 (12.5) responses. The size of the responding institutions by geographic region is presented in Table 3.

**TABLE 3**

**SIZE OF RESPONDING INSTITUTIONS BY REGION AND FUNDING SOURCE**

<table>
<thead>
<tr>
<th>Region</th>
<th>North Atlantic</th>
<th>Midwest</th>
<th>Southern</th>
<th>Western</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>&lt; 1,000</td>
<td>1</td>
<td>6</td>
<td>1</td>
<td>17</td>
<td>1</td>
</tr>
<tr>
<td>1,000-2,500</td>
<td>1</td>
<td>18</td>
<td>4</td>
<td>22</td>
<td>6</td>
</tr>
<tr>
<td>2,500-5,000</td>
<td>0</td>
<td>6</td>
<td>3</td>
<td>10</td>
<td>7</td>
</tr>
<tr>
<td>5,000-10,000</td>
<td>6</td>
<td>3</td>
<td>7</td>
<td>3</td>
<td>13</td>
</tr>
<tr>
<td>10,000-15,000</td>
<td>10</td>
<td>1</td>
<td>6</td>
<td>1</td>
<td>8</td>
</tr>
<tr>
<td>15,000-25,000</td>
<td>3</td>
<td>2</td>
<td>4</td>
<td>1</td>
<td>8</td>
</tr>
<tr>
<td>&gt; 25,000</td>
<td>3</td>
<td>0</td>
<td>10</td>
<td>0</td>
<td>3</td>
</tr>
<tr>
<td>Total</td>
<td>24</td>
<td>36</td>
<td>35</td>
<td>54</td>
<td>46</td>
</tr>
</tbody>
</table>

Note: Pub = public, Pvt = private, Midwest = Midwestern.

Data in Table 3 show that there were 4 (1.7%) public institutions with fewer than 1,000 students and 30 (11.7%)
private institutions with fewer than 1,000 students. Sixty-eight (26.6%) of the responding public institutions had student populations of more than 10,000 and 10 (3.9%) private institutions had student populations of more than 10,000. As shown in Table 3, the public sector was represented by a greater number of institutions with a total student population exceeding 10,000.

The distribution of responding institutions by population of schools of nursing is reported in Table 4. Table 4 also provides the funding source.

Of the responding institutions, for both the private and public sectors, 121 (47.2%) had school of nursing student populations of 200 or fewer students. Sixty-one (23.9%) institutions from the public sector had between 200 and 500 students, and 41 (16.0%) institutions from the private sector had between 200 and 500 students in their schools of nursing. The public sector included 30 (11.7%) schools of nursing with more than 500 students, while the private sector included 3 (1.2%) schools of nursing with populations greater than 500. Although the number of public and private schools of nursing reporting was fairly equal, the public institutions had greater numbers of students in nursing. The number of beginning generic baccalaureate nursing students taking their first skills course for all
TABLE 4

POPULATION OF SCHOOLS OF NURSING FOR RESPONDING INSTITUTIONS BY FUNDING SOURCE

<table>
<thead>
<tr>
<th>Number of Students in School of Nursing</th>
<th>Public</th>
<th></th>
<th>Private</th>
<th></th>
<th>Total</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>N</td>
<td>%</td>
<td>N</td>
<td>%</td>
<td>N</td>
<td>%</td>
</tr>
<tr>
<td>Under 100</td>
<td>8</td>
<td>3.1</td>
<td>34</td>
<td>13.3</td>
<td>42</td>
<td>16.4</td>
</tr>
<tr>
<td>100-200</td>
<td>28</td>
<td>10.9</td>
<td>51</td>
<td>19.9</td>
<td>79</td>
<td>30.8</td>
</tr>
<tr>
<td>200-300</td>
<td>16</td>
<td>6.3</td>
<td>22</td>
<td>8.6</td>
<td>38</td>
<td>14.9</td>
</tr>
<tr>
<td>300-400</td>
<td>22</td>
<td>8.6</td>
<td>10</td>
<td>3.9</td>
<td>32</td>
<td>12.5</td>
</tr>
<tr>
<td>400-500</td>
<td>23</td>
<td>9.0</td>
<td>9</td>
<td>3.5</td>
<td>32</td>
<td>12.5</td>
</tr>
<tr>
<td>500-600</td>
<td>14</td>
<td>5.5</td>
<td>0</td>
<td>0.0</td>
<td>14</td>
<td>5.5</td>
</tr>
<tr>
<td>600-700</td>
<td>6</td>
<td>2.3</td>
<td>3</td>
<td>1.2</td>
<td>9</td>
<td>3.5</td>
</tr>
<tr>
<td>Over 700</td>
<td>10</td>
<td>3.9</td>
<td>0</td>
<td>0.0</td>
<td>10</td>
<td>3.9</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td>127</td>
<td>49.6</td>
<td>129</td>
<td>50.4</td>
<td>256</td>
<td>100.0</td>
</tr>
</tbody>
</table>

Note: N = number of schools of nursing, % = percentage of total responding institutions.

Of the 256 usable questionnaires returned, 15 were unmarked in relation to the number of generic baccalaureate
### TABLE 5

BEGINNING GENERIC BACCALAUREATE NURSING STUDENTS TAKING FIRST NURSING SKILLS COURSE BY PRIMARY FUNDING SOURCE FOR ALL RESPONDING INSTITUTIONS

<table>
<thead>
<tr>
<th>Number of Students in First Skills Course</th>
<th>Public</th>
<th>Private</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>N</td>
<td>%</td>
<td>N</td>
</tr>
<tr>
<td>25-50</td>
<td>50</td>
<td>20.9</td>
<td>78</td>
</tr>
<tr>
<td>51-75</td>
<td>23</td>
<td>9.5</td>
<td>28</td>
</tr>
<tr>
<td>76-100</td>
<td>23</td>
<td>9.5</td>
<td>9</td>
</tr>
<tr>
<td>101-125</td>
<td>12</td>
<td>5.0</td>
<td>3</td>
</tr>
<tr>
<td>126-150</td>
<td>8</td>
<td>3.3</td>
<td>0</td>
</tr>
<tr>
<td>Over 150</td>
<td>7</td>
<td>2.9</td>
<td>0</td>
</tr>
<tr>
<td>Total</td>
<td>123</td>
<td>51.1</td>
<td>118</td>
</tr>
</tbody>
</table>

Note: \(N\) = number of responding institutions, *15 cases missing, \(\%\) = percentage of total responding institutions.

students taking their first skills course. Almost all of the 15 respondents who did not mark the demographic sheet for this item wrote a note on the demographic sheet explaining that the program was not on a two-semester schedule or, in a few cases, that the teaching of basic
skills was integrated throughout the curriculum. As indicated in Table 5, there were 96 (39.8%) public programs and 115 (47.7%) private programs which had 25 to 100 beginning generic baccalaureate students in their first skills course. Data in Table 5 also show that 30 (12.4%) public programs had class sizes greater than 100, and 3 (1.2%) private programs had class sizes greater than 100. These data show that the public institutions had a greater number of beginning skills courses with more than 100 students per course.

Data related to the number of full-time and part-time nursing faculty teaching beginning skills courses according to region and funding source are provided in Table 6. One hundred and nine (45.2%) nursing programs in the public sector had two or more full-time nursing faculty teaching beginning skills courses, and 69 (28.6%) programs from the private sector had two or more nursing faculty teaching in beginning skills courses. The data show that 31 (12.9%) public institutions had more than five full-time faculty teaching beginning skills courses. Seven (2.9%) private institutions had more than five full-time nursing faculty teaching in beginning skills courses. For both public and private institutions, 196 (81.3%) had two or fewer part-time faculty teaching beginning skills courses. Data for the
### TABLE 6

NUMBER OF FULL- AND PART-TIME NURSING FACULTY TEACHING BEGINNING SKILLS COURSES ACCORDING TO REGION AND FUNDING SOURCE FOR ALL RESPONDING INSTITUTIONS

<table>
<thead>
<tr>
<th># of FT and PT Faculty</th>
<th>North Atlantic</th>
<th>Mid-Western</th>
<th>Southern</th>
<th>Western</th>
<th>Totals</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Public</td>
<td>Private</td>
<td>Public</td>
<td>Private</td>
<td>Public</td>
</tr>
<tr>
<td></td>
<td>FT</td>
<td>PT</td>
<td>FT</td>
<td>PT</td>
<td>FT</td>
</tr>
<tr>
<td>None</td>
<td>1</td>
<td>12</td>
<td>1</td>
<td>18</td>
<td>0</td>
</tr>
<tr>
<td>1</td>
<td>3</td>
<td>3</td>
<td>13</td>
<td>9</td>
<td>4</td>
</tr>
<tr>
<td>2</td>
<td>2</td>
<td>2</td>
<td>9</td>
<td>4</td>
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<td>3</td>
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<td>5</td>
</tr>
<tr>
<td>4</td>
<td>4</td>
<td>1</td>
<td>3</td>
<td>0</td>
<td>4</td>
</tr>
<tr>
<td>5</td>
<td>5</td>
<td>0</td>
<td>3</td>
<td>0</td>
<td>6</td>
</tr>
<tr>
<td>&gt; 5</td>
<td>3</td>
<td>1</td>
<td>2</td>
<td>0</td>
<td>11</td>
</tr>
<tr>
<td>Total</td>
<td>22</td>
<td>22</td>
<td>36</td>
<td>36</td>
<td>34</td>
</tr>
</tbody>
</table>

Note: FT = Full-Time, PT = Part-Time.
public and private sectors combined reveal that most beginning skills courses were taught by full-time faculty.

**Presentation of Findings**

The four research questions designed to guide the study are presented in Chapter I. The following data analysis conforms to the sequence of the research questions in Chapter I.

**Feasibility of Adapted Montessori Method**

Research question 1 asked: To what extent do nursing education administrators of generic baccalaureate nursing programs believe it is feasible to use an adaptation of the Montessori method to teach basic nursing skills? Administrators were asked about their willingness to support faculty in an attempt to conduct a study similar to the adapted Montessori method to teach basic skills to beginning students. The results of this question are shown in Table 7.

Thirty-eight percent of the respondents agreed strongly with the statement regarding support for nursing faculty in an attempt to conduct a study similar to the study adapting the Montessori method to teach skills, and 37.5 percent agreed with the statement. The data show that administrators of baccalaureate programs in nursing were likely to support faculty interested in conducting a study
TABLE 7
ADMINISTRATORS' SUPPORT OF FACULTY RESEARCH
IN ADAPTED MONTESSORI METHOD

<table>
<thead>
<tr>
<th>Response</th>
<th>Frequency</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Strongly agree</td>
<td>96</td>
<td>38.0</td>
</tr>
<tr>
<td>Agree</td>
<td>95</td>
<td>37.5</td>
</tr>
<tr>
<td>Somewhat agree</td>
<td>42</td>
<td>16.6</td>
</tr>
<tr>
<td>Somewhat disagree</td>
<td>13</td>
<td>5.1</td>
</tr>
<tr>
<td>Strongly disagree</td>
<td>7</td>
<td>2.8</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>253</strong>*</td>
<td><strong>100.0</strong></td>
</tr>
</tbody>
</table>

*Three cases missing.

adapting the Montessori method to the teaching of basic skills.

Administrators were also asked about their support of a method of instruction for learning basic nursing skills that permits students to work independently and at a pace commensurate with their abilities. Administrators' response to this question are shown in Table 8.

The category of strongly agree with 56.4 percent of the responses, represents more than one-half of the total number responding to the questionnaire. The strongly disagree category was chosen by 1.6 percent of all respondents. The data show that more than half of the
TABLE 8
ADMINISTRATORS' SUPPORT OF INDEPENDENT LEARNING AT A PACE COMMENSURATE WITH STUDENT ABILITY

<table>
<thead>
<tr>
<th>Response</th>
<th>Frequency</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Strongly agree</td>
<td>144</td>
<td>56.4</td>
</tr>
<tr>
<td>Agree</td>
<td>67</td>
<td>26.3</td>
</tr>
<tr>
<td>Somewhat agree</td>
<td>30</td>
<td>11.8</td>
</tr>
<tr>
<td>Somewhat disagree</td>
<td>10</td>
<td>3.9</td>
</tr>
<tr>
<td>Strongly disagree</td>
<td>4</td>
<td>1.6</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>255</strong>*</td>
<td><strong>100.0</strong></td>
</tr>
</tbody>
</table>

*One case missing.

respondents would be supportive of a system for learning basic nursing skills that permits students to work independently and at a pace commensurate with students' abilities.

Data related to administrator support of the use of an adapted Montessori method for teaching basic nursing skills to students are included in Table 9. The agree category, with 36 percent of the responses, constitutes the largest percentage of responses for any category. This is followed by the somewhat agree category, with 30.8 percent of the responses, and strongly agree with 24.3 percent of the
TABLE 9
ADMINISTRATORS' SUPPORT OF ADAPTED MONTESSORI METHOD FOR USE IN TEACHING BASIC NURSING SKILLS

<table>
<thead>
<tr>
<th>Response</th>
<th>Frequency</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Strongly agree</td>
<td>60</td>
<td>24.3</td>
</tr>
<tr>
<td>Agree</td>
<td>89</td>
<td>36.0</td>
</tr>
<tr>
<td>Somewhat agree</td>
<td>76</td>
<td>30.8</td>
</tr>
<tr>
<td>Somewhat disagree</td>
<td>17</td>
<td>6.9</td>
</tr>
<tr>
<td>Strongly disagree</td>
<td>5</td>
<td>2.0</td>
</tr>
<tr>
<td>Total</td>
<td>247*</td>
<td>100.0</td>
</tr>
</tbody>
</table>

*Nine cases missing.

responses. The data in Table 9 are similar to the data related to administrator support of faculty research, independent student learning, and the use of the adapted Montessori method to teach basic nursing skills. Most of the respondents selected the agree category. Data related to administrator support of faculty who are interested in learning how to adapt the Montessori method to teach basic skills are presented in Table 10.

The agree category, with 39.0 percent, was chosen by the largest percentage of respondents, followed by the strongly agree category which was chosen by 35.3 percent of
TABLE 10
ADMINISTRATORS' SUPPORT OF FACULTY INTERESTED
IN LEARNING TO ADAPT THE MONTESSORI
METHOD TO TEACH BASIC SKILLS

<table>
<thead>
<tr>
<th>Response</th>
<th>Frequency</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Strongly agree</td>
<td>88</td>
<td>35.3</td>
</tr>
<tr>
<td>Agree</td>
<td>97</td>
<td>39.0</td>
</tr>
<tr>
<td>Somewhat agree</td>
<td>48</td>
<td>19.3</td>
</tr>
<tr>
<td>Somewhat disagree</td>
<td>13</td>
<td>5.2</td>
</tr>
<tr>
<td>Strongly disagree</td>
<td>3</td>
<td>1.2</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>249</strong>*</td>
<td><strong>100.0</strong></td>
</tr>
</tbody>
</table>

*Seven cases missing.

The respondents. The categories of somewhat and strongly disagree were selected least often by respondents. The data in Table 10 are similar to the data related to the support of faculty learning and research. All three areas were supported by many of the responding administrators.

**Reeducation of Faculty**

Research question 2 asked: To what extent do nursing education administrators believe it possible to reeducate nursing faculty to use the adapted Montessori method to teach basic nursing skills to beginning nursing students?
Responses by administrators concerning faculty willingness to conduct a study similar to the adapted Montessori method are shown in Table 11.

**TABLE 11**

ADMINISTRATORS' BELIEFS REGARDING FACULTY WILLINGNESS TO CONDUCT A STUDY SIMILAR TO THE ADAPTED MONTESSORI STUDY

<table>
<thead>
<tr>
<th>Response</th>
<th>Frequency</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Strongly agree</td>
<td>16</td>
<td>6.5</td>
</tr>
<tr>
<td>Agree</td>
<td>49</td>
<td>19.9</td>
</tr>
<tr>
<td>Somewhat agree</td>
<td>111</td>
<td>45.1</td>
</tr>
<tr>
<td>Somewhat disagree</td>
<td>58</td>
<td>23.6</td>
</tr>
<tr>
<td>Strongly disagree</td>
<td>12</td>
<td>4.9</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>246</strong>*</td>
<td><strong>100.0</strong></td>
</tr>
</tbody>
</table>

*Ten cases missing.

Approximately one-half (45.1%) of the administrators selected the somewhat agree category, and almost one-quarter (23.6%) of the administrators selected the somewhat disagree category. Administrators' responses to earlier statements indicated their support for faculty interested in conducting research in the adapted Montessori method. The data in Table 11 show that administrators have no certain or strong
beliefs regarding faculty willingness to conduct a study similar to the adapted Montessori method.

Administrators were also questioned regarding faculty interest in learning more about the adapted Montessori method for teaching basic nursing skills. These data are shown in Table 12.

TABLE 12
ADMINISTRATORS' BELIEFS REGARDING FACULTY WILLINGNESS TO LEARN ABOUT ADAPTED MONTESSORI METHOD FOR TEACHING BASIC NURSING SKILLS

<table>
<thead>
<tr>
<th>Response</th>
<th>Frequency</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Strongly agree</td>
<td>51</td>
<td>20.9</td>
</tr>
<tr>
<td>Agree</td>
<td>88</td>
<td>36.1</td>
</tr>
<tr>
<td>Somewhat agree</td>
<td>79</td>
<td>32.3</td>
</tr>
<tr>
<td>Somewhat disagree</td>
<td>19</td>
<td>7.8</td>
</tr>
<tr>
<td>Strongly disagree</td>
<td>7</td>
<td>2.9</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td>244*</td>
<td>100.0</td>
</tr>
</tbody>
</table>

*Twelve cases missing.

Approximately one-third (36.1%) of the respondents chose the agree category, while 32.3 percent of the respondents selected the somewhat agree category. The data in Table 12 show that many respondents believed that faculty
would be interested in learning about the adapted Montessori method.

**Economic Feasibility of Adapted Montessori Method**

Research question 3 asked: What percentage of administrators believe that an adapted Montessori method for teaching basic nursing skills is economically feasible? The responding administrators' willingness to provide financial support for a method similar to the adapted Montessori method to teach basic nursing skills is shown in Table 13.

The data in Table 13 show that 26.5 percent of the administrators somewhat disagreed with providing financial support, and 26.1 percent strongly disagreed with providing financial support for a method of instruction similar to the adapted Montessori method. The data also show that more than one-half of the respondents were unwilling to provide financial support for a method of instruction similar to the adapted Montessori method.

It is notable that approximately one-third of the respondents wrote comments in the margin adjacent to the questions related to financial feasibility. Their notes referred to limited financial resources and budgetary constraints, with 27 (10.5%) respondents making specific reference to the necessity for no budget increases or, in
TABLE 13
ADMINISTRATORS' WILLINGNESS TO PROVIDE FINANCIAL SUPPORT FOR A METHOD SIMILAR TO ADAPTED MONTESSORI METHOD

<table>
<thead>
<tr>
<th>Response</th>
<th>Frequency</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Strongly agree</td>
<td>6</td>
<td>2.6</td>
</tr>
<tr>
<td>Agree</td>
<td>26</td>
<td>11.3</td>
</tr>
<tr>
<td>Somewhat agree</td>
<td>77</td>
<td>33.5</td>
</tr>
<tr>
<td>Somewhat disagree</td>
<td>61</td>
<td>26.5</td>
</tr>
<tr>
<td>Strongly disagree</td>
<td>60</td>
<td>26.1</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>230</strong>*</td>
<td><strong>100.0</strong></td>
</tr>
</tbody>
</table>

*Twenty-six cases missing.

some cases, decreases in the budget for their schools of nursing.

The administrators were also questioned about their willingness to employ a specialist to train faculty in the use of an adapted Montessori method. Data related to the employment of a specialist are provided in Table 14.

The category with the smallest percentage of responses was strongly agree, with 1.8 percent of the respondents selecting that category. The category with the largest percentage of responses was strongly disagree, with 34.5 percent selecting that category. Data in Table 10 show high agreement by administrators regarding the support of faculty
TABLE 14
ADMINISTRATORS’ WILLINGNESS TO EMPLOY A SPECIALIST TO TRAIN FACULTY IN ADAPTED MONTESSORI METHOD

<table>
<thead>
<tr>
<th>Response</th>
<th>Frequency</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Strongly agree</td>
<td>4</td>
<td>1.8</td>
</tr>
<tr>
<td>Agree</td>
<td>19</td>
<td>8.3</td>
</tr>
<tr>
<td>Somewhat agree</td>
<td>63</td>
<td>27.5</td>
</tr>
<tr>
<td>Somewhat disagree</td>
<td>64</td>
<td>27.9</td>
</tr>
<tr>
<td>Strongly disagree</td>
<td>79</td>
<td>34.5</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>229</strong>*</td>
<td><strong>100.0</strong></td>
</tr>
</tbody>
</table>

*Twenty-seven cases missing.

learning how to adapt the Montessori method to teach basic skills. The data in Table 14 show that the respondents, although willing to support faculty learning, were not likely to employ a specialist to train faculty in the adapted Montessori method.

Respondents were asked about their willingness to designate funds to set up and support an adapted Montessori-type learning environment to teach basic nursing skills. Data from the survey instrument regarding this question are displayed in Table 15.
TABLE 15
ADMINISTRATORS' WILLINGNESS TO DESIGNATE FUNDS FOR ADAPTED MONTESSORI-TYPE LEARNING ENVIRONMENT

<table>
<thead>
<tr>
<th>Response</th>
<th>Frequency</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Strongly agree</td>
<td>3</td>
<td>1.3</td>
</tr>
<tr>
<td>Agree</td>
<td>16</td>
<td>7.0</td>
</tr>
<tr>
<td>Somewhat agree</td>
<td>66</td>
<td>28.9</td>
</tr>
<tr>
<td>Somewhat disagree</td>
<td>68</td>
<td>29.8</td>
</tr>
<tr>
<td>Strongly disagree</td>
<td>75</td>
<td>33.0</td>
</tr>
<tr>
<td>Total</td>
<td>228*</td>
<td>100.0</td>
</tr>
</tbody>
</table>

*Twenty-nine cases missing.

The categories of disagreement received the greatest number of responses, with 1.3 percent of the respondents strongly agreeing and 7 percent agreeing. According to their responses to earlier statements, the administrators seemed to support an adapted Montessori method for teaching basic skills and faculty interested in learning more about the method; however, the data in Table 15 show little support for funding such a method to teach basic skills. Just over 62 percent of the respondents disagreed either somewhat or strongly.
Administrators were asked to indicate their willingness to seek outside funding to establish and support an adapted Montessori-type learning environment. Data related to this question are shown in Table 16.

**TABLE 16**

ADMINISTRATORS’ WILLINGNESS TO SEEK OUTSIDE FUNDING FOR MONTESSORI-TYPE LEARNING ENVIRONMENT

<table>
<thead>
<tr>
<th>Response</th>
<th>Frequency</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Strongly agree</td>
<td>37</td>
<td>15.1</td>
</tr>
<tr>
<td>Agree</td>
<td>59</td>
<td>24.1</td>
</tr>
<tr>
<td>Somewhat agree</td>
<td>77</td>
<td>31.4</td>
</tr>
<tr>
<td>Somewhat disagree</td>
<td>32</td>
<td>13.1</td>
</tr>
<tr>
<td>Strongly disagree</td>
<td>40</td>
<td>16.3</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>245※</strong></td>
<td><strong>100.0</strong></td>
</tr>
</tbody>
</table>

※Eleven cases missing.

For this question, approximately one-half (49.2%) of the administrators selected responses from the strongly agree and agree categories, with the least number of responses (13.1%) selected from the somewhat disagree category. It appears that many administrators were more willing to seek outside funding for a Montessori-type
learning environment than to fund such an environment with existing financial resources.

**Differences in Responses by Selected Factors**

Research question 4 asked: To what extend do administrators vary in their responses based on region, institution size, funding source (public and private), school of nursing size, number of full-time and part-time faculty teaching beginning skills courses, and the number of generic students taking their first skills course? Data related to the feasibility of using an adaptation of the Montessori method to teach basic nursing skills are provided in Table 17.

The data in Table 17 show that when the seven demographic factors are cross tabulated, no statistically significant relationship was found. No difference in responses was evident based on region, funding source, institution size, school of nursing size, number of students in beginning skills courses, and full-time and part-time faculty teaching beginning skills courses.

The variation in responses to the reeducation of nursing faculty to use an adapted Montessori method for teaching basic nursing skills to beginning nursing students is shown in Table 18. The analyzed results for each of the demographic areas are also provided in Table 18.
TABLE 17
DIFFERENCES IN RESPONSES BY SELECTED FACTORS TO THE FEASIBILITY OF USING AN ADAPTATION OF THE MONTESSORI METHOD TO TEACH BASIC SKILLS

<table>
<thead>
<tr>
<th>Factor</th>
<th>Mean Square</th>
<th>DF</th>
<th>Level of Significance</th>
</tr>
</thead>
<tbody>
<tr>
<td>Location</td>
<td>1.573</td>
<td>3</td>
<td>.912</td>
</tr>
<tr>
<td>Institution size</td>
<td>8.914</td>
<td>6</td>
<td>.434</td>
</tr>
<tr>
<td>Funding</td>
<td>3.121</td>
<td>2</td>
<td>.706</td>
</tr>
<tr>
<td>School of nursing</td>
<td>6.163</td>
<td>7</td>
<td>.679</td>
</tr>
<tr>
<td>Nursing faculty</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Full-time</td>
<td>5.369</td>
<td>6</td>
<td>.728</td>
</tr>
<tr>
<td>Part-time</td>
<td>5.911</td>
<td>6</td>
<td>.680</td>
</tr>
<tr>
<td>Generic students</td>
<td>7.391</td>
<td>5</td>
<td>.534</td>
</tr>
</tbody>
</table>

Examination of Table 18 reveals that the area of statistical significance relate to full-time faculty. Administrators seemed to believe that full-time faculty could be reeducated in the adapted Montessori method for teaching basic nursing skills to beginning nursing students.

Variations in administrators’ responses to the economic feasibility of using an adapted Montessori method for teaching basic nursing skills are also reported based on selective factors. Data in Table 19 provide information from the seven demographic areas.
TABLE 18

ADMINISTRATORS' BELIEFS IN THE POSSIBILITY OF FACULTY REEDUCATION TO TEACH THE ADAPTED MONTESSORI METHOD BASED ON SELECTED FACTORS

<table>
<thead>
<tr>
<th>Factor</th>
<th>Mean Square</th>
<th>DF</th>
<th>Level of Significance</th>
</tr>
</thead>
<tbody>
<tr>
<td>Location</td>
<td>4.617</td>
<td>3</td>
<td>.165</td>
</tr>
<tr>
<td>Institution size</td>
<td>3.309</td>
<td>6</td>
<td>.290</td>
</tr>
<tr>
<td>Funding</td>
<td>.161</td>
<td>2</td>
<td>.941</td>
</tr>
<tr>
<td>School of nursing</td>
<td>1.724</td>
<td>7</td>
<td>.711</td>
</tr>
<tr>
<td>Nursing faculty</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Full-time</td>
<td>6.833</td>
<td>6</td>
<td>.025*</td>
</tr>
<tr>
<td>Part-time</td>
<td>1.589</td>
<td>6</td>
<td>.728</td>
</tr>
<tr>
<td>Generic students</td>
<td>2.603</td>
<td>5</td>
<td>.433</td>
</tr>
</tbody>
</table>

*Significant at .05 level.

The data in Table 19 show that when the demographic information was cross-tabulated, no one area of statistical significance emerged regarding the economic feasibility of using an adapted Montessori method to teach basic skills by region, funding source, institution size, school of nursing size, number of beginning students taking skills courses, and full-time and part-time faculty teaching beginning skills courses.
TABLE 19

VARIATIONS IN ADMINISTRATORS' BELIEFS IN THE ECONOMIC FEASIBILITY OF THE ADAPTED MONTESSORI METHOD BASED ON SELECTED FACTORS

<table>
<thead>
<tr>
<th>Factor</th>
<th>Mean Square</th>
<th>DF</th>
<th>Level of Significance</th>
</tr>
</thead>
<tbody>
<tr>
<td>Location</td>
<td>40.005</td>
<td>3</td>
<td>.062</td>
</tr>
<tr>
<td>Institution size</td>
<td>9.217</td>
<td>6</td>
<td>.734</td>
</tr>
<tr>
<td>Funding</td>
<td>2.877</td>
<td>2</td>
<td>.831</td>
</tr>
<tr>
<td>School of nursing</td>
<td>18.752</td>
<td>7</td>
<td>.313</td>
</tr>
<tr>
<td>Nursing faculty</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Full-time</td>
<td>15.032</td>
<td>6</td>
<td>.455</td>
</tr>
<tr>
<td>Part-time</td>
<td>22.936</td>
<td>6</td>
<td>.202</td>
</tr>
<tr>
<td>Generic students</td>
<td>4.374</td>
<td>5</td>
<td>.921</td>
</tr>
</tbody>
</table>

Summary of Major Findings

Based on analysis of the data, the major findings of the study are as follow:

1. Approximately three-fourths (75.5%) of the responding administrators strongly agreed or agreed that they would be willing to support faculty who were interested in conducting a study similar to that of the adapted Montessori method.

2. More than three-fourths (82.8%) of the responding administrators strongly agreed or agreed that they would be
willing to support the use of a method of instruction for learning basic nursing skills that permits students to work independently and at a pace commensurate with students' abilities.

3. Approximately two-thirds (60.3%) of the administrators were willing to support an adapted Montessori method for teaching basic nursing skills.

4. Almost three-fourths (74.3%) of responding administrators strongly agreed or agreed that they would be willing to support the nursing faculty's learning to adapt the Montessori method to teach basic nursing skills.

5. Administrators expressed no strong beliefs regarding faculty's willingness to conduct a study similar to that of the adapted Montessori study to teach basic nursing skills.

6. More than one-half (57.0%) of the administrators strongly agreed or agreed that faculty would be willing to learn about the adapted Montessori method to teach basic nursing skills to beginning generic baccalaureate nursing students.

7. More than one-half (52.6%) of the responding administrators somewhat disagreed or strongly disagreed with the provision of financial support for a method of instruction similar to the adapted Montessori method.
8. Approximately two-thirds (62.4%) of the administrators were unwilling to employ a specialist to train faculty in the use of an adapted Montessori method to teach basic nursing skills.

9. Two-thirds (62.8%) of the administrators were unwilling to designate funds for an adapted type Montessori learning environment.

10. No area of strong agreement or disagreement by administrators was evident concerning their willingness to outside funding for a Montessori-type learning environment.

11. No area of statistical significance was found in a comparison of the seven factors with administrators' opinions of the feasibility of using an adaptation of the Montessori method to teach basic skills to beginning students.

12. The number of full-time faculty was the only statistically significant ($p = .025$) factor when compared with the possibility of the reeducation of nursing faculty in an adapted Montessori method for teaching basic skills to beginning nursing students.

13. No area of statistical significance was found based on a comparison of the seven factors with administrators' opinions of the feasibility of funding an adapted Montessori method for teaching basic skills to beginning students.
CHAPTER V

SUMMARY, DISCUSSION, CONCLUSIONS, IMPLICATIONS, AND RECOMMENDATIONS

This chapter provides an overview of the study, summary of the major findings, and a discussion of the findings. Conclusions and implications based on the findings of this study and recommendations for further study are also represented.

Summary

This study concerns nursing education administrators' beliefs regarding the use of an adapted Montessori method to teach beginning generic baccalaureate nursing students basic nursing skills in on-campus laboratories in National League for Nursing accredited baccalaureate nursing programs in the United States and the District of Columbia. A two-fold purpose of this study was to determine the extent to which nursing education administrators were willing to accept the use of an adapted Montessori method for teaching beginning generic students basic nursing skills and to determine the feasibility of implementing such a method in on-campus laboratories in generic baccalaureate programs for nursing.
Data for this study were collected by the use of a questionnaire that was designed and developed to answer four research questions. Participants were asked to read a summary of an adapted Montessori study that was designed to teach beginning generic baccalaureate nursing students to match needle gauge and solution viscosity before responding to statements on the instrument.

The instrument and the summary of the adapted Montessori method were pilot tested for content validity and readability by a panel of experts composed of four deans of National League for Nursing accredited generic baccalaureate programs in nursing in the State of Texas. The summary of the adapted Montessori method and the questionnaire were mailed to 420 nursing education administrators of National League for Nursing accredited baccalaureate programs. The entire population of administrative heads of schools of nursing was surveyed in the study. The population was stratified into private and public sectors in four geographic regions of the United States identified by the National League for Nursing. Two hundred and fifty-six usable questionnaires were returned, resulting in a 60.95 percent national response rate.

Two major methods were used to treat the data obtained from the survey. Data in response to the first three research questions were treated using frequency
distributions in percentages. Frequency distributions allow large groups of responses to be adequately summarized. An analysis of variance was used to treat data related to the fourth research question. These data were tested at the .05 level of significance.

Summary of Major Findings

Data collected to describe the population of generic baccalaureate programs of nursing resulted in the following findings:

1. Of the 256 participating institutions, 25 percent of the public and 3.9 percent of the private institutions had student populations greater than 10,000.

2. A majority of the schools of nursing (70.7%) reported enrollments between 100 and 500 students.

3. Approximately 87 percent of the schools of nursing had between 25 and 100 beginning generic baccalaureate students enrolled in first skills courses.

4. Approximately 73 percent of the nursing programs had at least two full-time nursing faculty teaching beginning skills courses, and approximately 49 percent had no part-time faculty teaching beginning skills courses.

Data collected to answer the research questions for this study produced the following findings:
1. Of the 256 responding administrators, three-fourths (75.5%) strongly agreed or agreed that they were willing to support faculty who were interested in conducting a study similar to the adapted Montessori study.

2. More than four-fifths (82.8%) of the responding administrators strongly agreed that they were willing to support a method of instruction for learning basic nursing skills that permits students to work independently and at a pace commensurate with students' abilities.

3. Approximately two-thirds (60.3%) of the administrators were willing to support the use of an adapted Montessori method to teach basic nursing skills.

4. Almost three-fourths (74.3%) of all responding administrators indicated willingness to support faculty who were interested in learning how to adapt the Montessori method to teach basic skills.

5. Administrators had no strong beliefs regarding faculty willingness to conduct a study using an adaptation of the Montessori method to teach basic skills to beginning generic baccalaureate nursing students.

6. Fifty-seven percent of the responding administrators strongly agreed or agreed that faculty would be willing to learn about the adapted Montessori method.

7. More than one-half (52.6%) of the responding administrators somewhat or strongly disagreed with the
provision of financial support for a method of learning similar to the adapted Montessori method for teaching skills.

8. Of the responding administrators, 62.8 percent were unwilling to employ a specialist to train faculty in the use of the adapted Montessori method to teach basic nursing skills.

9. Approximately two-thirds (62.8%) of all responding administrators were unwilling to designate funds to set up and support a Montessori-type learning environment for teaching basic nursing skills.

10. No area of strong agreement or disagreement by administrators was found concerning their willingness to seek outside funding in order to establish and support a Montessori-type learning environment for teaching basic nursing skills.

11. No area of statistical significance was found when comparing the seven factors with administrators' opinions regarding the feasibility of using an adaptation of the Montessori method for teaching basic nursing skills.

12. The number of full-time faculty is the only statistically significant (p = .025) factor when compared with the possibility of the reduction of nursing faculty in an adapted Montessori method for teaching basic skills to beginning nursing students.
13. No area of statistical significance was found when the seven factors were compared with administrators' opinions of the feasibility of funding an adapted Montessori method for teaching basic skills to beginning students.

**Discussion of Findings**

The need to adequately prepare nursing students to competently perform clinical skills is stressed throughout the nursing literature. Faculty are responsible for the development and implementation of strategies to enhance students' abilities to gain mastery in skill performance and, based on faculty recommendation, administrators must certify each graduating student's competence to sit for the state board of nursing license examination.

The literature stresses the need for faculty to design and develop methods and strategies which enhance students' learning of basic nursing skills. There is evidence that faculty are meeting the challenge (Akinsanya 1990).

Administrators participating in this study were willing to support faculty who were interested in conducting studies similar to the one teaching nursing students to correctly match solution viscosity with the appropriate needle.

There has been a movement from a faculty-centered approach to teaching basic nursing skills toward independent work by students. Nationally, most baccalaureate programs
use some form of self-directed learning to teach basic nursing skills in on-campus laboratories (Knippers 1981).

Administrators responding to this survey were willing to support faculty who desire to use a less-faculty controlled system for teaching skills and were also supportive of students learning skills independent from faculty and at a pace commensurate with their individual abilities. Without administrator support, any system for teaching basic skills cannot be developed or maintained by faculty. Administrators in this study were not only willing to support the use of an adapted Montessori method to teach basic nursing skills, they were also willing to support faculty learning of such a system. This finding is congruent with nursing education literature which suggests the need to find innovative ways to teach basic nursing skills to nursing students (Akinsanya 1990, Pittman et al. 1991).

The literature shows little support for the use of a clinical setting for teaching basic nursing skills to beginning nursing students (Bell 1991, Kermode 1987). There are ethic and legal considerations when students perform a skill on a patient without first having practiced the skill preclinically (Lessner 1990).

The adapted Montessori method described in this study requires the preparation of a learning environment in an
on-campus laboratory and not in a clinical setting. Through the support of the adapted Montessori method for teaching skills, administrators are supporting a system that preclinically prepares students to perform skills. This finding is in agreement with the findings of investigators who support preclinical instruction and evaluation of students (Bell 1991, Cowan and Wiens 1986, Lessner 1990).

The administrators believed that their nursing faculty would be interested in learning about the adapted Montessori method for teaching basic nursing skills. This belief in faculty interest is congruent with other findings related to administrator support of faculty and of a method which allows students to learn independent of faculty and at a pace commensurate with students' abilities.

The adapted Montessori method for teaching students to correctly match solution viscosity with the appropriate needle is very student-directed, with emphasis on preparing the exercises rather than on manipulating the student, as is the case with the Montessori method for teaching small children (Montessori 1981). The adapted Montessori method represents a departure from the classic instructor-initiated type learning that has been used for many years in nursing education. By supporting the adapted Montessori method to teach skills, administrators are expressing their support of student directed learning.
The nursing education literature shows a number of problem areas in student-faculty relationships, which include emphasis on student anxiety and discomfort when being observed during skill performance (Kushnir 1986); faculty being perceived as uncaring (Beck 1991); and student difficulty in distinguishing between faculty’s instructor and evaluator roles (Kurshnir 1986). Administrator support of a student-oriented system constitutes support of a movement from the direct influence of faculty. In the adapted Montessori method for teaching skills, success and rewards come with the correct performance of a skill, as is the case with the Montessori method for teaching small children (Rusk and Scotland 1979).

The findings which relate to the economic feasibility of funding a system similar to the adapted Montessori method for teaching basic nursing skills show little administrator support. Most administrators were not willing to employ a specialist to train faculty and were not willing to fund the establishment and maintenance of such a system. Without adequate funding, it is unlikely that a system such as the adapted Montessori system could be developed and maintained.

The goals and programs of any organization are as realistic as the dollars provided to accomplish them (Gillies 1989).

Nursing education programs are costly, primarily because of the funds needed to support student clinical
instruction. Nursing education literature does not yet reflect the limited economic resources which many administrators addressed in their unsolicited comments provided on the questionnaire. There are few studies in the nursing literature related to cutting costs in the area of clinical teaching (Hegstad and Zsohar 1986, Paterniti 1987).

**Conclusions**

Based on the findings of this study, the following conclusions appear to be warranted:

1. Nursing faculty in generic baccalaureate nursing programs, both private and public, are free to explore methods for teaching basic nursing skills that advocate independent learning, student-centered activities, and flexible timetables for learning and mastery of skills.

2. For the purpose of instruction, administrators appear to believe that it is acceptable to use a method for teaching basic nursing skills that reduces the skill to a series of basic sensory exercises which support the learning and performance of the skill.

3. Faculty interested in learning more about methods for instructing students in basic nursing skills will most likely have to fund their own education or secure funds through a source other than the institution of higher education in which the faculty are employed.
4. Programs of nursing in private and public institutions appear to be highly affected by the economic condition of the sponsoring institutions; thus, limited financial resources directly impact the mode of instruction used to teach clinical skills to nursing students in on-campus laboratories.

Implications

Based on the findings of this study, the following implications are made:

1. When the finances of institutions of higher education are restricted or limited, faculty teaching in on-campus clinical laboratories in programs of nursing are not encouraged to explore modes of teaching or learning that necessitate the expenditure of additional funds beyond the customary budgetary allowances for such on-campus operations.

2. Faculty who are accustomed to instructor-dominated teaching methods in on-campus laboratories may be reluctant to consider a system of instruction that is student-centered, with faculty serving in a peripheral role.

3. A system of instruction which potentially could decrease the number of faculty needed in direct teaching may be opposed by the overall faculty in schools of nursing.
4. The funds and manpower needed to change the traditional on-campus laboratory into an environment that fosters independent student learning without rigid time constraints may be unrealistic in a program that is part of an institution that functions on a set timetable and is affected by the dynamic state of the economy.

Recommendations

Based on the results of this study, the following recommendations are made to schools of nursing:

1. Administrators of programs of nursing should encourage regular and ongoing evaluation of the effectiveness of modes of instruction being used in on-campus laboratories for teaching beginning generic nursing students basic nursing skills.

2. Service institutions that are having to spend large sums of money for preceptorship programs to orient graduate nurses should be encouraged to offer financial support to nursing programs for the development of better methods of adequately preparing students throughout the education process.

3. Faculty should become familiar with the basic tenets of the Montessori method, especially in relation to the education of the senses, and should determine what use they may serve in the teaching and learning process related
to preparing beginning generic baccalaureate nursing
students to safely and competently perform basic nursing
skills.

4. The relationship between faculty and students, and
the effects of that relationship upon students' performance
of nursing skills, should be carefully studied.

The following recommendations are made for further
study:

1. This study should be replicated comparing
administrators' opinions with those of faculty teaching
beginning generic nursing students in baccalaureate
programs.

2. The data collection instrument should be refined
and revised to more clearly define the information which is
sought, especially in relation to items addressing financial
support.

3. The original adapted Montessori study should be
expanded and replicated using several sets of exercises to
teach beginning generic baccalaureate nursing students the
entire procedure for preparing and administering parenteral
medications.
APPENDIX A

QUESTIONNAIRE
Questionnaire

Directions: Assuming that all basic nursing skills can be taught to beginning nursing students using the adaptation of the Montessori method, please respond to each item below using the following rating scale:

1--strongly disagree  2--somewhat disagree  3--somewhat agree  4--agree  5--strongly agree

___ 1. I would support the faculty's efforts to conduct a study similar to the one previously described.

___ 2. I would support a system of instruction for learning basic nursing skills that permits students to work independently at a pace commensurate with their abilities.

___ 3. I would be willing to support the use of the adapted Montessori method to teach basic nursing skills.

___ 4. I would be willing to support faculty who were interested in learning how to adapt the Montessori method to teaching basic nursing skills.

___ 5. I believe my faculty would be willing to conduct a study similar to the one previously described.

___ 6. I believe my faculty who are currently teaching basic nursing skills would be interested in learning more about the adapted Montessori method.

___ 7. I would be willing to provide financial support for a system of learning similar to the adapted Montessori method for teaching basic skills.

___ 8. I would be willing to employ a specialist to train faculty in the use of the adapted Montessori method for teaching skills.

___ 9. I would be willing to designate funds to set up and support a Montessori-type learning environment for teaching all basic nursing skills.
10. I would be willing to seek outside funding to establish and support a Montessori-type learning environment for teaching basic nursing skills.
APPENDIX B

SUMMARY OF ADAPTED MONTESSORI STUDY
Summary of Study Teaching Beginning Nursing Students to Match Fluid Viscosity With Needle Gauge

The Montessori method for teaching preschool children requires the adaptation of the learning environment to respond to the internal cues of children. Preparation of the environment is based upon how children learn and process information. There is little emphasis on manipulating children. The emphasis is on preparation of the learning environment.

The Montessori method was adapted for teaching beginning generic nursing students to match needle gauge with fluid viscosity. The study took place in a state university in the southwestern United States with a population of approximately 20,000 students, 500 who were enrolled in baccalaureate and master’s programs.

There was an experimental group of fourteen students and a control group with the same number of students. The control group received instructions in the traditional on-campus laboratory where they were given a lecture-demonstration followed by a practice session. The experimental group was taken into a specially prepared classroom where they were instructed to complete six sets of exercises which had been designed and developed based on an adaptation of the Montessori method. The exercises were developed after determining which visual and tactile
experiences would contribute to the student's understanding of solution viscosity and needle gauge. The students in the experimental group completed each exercise without peer or faculty involvement. Faculty were instructed to assist only when assistance was requested by the students.

The traditional on-campus laboratory lasted approximately ninety minutes. The students in the experimental group took between thirty-five and forty-five minutes to complete all exercises. There were two faculty members teaching the students in the control group and one faculty member with the students in the experimental group. The hypothesis stated that there would be no difference in the posttest scores of the students instructed in viscosity and needle gauge using an adaptation of the Montessori method as compared to the students instructed in the traditional lecture-demonstration mode for learning about fluid viscosity and needle gauge. Two weeks after the instruction, a posttest was administered to both groups. All students were asked to match three solutions of varying viscosities with three needles of varying gauge. The hypothesis was rejected at \( p = 0.0172 \), with nine students from the experimental group correctly matching all needles with solutions and no students from the control group correctly matching all needles with solutions.
The results of this study show that it is possible to instruct students in basic nursing skills with little direct faculty involvement. Faculty time would be spent developing and refining exercises that would facilitate the acquisition of skills. It also seems likely that fewer faculty would be involved in teaching skills.
### Demographic Information

1. Location of supporting institution (check one)
   - 1. North Atlantic region
   - 2. Midwest region
   - 3. Southern region
   - 4. Western region

2. Size of supporting institution: Total head count (check one)
   - 1. under 1,000 students
   - 2. 1,000-2,500 students
   - 3. 2,500-5,000 students
   - 4. 5,000-10,000 students
   - 5. 10,000-15,000 students
   - 6. 15,000-25,000 students
   - 7. over 25,000 students

3. Primary funding of supporting institution (check one)
   - 1. Public
   - 2. Private (church-related)
   - 3. Private (secular)

4. Size of the school of nursing during fall 1991 semester: Total head count (check one)
   - 1. under 100 students
   - 2. 100-200 students
   - 3. 200-300 students
   - 4. 300-400 students
   - 5. 400-500 students
   - 6. 500-600 students
   - 7. 600-700 students
   - 8. over 700 students

5. Number of nursing faculty teaching beginning nursing skills during the fall 1991 semester (check one)

<table>
<thead>
<tr>
<th>Full-time (check one)</th>
<th>Part-time (check one)</th>
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<td>3. Two</td>
<td>3. Two</td>
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<td>4. Three</td>
<td>4. Three</td>
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<td>5. Four</td>
<td>5. Four</td>
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<td>6. Five</td>
<td>6. Five</td>
</tr>
<tr>
<td>7. Over five</td>
<td>7. Over five</td>
</tr>
</tbody>
</table>
6. Number of generic nursing students taking first skills course during the fall 1991 semester (check one)

____1. 25-50 students
____2. 51-75 students
____3. 76-100 students
____4. 101-125 students
____5. 126-150 students
____6. Over 150 students
APPENDIX D

COVER LETTER
October 6, 1991

Dear Dean/Director:

Nursing faculty are continually investigating creative means for better educating nursing students. Although nursing education curricula have been developed to meet higher standards for education, little has been done to change the way in which beginning nursing students learn basic nursing skills.

As partial requirement for my doctorate degree at the University of North Texas, I am conducting a national study related to the use of an adaptation of the Montessori method for teaching beginning nursing students basic nursing skills. Your participation in this study will assist me in determining if it is feasible to redesign basic nursing on-campus skills laboratories using an adaptation of the Montessori method. The results of this study may impact the teaching of basic nursing skills to beginning nursing students.

I am enclosing a summary of a study that was done adapting the Montessori method to the teaching of fluid viscosity and needle gauge to beginning students. A short questionnaire accompanies the summary and you are being asked to complete the questionnaire after reading the summary. Strict confidentiality and anonymity are assured. I will appreciate return of the questionnaire in the self-addressed, stamped envelope no later than October 30. An abstract of the completed study will be made available upon request.

Yours sincerely,

Anthony P. Paternity, R.N., M.S.
Director of Nursing Services

Endorsed by:

Myrna Pickard, Dean
School of Nursing
The University of Texas at Arlington
APPENDIX E

SUMMARY OF ORIGINAL ADAPTED

MONTESSORI STUDY
Adapting the Montessori Method to Teach Baccalaureate Nursing Students to Match Fluid Viscosity and Needle Gauge

Study Summary

Background

This study attempted to adapt the Montessori method for teaching children, to teaching baccalaureate generic nursing students to match needle gauge and fluid viscosity—an important skill in the preparation and administration of all parenteral medications. The study took place in a state university in the southwest region of the United States. The university has a population of approximately 20,000 students. The school of nursing has approximately 500 students enrolled in baccalaureate and master’s level programs. The school of nursing is accredited by the National League for Nursing.

Information regarding the Montessori method was obtained from the literature, with particular emphasis on those Montessori methods and exercises which are designed to enhance the visual and tactile senses of children. Prior to designing the six exercises adapted from the Montessori method, a conference was held with two Montessori-trained teachers, one trained in Germany and the other in the United States.
Both teachers were employed in a school that used the Montessori method exclusively for children of preschool and school age. The German-trained teacher had more than twenty years experience with the Montessori method and had teaching experience in both Germany and the United States. The American-trained teacher had more than five years teaching experience with the Montessori method in the United States.

The Montessori teachers met with the investigator in a session in which the teaching of parenteral medication was explained. The researcher demonstrated the use of all the equipment needed to prepare an injection. Particular emphasis was given to the need for strict adherence to sterile techniques in all facets of assembly and preparation. The Montessori teachers were then given an opportunity to raise questions regarding the demonstration.

Both teachers emphasized the need to reduce the learning process into a series of exercises prior to having students work with the actual equipment needed in the preparation of a parenteral medication. Since the study to be conducted would deal specifically with matching needle gauge with fluid viscosity, the Montessori teachers recommended that two sets of exercises be developed, one set for teaching needle gauge and a second set for teaching solution viscosity. The teachers cautioned against emphasizing sterility early in the learning process,
believing that premature introduction of the concept of sterility might cause the students to become anxious and might hamper the students' ability to focus on the technical aspects of the process. Information from the literature and the Montessori teachers was used to develop the six exercises for the study, with particular attention to the literature related to the tactile and visual senses.

Problem of the Study

The problem of the study was the effect of exercises adapted from the Montessori method on beginning generic nursing students' abilities to match a solution with the correct need.

Hypothesis

There will be no difference in the posttest scores of students instructed in solution viscosity and needle gauge using an adaptation of the Montessori method and those of students instructed in traditional, instructor-directed on-campus laboratories.

Population and Sample

The population consisted of all the beginning generic baccalaureate nursing students in the school of nursing. These students were taking their first nursing course which
had an on-campus laboratory component. Thirty-six students were in the first nursing course.

The sample for the study consisted of twenty-eight (77.7%) of the thirty-six students. Eight students (33.3%) were eliminated from the study because they had prior exposure to the preparation and administration of parenteral medications. A convenience sample was used. The experimental group consisted of fourteen students who were assigned to the Tuesday clinical group for the clinical component of the course, and the control group consisted of fourteen students who were assigned to the Wednesday clinical group.

Methodology

The design for this quasi-experimental study used a treatment and a posttest. The sample was not pretested, although no student in either the experimental or control group had any experience with the preparation and administration of parenteral medications.

Six exercises were developed for the purpose of teaching students in the experimental group to match needle gauge with fluid viscosity. The six exercises were designed and developed in accordance with the Montessori principles related to the education of the senses. Those principles included isolation of a sense, the development of materials
that are not teacher-dependent, and movement from a few contrasting stimuli in gradual differentiation (Montessori 1964).

On the day of the study, students in the experimental group were instructed to meet in a classroom in the school of nursing. Six stations were set up with directions and enough equipment for each student in the group. A nursing instructor was present who served as the room director. The instructor was directed to assist students only when assistance was requested.

The students were instructed to complete each exercise at each of the six stations. They were given a sheet of general instructions regarding how to proceed. Each exercise had an information sheet which provided the students with guidelines for performing the exercise. Students were given a three-by-five card with each of the six exercises printed on the card. The students were asked to submit their cards to the instructor prior to leaving the room. The session was timed from the beginning until the last student completed all exercises. The student requiring the least amount of time to complete the six exercises took thirty-five minutes and the student requiring the greatest time took forty-five minutes. It is important to note that no student in the experimental group requested instructor assistance and that the students worked independently but
were observed conversing with one another at different times throughout the session.

The students in the control group attended an on-campus skills laboratory that was conducted by two instructors from the school of nursing at the university. The lecture demonstration mode was used in a 1½ hour session during which students were instructed about the preparation and administration of parental medications.

The instructor conducting the session lectured students about the preparation and administration of medications and used overheads to demonstrate the concepts of needle gauge and fluid viscosity. Students were encouraged to ask questions and did so throughout the presentation. The students were instructed in sterile technique and the need for the use of that technique was emphasized throughout the presentation.

During the second half of the session, each student was given a syringe with an attached needle. Each syringe was packaged and marked sterile by the manufacturer. Students were instructed to practice using the syringe, and given approximately thirty minutes to do so.

Two weeks after instruction, the students from both groups were given a posttest. Two faculty from the school of nursing who had nothing to do with instruction for either of the groups conducted the posttest sessions. Each student
was randomly assigned a number from one to twenty-eight, with no attention given to student membership in either the control or experimental group. The investigator was the only individual familiar with each student's number. Students were not posttested in any particular order and were not assigned to either of the faculty conducting the posttest.

During each posttest session, an eighteen-, twenty-one- and twenty-five-gauge needle was placed on a table before each student. The needles were not packaged. Three solutions were also placed on the same table, one at a time. Each student was asked to choose the needle that they would use to draw up and administer the solution. Students were encouraged to pick up the needles and the vials. The solutions were placed into each of the vials by the investigator prior to the posttest. The label on each vial was the one placed there by the manufacturer, and two sets of three vials were identically prepared with the same labels and solutions. The first vial contained water, the second vial contained vegetable oil, and the third vial contained honey. The faculty conducting the posttest were handed a three-by-five card by each student. The cards had the students' number written on them and the faculty member recorded the students choices on the cards.
Pilot Test

Prior to the posttest, twenty-two registered nurses, practicing in a general hospital, were given the same three solutions and needles and asked to choose the needle they would use to prepare and administer each solution. Each nurse was then asked to choose the second best and third best needles for each of the three solutions. All twenty-two registered nurses selected the same needles in the same order for each of the three solutions. The results of the pilot study were used to assign value to each of the needles. First choice needles for all three solutions were assigned a value of two, second choice needles were assigned a value of one, and zero was assigned to the third choice.

Analysis of Data

In order to measure the results of the study, a composite score was determined for each of the students, with the highest possible score being six and the lowest score being zero. The two tailed t-test was used to compare the scores.

Results

The hypothesis of the study stated that there would be no difference between the posttest scores of the experimental and control groups. The hypothesis was rejected ($p = 0.0172$). It is notable that nine of the
fourteen students in the experimental group correctly matched all three needles with the solutions, and none of the students in the control group correctly matched all three needles with the solutions.

Implications and Conclusions

The results of this study show that it is possible to instruct students in concepts related to basic skills with little direct faculty involvement. The results seem to indicate that, for the purpose of learning, skills should be broken down into component exercises that allow students to master parts of a skill before attempting an entire skill.

The use of adapted Montessori exercises for the purpose of teaching skills to students would seem cost effective in that fewer faculty would be directly involved in teaching skills to students. The traditional on-campus instruction by faculty is effected by the individual idiosyncrasies of the faculty doing the teaching; whereas, the adapted Montessori exercises ensure that students are exposed to a consistent set of experiences. Faculty who generally teach skills classes could use their time to develop exercises designed to enhance students' understanding of skill performance.

The study also shows that students are able to transfer information from one setting to another. The students in
the experimental group were better able to apply what they had learned in the posttest situation.

There may be some potential for expanding this system to service institutions where there are practicing nurses who are having to learn new skills because of advances in technology in nursing and medicine. The Montessori-adapted method could possibly be a shared venture between the clinical agency, companies that produce the products, and schools and departments of nursing in colleges and universities. The clinical agency and school of nursing may benefit from the collaboration with those industries that produce equipment used to treat patients.
Student Guidelines

1. You have up to one hour to complete the six exercises.

2. You must complete all six exercises and have the room director initial your card for each exercise.

3. Please read the information for each exercise before beginning the exercise.

4. If you do not understand the directions for any of the exercises, ask the room director to assist you.

5. You may work at any of the tables or on the floor.

6. Please return the exercises to the place where you found them after you finish.

7. Please be careful when handling needles. If you stick yourself with a needle, please bring the needle to the room director for a replacement.

8. Please give your card to the room director before leaving.

9. Please do not discuss what you did with other students or faculty.
Exercise #1

Punching Holes

Purpose(s): To visually discriminate between the various openings made by the various size needles (gauge).

Pointers: None

Presentation: 1. Take the black piece of construction paper and note the various numbers printed across it.

2. Locate the needle with the gauge that matches each number on the construction paper.

3. With the correct needle, poke a hole into the black paper about one inch above the number.

4. After all the holes are poked, place the black sheet of paper on one of the overhead projectors.

5. Inspect each of the holes and note that the needle with the largest number gauge makes the smallest hole and the needle with the smallest number gauge makes the largest hold.

6. Have the room director check your work and initial your card before proceeding to the next exercise.

Language: Gauge relates to the opening (lumen) of the needle. The larger the opening of the needle the smaller the number used to identify the gauge. For example, a 16 gauge needle has a much larger opening than a 26 gauge needle.

Following Exercises: #2—Needle-Gauge Match

ATTENTION!! PLEASE BE CAREFUL WHEN HANDLING NEEDLES!
Exercise #2

Needle-Gauge Match

Prerequisite Exercises: #1 Punching Holes

Purpose(s):
1. To visually match needles of the same gauge.
2. To associate needle gauge with opening (lumen) of the needle.

Pointers: None

Presentation:
1. Examine each of the openings (lumens) of the needles stuck in the foam.
2. Match each of the packaged needles to the same size needle stuck in the foam.
3. Please note the gauge number printed on the outside of the packaged needle.
4. Have the instructor check your work and initial your card before proceeding to the next exercise.

Language: Lumen is the cavity or channel within the needle.

Following Exercises: #3--Pouring, or #4--Stirring, then #5--Pulling, or #6--Pushing

ATTENTION!! PLEASE BE CAREFUL WHEN HANDLING NEEDLES!
Exercise #3

Pouring

Prerequisite Exercises: None

Purpose(s): To visually and tactilly discriminate between the different densities (viscosities) of solutions.

Pointers: None

Presentation:
1. Pour each solution from its original container into the container provided.
2. Repeat the process as many times as you desire.
3. Note the relationship between the density (viscosity) of the solution and the ease at which it is transferred from one container to the other.
4. Have the room director initial your card before proceeding to the next exercise.

Language:
Viscosity is the resistance to flow which is related to the thickness of the solution. The thicker the solution, the more viscous or resistant to flow.

Following Exercises: #4--Stirring, then #5--Pulling or #6--Pushing
Exercise #4

Stirring

Prerequisite Exercises: None

Purpose(s): To tactilly discriminate between the amount of effort needed to stir three solutions of different densities (viscosities).

Pointers: Perform the exercise several times with your eyes closed.

Presentation: 1. Stir each solution with the instrument provided.

2. Be certain to try it with your eyes closed.

3. Note the difference in effort needed to stir each of the three solutions. The thicker, more viscous solution requires more effort.

4. Have the room director initial your card before going on to the next exercise.

Language: Viscosity is the resistance to flow which is related to the thickness of the solution. The thicker the solution the more viscous or resistant to flow.

Following Exercises: #2--Needle-Gauge Match, then #5--Pulling or #6--Pushing
Exercise #5

Pulling

Prerequisite Exercises: #1--Punching Holes, #2--Needle-Gauge Match, #3--Pouring, #4--Stirring

Purpose(s): To tactilly discriminate the efforts needed to pull into a syringe three different solutions through the same size (gauge) needle.

Pointers: 1. All syringes are the same size.
2. All needles are 18 gauge.

Presentation: 1. Place the needle into the solution and pull-up about 2 cc.
2. Note the difference in effort needed to pull-up each solution.
3. Have the room director initial your card.

Language: None

Following Exercises: #6--Pushing

ATTENTION!! PLEASE BE CAREFUL WHEN HANDLING SYRINGES!
Exercise #6

Pushing

Prerequisite Exercises: #1--Punching, #2--Needle-Gauge Match, #3--Pouring, #4--Stirring

Purpose(s): To discriminate between the different efforts needed to push a solution through different gauge needles.

Pointers: 1. All the syringes are the same size.
2. The solution in each syringe is the same.

Presentation: 1. Push the solution out of each syringe in the following order:

   1st 23 gauge needle
   2nd 22 gauge needle
   3rd 21 gauge needle
   4th 20 gauge needle
   5th 18 gauge needle

   2. Note the different effort needed to get the solution through the different size syringes.

Language: None

Following Exercises: #5--Pulling

ATTENTION!! PLEASE BE CAREFUL WHEN HANDLING SYRINGES!


Wilson, S. M. 1988. Comparing patients' length of stay and nursing resource use before and after the implementation of prospective payment. ED.D. diss., Columbia University Teachers' College.

