NURSE EDUCATOR AND NURSING STUDENT LEARNING STYLE MATCH AND ITS EFFECT ON THE PROBLEM SOLVING ABILITY OF THE NURSING STUDENT

DISSERTATION

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By

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This investigation concerned the effect of nurse educator/nursing student learning style match on the latter's problem solving ability. Problem solving ability was defined as the processes of finding facts, problems, ideas, solutions and their acceptance in other than past experience, tradition and habit.

The underlying conceptual framework was Kolb's holistic model of experiential learning which combines experience, perception, cognition and behavior. The model has vertical and horizontal axes resulting in four quadrants or kinds of learners: diverger, assimilator, converger and accommodator. Instruments used were Kolb's Learning Style Inventory and Gover's Nursing Performance Simulation Instrument.

Two alternative hypotheses were tested from a randomly selected sample of the three types of accredited nursing education programs in the thirteen state Southern Regional Educational Board area. Directors of accredited programs had a choice of participating. Forty-one nurse educators
and 611 nursing students comprised the sample. Assimilator and diverger ranked 1-2 as predominant learning styles of both groups.

One alternative hypothesis, not supported, assumed converger learning style most likely. No statistically significant difference was found to occur in nursing students with converger learning styles on their problem solving ability. The other hypothesis, not supported, concerned the effect of a match of nurse educator/nursing student learning style on the latter's problem solving ability. Similarity of nurse educators' and nursing students' learning style was concluded.

Recommendations included investigation of the effect of nonmatch of nurse educator/nursing student learning style on problem solving ability and replication of the methodology with teachers and students in other disciplines. Significance lies in finding that in one profession, nursing, teacher/student learning style match does not appear to affect the latter's attaining high scores as problem solvers as measured by a tested instrument. A holistic learner suggests a wholeness to learning that may make difficult determining the association of specific skills in problem solving even though their identification is possible.
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CHAPTER I

INTRODUCTION

The future of the nursing profession lies with the students of today and of tomorrow. Great demands will be placed on these practitioners as technological and sociological changes in the world impact the nursing profession. Nursing situations created by these changes require actions that go beyond contemporary practice. Innovative problem solving can enhance the clinical practice and leadership skills necessary for managing nursing problems in diverse as well as new situations (1, p. 120).

Innovative problem solving broadens the number and nature of approaches to problems encountered in nursing situations (1, p. 120). For example, there are increasing numbers of persons with Diabetes Mellitus in the United States (2). They are prone to a variety of medical and nursing conditions some of which involve peripheral circulation and appropriate nursing actions. There is also a large, although decreasing, number of illiterate adults in the United States (3). Thus, nurses are likely to encounter an adult diabetic person unable to read. In this situation, the abundance of printed patient teaching material currently available for patient self-study is useless (4, p. 126).
Different ways of accomplishing patient education through utilizing other senses and capabilities will be required for the illiterate diabetic person to participate in self-teaching. Some solutions include: a pictorial presentation with progressive steps in self-care, audio-visuals presented via videotape or closed circuit television network, a volunteer reader for the patient, or family member involvement, all reinforced by nurse/patient interaction. The number of possibilities are limited only by the innovativeness of the nurse.

Problem solving that yields innovative solutions for managing nursing problems involves an individualized internal process. Torrance and Torrance called this process creative thinking, which they defined as:

A natural human process in which a person becomes aware of a problem, difficulty, or gap in information for which he has no learned response; searches for possible solutions from his own past experiences and those of others; formulates hypotheses about possible solutions; evaluates these possible solutions and tests them; modifies them and retests them; and communicates the results to others (5, p. 6).

Examination of this definition reveals these authors believe several skills are integral to their concept of creative thinking, e.g., increasing awareness and gaps in information, combining information with previous experiences and knowledge, and implementing solutions (5, p. 6). These skills are also basic to problem solving. All of the skills involved can be learned and are enhanced by practice and by teaching (5, p. 7).
Research reports indicate that individuals have specific, personal styles of learning (6, p. 125; 7, p. 62). Each of the two halves of the brain has specialized forms of intellect (8, p. 31). The left hemisphere thinks in words, processing information in a logical step-by-step sequence. The right hemisphere thinks in picture images and processes information from a holistic perspective (9, pp. 9-10).

Individual styles of learning tend to conform to these configurations, often with only a vague understanding of one's own style on the part of the involved person. This lack of awareness may deter maximum learning. Raising awareness of learning style, conversely, may enhance the learning process. Therefore, cognizance of one's own learning style would seem beneficial.

Kolb (7, p. 30) states effective learners need four kinds of abilities. These are: concrete experience abilities (full involvement in new experiences); reflective observation abilities (reflection and observation of experiences from many perspectives); abstract conceptualization abilities (create concepts that integrate observations into logically sound theories); and active experimentation abilities (use theories for decision-making and problem solving). Innovativeness and personal development call for integration of these four adaptive modes.
(abilities). Development in one precipitates development in the others (7, pp. 30-31).

Kolb (10, pp. 29-32) conceptualizes these modes in a four quadrant model. He classifies concrete observers (feeler-watchers) as divergers; abstract-reflectors (thinker-watchers) as assimilators; abstract-experimentors (thinker-doers) as convergers; and concrete-experimentors (feeler-doers) as accommodators. According to Kolb (7, p. 86), undergraduate nursing students tend to favor the converger mode of learning.

Ideally, teaching styles need to relate closely to preferred style of learning. In processing information, teachers present information to students in a manner that flows from their own learning style (11, p. 90-128). Can matching learning style of teacher and student affect student learning?

McCarthy (11, pp. 90-128) explored methods which facilitate teaching with different techniques to enhance learning according to brain hemisphere dominance. Some techniques facilitate learning by engaging the preferred brain hemisphere of the student. Some techniques require the student to utilize the less dominant hemisphere. Still other techniques elicit participation of both brain hemispheres.

The role of a teacher can change with application of methods designed to facilitate each learning style.
Teacher awareness of student style of learning could enable presentation of information in a manner most conducive to that student's knowledge acquisition.

Taking advantage of contributions from both hemispheres of the brain could be beneficial to the development of creative thinking and subsequent problem solving abilities because of facilitating more use of both sides of the brain (1, p. 15). If problem solving is a learned process, and also integral to future nursing actions of the professional nurse, are there measures to be taken in basic nursing education programs to foster its development?

Are students who enter the nursing profession benefiting from educational practices which ensure, or at least promote, the development of problem solving skills? The matching of teacher-student learning styles with regard to problem solving skills is one method directed toward its development and is the basis of this investigation. Thus, this research sought to test Kolb's premise that converger learning style is dominant among nursing students and that when learning style of teacher and student match, student problem solving ability is likely to be higher.

The Problem

The presence of a match in learning styles between nurse educator and nursing student is currently undetermined in associate degree, diploma, and baccalaureate
nursing education programs that prepare candidates for registered nurse licensure examination. If such a match is present, the effect, if any, on student problem solving ability needs to be determined for its possible influence on problem solving in students' nursing practice. Therefore, the question is: What is the association between the match of nurse educator and nursing student learning style and its effect on the problem solving ability of the nursing student?

Purposes of the Study

1. To determine the learning style of nurse educators and nursing students in randomly selected accredited associate degree, diploma, and baccalaureate nursing education programs.

2. To determine the problem solving ability of nursing students in accredited associate degree, diploma, and baccalaureate nursing education programs.

3. To determine the association of learning style between nurse educators and nursing students in accredited associate degree, diploma, and baccalaureate nursing education programs.

4. To determine the association between preferred learning style and problem solving ability of nursing students in accredited associate degree, diploma, and baccalaureate nursing education programs.
5. To determine the association between the nurse educator and nursing student learning style match and the problem solving ability of the nursing student in accredited associate degree, diploma, and baccalaureate nursing education programs.

Hypotheses

1. Nursing students who have a converger learning style will have high scores on a measure of problem solving ability in each of the three types of nursing education programs.

2. Problem solving ability of nursing students will be high when nurse educator and nursing students' learning styles are the same in each of the three types of nursing education programs.

Significance of the Study

This study has direct significance for nurse educators and nursing students and indirect significance for nursing care. If nurse educators recognize different styles of learning, two major benefits can ensue: (1) they can foster their own and students' intellectual growth and personal comfort in each type of learning style, thus widening horizons for student learning experiences, and (2) they can implement strategies to enhance different approaches to solving problems. Thus, nurse educators
potentially can influence future nursing practice in desired directions. Logically, nurse educators in basic nursing education programs who purposely prepare students to be problem solvers have a great effect on student learning because of their influence on the formative development of the student.

If nursing students recognize different styles of learning, they can experience intellectual growth and personal comfort in each type of learning style, thus widening the horizons for their own learning experiences. Students who are taught flexibility in problem solving and non-rigidity in beliefs can develop skills and attitudes that will affect their own practice, particularly as it relates to problem solving in nursing situations. Logically, students in basic nursing education programs are acquiring knowledge, skills and attitudes underlying the practice of professional nursing. Over time, professional practice is altered by scientific advances and technology. Nursing students who have acquired adaptive problem solving skills will be in a better position to deal with the changes.

Definition of Terms

For the purpose of this study the following terms are defined:

1. **Nurse Educator.**--A registered nurse who actively teaches in a formal program leading to registered nurse licensure.
2. **Diverger Learning Style**.—Information is perceived concretely and processed reflectively (7, p. 30).

3. **Assimilator Learning Style**.—Information is perceived abstractly and processed reflectively (7, p. 30).

4. **Converger Learning Style**.—Information is perceived abstractly and processed actively (7, p. 30).

5. **Accommodator Learning Style**.—Information is perceived concretely and processed actively (7, p. 30).

6. **Problem Solving**.—The process of fact-finding, problem-finding, idea-finding, solution-finding, and acceptance-finding (12, p. 73). It is a process that emphasizes innovative thinking and intuition. These facets of problem solving facilitate awareness and increase a person's capability to act in ways other than past experiences, tradition, and rote habit (1, p. 55).

**Limitations of the Study**

Limitations of this study include

1. the extent to which the instruments actually measure learning styles and problem solving,

2. the extent to which a nursing student's learning style is consistent throughout the nursing education program,

3. problem solving defined as a process that develops through a variety of learning experiences, not limited to formal learning or a specific class, and
4. results generalizable only to nurse educators and nursing students and not to populations other than nursing.

Assumptions of the Study

The assumptions of this study include

1. learning styles and problem solving can be measured,

2. nursing students have a preferred learning style,

3. nursing educators have a preferred learning style that affects their teaching style,

4. nurse educators' learning styles reflect a common set of values and beliefs about professional behavior, and

5. the ability for nursing students to use more than one learning style will increase their capability in problem solving.
CHAPTER BIBLIOGRAPHY


CHAPTER II
SYNTHESIS OF RELATED LITERATURE

The following review synthesizes major published literature from 1966 to 1986 concerning problem solving and learning styles. Sources were Educational Resources Information Center (ERIC), Nursing and Allied Health Database (NAHL), Medical Literature Analysis and Retrieval System (MEDLARS), and Psychological Abstracts (PsycINFO). The review begins with problem solving.

Problem Solving

Of the eight types of learning described and ranked by Gagné (1, p. 214), the highest level is problem solving. The other types of learning preceding problem solving provide a basis for the problem solving process. As operationalization of problem solving occurs, different combinations of previously learned types are formed and applied in achieving solutions to newly encountered situations.

The problem solving process described by Gagné (1, pp. 222-223) includes three essential elements: linkage of rules that hold component principles in mind ready for re-activation; recall of relevant rules; and verbal instructions which stop short of a solution. This largely internal symbolic approach requires specific symbolic
abilities, viz., storage and subsequent easy recall of relevant rules; distinguishing between and among concepts; fluent hypothesizing of relevant rules; and matching specific instances to a general class when verifying the solution.

Guilford's (2, p. 91) model for problem solving is clearly aligned to cybernetic principles involving cycles of input, filtering, feedback, and evaluation. Input sources are derived mainly from environmental and somatic sources, including motivational and emotional components. The filtering step involves synthesis of inputs from the problem situation. Memory underlies each filtering step. Synthesis of the input information and memory storage affects decisions to proceed or exit the cycle. Additional input may be required, with another cycle begun until a satisfactory solution has been derived. The cycle can be exited when a satisfactory solution is reached or the process may be abandoned. Feedback is involved in ongoing evaluation so that this important step is not left to the final stage of the problem solving process.

Torrance (3, p. 94), supports the Guilford model and its emphasis on the relationship of creativity, cognition, and problem solving. Torrance (3, p. 47) states that learning and thinking creatively take place in the processes of sensing difficulties, problems and gaps in information; in making guesses or formulating hypotheses
about these deficiencies; in testing these guesses and possibly revising and retesting them; and in communicating the results. The overall process involves the arousal of tension when something is sensed as being wrong or absent. In an attempt to relieve the tension, guesses are made about possible solutions to correcting or finding the wrong or absent parts. As these possible solutions are tested and modified, too much uncertainty inhibits the process. Making the correct discovery, or finding the missing parts of the puzzle, creates a great urgency in the problem solver to tell someone about the discovery.

Isaksen (4, p. 18), recognizing the need for leaders skilled in releasing the creative potential in people, developed a model for facilitation of creative problem solving. The model has three major components: the facilitator, the client(s) and the problem solving session designed to find a solution to a unique and real problem requiring a solution. The model has implications for use in the nursing profession by nurse educators teaching nursing students to problem solve.

Parnes, Noller, and Biondi (5, p. 73) have refined the five step creative problem solving process originated by Osborn to the following sequence: fact-finding, problem-finding, idea-finding, solution-finding, and acceptance-finding. Each step is briefly addressed.
The fact-finding step includes identifying as many facts as possible pertaining to the situation and deriving facts from a variety of sources, e.g., literature, personal experiences or records. The problem-finding step involves identifying problems open to innovative intervention.

The approach in the idea-finding step is to put the facts together in ways that suggest problem solutions with creative recommendations. Evaluation of the proposed recommendations is withheld until the solution-finding step where alternatives are examined for appropriateness. When a solution is implemented, the acceptance-finding step is in operation (6, pp. 53-54).

This five-step problem solving process correlates with the five steps of the nursing process: assessing, analyzing, planning, implementing, and evaluating. The nursing process is the basis for problem solving in nursing practice and, thus, implementing change in its practice (7, p. 256). Brooten, Hayman, and Naylor (8, p. 83-97) proposed problem solving as a method for change in nursing practice. There is evident similarity between the problem solving process described by Parnes, Noller and Biondi and the nursing process utilized for problem solving in the nursing profession. The assessing and analyzing phases in the nursing process indicate interest in and motivation for change (fact-finding, problem-finding). The planning phase involves development of strategies for action (idea-finding,
solution-finding). The nursing plan is put into operation and evaluated in the implementing and evaluating phases (acceptance-finding). If the evaluation is satisfactory, stabilization of the nursing plan completes the nursing process cycle.

Studies in nursing education both support and refute the premise that placing nursing students in situations in which they are forced to solve nursing problems will foster creative behavior, i.e., problem solving in ways other than the ordinary and obvious. Studies demonstrate varying degrees of creative thinking abilities of nursing students (9, pp. 106-107; 10, p. 68; 11, p. 118; 12, p. 15; and 6, pp. 4, 15, 19). A study by Marriner (13, p. 57) shows that nursing students have a low concept of their own creativity, particularly in relation to problem solving.

Bailey, McDonald, and Claus (9, pp. 106-107) report the effect of an experimental nursing curriculum (University of California School of Nursing, San Francisco) on nursing students' creativity in nursing practice. This curriculum was designed to educate nurses as innovative problem solvers who recognize each problem as unique and are, thus, required to analyze and synthesize frequently and in diverse ways. Bailey and others' conclusions were mixed, revealing an increase in student verbal creativity with no significant increase in originality of, or
production of, problem solutions in the experimental group of students.

In a study comparing nursing students in different types of nursing education problems, Blumer (10, p. 68) demonstrated no significant difference in creative thinking ability and problem solving skill between baccalaureate and associate degree nursing students. When the nursing faculty of the Division of Nursing at the New York State University at Plattsburgh changed its nursing curriculum from a traditional lecture approach to a problem solving approach, Marriner (13, p. 57) studied the nursing students' perceptions of creativity. She demonstrated that these nursing students perceived themselves as being significantly less creative than nonnursing (biological science) students.

Thomas (11, p. 118) examined nursing students at the University of Iowa after its school of nursing implemented a curriculum designed to promote individuality, a problem solving approach to nursing interventions, and, subsequently, higher levels of creativity in meeting unusual nursing situations. Beginning and graduating nursing students in the new curriculum and students from the previous curriculum were compared. When measured on creative behaviors, beginning nursing students in the new curriculum scored higher than graduating nursing students and students from the old curriculum scored significantly higher than
either the new or graduating nursing students in the new curriculum.

In still another study of nursing students' problem solving abilities, Baldonado (12, p. 15) reported on a seminar method of teaching nursing designed to facilitate innovative problem solving. The outcome was a frustrating, yet successful experience for both students and instructors. Faculty members reported becoming more sensitive to the needs and capabilities of the students. Students reported their most positive outcome as being taught how to think rather than what to think.

Steele and Maraviglia (6, p. 4), in their work on creativity in nursing, state that developing students' minds to think creatively is an excellent resource for solving nursing problems. They support use of both halves of the brain for creative thinking to emerge. They subsequently recommend an atmosphere for learning that stimulates both sides of the brain in order to increase innovative problem solving ability and to enhance that kind of thinking (6, pp. 15-19). Such an atmosphere encourages nursing students to develop imaginative and investigative abilities that result in problem solving in ways other than the ordinary and obvious. Problem solving has been approached in different ways by different researchers, one of whom is David Kolb, who has approached it in the context of learning styles.
Learning Styles

David Kolb (14, pp. 4-5) developed a model and categories of learning styles through a syntheses of intellectual traditions of philosophy, social psychology, and cognitive psychology. The model, reflecting experience as an integral part of learning, is built on the works of John Dewey (philosophy), Kurt Lewin (social psychology), and Jean Piaget (cognitive psychology) (14, pp. 4-15).

Experiential learning theory is also influenced by the therapeutic psychologies, including the works of Carl Jung, Erik Erickson, Carl Rogers, Fritz Perls, and Abraham Maslow. Concepts of adaptation and socioemotional development throughout the life cycle are central contributions to understanding learning from experience. In addition, the writings of Paulo Freire and Ivan Illich (14, pp. 15-16) contribute perspectives on abstract concepts and subjective personal experience. Kolb has developed the following model, the explanation of which follows the model.
Kolb (14, p. 41) believes learning is creating knowledge from the combination of grasping experience (perception) and transforming experience (processing). Two opposing ways of grasping experience (perception) illustrate the abstract/concrete mode of learning in Kolb's model (the vertical line). The top end of the vertical line is apprehension (concrete)—reliance on tangible, felt qualities of immediate experience (sensing/feeling) exemplified by feeling the sun's warmth on a sunny day. The bottom end of the vertical line is comprehension (abstract)—reliance on conceptual interpretation and symbolic representation (thinking), exemplified by reasoning on a cloudy day that the sun is overhead. In either instance, the learner interprets the perception and determines information from it.

Kolb (14, pp. 41-42) visualizes the transforming experience (processing) as opposite ends of the horizontal line. In the model, the active-reflective mode of learning includes two opposing ways that transform one's grasp of experience. On the right end of the horizontal line is intention (reflection), which is a process of internal reflection exemplified by watching and thinking about what is happening. On the left end of the horizontal line is extension (action), which is active external manipulation of the external world exemplified by doing or trying a thing out.
The intersection of the vertical and horizontal lines results in four quadrants, each representing a particular style of learning with specific characteristics. Kolb noted that people seem to fall into different quadrants of this model. The quadrants named and described by Kolb are defined.

1. **Diverger.**--A style of learning resulting in divergent knowledge where experience is grasped through apprehension (concrete experience) and transformed through intention (reflective observation). Divergers are people who perceive information concretely and process reflectively (sensor/feelers and watchers). In the model they are in the upper right quadrant labeled one.

2. **Assimilator.**--A style of learning resulting in assimilative knowledge where experience is grasped through comprehension (abstract conceptualization) and transformed through intention (reflective observation). Assimilators are people who perceive abstractly and process reflectively (thinkers and watchers). In the model they are in the lower right quadrant labeled two.

3. **Converger.**--A style of learning resulting in convergent knowledge where experience is grasped through comprehension (abstract conceptualization) and transformed through extension (active experimentation). Convergers are people who perceive abstractly and process actively
(thinkers and doers). In the model they are in the lower left quadrant labeled three.

4. **Accommodator**.--A style of learning resulting in accommodative knowledge where experience is grasped through apprehension (concrete experience) and transformed through extension (active experimentation). Accommodators are people who perceive concretely and process actively (sensor/feelers and doers). In the model they are in the upper left quadrant labeled four (15, pp. 29-32; 14, p. 42).

Each style of learning has predominant but not exclusive features. A diverger is a learner who needs personal involvement, listens and shares ideas, perceives information concretely, and processes it reflectively. An assimilator is a learner who seeks facts, relies on experts, thinks through ideas, perceives information abstractly, and processes it reflectively. A converger is a learner who needs hands-on experience, tests theories in ways that seem sensible, is a skillful problem solver, perceives information abstractly, and processes it actively. An accommodator is a learner who learns by trial-and-error, relishes change, perceives information concretely, and processes it actively (15, pp. 29-32; 16, pp. 49-55).

Each learner has a predominant learning style regardless of the task. People develop learning styles that emphasize some learning abilities over others. This
development results from heredity, past life experiences and demands of the present environment (15, p. 4). In early stages of development the four styles are relatively independent from the others, yet with later stages of development a strong need for integration of the four modes is produced. Development in one style tends to precipitate development in the other styles (15, p. 8).

Kolb (17, p. 32) reports a strong correlation between the learning style of students and their rating of the learning style of the teacher "who influenced them most." He suggests that students learn best when taught by methods matching their own learning style.

To summarize, learning requires both grasping experience (perception) and transforming experience (processing). Either alone is insufficient for learning to take place (14, p. 42). Thus, the learning style theory conceptualized by Kolb (14, p. 21) is "a holistic, integrative perspective on learning that combines experience, perception, cognition, and behavior."

McCarthy (16) has developed a learning system coined "The 4-MAT System" that is based in part on the Kolb experiential learning model. McCarthy (18, p. 12) maintains that we progress from type to type as we learn, while being most comfortable in one of four types and favoring that mode over another. McCarthy (16, pp. 13-19) states that it is advantageous to acquire skill in both the
logical and rational as well as the sensing and feeling. If one mode is preferred, the learner needs to develop skills of the other mode; that is, sensor/feelers (experience) need to learn logic and analysis; watchers (reflection) need to be courageous and act; thinkers (conceptualization) need to learn to trust their intuitive abilities; doers (experimentation) need to be patient and watch reflectively. Each preferred way of learning can be refined as well as new ways be learned. Teaching students always in the way they learn best, in the mode in which they feel most comfortable, will not develop other learning skills. In her system, McCarthy (16, p. 55) proposes teaching in all four ways: from experience, to reflection, to conceptualization, to experimentation and back to experience.

Brekke (19, p. 216) reported use of the McCarthy 4-MAT System that integrates the four learning styles described by Kolb. In the nursing program of Metropolitan State University, St. Paul, Minnesota, the 4-MAT System was applied to instruction of the planned change process. Brekke determined that during this instruction approximately 50% of the nursing students were never purposefully taught in a preferred learning style. Review of other curriculum content was instituted to determine the extent to which all learning styles were addressed. The goal was to assure
that curriculum content was presented in all four learning styles.

Parallels can be drawn between Kolb's experiential learning model and nursing education. Both emphasize the holistic view of man and the importance of the individual. Both emphasize the importance of experience. Kolb's model focuses on experience as a basis for learning. A major component of nursing education is clinical experience in client settings (20, p. 375).

There are few reports in the literature regarding using Kolb's theory to study learning styles of either nursing students or practicing nurses. No studies were found that examine relationships of learning style and problem solving abilities. Laschinger and Bass (20, p. 378) studied learning styles of incoming nursing students and of more advanced nursing students. They found all types of learning styles represented. Larger numbers of divergers were in the incoming student group and larger numbers of accommodators were in the more advanced student group.

Seideman (21) studied nursing students learning styles in all three types of nursing education programs preparing graduates for registered nurse licensure. Using Kolb's Learning Style Inventory, she identified no dominant learning style in either the combined three types of programs or in each individual type of program. Students from all
types of programs tended to be more concrete than abstract and almost equal on active versus reflective components.

Merritt (22, pp. 370-371) studied the learning style preferences of basic and Registered Nurse (R.N.) baccalaureate nursing students using the Kolb and Canfield models of learning style. Mean scores of basic and R.N. students, adjusted for age and work experience in professional nursing, showed no significant difference between the two student groups using the Kolb scale. Significant differences following similar adjustments were found using the Canfield scale.

Christiansen et al (23, p. 54) reported the majority of a group of licensed nurse practitioners they studied to be either accommodators or divergers. Kolb (15, p. 35) found a limited sample of nurses enrolled in a management program at MIT to be convergers.

An association not heretofore reported in the nursing literature is that of match/nonmatch between learning styles of nurse educators and their nursing students and its influence on developing the innovative problem solving skills of the nursing students. This research tested Kolb's premise relating learning styles to problem solving skills in the context of teacher-student learning style match.
CHAPTER BIBLIOGRAPHY


11. Thomas, Barbara, "Promoting Creativity in Nursing Education," Nursing Research, XXVIII (March-April, 1979), 115-119.


A descriptive study is one designed "to determine the facts of current situations and thereby to clarify states" (1, p. 62). This particular descriptive study tests hypotheses regarding the association of learning style match of teacher and student and its effect on students' problem solving skills. The study population is nurse educators and nursing students in three kinds of basic nursing education programs.

When the learning style of nurse educator and nursing student is the same, a match occurs. Diagramatically, one example appears as indicated below.

**Learning Styles**

a - Diverger  

b - Assimilator  

c - Converger  

d - Accommodator

The nurse educator and nursing student both have a diverger learning style.
When the learning style of nurse educator and nursing student is different, a nonmatch occurs. Diagramatically, one example appears as indicated below.

Nurse Educator  Nursing Student

\[ \begin{array}{cccc}
   a & b & c & d \\
\end{array} \]

The nurse educator has a diverger learning style. The nursing student has a converger learning style.

This particular study focuses on learning style matches between nurse educator and nursing student in association with influence, if any, on problem solving skills. These are essential in a changing technological society.

Procedures for Collection of Data

Instruments

Two instruments were used. They were: the Learning Style Inventory (LSI) and the Nursing Performance Simulation Instrument (NPSI) (Appendix A).

David Kolb (2, p. 1; 3, p. 68) developed the Learning Style Inventory in which a respondent's learning style is identified through a twelve-item self description questionnaire. Respondents rank four words in a way to best describe one's own learning style. One word in each item corresponds to one of the four learning modes - concrete experience (CE), reflective observation (RO), abstract
conceptualization (AC), and active experimentation (AE). The LSI additionally measures respondents' emphasis of abstractness over concreteness and action over reflection.

To score the LSI, Kolb (4, p. 6) developed a rank order numbering system from 4 (most like you) to 1 (least like you). Each person's score is obtained in a specifically defined fashion. Two combination scores are obtained, Abstract Conceptualization minus Concrete Experience (AC - CE) and Active Experimentation minus Reflective Observation (AE - RO). These two combination scores are plotted on a grid with their point of interception indicating the quadrant representing that person's preferred learning style. These four quadrants of the grid are labeled: Diverger, Assimilator, Converger, and Accommodator.

Kolb did not indicate the distribution of learning styles in the general population. His work was conducted primarily with college students in management, law, and industry, both graduate and undergraduate and this particular study was conducted with undergraduate nursing students.

Kolb (2, pp. 27-37) developed a manual which includes a chapter titled "Validity." He reviewed his own correlational studies between the Learning Style Inventory and the following tests:
1. Two graduate aptitude tests, a personnel aptitude test, and two creativity tests (The subjects of these tests were graduate students.);

2. Four personality tests, e.g., Myers-Briggs Type Indicator, Thematic Apperception Test (TAT), measures of n Achievement, N Power, and n Affiliation, and FIRO-B (The subjects of these tests were both undergraduate and graduate students.); and

3. Academic specialization (The subjects of these tests were undergraduates.).

While Kolb discussed in detail the outcomes of these tests, he did not address validity conceptually as an issue or in specific contexts, e.g., criterion-referenced or content.

Kolb (2, p. 15) reported reliability testing (n=687) with the Spearman-Brown Split-half procedure. Reliability coefficients for the Learning Style Inventory four basic modes were: concrete experimentation (.55); reflective observation (.62); abstract conceptualization (.75); and active experimentation (.66). Kolb attributes the relatively low reliability coefficient of the concrete experimentation scale (.55) to its possible bias in obtaining accurate measurements. He does this because the LSI is an active, abstract task requiring a concrete person to have some abstract/active abilities in order to accurately communicate preference of style.
Gover (5) designed the Nursing Performance Simulation Instrument to measure problem solving. It involves four simulations of clinical situations. In each simulation respondents make nursing decisions regarding patients' nursing care based on information about the patient at that time. Responses indicate: discrimination of relevant-irrelevant information in the clinical situation; knowledge of basic and behavioral principles underlying nursing interventions; and selection of the nursing intervention most appropriate for the situation (6, pp. 41-42).

There are 126 items on the test, of which Gover has validated fifty-three. Scoring is by counting one for each validated item marked correctly. Hence, scores of validated items can range from zero to fifty-three.

Gover established reliability and validity by using groups of nursing practitioners and nursing educators. She (5, p. 166) determined: (1) stability of the instrument using a test-retest sample (n=40) with an eight month interval and (2) internal consistency using an odd-even item correlation of the total sample (n=379). Both stability and internal consistency were statistically significant at less than the .01 level.

Gover (5, p. 166) determined that two types of validity were statistically significant. The relationship between a criterion-observation of nursing performance of thirty-five nursing practitioners as rated by the Slater
Nursing Competencies Rating Scale and a predictor-estimation of the intelligence of all subjects (n=379) as measured by the Personality Factor Questionnaire Factor B was used to determine predictive validity. The difference in performance on the NPSI between nursing practitioners and nursing educators was used to determine construct validity.

Population

The target population for this study was nurse educators and nursing students in National League for Nursing (NLN) accredited nursing education programs of all three kinds within the jurisdiction of the Southern Region Education Board (SREB). The SREB region includes thirteen states: West Virginia, Virginia, North Carolina, South Carolina, Florida, Georgia, Tennessee, Alabama, Mississippi, Arkansas, Louisiana, Texas, and Oklahoma.

The three kinds of basic nursing education programs qualifying for Registered Nurse Licensure are baccalaureate, diploma, and associate degree type programs. A baccalaureate nursing program is located in a college or university. Its main focus is to prepare persons with a broad base of technical and theoretical nursing knowledge in conjunction with a liberal arts and science foundation. Graduates of this type program earn a Bachelor of Science or Bachelor of Science in Nursing degree concurrent with meeting qualifications for Registered Nurse Licensure examination.
Graduates are capable of the practice of nursing both in hospitals and the community at large.

A diploma nursing program varies in length from two and one half to three years and is generally based in a hospital system. Its main focus is to prepare nurses qualified for the Registered Nurse Licensure examination. They practice nursing in hospitals.

An associate degree nursing program is two years in length and is generally located in a junior or community college setting. Its main focus is also to prepare nurses qualified for the Registered Nurse licensure examination. Graduates are proficient at nursing patients in institutional settings.

The student subjects of this study were senior level students studying advanced medical-surgical nursing, or the equivalent, in all three kinds of nursing education programs. They had completed successfully at least three semesters of nursing courses and sometimes more depending upon the particular curriculum.

The nurse educator subjects in the three nursing programs had varied basic educational preparation in nursing ranging from associate degree to baccalaureate degree. Many obtained degrees beyond the baccalaureate level including master's and doctorate degrees in both nursing and related areas. These nurse educators also varied in other ways, such as age, sex, number of years teaching
experience, professional organization memberships, and publication subscriptions (Appendix B).

**Sampling**

A stratified random sample was obtained of each type of nursing education program in the SREB states from the National League of Nursing 1985 book of accredited nursing education programs (7, 8). Names and addresses of programs and deans/directors of the programs in each type - baccalaureate, diploma, and associate degree - were obtained from *State Approved Schools of Nursing RN 1985*, 43rd ed., New York, National League for Nursing, 1985, Pub. No. 19-1986 and *Roster 1984-1985: Nurse Administrator Heads and Program Directors*, Atlanta, Georgia, Southern Council on Collegiate Education for Nursing, 1985. A table of random numbers was used to obtain a random sample of all three types of accredited nursing education programs in the thirteen states from the population group of each type program (9, pp. 294-295). The number of nursing programs selected was designed to ensure forty-five nurse educators, fifteen from each type nursing education program. The name of the nurse educator who taught advanced medical-surgical nursing or its equivalent at that school was obtained from the dean/director of each school.

Student respondents were to be the entire senior class of the selected nurse educators. However, the number of
nursing student respondents varied according to decisions by the deans/directors of the schools or by the selected nurse educators. Student respondents from some schools included only volunteer participants. Student respondents from other schools represented that nurse educators' entire clinical student group, a group smaller than the entire class. Several schools participated with only one volunteer nursing student respondent from the entire class of the selected nurse educator. No control was possible over these deviations from the written procedures sent each school.

Data Collection

Deans/directors of each nursing education program in the sample were telephoned to invite participation in the study. Appendix C is the protocol guiding the telephone communication.

Overall, the deans/directors expressed interest and cooperation in the study. Deans/directors of the baccalaureate nursing education programs often did not accept immediately the invitation to participate. Some deans of the baccalaureate nursing education programs wanted to discuss it with others and were not only slow to respond, but seemed reluctant to participate. Repeated telephone requests were not successful in obtaining participation. Of the forty deans/directors of baccalaureate programs invited to participate, fifteen agreed to do so.
Directors of the diploma nursing education programs were the most enthusiastic of the three groups and were quick to agree to participate in the study. Of the seventeen directors of diploma programs invited to participate, fifteen agreed to do so.

Directors of the associate degree nursing education programs were somewhat reluctant to agree to participate. Of the twenty-four deans/directors of associate degree programs invited to participate, fifteen agreed to do so.

Deans/directors of associate degree and baccalaureate nursing education programs were more restricted from participating in research studies. Institutional research procedures of their respective colleges and universities unfortunately can be inhibiting and time consuming. Directors of hospital-based diploma schools of nursing do not have the same constraints.

Many deans/directors stated concern regarding the already full schedules of their nursing students. Several dean/directors expressed reluctance to participate because of the projected two hour time period for data collection. However, only two deans identified this as a reason when declining to participate.

Each telephone conversation was followed with a letter of invitation to those agreeing to participate (Appendix D). A self-addressed stamped postcard was included to be returned by deans/directors stating name and address of a
nurse educator in each program who met the criteria of teaching an advanced medical-surgical or equivalent nursing course.

A letter was sent to each nurse educator inviting participation in the study (Appendix E). Again, a self-addressed stamped postcard was included to be returned by each nurse educator stating agreement to participate and the number of nursing students in each respective advanced medical-surgical or equivalent nursing class.

This established step in the procedure was frequently omitted because the dean/director in the initial telephone conversation often identified the nurse educator who would participate in the study and conversation occurred with the nurse educator at that time. Agreement was reached to participate and the number of students in the class was obtained.

Once agreement to participate and the number of students were obtained from the nurse educator, that person was given additional details of the study. Then, the nurse educator was sent a letter giving guidelines for data collection (Appendix F) and a coded packet of materials in sufficient numbers for administration to each class (Appendix A). Nursing student materials included: the Learning Style Inventory and the Nursing Performance Simulation Instrument. Scores were to be recorded directly on these instruments. Instruments were attached together to
form a set to facilitate matching of learning style and problem solving ability of each respondent during analysis of the data.

Nurse educator materials included: a demographic data sheet (Appendix B) and the Learning Style Inventory. Information and scores were to be recorded directly on these instruments. The nursing student and nurse educator materials were coded to ensure confidentiality and matching of nurse educators with corresponding nursing students.

The nurse educators were requested to administer the instrument not only within a two week period of time after receiving the materials, but to limit their administration to no more than two hours. Also the nurse educators were requested to complete the demographic data sheet and a Learning Style Inventory, and to return all materials - completed instruments for both students and instructors - in a self-addressed stamped envelope provided for this purpose within a specified period of time.

If materials were not returned one week beyond the specified date, a follow-up telephone call was made to the respective nurse educator. In the majority of the cases, this telephone call resulted in return of the materials. In a few cases a follow-up letter was sent to nonrespondents. This letter resulted in receipt of the materials from all but four of the schools participating in the study.
Eight participating deans/directors requested results of this study. The results of the participating nurse educator's own score on the Learning Style Inventory and corresponding nursing student class scoring as well as the final results of the study will be shared accordingly.

Procedures for Data Analysis

**Testing the Hypotheses**

Hypotheses were tested in the null by chi-square tests of goodness of fit. The level of significance for testing the hypotheses was set at 0.05.

A chi-square test is the test of choice to compare obtained frequencies (nominal data) with expected frequencies when data are counts, i.e., nominal in scale of measurement (10, p. 163). Thus, chi-square was selected because subjects' scores are independent, and represent categories of learning styles and levels of problem solving ability. Goodness of fit chi-square tests compare on one variable actual frequencies with expected or theoretical frequencies (11, p. 205).

**Analyzing the Data**

Data were organized to identify the attributes of age and sex of the nurse educators and their characteristics of basic nursing education, highest degree held, current professional organization membership held, current
professional publication subscriptions, and preferred learning style. Data on nursing students were limited to learning style and problem solving ability.

The distribution of learning styles among the general population has not been reported in the literature. This raises the possibility of their equal or unequal distribution not only in the general public but in particular disciplines. If learning styles are equally distributed in both nurse educators and nursing students, a match can be expected a fourth of the time and a nonmatch three-fourths of the time. If learning styles are not equally distributed between nurse educators and nursing students, the ratios will not only be different but are unknown. The investigator used Kolb's method of determining the classification of learning styles in both nurse educators and nursing students.

Regarding the Nursing Performance Simulation Instrument (NPSI), Gover (5) has established no categories (High/Low; High, Medium, Low; Excellent, Above Average, Average, Below Average, Poor). Nor have others (12, 13, 14, 15) who used her tool grouped the scores. Because no published literature has grouped scores by classification it was necessary to establish the kind of distribution and central values (mean, median, mode) in order to determine categories of high/low or high/medium/low. A frequency polygon showed the distribution to be unimodal with a small tail at
the low score end. Central values for each group and the total were obtained. The n's of nursing students for each kind of nursing education program were eighty-nine for the baccalaureate, 314 for the diploma and 208 for the associate degree. The mean and median scores for all three groups were within a two count range. Because of the disparate size of the three n's and the tail of the distribution, a median score derived from the 611 students was used to establish the high/low categories.

Both hypotheses were tested statistically. Hypothesis 1 related to frequency of nursing students' problem solving ability and their converger learning style by type of program. Hypothesis 2 related to frequency of nursing students' problem solving ability by match of learning styles of nurse educators and nursing students.

Reporting the Data

Data were organized to demonstrate attributes and characteristics and for testing the hypotheses by statistical analysis. Nineteen tables are used to portray the information.
CHAPTER BIBLIOGRAPHY


CHAPTER IV

ANALYSIS AND INTERPRETATION OF THE DATA

This descriptive study focused on the association of nurse educator and nursing student learning style match and its effect on the problem solving ability of the nursing student. For insight into the background of the nurse educators, data were collected on attributes and professional characteristics. These findings are presented on pages 41 to 72. The statistical analysis of the hypotheses begins on page 72.

Attributes of Nurse Educators

Table I presents the nurse educators by the attributes of age and by type of nursing education program.

Inspection of Table I shows that two of the forty-one nurse educators are under 30 years of age and both teach in a diploma nursing education program. Nine nurse educators are between 30 and 34 and eight between 35 and 39 years of age. Sixteen nurse educators under 40 years of age teach in diploma and associate degree nursing education programs compared with three in baccalaureate nursing education programs. There are eleven nurse educators in the 40-44 age group and five of those teach in baccalaureate nursing education programs. The six nurse educators in the 45-49
age group are evenly divided - two in each - among the three types of nursing education programs. Five nurse educators are between 50 and 60 years of age. The eldest nurse educator teaches in a diploma nursing education program.

**TABLE I**

**NURSE EDUCATORS BY AGE AND TYPE OF NURSING EDUCATION PROGRAM***

*n=41

<table>
<thead>
<tr>
<th>Attribute of Age</th>
<th>Baccalaureate</th>
<th>Diploma</th>
<th>Associate Degree</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>20-24</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>25-29</td>
<td>0</td>
<td>2</td>
<td>0</td>
<td>2</td>
</tr>
<tr>
<td>30-34</td>
<td>1</td>
<td>4</td>
<td>4</td>
<td>9</td>
</tr>
<tr>
<td>35-39</td>
<td>2</td>
<td>3</td>
<td>3</td>
<td>8</td>
</tr>
<tr>
<td>40-44</td>
<td>5</td>
<td>3</td>
<td>3</td>
<td>11</td>
</tr>
<tr>
<td>45-49</td>
<td>2</td>
<td>2</td>
<td>2</td>
<td>6</td>
</tr>
<tr>
<td>50-54</td>
<td>1</td>
<td>0</td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>55-59</td>
<td>1</td>
<td>0</td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>60-64</td>
<td>0</td>
<td>1</td>
<td>0</td>
<td>1</td>
</tr>
<tr>
<td>65 and up</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>12</strong></td>
<td><strong>15</strong></td>
<td><strong>14</strong></td>
<td><strong>41</strong></td>
</tr>
</tbody>
</table>

*A total of forty-one (41) nurse educators responded; one was male.
The youngest and oldest nurse educators teach in a diploma nursing education program. The majority of the nurse educators in the three types of nursing education programs are between 30 and 49 years of age. The mean age of all forty-one nurse educators is 40.5 years and the modal age between 40-44.

**Findings**

In this sample these are the findings.

1. The mean age of the forty-one nurse educators is 40.5 years.

2. Nurse educators are younger in age in diploma and associate degree programs.

**Interpretation**

These two findings mean that nurse educators in this study are of an age to have many more years potentially to teach nursing students. Therefore, knowledge about and attention to learning styles and effective problem solving can be useful to them.

Table II presents nurse educators by the characteristic of their basic nursing education program and by type of nursing education program in which they teach.

Inspection of Table II reveals that eighteen of the forty-one nurse educators in the three types of nursing education programs have a basic baccalaureate nursing
education, nineteen have basic diploma education and only two have basic associate degree nursing education. While

TABLE II

NURSE EDUCATORS BY THEIR BASIC NURSING EDUCATION PROGRAM AND BY TYPE OF NURSING EDUCATION PROGRAM IN WHICH THEY TEACH
n=41

<table>
<thead>
<tr>
<th>Characteristic of Basic Nursing Education of Nurse Educators</th>
<th>Type of Nursing Education Program</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Baccalaureate</td>
</tr>
<tr>
<td>Baccalaureate</td>
<td>6</td>
</tr>
<tr>
<td>Diploma</td>
<td>6</td>
</tr>
<tr>
<td>Associate Degree</td>
<td>0</td>
</tr>
<tr>
<td>Other</td>
<td>0</td>
</tr>
<tr>
<td>No Response</td>
<td>0</td>
</tr>
<tr>
<td>Total</td>
<td>12</td>
</tr>
</tbody>
</table>

*One respondent indicates MSN as basic nursing education preparation.

basic baccalaureate prepared nurse educators teach in all three types of nursing education programs (6, 5, 7 respectively) basic diploma prepared nurse educators tend to teach in diploma nursing education programs. Of the nineteen nurse educators whose basic nursing education program is diploma, nine teach in diploma programs. Only two of the forty-one nurse educators have a basic associate degree
nursing education program. One nurse educator has a basic
nursing education program at the Master's level of which
there are three or four such programs in the U.S.A. One
nurse educator did not respond to this item.

Findings

In this sample these are the findings.

1. Nurse educators with basic baccalaureate nursing
education preparation teach in all three types of nursing
education programs.

2. Nurse educators with basic diploma nursing
education preparation teach more often in diploma nursing
education programs.

3. Nurse educators with associate degree nursing
education preparation are few in number.

Interpretation

These findings mean that nurses in this study with
basic associate degree nursing education preparation may
be less likely to become teachers than nurses with either
basic baccalaureate or diploma nursing education
preparation.

Basic baccalaureate nursing education programs require
a minimum of four years to complete, which is at least a
year longer than either of the other two kinds of basic
nursing education programs. Therefore, it is reasonable
to believe that graduates of basic baccalaureate nursing
education programs have been exposed to more teachers and more opportunity to experience different learning styles.

Table III shows nurse educators by the characteristic of highest degree held and by type of nursing education program in which they teach.

TABLE III
NURSE EDUCATORS BY HIGHEST DEGREE HELD AND BY TYPE OF NURSING EDUCATION PROGRAM IN WHICH THEY TEACH
n=41

<table>
<thead>
<tr>
<th>Characteristic of Highest Degree Held</th>
<th>Baccalaureate</th>
<th>Diploma</th>
<th>Associate Degree</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>B.S.</td>
<td>0</td>
<td>1</td>
<td>0</td>
<td>1</td>
</tr>
<tr>
<td>B.S.N.</td>
<td>1</td>
<td>1</td>
<td>0</td>
<td>2</td>
</tr>
<tr>
<td>M.S.</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>3</td>
</tr>
<tr>
<td>M.S.N.</td>
<td>7</td>
<td>8</td>
<td>10</td>
<td>25</td>
</tr>
<tr>
<td>M.S.E.</td>
<td>0</td>
<td>3</td>
<td>2</td>
<td>5</td>
</tr>
<tr>
<td>M.N.</td>
<td>1</td>
<td>0</td>
<td>0</td>
<td>1</td>
</tr>
<tr>
<td>Ed.D.</td>
<td>1</td>
<td>0</td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>Ph.D.</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>D.N.Sc.</td>
<td>1</td>
<td>0</td>
<td>0</td>
<td>1</td>
</tr>
<tr>
<td>No Degree</td>
<td>0</td>
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<td>0</td>
<td>1</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>12</strong></td>
<td><strong>15</strong></td>
<td><strong>14</strong></td>
<td><strong>41</strong></td>
</tr>
</tbody>
</table>
Inspection of Table III reveals that thirty-seven of the forty-one nurse educators in the three types of nursing education programs hold at least a Master's degree. Further, at least twenty-five of the forty-one nurse educators in the three types of nursing education programs hold a Master's degree in nursing. Three of the forty-one nurse educators hold doctorate degrees, two Ed.D. (Doctor of Education), and one D.N.Sc. (Doctor of Nursing Science). Two of these teach in baccalaureate nursing education programs and one in an associate degree nursing education program. No nurse educator participant who teaches in a diploma nursing education program holds higher than a Master's degree. One participant who teaches in a diploma nursing education program holds no degree.

The range in highest academic degree held by the twelve nurse educator participants who teach in a baccalaureate nursing education program is from a basic baccalaureate nursing education program to a doctorate. The range in highest academic degree held by the fifteen nurse educator participants who teach in diploma nursing education programs is from no degree (1) through Master's degree (12). All of the fourteen nurse educator participants who teach in an associate degree nursing education program hold at least a Master's degree.
Findings

In this sample these are the findings.

1. Thirty-seven of the forty-one nurse educators participating hold at least a Master's degree.

2. Twenty-five of the forty-one nurse educators hold at least a Master's degree in Nursing.

3. Three hold doctorate degrees; two hold Ed.D. degrees, and one a D.N.Sc.

4. One nurse educator holds no academic degree and teaches in a diploma program.

5. The range in highest academic degree held by the twelve nurse educators who teach in baccalaureate nursing education programs is from a basic baccalaureate nursing preparation (1) through a doctorate (2) with eight holding a Master's degree in nursing.

6. The range in highest academic degree held by nurse educators who teach in a diploma nursing education program is from no degree through a Master's degree (held by twelve of the fifteen).

7. All fourteen nurse educators who teach in an associate degree nursing education program hold at least a Master's degree. One holds an Ed.D.

Interpretation

The academic preparation of thirty-seven of the forty-one nurse educator participants in this study is at least
that of a Master's degree. A criterion in nursing education is that teachers be prepared at one academic level beyond that of the kind of nursing education program in which they teach. Thirty-nine of the forty-one nurse educator participants meet that criterion.

One facet of graduate education in any discipline is exposure to different faculty and to a range of learning styles. Hence, academically prepared nurse educators would be likely to bring to their individual learning styles both the direct and indirect influence of exposure to the four learning styles.

While more than half (at least twenty-five) out of forty-one nurse educators have at least a Master of Science in Nursing (M.S.N.) degree, the interaction between those whose highest academic degree is either in a different discipline or at a doctorate level and those whose highest academic degree is a M.S.N. could result in more exposure to variations in the four learning styles.

Other measures to evaluate the attitudes of nurse educators toward the profession of nursing are the frequency with which they belong to professional organizations (nursing and other) and their subscriptions to professional journals.

Inspection of Table IV shows that the twelve nurse educators in baccalaureate nursing education programs hold membership in eighteen professional organizations, the
TABLE IV
TOTAL PROFESSIONAL ORGANIZATION MEMBERSHIPS HELD BY NURSE EDUCATORS BY TYPE OF NURSING EDUCATION PROGRAM*

<table>
<thead>
<tr>
<th>Type of Nursing Education Program</th>
<th>Baccalaureate</th>
<th>Diploma</th>
<th>Associate Degree</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number of Nurse Educators</td>
<td>12</td>
<td>15</td>
<td>14</td>
<td>41</td>
</tr>
<tr>
<td>Number of Professional Organization Memberships</td>
<td>18</td>
<td>5</td>
<td>11</td>
<td>34</td>
</tr>
</tbody>
</table>

*Chi-square test of goodness of fit = 7.48 with two degrees of freedom. Significant at .05 level.

fifteen nurse educators in diploma nursing education programs hold membership in five professional organizations and the fourteen nurse educators in associate degree nursing education programs hold membership in eleven professional organizations. Thus, the forty-one nurse educators in the three kinds of programs hold memberships in thirty-four professional organizations, nursing and other.

Nurse educators in baccalaureate nursing education programs belong to more professional organizations but is the number statistically significant? A chi-square goodness of fit analysis of the total number of professional memberships (34) at an .05 level of significance is
statistically significant. A computed value of 7.48 was compared to a table value of 5.99 with a df of 2. Thus, it is more than a chance happening that nurse educators in baccalaureate nursing education programs belong to more professional organizations.

The forty-one nurse educators present a total of thirty-four memberships in professional organizations, nursing and other. Some nurse educators have more than one membership, but not all nurse educators regardless of type of nursing education program are members in professional organizations.

**Findings**

In this sample these are the findings.

1. Not all nurse educators hold membership in professional organizations, nursing or other.

2. Nurse educators in baccalaureate nursing education programs belong to more professional organizations than do nurse educators in diploma and associate degree nursing education programs and this is more than chance.

**Interpretation**

These findings mean that belonging to professional organizations is not considered a responsibility by all nurse educators in this study. However, those in baccalaureate nursing education programs statistically hold more memberships in professional organizations than do
those in diploma and associate degree nursing education programs.

Table V is presented to answer the question, what memberships in professional nursing organizations do nurse educators hold?

**TABLE V**

FREQUENCIES OF PROFESSIONAL NURSING ORGANIZATION MEMBERSHIPS HELD BY NURSE EDUCATORS BY TYPE OF NURSING EDUCATION PROGRAM*

<table>
<thead>
<tr>
<th>Professional Nursing Organization</th>
<th>Type of Nursing Education Program</th>
<th>Baccalaureate</th>
<th>Diploma</th>
<th>Associate Degree</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>American Nurses' Association</td>
<td></td>
<td>11</td>
<td>2</td>
<td>9</td>
<td>22</td>
</tr>
<tr>
<td>National League for Nursing</td>
<td></td>
<td>2</td>
<td>7</td>
<td>1</td>
<td>10</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td></td>
<td><strong>13</strong></td>
<td><strong>9</strong></td>
<td><strong>10</strong></td>
<td><strong>32</strong></td>
</tr>
</tbody>
</table>

*Chi-square test of goodness of fit = 1.01 with two degrees of freedom. Not significant at .05 level.

Inspection of Table V shows that nurse educators in the three types of nursing education programs belong to the two major professional organizations in nursing: the American Nurses' Association and the National League for Nursing. There are many other professional nursing organizations of specialties and functions, and nurse educators
in the three types of nursing education programs tended to belong to particular interest groups. In addition, nurse educators in the three types of programs state they belong to a variety of other professional organizations and named sororities, health care organizations and personal development organizations.

Are nurse educators in one kind of program more likely to belong to professional nursing organizations? Chi-square goodness of fit analysis at an .05 level of significance indicates this was not the case. A computed value of 1.01 was compared to a table value of 5.99 with a df of 2.

**Finding**

In this sample there is no statistical difference among nurse educators in membership in the major professional nursing organizations.

**Interpretation**

This finding means that nurse educators in the three types of nursing education programs in this study feel responsibility to belong to the major professional nursing organizations.

Another measure of professional responsibility is that of subscribing to journals of one's profession. Table VI presents the total professional nursing journal subscriptions of nurse educators by type of nursing education program.
TABLE VI

TOTAL PROFESSIONAL NURSING JOURNAL SUBSCRIPTIONS OF NURSE EDUCATORS BY TYPE OF NURSING EDUCATION PROGRAM*

<table>
<thead>
<tr>
<th>Type of Nursing Education Program</th>
<th>Baccalaureate</th>
<th>Diploma</th>
<th>Associate Degree</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number of Nurse Educators</td>
<td>12</td>
<td>15</td>
<td>14</td>
<td>41</td>
</tr>
<tr>
<td>Number of Professional Nursing Journal Subscriptions</td>
<td>24</td>
<td>17</td>
<td>14</td>
<td>55</td>
</tr>
</tbody>
</table>

*Chi-square test of goodness of fit = 2.88 with two degrees of freedom. Not significant at .05 level.

Inspection of Table VI shows that the forty-one nurse educators have forty-five subscriptions to professional nursing journals. On the original data forms one nurse educator from a baccalaureate nursing education program indicated "no professional subscription," four from a diploma nursing education program and two from an associate degree nursing education program indicated likewise. So, not all nurse educators subscribe to professional nursing journals, regardless of type of nursing education program.

Further inspection shows that the twelve nurse educators in baccalaureate nursing education programs
subscribe to twenty-four professional nursing journals, the fifteen nurse educators in diploma nursing education programs subscribe to seventeen professional nursing journals, and the fourteen nurse educators in associate degree nursing education programs subscribe to fourteen professional nursing journals. Thus, the forty-one nurse educators in the three types of nursing education programs subscribe to fifty-five professional nursing journals.

Nurse educators in baccalaureate nursing education programs subscribe to more professional nursing journals, but is it chance or not? A chi-square goodness of fit analysis of the total number of professional nursing journals (55) at an .05 level of significance is not statistically significant. A computed value of 2.88 was compared to a table value of 5.99 with a df of 2. Hence, the data indicate no statistical significance to the frequency with which nurse educators in the three types of nursing education programs subscribe to professional nursing journals.

Findings

In this sample these are the findings.

1. In each type of nursing education program, there are nurse educators who do not subscribe to any professional nursing journal.
2. Nurse educators in baccalaureate nursing education programs subscribe to more professional journals than do nurse educators in diploma and associate degree nursing education programs but it is not statistically significant.

**Interpretation**

These findings mean that there are a few nurse educators in all three types of nursing education programs in this study who do not subscribe to professional nursing journals. Nurse educators in baccalaureate nursing education programs subscribe to more professional nursing journals than do nurse educators in diploma and associate degree nursing education programs but the frequency is not statistically significant.

Table VII is presented to answer the question, To what professional nursing journals do nurse educators subscribe?

Inspection of Table VII shows that nurse educators in the three types of nursing education programs subscribe to the *American Journal of Nursing* (21) more often than any other professional nursing journal. A chi-square goodness of fit analysis on the row totals at an .05 level of significance indicates this is statistically significant. An obtained value of 18.57 was compared to a table value of 9.49 with a df of 4.
TABLE VII

FREQUENCIES OF PROFESSIONAL NURSING JOURNAL SUBSCRIPTIONS HELD BY NURSE EDUCATORS BY TYPE OF NURSING EDUCATION PROGRAMS*

n=52

<table>
<thead>
<tr>
<th>Professional Nursing Journals</th>
<th>Type of Nursing Education Program</th>
<th>Baccalaureate</th>
<th>Diploma</th>
<th>Associate Degree</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>American Journal of Nursing</td>
<td></td>
<td>7</td>
<td>7</td>
<td>7</td>
<td>21</td>
</tr>
<tr>
<td>Nursing Outlook</td>
<td></td>
<td>4</td>
<td>1</td>
<td>0</td>
<td>5</td>
</tr>
<tr>
<td>Nursing '86</td>
<td></td>
<td>3</td>
<td>5</td>
<td>6</td>
<td>14</td>
</tr>
<tr>
<td>Heart and Lung</td>
<td></td>
<td>2</td>
<td>3</td>
<td>1</td>
<td>6</td>
</tr>
<tr>
<td>R.N.</td>
<td></td>
<td>0</td>
<td>2</td>
<td>4</td>
<td>6</td>
</tr>
<tr>
<td>Total</td>
<td></td>
<td>16</td>
<td>18</td>
<td>18</td>
<td>52</td>
</tr>
</tbody>
</table>

*Chi-square test of goodness of fit = 18.57 with four degrees of freedom. Significant at .05 level.

Finding

In this sample nurse educators in the three types of nursing education programs subscribe to the American Journal of Nursing more often than any other professional nursing journal.

Interpretation

The statistically significant difference means that nurse educators in this study subscribe more often to the
American Journal of Nursing than to any other professional nursing journal.

Table VIII presents the frequencies of nurse educator learning style by type of nursing education program.

<table>
<thead>
<tr>
<th>TABLE VIII</th>
</tr>
</thead>
<tbody>
<tr>
<td>FREQUENCIES OF NURSE EDUCATOR LEARNING STYLE BY TYPE OF NURSING EDUCATION PROGRAM*</td>
</tr>
<tr>
<td>n=41</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Type of Learning Style</th>
<th>Baccalaureate</th>
<th>Diploma</th>
<th>Associate Degree</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Diverger</td>
<td>3</td>
<td>6</td>
<td>3</td>
<td>12</td>
</tr>
<tr>
<td>Assimilator</td>
<td>6</td>
<td>6</td>
<td>7</td>
<td>19</td>
</tr>
<tr>
<td>Converger</td>
<td>0</td>
<td>2</td>
<td>3</td>
<td>5</td>
</tr>
<tr>
<td>Accommodator</td>
<td>3</td>
<td>1</td>
<td>1</td>
<td>5</td>
</tr>
<tr>
<td>Total</td>
<td>12</td>
<td>15</td>
<td>14</td>
<td>41</td>
</tr>
</tbody>
</table>

*Chi-square test of goodness of fit = 13.25 with three degrees of freedom. Significant at .05 level.

Inspection of Table VIII shows that all learning styles are represented in the three types of nursing education programs with one exception. In baccalaureate nursing education programs no nurse educator shows a converger learning style.
Further inspection of Table VIII by column shows that of the forty-one nurse educators twelve teach in baccalaureate nursing education programs. Three have a diverger learning style, six have an assimilator learning style, none has a converger learning style and three have an accommodator learning style. In rank order from most to least, the learning styles are assimilator, diverger and accommodator (tied) and converger.

Fifteen of the forty-one nurse educators teach in diploma nursing education programs. Six have a diverger learning style, six have an assimilator learning style, two have a converger learning style and one has an accommodator learning style. In rank order from most to least the learning styles of nurse educators in diploma nursing education programs are assimilator and diverger (tied), converger, and accommodator.

Fourteen of the forty-one nurse educators teach in associate degree nursing education programs. Three have a diverger learning style, seven have an assimilator learning style, three have a converger learning style and one has an accommodator learning style. In rank order from most to least, the learning style of nurse educators in associate degree nursing education programs is assimilator, diverger and converger (tied) and accommodator.

Thus, assimilator learning style of nurse educators ranks top in nurse educators in the three types of nursing
education programs. The 1-2 rank order of assimilator, diverger is the same in nurse educators in the three types of nursing education programs.

Inspection of Table VIII by row shows that of the forty-one nurse educators twelve have a diverger learning style, nineteen an assimilator learning style, five a converger and five an accommodator learning style. A chi-square goodness of fit analysis indicated that the frequency of assimilators is statistically significant at an .05 level of significance. A computed value of 13.25 was compared to a table value of 7.82 with a df of 3.

Findings

In this sample these are the findings.

1. All learning styles are represented with one exception. There are no convergers among the nurse educators teaching in baccalaureate nursing education programs.

2. The assimilator learning style ranks top in nurse educators in the three types of nursing education programs.

3. The 1-2 rank order of assimilator and diverger learning style is the same for nurse educators in the three types of nursing education programs.

4. Nineteen of the forty-one nurse educators demonstrate an assimilator learning style which is statistically significant at an .05 level of significance, hence the frequency of assimilator learning style is statistically
significant. More nurse educators demonstrate an assimilator learning style.

**Interpretation**

The findings mean that there are nurse educators of all learning styles in all three types of nursing education programs with one exception in this study. In a larger sample all four learning styles would more likely be represented in the three types of nursing education programs. The data show exposure of nursing students to all learning styles (with one exception) in the three types of nursing education programs. Kolb (1, p. 21) states that a person learns best in one's own learning style, while becoming a more holistic learner if exposed to all four learning styles. Thus, nursing students are essentially exposed to a variety of learning styles and have opportunities to become holistic learners.

A 1-2 rank order of assimilator, diverger occurs in nurse educators in the three types of nursing education programs. The rank of assimilator learning style is first with nurse educators in the three types of nursing education programs. The frequency of assimilator learning style is statistically significant. Thus, in this study on the dimension of learning style, there is similarity of learning style among nurse educators in the three types of nursing education programs.
Summary of Attributes and Characteristics of Nurse Educators

Regarding attributes of nurse educators in this study, there are forty-one nurse educators of which forty are female and one male. The mean age is forty and one half years. Nurse educators are younger in age in diploma and associate degree nursing education programs than nurse educators in baccalaureate nursing education programs.

Regarding the characteristic of basic nursing education, nurse educators with basic baccalaureate nursing education preparation teach in all three types of nursing education programs. Nurse educators with basic diploma nursing education preparation teach more often in diploma nursing education programs. Nurse educators with associate degree nursing education preparation are few in number. Regarding the characteristic of highest degree held, thirty-seven of the forty-one participating nurse educators hold a Master's degree, twenty-five of which are Master's in nursing. Three hold doctorate degrees.

Two measures of professional responsibility are belonging to professional nursing organizations and subscribing to professional nursing journals. There are a few nurse educators in each of the three types of nursing education programs in this study who neither belong to professional organizations nor subscribe to professional journals. However, nurse educators in baccalaureate
nursing education programs are statistically significantly more likely to belong to more professional organizations than nurse educators in either diploma or associate degree nursing education programs. Numerically nurse educators in baccalaureate nursing education programs in this study subscribe to more professional journals than nurse educators in either diploma or associate degree nursing education programs, but the frequency is not statistically significant. The American Journal of Nursing is by far the professional journal of choice by nurse educators in the three types of nursing education programs.

Table IX presents the frequencies of nursing student learning style by type of nursing education program.

Inspection of Table IX shows that nursing students in the three types of nursing education programs demonstrate all four learning styles. Further inspection of Table IX by column shows that of the 611 nursing student participants, 89 are from baccalaureate nursing education programs, 314 from diploma nursing education programs and 208 from associate degree nursing education programs.

The discrepancy in total numbers of nursing student participants in each type of nursing education program requires explanation. Similar procedural instructions were sent to nurse educator participants of the three types of nursing education programs. The same instructions were interpreted in a different way by some nurse educator
TABLE IX

FREQUENCIES OF NURSING STUDENT LEARNING STYLE
BY TYPE OF NURSING EDUCATION PROGRAM

<table>
<thead>
<tr>
<th>Type of Learning Style</th>
<th>Type of Nursing Education Program</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Baccalaureate</td>
</tr>
<tr>
<td>Diverger</td>
<td>27</td>
</tr>
<tr>
<td>Assimilator</td>
<td>27</td>
</tr>
<tr>
<td>Converger</td>
<td>18</td>
</tr>
<tr>
<td>Accommodator</td>
<td>17</td>
</tr>
<tr>
<td>Total</td>
<td>89</td>
</tr>
</tbody>
</table>

*a* Chi-square test of goodness of fit = 124.5 with two degrees of freedom. Significant at .05 level.

*b* Chi-square test of goodness of fit (Baccalaureate) = 4.01 with three degrees of freedom. Not significant at .05 level.

*c* Chi-square test of goodness of fit (Diploma) = 15.49 with three degrees of freedom. Significant at .05 level.

*d* Chi-square test of goodness of fit (Associate Degree) = 9.5 with three degrees of freedom. Significant at .05 level.

participants in some baccalaureate programs. Although the number of participating programs is essentially similar, the total numbers of nursing student participants shows marked discrepancy. In fact, the total numbers of nursing student participants by kind of nursing education program are statistically significantly different. A chi-square
goodness of fit at an .05 level of significance resulted in a computed value of 124.5 compared to a table value of 5.99 with a df of 2.

It is necessary that sample sizes be comparable. When statistical comparisons are made with widely varying totals, and statistically significant differences are shown to exist, one does not know if the difference is due to the total numbers or to association of the variables.

To obtain comparable sample size of nursing student participants in the three types of nursing education programs, the investigator took a random sample of 89 of the 314 nursing students from diploma nursing education programs and 89 of the 208 nursing students from associate degree nursing education programs. This corresponds to the 89 nursing students from baccalaureate nursing education programs. The data from the similar sample sizes will be discussed after further discussion of Table IX.

To look back at Table IX in terms of columns, inspection shows that the distribution and ranking of the four learning styles among nursing students in a baccalaureate nursing education program is:

- Diverger 27
- Assimilator 27
- Converger 18
- Accommodator 17

89.
The diverger and assimilator learning style (27 each) are tied and rank number one. Converger and accommodator rank three and four respectively. A chi-square goodness of fit test at an .05 level of significance showed no statistically significant difference in learning styles of the 89 nursing students in baccalaureate nursing education programs. A computed value of 4.01 was compared to a table value of 7.82 with a df of 3. This means the distribution of learning styles in nursing students of baccalaureate nursing education programs is chance and not statistically significant.

The distribution of the four learning styles among nursing students in diploma nursing education programs is:

<table>
<thead>
<tr>
<th>Learning Style</th>
<th>Frequency</th>
</tr>
</thead>
<tbody>
<tr>
<td>Diverger</td>
<td>81</td>
</tr>
<tr>
<td>Assimilator</td>
<td>106</td>
</tr>
<tr>
<td>Converger</td>
<td>62</td>
</tr>
<tr>
<td>Accommodator</td>
<td>65</td>
</tr>
</tbody>
</table>

314.

The assimilator learning style (106) is most frequent and diverger learning style (81) second most frequent. Accommodator (65) and converger (62) rank third and fourth respectively.

A chi-square goodness of fit test at an .05 level of significance showed a statistically significant difference in learning style of the 314 nursing students in diploma
nursing education programs. There are statistically significantly more nursing students in diploma nursing education programs with an assimilator learning style. A computed value of 15.49 was compared to a table value of 7.82 with a df of 3. This means the distribution of learning styles in nursing students of diploma nursing education programs is not chance and is statistically more likely to be assimilator.

The distribution of the four learning styles among the nursing students in associate degree nursing education programs is:

<table>
<thead>
<tr>
<th>Learning Style</th>
<th>Frequency</th>
</tr>
</thead>
<tbody>
<tr>
<td>Diverger</td>
<td>52</td>
</tr>
<tr>
<td>Assimilator</td>
<td>69</td>
</tr>
<tr>
<td>Converger</td>
<td>38</td>
</tr>
<tr>
<td>Accommodator</td>
<td>49</td>
</tr>
</tbody>
</table>

\[
\frac{208}{208}.
\]

The assimilator learning style is the most frequent (69) and the diverger learning style second most frequent (52). Accommodator (49) and converger (38) rank third and fourth respectively.

A chi-square goodness of fit test at an .05 level of significance showed a statistically significant difference in learning style of the 208 nursing students in an associate degree nursing education program. There were statistically significantly more nursing students in associate degree nursing education programs with an assimilator
learning style. A computed value of 9.5 was compared to the table value 7.82 with a df of 3. This means that the distribution of learning styles in nursing students in associate degree nursing education programs is not chance and is statistically more likely to be assimilator.

Inspection of Table IX by row shows that of the 611 nursing student participants 160 nursing students have a diverger learning style, 202 nursing students have an assimilator learning style, 118 nursing students have a converger learning style, and 131 nursing students have an accommodator learning style.

The row totals (learning styles by kind) include the column totals (type of nursing education program). The column totals are not comparable, because they are statistically significantly different. Yet, these column totals are embedded in the row totals. This makes invalid statistical comparison of the row totals because if a statistically significant difference is found, one does not know if it is due to the different column totals or due to the variable of learning style. That is the reason that comparable sizes were obtained of nursing students in each type of nursing education program and will be presented in Table X.

Findings

In this sample these are the findings.
1. All learning styles are represented among nursing student participants in the three types of nursing education programs.

2. The rank order of assimilator, diverger exists in learning styles of nursing students in the three types of nursing education programs.

3. There was no statistically significant difference at an .05 level of significance in learning style of the 89 nursing students in baccalaureate nursing education programs.

4. The assimilator learning style is not only the most frequent learning style of nursing students in both diploma and associate degree nursing education programs but is statistically significant with both groups.

**Interpretation**

This investigator interprets the findings to mean that all four learning styles are represented among nursing students in all three types of nursing education programs in this study. The representation of all four learning styles among nursing students in the three types of nursing education programs provides nurse educators in these programs with opportunities to teach nursing students in the style each learns best. The same top two in rank order of frequency of nursing student learning styles (assimilator, diverger) in the three types of nursing education programs
indicates similarity on the variable of learning styles of nursing students in the three types of nursing education programs. Further, the same rank order exists with nurse educators in the three types of nursing education programs and was statistically significant. Thus, when matches of learning styles occur between nurse educators and nursing students in each of the three types of nursing education programs in this study it will more often be a match of assimilator learning style.

Because of the differences in total nursing student participants in the three types of nursing education programs, this investigator obtained a random sample of 89 each from the nursing students in both diploma and associate degree nursing education programs. Table X presents frequencies of nursing student learning styles by type of nursing education program and by equal sample size.

Inspection of Table X shows that the four learning styles are represented in the three types of nursing education programs. Further inspection of Table X by column shows that in baccalaureate nursing education programs the diverger and assimilator learning styles are tied for top rank. Converger and accommodator rank three and four respectively.

A chi-square goodness of fit test at an .05 level of significance showed no statistically significant difference in learning styles of the 89 nursing students in
TABLE X

FREQUENCIES OF NURSING STUDENT LEARNING STYLE BY TYPE OF NURSING EDUCATION PROGRAM AND BY EQUAL SAMPLE SIZE

<table>
<thead>
<tr>
<th>Type of Learning Style</th>
<th>Baccalaureate(^a)</th>
<th>Diploma(^b)</th>
<th>Associate Degree(^c)</th>
<th>Total(^d)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Diverger(^e)</td>
<td>27</td>
<td>24</td>
<td>20</td>
<td>71</td>
</tr>
<tr>
<td>Assimilator(^f)</td>
<td>27</td>
<td>32</td>
<td>33</td>
<td>92</td>
</tr>
<tr>
<td>Converger(^g)</td>
<td>18</td>
<td>19</td>
<td>20</td>
<td>57</td>
</tr>
<tr>
<td>Accommodator(^h)</td>
<td>17</td>
<td>14</td>
<td>16</td>
<td>47</td>
</tr>
<tr>
<td>Total</td>
<td>89</td>
<td>89</td>
<td>89</td>
<td>267</td>
</tr>
</tbody>
</table>

\(^a\) Chi-square test of goodness of fit (Baccalaureate) = 4.01 with three degrees of freedom. Not significant at .05 level.

\(^b\) Chi-square test of goodness of fit (Diploma) = 7.94 with three degrees of freedom. Not significant at .05 level.

\(^c\) Chi-square test of goodness of fit (Associate Degree) = 7.41 with three degrees of freedom. Not significant at .05 level.

\(^d\) Chi-square test of goodness of fit (Total) = 17.08 with three degrees of freedom. Significant at .05 level.

\(^e\) Chi-square test of goodness of fit (Diverger) = 3.91 with two degrees of freedom. Not significant at .05 level.

\(^f\) Chi-square test of goodness of fit (Assimilator) = .68 with two degrees of freedom. Not significant at .05 level.

\(^g\) Chi-square test of goodness of fit (Converger) = .10 with two degrees of freedom. Not significant at .05 level.

\(^h\) Chi-square test of goodness of fit (Accommodator) = .30 with two degrees of freedom. Not significant at .05 level.
baccalaureate nursing education programs in this study. A computed value of 4.01 was compared to a table value of 7.82 with a df of 3. This means the distribution of learning styles in nursing students of baccalaureate nursing education programs is chance and not statistically significant.

Further inspection of Table X by column shows that in diploma nursing education programs, the assimilator learning style is most frequent (32) and the rank order is assimilator, diverger, converger, and accommodator. Chi-square goodness of fit analysis resulted in a computed value of 7.94 compared to a table value of 7.82 with a df of 3. This means that in the diploma nursing education programs in this study assimilator learning style is statistically significant.

Regarding nursing students in the associate degree nursing education programs, the assimilator learning style is most frequent (33), and the rank order is assimilator, diverger and converger (tied) and accommodator. Chi-square goodness of fit analysis resulted in a computed value of 7.41 compared to a table value of 7.82 with a df of 3. This means that in associate degree nursing education programs in this study assimilator learning style is not statistically significant.

Inspection of Table X by totals of types of learning style shows that of the 267 nursing student participants
of the sample, seventy-one nursing students have a diverger learning style, ninety-two nursing students have an assimilator learning style, fifty-seven nursing students have a converger learning style and forty-seven nursing students have an accommodator learning style. The rank order is assimilator, diverger, converger, and accommodator. A chi-square goodness of fit test shows that at an .05 level of significance these numbers are statistically different. A computed value of 17.08 was compared to a table value of 7.82 with a df of 3. This means that assimilator learning style is statistically significant in nursing students in the three types of nursing education programs in this study.

In comparing distributions of learning styles in nursing students in the three types of nursing education programs in Tables IX and X, it is noted that in both tables the assimilator learning style is most frequent and in each case the rank order of assimilator, diverger was 1-2. In Table X when learning style was analyzed by type of program, with chi-square goodness of fit, learning style of nursing students in diploma nursing education programs was statistically significant. This was not the case with learning styles of nursing students in baccalaureate and associate degree nursing education programs. Again in Table X when the totals of each type of learning style were analyzed, there was confirmed statistical significance. This is
explained as the accrued effect of the assimilator learning style having the most frequency in each nursing education program. Assimilator learning style was also the most frequent in nurse educators in all three types of nursing education programs (Table VIII). Therefore, in this study both nurse educators and nursing students more often demonstrated an assimilator learning style.

Further inspection of Table X (with equal size samples) shows by row that the distribution of the diverger learning style among nursing students in the three types of nursing education programs is:

Baccalaureate 27
Diploma 24
Associate Degree 20
\[ \text{Total} = 71. \]

A chi-square goodness of fit test at an .05 level of significance showed no statistically significant difference in the seventy-one nursing education programs. A computed value of 3.91 was compared to a table value of 5.99 with a df of 2. This means that frequency of diverger learning style was not associated with type of program.

The distribution by row of the assimilator learning style among nursing students in the three types of nursing education programs is:
A chi-square goodness of fit test at an .05 level of significance showed no statistically significant difference in the ninety-two nursing students of assimilator learning style in the three types of nursing education programs. A computed value of 0.68 was compared to a table value of 5.99 with a df of 2. This means that assimilator learning style was not associated with kind of program.

The distribution by row of the converger learning style among nursing students in the three types of nursing education programs is:

<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Baccalaureate</td>
<td>27</td>
</tr>
<tr>
<td>Diploma</td>
<td>32</td>
</tr>
<tr>
<td>Associate Degree</td>
<td>33</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>92</strong></td>
</tr>
</tbody>
</table>

A chi-square goodness of fit test at an .05 level of significance showed no statistically significant difference in the fifty-seven nursing students of converger learning style in the three types of nursing education programs. A computed value of 0.10 was compared to a table value of 5.99 with a df of 2. This means that frequency of
converger learning style was not associated with type of nursing education program.

The distribution by row of the accommodator learning style among nursing students in the three types of nursing education programs is:

<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Baccalaureate</td>
<td>17</td>
</tr>
<tr>
<td>Diploma</td>
<td>14</td>
</tr>
<tr>
<td>Associate Degree</td>
<td>16</td>
</tr>
<tr>
<td></td>
<td><strong>47</strong></td>
</tr>
</tbody>
</table>

A chi-square goodness of fit test at an .05 level of significance showed no statistically significant difference in the forty-seven nursing students of accommodator learning style in the three types of nursing education programs. A computed value of 0.30 was compared to a table value of 5.99 with a df of 2. This means that frequency of accommodator learning style was not associated with type of nursing education program.

Findings

In this sample these are the findings.

1. All learning styles are represented in Table X of equal sample size of nursing student participants in the three types of nursing education programs.

2. Assimilator learning style is the most frequent in the three types of nursing education programs and the rank
order of assimilator-divergent learning styles exists in nursing students in the three types of nursing education programs.

3. By type of nursing education program, the frequency of assimilator learning style was statistically significant in diploma nursing education programs and not statistically significant in nursing students in baccalaureate and associate degree nursing education programs. Yet by totals of types of learning styles the assimilator learning style was statistically significant.

4. The findings in Table X with equal sample size of nursing students supported the findings of Table IX regarding frequency of learning styles.

5. There was a statistically significant difference in the frequency of assimilator learning style among all nursing students in the three types of nursing education programs.

6. There was no statistically significant difference in learning styles of nursing students by type of nursing education program.

**Interpretation**

Chi-square goodness of fit analyzes were not statistically significant in nursing students in baccalaureate and associate degree nursing education programs. The same kind of analyses was significant in the nursing students in
diploma nursing education programs and in the analyses of the row totals (learning styles).

This is explained in that in each type of nursing education program the top rank of assimilator learning style is most frequent but not quite enough to be statistically significant. Yet totals of each learning style are statistically significant. This is an accrued effect and not attributable to nursing students in any one type of nursing education program. It further supports the finding that by type of nursing education program there is no statistically significant difference in learning styles of nursing students in this study.

There are nursing students in each type of nursing education program of each learning style just as there are nurse educators of each learning style in each type of nursing education program. The similarity in 1-2 rank of learning styles (assimilator, diverger) of nursing students in the three types of nursing education programs means that on the dimension of learning style no significant difference exists among nursing students in this study in the three types of nursing education programs.

**Summary**

The most frequent learning style in both nurse educators and nursing students in this study was assimilator and the second most frequent diverger. This supports Kolb's
The findings also indicate that Kolb's (1, p. 42) notion of the desirability of students being exposed to all four types of learning styles to become holistic learners exists in nursing education programs. Both nurse educators and nursing students reflected all four kinds of learning style (with one exception). Thus, nursing students in the three types of nursing education programs have opportunity to become holistic learners.

Kolb's (1, p. 86) statement that nursing students are more frequently of a converger learning style is not supported. The findings indicate a more frequent match in assimilator learning style in the three types of nursing education programs. Both nurse educators and nursing students in the three types of nursing education programs show similarity in match and in 1-2 rank order on the dimension of learning style (assimilator, diverger).

Testing the Hypotheses

Hypothesis I concerns the converger learning style and problem solving ability.

Hypothesis I: Nursing students who have a converger learning style will have high scores on a measure of problem solving ability in each of the three types of nursing education programs.
Problem solving ability was measured by Gover's Nursing Performance Simulation Instrument (Appendix A). Neither Gover nor others who have used her tool have grouped scores to determine categories of high/low or high/medium/low.

Hence to determine categories of problem solving ability, the first step was to identify the distribution of nursing student scores on Gover's Nursing Performance Simulation Instrument (NPSI). It was unimodal. Using a median to determine High/Low categories resulted in a score of 34 and above being high and 33 and below being low. Appendix G presents the frequencies of nursing student High/Low problem solving ability by type of nursing education program.

The next step was to determine the frequencies of nursing student problem solving ability and their converger learning style by type of nursing education program into the categories of High/Low. This is presented in Appendix H.

Table XI presents the High/Low NPSI scores of nursing students in baccalaureate nursing education programs with a converger learning style.

A chi-square goodness of fit test was used; the computed value of .48 is less than the table value of 2.71 in a one tailed test with a df of 1. This means that the hypothesis is not supported in terms of nursing students in
baccalaureate nursing education programs in this study. In other words, nursing students in baccalaureate nursing education programs and with a converger learning style in this study do not score higher in a statistically significant degree.

TABLE XI

OBSERVED AND EXPECTED FREQUENCIES OF BACCALAUREATE NURSING STUDENTS WITH CONVERGER LEARNING STYLE AND THEIR NPSI SCORES*

<table>
<thead>
<tr>
<th>NPSI Scores</th>
<th>Frequencies</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Observed</td>
</tr>
<tr>
<td>High</td>
<td>11</td>
</tr>
<tr>
<td>Low</td>
<td>8</td>
</tr>
<tr>
<td>Total</td>
<td>19</td>
</tr>
</tbody>
</table>

*Chi-square test of goodness of fit = .48 with one degree of freedom. Not significant at .05 level.

A similar procedure was carried out with nursing students in diploma nursing education programs. Table XII presents the High/Low NPSI scores of nursing students in diploma nursing education programs with a converger learning style.

A chi-square goodness of fit test was used; the computed value of 1.04 is less than the table value of 2.71 in a one tailed test with a df of 1. This means that the
hypothesis is not supported in terms of nursing students in diploma nursing education programs in this study. In other words, nursing students in diploma nursing education programs with a converger learning style in this study do not score higher in a statistically significant degree.

TABLE XII

OBSERVED AND EXPECTED FREQUENCIES OF DIPLOMA NURSING STUDENTS WITH CONVERGER LEARNING STYLE AND THEIR NPSI SCORES*

<table>
<thead>
<tr>
<th>NPSI Scores</th>
<th>Frequencies</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Observed</td>
</tr>
<tr>
<td>High</td>
<td>27</td>
</tr>
<tr>
<td>Low</td>
<td>35</td>
</tr>
<tr>
<td>Total</td>
<td>62</td>
</tr>
</tbody>
</table>

*Chi-square test of goodness of fit = 1.04 with one degree of freedom. Not significant at .05 level.

A similar procedure was carried out with nursing students in associate degree nursing education programs. Table XIII presents the High/Low NPSI scores of nursing students in associate degree nursing education programs with a converger learning style.

A chi-square goodness of fit test was used; the computed value of 0.026 was less than the table value of 2.71 in a one tailed test with a df of 1. This means that the
hypothesis is not supported in terms of nursing students in associate degree nursing education programs in this study. In other words, nursing students in associate degree nursing education programs with a converger learning style in this study do not score higher in a statistically significant degree.

TABLE XIII

OBSERVED AND EXPECTED FREQUENCIES OF ASSOCIATE DEGREE NURSING STUDENTS WITH CONVERGER LEARNING STYLE AND THEIR NPSI SCORES*

<table>
<thead>
<tr>
<th>NPSI Scores</th>
<th>Observed</th>
<th>Expected</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>High</td>
<td>20</td>
<td>19.5</td>
<td>39.5</td>
</tr>
<tr>
<td>Low</td>
<td>19</td>
<td>19.5</td>
<td>38.5</td>
</tr>
<tr>
<td>Total</td>
<td>39</td>
<td>39</td>
<td>78</td>
</tr>
</tbody>
</table>

*Chi-square test of goodness of fit = .026 with one degree of freedom. Not significant at .05 level.

Finding

In this study nursing students with a converger learning style did not score higher in a statistically significant way in any of the three types of nursing education programs.
Interpretation

Kolb's (1, p. 86) statement that nursing students of a converger learning style are most prevalent is not supported by the findings of this investigation. Kolb (1, p. 77) also states that nursing students with a converger learning style are better problem solvers. Therefore, they should score higher. The findings of this study do not support the belief that nursing students more frequently have a converger learning style nor the belief that a converger learning style results in a higher score on a test of problem solving.

Further examination of the data show that assimilator learning style was most frequent to a statistically significant degree. Therefore, Hypothesis I was tested with data from nursing students showing an assimilator learning style. Table XIV presents the High/Low NPSI scores of nursing students in baccalaureate nursing education programs with an assimilator learning style.

A chi-square goodness of fit test was used; the computed value of 0.34 was less than the table value of 2.71 in a one tailed test with a df of 1. This means that nursing students in this study in baccalaureate nursing education programs and with an assimilator learning style did not score higher in a statistically significant degree.

A similar procedure was carried out with nursing students in diploma nursing education programs. Table XV
TABLE XIV

OBSERVED AND EXPECTED FREQUENCIES OF BACCALAUREATE NURSING STUDENTS WITH ASSIMILATOR LEARNING STYLE AND THEIR NPSI SCORES*

<table>
<thead>
<tr>
<th>NPSI Scores</th>
<th>Frequencies</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Observed</td>
</tr>
<tr>
<td>High</td>
<td>15</td>
</tr>
<tr>
<td>Low</td>
<td>12</td>
</tr>
<tr>
<td>Total</td>
<td>27</td>
</tr>
</tbody>
</table>

*Chi-square test of goodness of fit = .34 with one degree of freedom. Not significant at .05 level.

presents the High/Low NPSI scores of nursing students in diploma nursing education programs with an assimilator learning style.

A chi-square goodness of fit test was used; the computed value of .038 was less than the table value of 2.71 in a one tailed test with a df of 1. This means that nursing students in this study in diploma nursing education programs and with an assimilator learning style did not score higher in a statistically significant degree.

A similar procedure was used with nursing students in associate degree nursing education programs. Table XVI presents the High/Low NPSI scores of nursing students in associate degree nursing education programs.
### TABLE XV

**OBSERVED AND EXPECTED FREQUENCIES OF DIPLOMA NURSING STUDENTS WITH ASSIMILATOR LEARNING STYLE AND THEIR NPSI SCORES***

<table>
<thead>
<tr>
<th>NPSI Scores</th>
<th>Observed</th>
<th>Expected</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>High</td>
<td>52</td>
<td>53</td>
<td>105</td>
</tr>
<tr>
<td>Low</td>
<td>54</td>
<td>53</td>
<td>107</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>106</strong></td>
<td><strong>106</strong></td>
<td><strong>212</strong></td>
</tr>
</tbody>
</table>

*Chi-square test of goodness of fit = .038 with one degree of freedom. Not significant at .05 level.

### TABLE XVI

**OBSERVED AND EXPECTED FREQUENCIES OF ASSOCIATE DEGREE NURSING STUDENTS WITH ASSIMILATOR LEARNING STYLE AND THEIR NPSI SCORES***

<table>
<thead>
<tr>
<th>NPSI Scores</th>
<th>Observed</th>
<th>Expected</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>High</td>
<td>41</td>
<td>34.5</td>
<td>75.5</td>
</tr>
<tr>
<td>Low</td>
<td>28</td>
<td>34.5</td>
<td>62.5</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>69</strong></td>
<td><strong>69</strong></td>
<td><strong>138</strong></td>
</tr>
</tbody>
</table>

*Chi-square test of goodness of fit = 2.44 with one degree of freedom. Not significant at .05 level.*
A chi-square goodness of fit test was used; the computed value of 2.44 was less than the table value of 2.71 in a one tailed test with a df of 1. This means that nursing students in this study in associate degree nursing education programs and with an assimilator learning style did not score higher in a statistically significant degree.

**Finding**

In this descriptive study nursing students with an assimilator learning style did not score higher in a statistically significant way in any of the three types of nursing education programs.

**Interpretation**

Based on the data in this descriptive study the findings mean that nursing students with an assimilator learning style in all three types of nursing education programs are similar to nursing students with converger learning style in respect to no significant association of learning style to problem solving. Nursing students of neither learning style, converger or assimilator, scored significantly higher than other nursing students on the dimension of problem solving ability.

Hypothesis II concerns problem solving ability and match of nurse educator and nursing student learning style.
Hypothesis II: Problem solving ability of nursing students will be high when nurse educator and nursing student learning styles are the same in each of the three types of nursing education programs.

Appendix I shows the counts of matches of nurse educators and nursing students by learning style, by kind of nursing education program and by nursing student scores on High/Low categories on Gover's Nursing Performance Simulation Instrument. Table XVII presents matches of nurse educator and nursing student learning styles in baccalaureate nursing education programs and the nursing students' performance in High/Low categories on Gover's NPSI.

TABLE XVII

OBSERVED AND EXPECTED FREQUENCIES OF MATCHES OF BACCALAUREATE NURSE EDUCATOR AND NURSING STUDENT LEARNING STYLE AND THE NURSING STUDENTS' NPSI SCORES*

<table>
<thead>
<tr>
<th>NPSI Scores</th>
<th>Frequencies</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Observed</td>
</tr>
<tr>
<td>High</td>
<td>13</td>
</tr>
<tr>
<td>Low</td>
<td>8</td>
</tr>
<tr>
<td>Total</td>
<td>21</td>
</tr>
</tbody>
</table>

*Chi-square test of goodness of fit = 1.24 with one degree of freedom. Not significant at .05 level.
A chi-square goodness of fit test was used; the computed value of 1.2 was less than the table value of 2.71 in a one tailed test with a df of 1. This means that on the dimension of problem solving ability a match of learning style between nurse educator and nursing students in baccalaureate nursing education programs in this study did not result in statistically significant higher scores by nursing students.

A similar procedure was carried out with scores of nursing students in diploma nursing education programs. Table XVIII presents matches of nurse educator and nursing student learning style in diploma nursing education programs and the nursing students' performance in High/Low categories on Gover's Nursing Performance Simulation Instrument.

A chi-square goodness of fit test was used; the computed value of 1.6 was less than the table value of 2.71 in a one tailed test with a df of 1. This means that on the dimension of problem solving ability a match of learning style between nurse educators and nursing students in diploma nursing education programs in this study did not result in statistically higher scores by nursing students.

A similar procedure was used with scores of nursing students in associate degree nursing education programs. Table XIX presents matches of nurse educator and nursing student learning style in associate degree nursing
TABLE XVIII
OBSERVED AND EXPECTED FREQUENCIES OF MATCHES OF DIPLOMA NURSE EDUCATOR AND NURSING STUDENT LEARNING STYLE AND THE NURSING STUDENTS' NPSI SCORES*

<table>
<thead>
<tr>
<th>NPSI Scores</th>
<th>Observed</th>
<th>Expected</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>High</td>
<td>39</td>
<td>45</td>
<td>84</td>
</tr>
<tr>
<td>Low</td>
<td>51</td>
<td>45</td>
<td>96</td>
</tr>
<tr>
<td>Total</td>
<td>90</td>
<td>90</td>
<td>180</td>
</tr>
</tbody>
</table>

*Chi-square test of goodness of fit = 1.6 with one degree of freedom. Not significant at .05 level.

education programs and the nursing students' performance in High/Low categories on Gover's Nursing Performance Simulation Instrument.

A chi-square goodness of fit test was used; the computed value of 0.6 was less than the table value of 2.71 in a one tailed test with a df of 1. This means that on the dimension of problem solving ability a match of learning style between nurse educators and nursing students in associate degree nursing education programs in this study did not result in statistically higher scores by nursing students.
TABLE XIX

OBSERVED AND EXPECTED FREQUENCIES OF MATCHES OF ASSOCIATE DEGREE NURSE EDUCATOR AND NURSING STUDENT LEARNING STYLE AND THE NURSING STUDENTS' NPSI SCORES*

<table>
<thead>
<tr>
<th>NPSI Scores</th>
<th>Observed</th>
<th>Expected</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>High</td>
<td>23</td>
<td>20.5</td>
<td>43.5</td>
</tr>
<tr>
<td>Low</td>
<td>18</td>
<td>20.5</td>
<td>38.5</td>
</tr>
<tr>
<td>Total</td>
<td>41</td>
<td>41</td>
<td>82</td>
</tr>
</tbody>
</table>

*Chi-square test of goodness of fit = .6 with one degree of freedom. Not significant at .05 level.

Finding

In this descriptive study problem solving ability of nursing students in any of the three types of nursing education programs was not higher when nurse educator and nursing student learning style were the same.

Interpretation

Kolb (2, p. 32) states that students learn best when taught by methods matching their own learning style. While that may be true on other dimensions, the findings of this investigation did not support the statement on the dimension of problem solving.
Summary

Neither hypothesis was supported. Nursing students with a converger learning style did not have higher scores on problem solving in any of the three types of nursing education programs. Problem solving ability of nursing students was not higher when learning styles of nurse educators and nursing students match. The same finding existed in the three types of nursing education programs in this study.
CHAPTER BIBLIOGRAPHY


CHAPTER V

SUMMARY, CONCLUSIONS, AND RECOMMENDATIONS

Summary and Conclusions

David Kolb (1, p. 70) has synthesized the work of many others to develop a model of experiential learning styles. The model comprises four quadrants: one a vertical axis of concrete experience and abstract conceptualization and one a horizontal axis of active experimentation and reflective observation. The model looks like this.

A diverger is a learner who needs personal involvement and listens and shares ideas. An assimilator is a learner who seeks facts, relies on experts, thinks through ideas. A converger is a learner who needs hands-on experience and is a skillful problem solver. An accommodator is a learner who learns by trial and error.
Kolb's (1, p. 21) learning style theory is "a holistic, integrative perspective on learning that combines experience, perception, cognition and behavior." As succinctly stated above, Kolb's conceptual framework underlies this investigation of nurse educator and nursing student learning style match and its effect on the problem solving ability of the nursing student.

Findings

Regarding the attributes and professional characteristics of the forty-one participating nurse educators, they were female with one exception; their mean age was forty and one half years; and more younger nurse educators taught in diploma and associate degree nursing education programs. Regarding the characteristic of basic nursing education preparation, nurse educators with basic baccalaureate nursing education preparation taught in all three types of nursing education programs; nurse educators with basic diploma nursing education preparation were more likely to teach in diploma nursing education programs; and there were only two nurse educators with basic associate degree nursing education preparation. Regarding the highest degree held, thirty-seven of the forty-one nurse educators held a Master's degree and three held a doctorate degree.

Regarding professional responsibility manifested by belonging to professional organizations and subscribing to
professional nursing journals a few nurse educators in each of the three types of nursing education programs did neither. But a large majority did belong and subscribe. The *American Journal of Nursing* was by far the most frequent subscribed professional nursing journal.

Nurse educators were found to be of an age to have potentially many more years to teach; the majority were academically prepared for their job according to accrediting body standards; and the majority belonged to a professional nursing organization and subscribed to a professional to a professional nursing journal. Nursing students in all three types of nursing education programs were found to have exposure to nurse educators who have the academic preparation to foster holistic learning in the students.

Regarding the learning styles of the nurse educators, the findings of this descriptive study were that all four learning styles (with one exception) were represented by nurse educators in the three types of nursing education programs. The 1-2 rank of assimilator, diverger learning styles was the same in the three types of nursing education programs. On the dimension of learning style there was much similarity in nurse educators in the three kinds of nursing education programs. Each manifested a 1-2 ranking of assimilator and diverger learning style. In accord with Kolb's theoretical framework, an assimilator is a learner who seeks facts and relies on experts and a diverger is a
learner who needs personal involvement and listens and shares ideas.

The majority of participating nurse educators are prepared at the Master's level and this is the standard of the accrediting agency of nursing education programs. The standard of the accrediting agency results in academically prepared nurse educators of all learning styles in the three types of nursing education programs in this study, thus enabling nursing students to have the opportunity to become holistic learners.

Regarding the learning style of the 611 participating nursing students, all learning styles were represented among nursing student participants in the three kinds of nursing education programs and their 1-2 rank order of learning style was assimilator, diverger in the three kinds of nursing education programs. Thus, participating nursing students were mostly learners who sought facts, relied on experts and thought through ideas and learners who needed personal involvement and who listened and shared ideas. Kolb's (1, p. 86) statement that nursing students show more often a converger learning style was not supported.

The 1-2 rank order of learning styles (assimilator, diverger) was the same in both nurse educators and nursing students in the three types of nursing education programs. The match of nurse educator and nursing student learning style occurred more often in the rank order of 1-2
(assimilator, diverger) than any other learning style. Both nurse educator and nursing student in the three kinds of nursing education program demonstrated a high degree of similarity on the dimension of learning style.

Questions to be raised from this conclusion include: Why? Is learning style match of teacher and student characteristic of professional education in general? Or, is it limited to the health care professions? At what stage do students develop a predominant learning style? Does a predominant learning style subtly influence one's career choice?

Kolb's work takes account of Piaget's work with cognitive development in children. Piaget (1, p. 12) identified four stages of cognitive growth in children, hence, the development of learning styles begins early in life.

Kolb (1, p. 88) states that after a person selects a profession and is admitted to a program of study that person is exposed to the particular values and attitudes of that profession. This appeared to be the case of nurse educators and nursing students in this study.

The hypotheses tested were alternative and directional in nature. They were:

Hypothesis I: Nursing students who have a converger learning style will have high scores on a measure of problem solving ability in each of the three types of nursing education programs.
Hypothesis II: Problem solving ability of nursing students will be high when nurse educator and nursing student learning styles are the same in each of the three types of nursing education programs.

Hypothesis I predicted that students with a converger learning style would score statistically significantly higher on a validated instrument measuring problem solving ability (Nursing Performance Simulation Instrument). They did not. This hypothesis assumed that a converger learning style predominated in nursing students and they would be better problem solvers. They were not.

However, the converger learning style was not predominant in the 611 participating nursing students. Assimilator learning style predominated. The hypothesis was tested using the data from nursing students with an assimilator learning style. The hypothesis was not supported.

It was found that nursing students with neither converger nor assimilator learning style in the three kinds of nursing education programs scored in a statistically significantly higher way on the dimension of problem solving. The hypothesis referred only to nursing students with a converger learning style. Because most students showed an assimilator learning style analysis was carried out to see if the hypothesis could be supported with assimilator learning style. It could not. The other two learning styles were not tested. Thus, the conclusion is
there is not a statistically significant association in
nursing students in this study of converger and assimilator
learning style and their problem solving ability.

Hypothesis II predicted that the nursing student's
problem solving ability would be statistically signifi-
cantly higher when a match of nurse educator and nursing
student learning style occurred. The hypothesis was not
supported.

A match of learning style of nurse educator and senior
nursing students in this study did not result in the lat-
ter's higher scores in a statistically significant way on
the dimension of problem solving. Thus, no statistically
significant association existed between match of nurse
educator and nursing student learning style and its effect
on nursing students' problem solving ability.

Questions to be raised from this conclusion include:
What is the association, if any, between nursing students'
problem solving ability and the more frequent occurrence of
a nonmatch of nurse educator and nursing student learning
style? Nonmatches were not the focus of this investiga-
tion. While the instruments had been tested for validity,
were they indeed valid in this situation? Even though it
appeared logical that a match of nurse educator and nursing
student learning style would promote learning, is that
indeed the case?
This investigation raises other questions. Kolb's (1, pp. 1-98) experiential learning style model was developed as a synthesis of ideas from different disciplines. If match of teacher-student learning style does not promote problem solving ability, what does? The findings of this study suggest it is not the dimension of match of nurse educator and nursing student learning style. The notion of a holistic learner suggests a wholeness to learning that may inhibit or make difficult identifying the association of specific dimensions. Dimensions per se can be identified but presently accepted statistical procedures may not measure their interaction.

Reported studies in nursing education both support and refute the extent of nursing students problem solving ability. Steele and Maraviglia (6, p. 4) support developing both brain hemispheres to foster problem solving skills whereas Thomas (11, p. 118) found that nursing students in an "old" curriculum scored higher on problem solving than did graduating students in the "new" curriculum with supposed emphasis on problem solving.

If nurse educators are aware of the other learning styles in addition to their own, can they take steps to widen their horizons by developing characteristics specific to other learning styles? If so, can they enhance their teaching abilities as they develop new strategies and improve old ones? If so, nursing students can benefit.
Indirectly this investigation has implications for nursing care in a rapidly changing health care environment of continual new knowledge and increased technology. In basic nursing education programs students acquire knowledge, skills and attitudes underlying a current professional practice of nursing that is expanding in scope and depth with the new knowledge and technology. Hence, developing problem solving ability as it relates to changing nursing care situations is an essential skill to learn.

Recommendations

The investigator offers three recommendations:

1. a. Replication of this investigation in another geographical area. Data for this investigation were obtained from fully accredited nursing education programs of the three types of nursing education programs in the Southeastern part of the U.S.A. Since the national accrediting agency uses the same criteria to determine accreditation of nursing education programs everywhere, geographical area should not make a difference. But, that assumption requires testing.

2. Replication of this investigation in other health care professions, e.g., medicine, pharmacy, social work. What learning styles predominate in their teachers and students? Is it the same or different from nursing?

3. Replication with nonhealth care professions, e.g., law, accounting, ministry. What learning styles
predominate in the teachers and students in these professions? Is it the same or different from the health care profession?

4. This investigation focused on match of nurse educator and nursing student learning styles. A study of nonmatch of nurse educator and nursing student learning styles and its effect on nursing students' problem solving ability is recommended. The findings would provide evidence to support or deny association between nurse educator and nursing student learning styles and problem solving ability of nursing students.

5. An investigation comparing nursing student learning style at admission to a nursing education program and at its successful completion. The findings would indicate if students' learning style changes during a particular kind of educational program.
CHAPTER BIBLIOGRAPHY


2. Steele, Shirley N. and Frank L. Maraviglia, Creativity in Nursing (and Other Professions), Thorofare, New Jersey, Charles B. Slack, Inc., 1981.

3. Thomas, Barbara, "Promoting Creativity in Nursing Education," Nursing Research, XXVIII (March-April, 1979), 115-119.
APPENDIX A

INSTRUMENTS

1. Learning Style Inventory

2. Nursing Performance Simulation Instrument
Learning-Style Inventory: Instructions

The Learning-Style Inventory describes the way you learn and how you deal with ideas and day-to-day situations in your life. Below are 12 sentences with a choice of four endings. Rank the endings for each sentence according to how well you think each one fits with how you would go about learning something. Try to recall some recent situations where you had to learn something new, perhaps in your job. Then, using the spaces provided, rank a "4" for the sentence ending that describes how you learn best, down to a "1" for the sentence ending that seems least like the way you would learn. Be sure to rank all the endings for each sentence unit. Please do not make ties.

Example of completed sentence set

<table>
<thead>
<tr>
<th></th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. When I learn:</td>
<td>I am happy.</td>
<td>I am fast.</td>
<td>I am logical.</td>
<td>I am careful.</td>
</tr>
<tr>
<td>2. I learn best when:</td>
<td>I have strong feelings</td>
<td>I like to watch</td>
<td>I like to be doing things</td>
<td>I am responsible about</td>
</tr>
<tr>
<td>3. When I am learning:</td>
<td>I am quiet and reserved</td>
<td>I am logical</td>
<td>I am a logical person</td>
<td>I am an active person</td>
</tr>
<tr>
<td>4. I learn by:</td>
<td>I am an intuitive person</td>
<td>I am a logical person</td>
<td>I am a logical person</td>
<td>I am an active person</td>
</tr>
<tr>
<td>5. When I learn:</td>
<td>I rely on my observations</td>
<td>I am a logical person</td>
<td>I am a logical person</td>
<td>I am an active person</td>
</tr>
<tr>
<td>6. When I am learning:</td>
<td>I am an active person</td>
<td>I am a logical person</td>
<td>I am an active person</td>
<td>I am a logical person</td>
</tr>
<tr>
<td>7. I learn best when:</td>
<td>I am an intuitive person</td>
<td>I am a logical person</td>
<td>I am a logical person</td>
<td>I am an active person</td>
</tr>
<tr>
<td>8. When I learn:</td>
<td>I rely on my observations</td>
<td>I am a logical person</td>
<td>I am a logical person</td>
<td>I am an active person</td>
</tr>
<tr>
<td>9. I learn best when:</td>
<td>I rely on my observations</td>
<td>I am a logical person</td>
<td>I am a logical person</td>
<td>I am an active person</td>
</tr>
<tr>
<td>10. When I am learning:</td>
<td>I am an active person</td>
<td>I am a logical person</td>
<td>I am an active person</td>
<td>I am a logical person</td>
</tr>
<tr>
<td>11. When I learn:</td>
<td>I get involved</td>
<td>I am logical</td>
<td>I am logical</td>
<td>I am an active person</td>
</tr>
<tr>
<td>12. I learn best when:</td>
<td>I am an active person</td>
<td>I am logical</td>
<td>I am logical</td>
<td>I am an active person</td>
</tr>
</tbody>
</table>

Permission granted to Sarojane McCormick (November 1985) to use this tool for her Ph.D. dissertation at North Texas State University under Associate Professor Ronald V. Newsom, Ph.D. No other use permitted.
SIMULATION 1

In the clinical situations described below you are introduced to six of the seven patients to whom you will be giving nursing care for the day. On the next page are some statements. Your problem is to determine if each of these statements is TRUE in relation to each of the clinical situations.

If you decide that a statement is TRUE in relation to a clinical situation indicate this by placing a check in the corresponding space in the chart on the next page.

**The Clinical Situations**

A. Tommy Blake is a 5 year old from a foster home who was burned when a space heater exploded. Ten percent of his body is covered with third degree burns and thirty percent with second degree burns. His burns are being treated by the closed method. It is now twenty-four hours after the explosion. Tommy’s urinary output has decreased and his hematocrit has increased.

B. Mr. Jones is an elderly man who lives alone. A week ago, while walking on the street, he developed weakness in his extremities, became stuporous, and was brought to the hospital. Since then he has had hemiparesis. He also has had difficulty talking and swallowing, and has taken little in the way of food or fluids. Now he appears lethargic and somewhat disoriented.

C. Michael Gray is a one month old infant with diarrhea. Although he has undergone many diagnostic tests, the etiology of his diarrhea still remains obscure. The laboratory results of his latest urinalysis indicate an increase in specific gravity.

D. Mrs. Fisher, in her 26th week of pregnancy, has mild congestive heart failure. She has been taking diuretics and diuretics for the past three months. She has been admitted to the hospital for re-evaluation of her cardiac condition. She has lost weight and recently she has noticed that her skin is dry and itchy. Her dyspnea and edema have improved.

E. Mr. Thor is a middle-aged business executive who was admitted with a diagnosis of Leunec’s cirrhosis. Two days ago he had a paracentesis which partially relieved his ascites. Last evening he had a liver biopsy. Now Mr. Thor is apprehensive and complaining of thirst. His blood pressure has fallen, his pulse and respirations have risen, and his urinary output has decreased.

F. Mrs. Davis, a 42 year old widow, is recuperating satisfactorily from a right nephrectomy which was performed a week ago. She has just been informed that her son, a Marine, was killed in action. On hearing this news she fainted.
### The Statements

1. Some of these signs and/or symptoms are a result of renal pathology.
2. Some of these signs and/or symptoms are a result of normovolemic shock.
3. Some of these signs and/or symptoms are a result of dehydration.
4. Some of these signs and/or symptoms are a result of an increase or decrease in hydrostatic pressure.
5. This patient is likely to experience emotional problems because of distortion of body image.
6. This situation indicates a need for therapeutic nutrition.
7. Special skin care is a necessary nursing intervention.
8. This patient is likely to experience grief.
9. Limiting oral fluid intake is a necessary nursing intervention.
10. Proper positioning is a necessary nursing intervention.

### The Chart

<table>
<thead>
<tr>
<th>Clinical Situations</th>
<th>Statements</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>1 2 3 4 5 6 7 8 9 10</td>
</tr>
<tr>
<td>A</td>
<td></td>
</tr>
<tr>
<td>B</td>
<td></td>
</tr>
<tr>
<td>C</td>
<td></td>
</tr>
<tr>
<td>D</td>
<td></td>
</tr>
<tr>
<td>E</td>
<td></td>
</tr>
<tr>
<td>F</td>
<td></td>
</tr>
</tbody>
</table>

✓ = Statement is TRUE in relation to clinical situation.
SIMULATION 2

Later in the same day that you are caring for the group of patients introduced in Simulation 1, you are confronted with the clinical situations described below.

The Clinical Situations

A. Dr. Smith has ordered that the drainage from Tommy's urinary catheter be measured every hour. For the past six hours the volume has been stable and adequate. It is now time to measure it again.

B. Mr. Jones is becoming restless and is attempting to get out of bed. The bed is in a lowered position and the siderails are up.

C. Michael's mother is here visiting him and she wants some information about his condition. She is able to come to the hospital only every other day.

D. For the fifth time in an hour Mrs. Fisher has rung her call-bell. Each of the preceding times she has requested that some small service be done for her.

E. Mr. Thor has become restless and is diaphoresing. His hematocrit and hemoglobin levels have decreased significantly. Dr. Beale has just arrived to examine Mr. Thor and to start his blood transfusion.

F. Mrs. Davis is weeping quietly. She appears stunned. Her sister is with her, reassuring her that "everything will be all right," and encouraging her to stop crying before she "wears herself out."

First, determine the priority of each of the above situations as it relates to the welfare of the patient. The situations may be classified as either IMMEDIATE or DEFERRED. Indicate your decision by placing a check in the corresponding space in the chart below.

Priority Classifications

<table>
<thead>
<tr>
<th>Priority Classifications</th>
<th>Clinical Situations</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>A</td>
</tr>
<tr>
<td>Immediate</td>
<td></td>
</tr>
<tr>
<td>Deferred</td>
<td></td>
</tr>
</tbody>
</table>
Second, rank the clinical situations described on the preceding page according to the priority in which you, the Registered Nurse, would cope with them. Assume that there are no other nursing personnel available. Indicate your decision by entering the situation letters according to priority in the chart below.

**Rank Order of Priorities**

<table>
<thead>
<tr>
<th>Rank Order</th>
<th>Situation Letter</th>
</tr>
</thead>
<tbody>
<tr>
<td>High = 1</td>
<td></td>
</tr>
<tr>
<td>2</td>
<td></td>
</tr>
<tr>
<td>3</td>
<td></td>
</tr>
<tr>
<td>4</td>
<td></td>
</tr>
<tr>
<td>5</td>
<td></td>
</tr>
<tr>
<td>6</td>
<td></td>
</tr>
</tbody>
</table>

Third, determine which one of the following members of the health team you would delegate to handle each of the situations described on the preceding page: The Physician (MD), the Registered Nurse (RN), or the Auxiliary Nursing Personnel (ANP). Indicate your decision by placing a check in the corresponding space in the chart below.

**Role Function**

<table>
<thead>
<tr>
<th>Health Team Members</th>
<th>Clinical Situations</th>
</tr>
</thead>
<tbody>
<tr>
<td>MD</td>
<td>A</td>
</tr>
<tr>
<td>RN</td>
<td></td>
</tr>
<tr>
<td>ANP</td>
<td></td>
</tr>
</tbody>
</table>
SIMULATION 3

Later in the day, while caring for the same patients you encountered in Simulations 1 and 2, you are presented with the following clinical situations.

Clinical Situations

A. Tommy is scheduled to have his burn dressings changed by the physician. Dr. Smith has just stopped by Tommy's room and told him of the impending procedure. Tommy protests loudly. He begins to cry and scream, and calls plaintively, "Mama." Dr. Smith then orders an analgesic injection for Tommy to be given immediately.

B. Miss Adams, a medical technologist, went to Mr. Jones' room to draw a blood sample. As she entered she saw Mr. Jones remove the nasogastric tube through which he has been receiving feedings.

C. Earlier in the day, Gladys Bennett, a 14 year old, was admitted for regulation of her dietary and insulin needs. She was recently diagnosed as having diabetes mellitus. She is to be given regular insulin twenty minutes before each meal. The dosage is to be scaled according to the amount of sugar and acetone in her urine as determined by the Clinistix and Acetest methods respectively. The insulin is due to be given now, yet Gladys has not voided for the urine specimen. Just now, one of the other patients, also a diabetic, tells you that Gladys is eating a candy bar.
Imagine now that you are forced to choose between pairs of alternative actions. Based on the clinical situations described on the preceding page, indicate which action, in each pair of alternatives, you would perform FIRST by placing a check in the space to the left of the alternative.

1. ___ Remind Gladys about obtaining the urine specimen, or
   ___ Give Tommy the analgesic injection.

2. ___ Report the candy bar incident to the physician, or
   ___ Explore the candy bar incident with Gladys.

3. ___ Give Tommy the analgesic injection, or
   ___ Report the removal of the nasogastric tube to the physician.

4. ___ Comfort Tommy, or
   ___ Assist Dr. Smith with Tommy's dressing change.

5. ___ Test Gladys' urine specimen (urine specimen has been obtained), or
   ___ Comfort Tommy.

6. ___ Check Mr. Jones' condition, or
   ___ Give Gladys the insulin injection (urine specimen has been obtained and tested).

7. ___ Comfort Tommy, or
   ___ Report the removal of the nasogastric tube to the physician.

8. ___ Assist Dr. Smith with Tommy's dressing change, or
   ___ Explore the candy bar incident with Gladys.
SIMULATION 4

Now you are concerned with planning for the future care of these seven patients.

First, you may feel that your patients would benefit from the expertise of other members of the health team. Based on your knowledge of their present needs and your prediction of their future needs, determine which of these patients would need referral(s) to other members of the health team.

If you decide that a patient needs a referral, indicate to which member(s) of the health team by placing a check in the corresponding space in the chart below.

<table>
<thead>
<tr>
<th>Patients</th>
<th>Public Health Nurse</th>
<th>Social Worker</th>
<th>Dietitian</th>
<th>Physical Therapist</th>
</tr>
</thead>
<tbody>
<tr>
<td>Jimmy</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mr. Jones</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Michael</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mrs. Fisher</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mr. Thor</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mrs. Davis</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Gladys</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Second, tomorrow you will be a team leader and responsible for planning the nursing care assignments for this group of patients. Imagine that you are forced to decide which ONE patient in each pair of alternatives listed below is to be assigned to the care of a REGISTERED NURSE. The unselected patient in each pair will be cared for by auxiliary nursing personnel under your supervision.

You may use all the information provided in the first three simulations to assist you in making your decision.

Indicate which ONE patient in each pair you would choose to be cared for by a REGISTERED NURSE by placing a check in the space to the left of the name of the selected patient.

1. ___ Gladys
   ___ Mrs. Fisher

2. ___ Michael
   ___ Tommy

3. ___ Mr. Thor
   ___ Mr. Jones

4. ___ Mr. Thor
   ___ Tommy

5. ___ Tommy
   ___ Mr. Jones

6. ___ Mr. Jones
   ___ Gladys

7. ___ Mrs. Fisher
   ___ Michael

8. ___ Mrs. Davis
   ___ Mrs. Fisher

9. ___ Mrs. Davis
   ___ Mr. Thor

10. ___ Mrs. Fisher
    ___ Mr. Jones

11. ___ Tommy
    ___ Mrs. Fisher

12. ___ Gladys
    ___ Mr. Thor
APPENDIX B

NURSE EDUCATOR DEMOGRAPHIC DATA SHEET

DIRECTIONS: Please complete the following information sheet. These data will be used for data interpretation only. Include this sheet when you return the instruments and completed scoring sheets. Thank you for your cooperation.

CODE NUMBER: ____________ SEX: ____________ RACE: ____________

AGE: (Please check the appropriate line)

_____ 20-24 _____ 30-34 _____ 40-44 _____ 50-54 _____ 60-64
_____ 25-29 _____ 35-39 _____ 45-49 _____ 55-59 _____ 65-over

BASIC NURSING EDUCATION: (Please check the appropriate line)

_____ AD _____ DI _____ BS

HIGHEST DEGREE HELD: (Please check the appropriate line)

_____ BS _____ MS _____ MSE _____ PhD
_____ BSN _____ MSN _____ EdD _____ DNSc

NURSING EDUCATION PROGRAM TYPE: (Please check the appropriate line)

_____ Junior/Community College _____ Hospital _____ College/University

STUDENTS ENROLLED IN NURSING PROGRAM: (Please check the appropriate line)

_____ 0-49 _____ 100-149 _____ 200-249 _____ 300-349 _____ 400-449
_____ 50-99 _____ 150-199 _____ 250-299 _____ 350-399 _____ 450-Over

CURRENT MEMBERSHIPS IN PROFESSIONAL ORGANIZATIONS:
(Please list)

CURRENT PUBLICATION SUBSCRIPTIONS:
(Please list)
I am Sarajane McCormick, a doctoral student at North Texas State University. I am seeking your participation in a research study. As an (associate degree, diploma, or baccalaureate) NLN accredited nursing education program in the Southern Region Educational Board, your program has been selected to participate in a study to examine the possible association of nurse educator/nursing student learning style match and its effect on the problem solving ability of the student. Participation of your program will contribute to identifying potential ways to broaden learning experiences of nursing students.

As a participant in this study you will be asked to provide the name of a nurse educator in your program who currently teaches senior level nursing classes in advanced medical-surgical nursing or the equivalent. Participation in the study will involve administration of two instruments: the Learning Style Inventory and the Nursing Performance Simulation Instrument.
A two hour period of time is required to administer these tests. Information from your program will remain confidential.

Will you be willing for a nurse educator and nursing students in your program to participate? I would be pleased to answer any questions about anything I have said.
APPENDIX D

LETTER OF INVITATION TO PARTICIPATE BY SCHOOL

5 Butterfly Cove
Little Rock, Arkansas 72209

Date

Inside Address

Dear Dean/Director:

As a/an diploma/associate degree/baccalaureate NLN accredited nursing education program in the Southern Region Education Board (SREB) area, your program has been selected to participate in a study to examine the possible association of nurse educator/nursing student learning style match and its effect on the problem solving ability of the student. This letter follows our telephone conversation regarding your participation.

As a participant in this study, you will be asked to provide the name of a nurse educator in your program who currently teaches senior level nursing classes in advanced medical-surgical nursing or the equivalent. Participation in the study will involve administration of two instruments: the Learning Style Inventory and the Nursing Performance
Simulation Instrument. A two hour period of time is required to administer these tests.

 Upon request, the results of each participating nurse educator and corresponding nursing student class scoring will be shared with each participating nurse educator. Upon request, the final results of the study will be made available to each participating nursing education program.

 Please indicate your interest in your nursing education program participating in this study by marking the enclosed post card. Please include the name of a nurse educator who matches the above stated criteria. This person will be contacted individually. Return the card to me as soon as possible.

 Thank you for agreeing to your program participating in this study. I look forward to hearing from you in the near future.

 Sincerely,

 Sarajane Y. McCormick, R.N., M.S.N.
 Ph.D. Candidate
 North Texas State University
 Denton, Texas

 Enclosure
APPENDIX E

LETTER OF INVITATION TO NURSE EDUCATOR

5 Butterfly Cove
Little Rock, Arkansas 72209

Date

Inside Address

Dear Nurse Educator:

As a nurse educator in a/an diploma/associate degree/baccalaureate NLN accredited nursing education program who teaches an advanced medical-surgical, or equivalent nursing course, you are invited to participate in a study to examine the association nurse educator/nursing student learning style match and its effect on the problem solving ability of the student.

As a participant in this study, you will be asked to administer two instruments to your nursing students. These instruments include: the Learning Style Inventory and the Nursing Performance Simulation Instrument. You will be asked to complete a demographic data sheet and to administer the Learning Style Inventory to yourself. Appropriate scoring sheets will be provided. You will be asked to administer the instruments to yourself and the nursing
students in your class over a period of time not to exceed two hours.

Upon request, the results of each participating nurse educator and corresponding nursing class scoring will be shared with each participating nurse educator. Upon request, the final results of the study will be made available to each participating nurse education program.

Please indicate your interest in participating in this study by marking the enclosed post card. If you are interested in participating, include the number of nursing students in your class. Please return the card to me as soon as possible.

Details regarding data collection and your packets of material will be sent to you within 24 hours after I receive the post card. The materials will be coded to ensure matching of nurse educators with corresponding nursing students and to ensure confidentiality.

Thank you for considering to participate in this study. I look forward to hearing from you in the near future.

Sincerely,

Sarajane Y. McCormick, R.N., M.S.N.
Ph.D. Candidate
North Texas State University
Denton, Texas

Enclosure
INSTRUCTIONS TO STUDENTS/NURSE EDUCATOR

5 Butterfly Cove
Little Rock, Arkansas 72209

Date

Inside Address

Dear Nurse Educator:

Thank you for agreeing to participate in this research study that examines the association of nurse educator/nursing student learning style match and its effect on the problem solving ability of the student. Enclosed you will find materials for data collection. The materials are coded to ensure matching of the nurse educator with corresponding nursing students and to ensure confidentiality.

Please follow the guidelines outlined below. Total testing time is not to exceed a two hour period of time.

Instructions for Students

Complete the following by marking answers directly on the instruments.

Learning Style Inventory
Nursing Performance Simulation Instrument
Instructions for Nurse Educator

Complete the following by marking answers directly on the instruments.

Learning Style Inventory
Demographic Data Sheet

Please return the completed instruments and all unused instruments to me by ___Date___. Return address labels and postage are enclosed. Thank you again for your participation and for the participation of your nursing students.

Sincerely,

Sarajane Y. McCormick, R.N., M.S.N.
Ph.D. Candidate
North Texas State University
Denton, Texas
APPENDIX G

TABLE XX
FREQUENCIES OF NURSING STUDENTS' HIGH/LOW PROBLEM SOLVING ABILITY BY TYPE OF NURSING EDUCATION PROGRAM

<table>
<thead>
<tr>
<th>Nursing Students' Problem Solving Ability</th>
<th>Type of Nursing Education Program</th>
<th></th>
<th></th>
<th></th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Baccalaureate</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>High</td>
<td>48</td>
<td>135</td>
<td>113</td>
<td>296</td>
<td></td>
</tr>
<tr>
<td>Low</td>
<td>41</td>
<td>179</td>
<td>95</td>
<td>315</td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>89</td>
<td>314</td>
<td>208</td>
<td>611</td>
<td></td>
</tr>
</tbody>
</table>
### APPENDIX H

#### TABLE XXI

Frequencies of Nursing Students' High/Low Problem Solving Ability and Converger Learning Style by Type of Nursing Education Program

**Converger Learning Style**

<table>
<thead>
<tr>
<th>Nursing Students' Problem Solving Ability</th>
<th>Type of Nursing Education Program</th>
<th>Baccalaureate</th>
<th>Diploma</th>
<th>Associate Degree</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>High</td>
<td></td>
<td>11</td>
<td>27</td>
<td>20</td>
<td>58</td>
</tr>
<tr>
<td>Low</td>
<td></td>
<td>8</td>
<td>35</td>
<td>19</td>
<td>62</td>
</tr>
<tr>
<td>Total</td>
<td></td>
<td>19</td>
<td>62</td>
<td>39</td>
<td>120</td>
</tr>
</tbody>
</table>

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APPENDIX I

TABLE XXII

FREQUENCIES OF NURSING STUDENTS' HIGH/LOW PROBLEM SOLVING ABILITY BY MATCH OF NURSE EDUCATOR/NURSING STUDENT LEARNING STYLE

<table>
<thead>
<tr>
<th>Match of Nurse Educator/Nursing Student Learning Style</th>
<th>Diverger</th>
<th>Assimilator</th>
<th>Converger</th>
<th>Accommodator</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Nursing Students' Problem Solving Ability</strong></td>
<td>BS 3</td>
<td>BS 4</td>
<td>BS 0</td>
<td>BS 6</td>
<td>BS 13</td>
</tr>
<tr>
<td>High</td>
<td>DI 10</td>
<td>DI 26</td>
<td>DI 2</td>
<td>DI 1</td>
<td>DI 39</td>
</tr>
<tr>
<td></td>
<td>AD 11</td>
<td>AD 11</td>
<td>AD 11</td>
<td>AD 0</td>
<td>AD 23</td>
</tr>
<tr>
<td><strong>Low</strong></td>
<td>BS 3</td>
<td>BS 3</td>
<td>BS 0</td>
<td>BS 2</td>
<td>BS 8</td>
</tr>
<tr>
<td></td>
<td>DI 15</td>
<td>DI 29</td>
<td>DI 3</td>
<td>DI 4</td>
<td>DI 51</td>
</tr>
<tr>
<td></td>
<td>AD 4</td>
<td>AD 9</td>
<td>AD 4</td>
<td>AD 1</td>
<td>AD 18</td>
</tr>
<tr>
<td><strong>Totals</strong></td>
<td>BS 6</td>
<td>BS 7</td>
<td>BS 0</td>
<td>BS 8</td>
<td>BS 21</td>
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<tr>
<td></td>
<td>DI 25</td>
<td>DI 55</td>
<td>DI 5</td>
<td>DI 5</td>
<td>DI 90</td>
</tr>
<tr>
<td></td>
<td>AD 15</td>
<td>AD 20</td>
<td>AD 5</td>
<td>AD 1</td>
<td>AD 41</td>
</tr>
</tbody>
</table>

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