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A Quasi Experimental Study Of Cognitive Styles And Teaching Methodology For Students In Nursing Education.

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A Major Applied Research Project presented in partial fulfillment of the requirements for the degree of Doctor of Education

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Abilene Intercollegiate School of Nursing (AISN) is faced with the task of educating nurses who acquire their undergraduate courses from three different universities. AISN is a consortium of these three institutions of higher education. Just as these students are varied in their first years of higher education, they do not approach learning situations in the same manner. They differ in the ways they perceive, organize, and relate experiences. It is likely that they respond differently to a particular instructional approach. Little investigation has been done at AISN to define and use specific methods to present relevant information.

The study is a quasi-experimental design with sixty-three nursing students, which is the total population of AISN. Subjects were offered the Group Embedded Figures Test (GEFT) of Witkin and associates (1976). Subjects were

stratified on results of the GEFT scores, after which they were randomly assigned to one of two teaching methods (traditional or Personalized System of Instruction). Four null hypotheses were developed for this study:

1. There will be no significant difference in the mean scores on the topic exam for field dependent subject receiving Personalized System of Instruction (PSI) teaching method and field dependent subjects receiving traditional teaching method.

2. There will be no significant difference in the mean scores on the topic exam for field dependent subjects receiving PSI teaching method and field independent subjects receiving traditional teaching method.

3. There will be no significant difference in the mean scores on the topic exam for field dependent subjects receiving the PSI teaching method and the field independent subjects receiving the PSI method.

4. There will be no significant difference in the mean scores on the topic exam for the field dependent subjects receiving the traditional teaching method and the field independent subjects receiving the traditional teaching method.

The data were analyzed using the two-way ANOVA. Data were related back to each null hypothesis, with no significant differences apparent.

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INTRODUCTION

Background and Significance

The Abilene Intercollegiate School of Nursing (AISN), which is a consortium of three institutions of higher education, is faced with the tremendous task of educating nurses who come from three different types of undergraduate universities. Students enter the off-campus building where classes are held for upper division level nurses after they have completed one or two years on the "parent" campuses. Just as these students are varied in their first years of higher education, they do not approach learning situations in the same manner. They differ in the ways they perceive, organize, and relate to experiences; that is, they vary in the way in which they acquire, retain, and use knowledge. It is likely that they will respond differently to a particular instructional approach. It is unrealistic to expect each member of a class to learn the same thing to the same degree at the same time. The varied backgrounds of these students present a challenge to educators as they teach complicated material. Pharmacology is an example of such material that is difficult to learn. There is a heightened awareness at AISN of students' problems in learning the thousands of medications delivered

today. The curriculum at Abilene Intercollegiate School of Nursing does not presently offer a separate course in pharmacology; however, there is a need for one. This research has prompted the inclusion of more pharmacology lectures this academic year, and the development of a syllabus for a future pharmacology course (Appendix A).

Thus, relevance of the study to the institution of nursing as a whole may be shown by assisting educators to understand that specific methods may be used to present relevant information. Also, a dual relevance is found at AISN. All AISN teachers are first and foremost registered nurses before they are teachers. Perhaps through reading this study, a personal interest in cognitive style may be fostered, and more varied methods of teaching styles may be offered to aid the students in their learning.

Educators at Abilene Intercollegiate School of Nursing want to assist graduates in developing their educational potential to the fullest. Each person has the potential to increase cognitive skills if nourished by the proper climate. Therefore, the significance of this study is that the results of the investigation will be used as a basis for deciding to incorporate the teaching of a pharmacology course in the future.

Attempts have been made in the past few decades to extensively research the various approaches to college teaching and to develop improved ways of individualizing instruction to accommodate the cognitive style differences

of higher education students. An emerging area of research that holds promise in helping educators determine which students learn best under what conditions is student learning styles. The term "learning styles" refers to a student's consistent way of responding and using stimuli in the context of learning (Claxton and Ralston, 1978).

There are numerous major research reports concerning cognitive styles of students. There is little in the literature about relationships of cognitive styles and nursing education incorporated with field dependence/independence. More research is needed in this area, with particular attention to the field dependence (FD), field independence (FI). Of the numerous models of cognitive styles that have been developed, the one receiving focus in this paper is the FD/FI developed by Witkin, Moore, Goodenough, and Cox (1976).

Before the study of cognitive style began, individual learning differences were either ignored or treated as sources of error. Learning differences, first addressed by Witkin, Dyk, Paterson, Goodenough, and Karp (1962), refer to the ability to select a figure from a cluttered, complicated, embedded background. Witkin et al. (1976) state that field dependent people look at the world in a gestalt, holistic way, while field independent people view things in a more analytic style. Most people, however, fall somewhere on a continuum between the two styles, and cognitive preference tends to be stable over

life unless there is specific instruction for change. Gestalt, or holistic, students have particular problems in the educational setting, and these problems may escalate as the student progresses through higher learning.

If the students are field dependent, problems appear with restructuring and comprehensive ability (Witkin and Goodenough, 1981). Messick and French (1975) and Joyce and Weil (1980) have conducted the most comprehensive studies today of the relationships among verbal disembedding tests. Reading tests were developed which require subjects to find hidden words in a sentence by combining the last several letters of one word with the first few letters of the immediately following word. This encoding and decoding process is similar to the problems related to the study of nursing where students are required to read approximately five hundred pages a week. Many of those readings contain a practically new medical language demanding comprehension from the student.

Within nursing, there is a need to examine the curriculum and present teaching methods to determine whether or not pedagogical methods promote learning. Traditionally, analytical learning has been emphasized within the educational system because of the overwhelming importance of language ability in the culture. Analytical people solve problems by looking at parts; whereas, holistic people solve problems by looking at the entire picture, thereby intuitively arriving at accurate

conclusions. Both analytical and holistic attributes are needed for the expert nurse. Surely, a teaching/learning environment should be provided to afford students the opportunity to develop all of their potential resources. The study of nursing is a combination of arts and sciences, and of people plus technology. Clearly, nursing contains a mixture of types of people who need to be both analytical and holistic in their learning styles. This mixture makes a difference in students' ability to learn complex concepts required by baccalaureate schools of nursing.

Problem Statement

Nursing students are constantly trying to elevate their grades in nursing school, and teachers are constantly trying to help them. Few studies have explored the relationships between learning theories and analytical or holistic methods of instruction as they relate to nursing students. Yet, a major area of nursing education is to assist the student with problems of learning the ever-changing skills related to caring adequately for patients. Therefore, a study that focuses on the most productive type of teaching methods should provide students, as well as teachers, with some ways to assist in gaining a knowledge base that can be used throughout students' and teachers' careers. For this reason, the present study focused on the interaction between teaching strategy and selected learner characteristics. The

differences in two teaching methods, personalized system of instruction (PSI) and traditional method, were further investigated. This type of research has how been extended to educational theory (Frank, 1986), psychology (Faschingbauer and Moore, 1978), science (Shymansky and Yore, 1980), physiology (Swinnen, 1984), management (O'Connor and Barrett, 1980) and other fields.

Major Purpose of the Study

The purpose of this study was to determine the effects of personalized system of instruction and traditional method of instruction (lecture) on the test-taking capacity of nursing students who were either analytic or holistic learners.

Few studies were identified that examined field dependence/field independence and methods of teaching nursing. Data compiled by Frank (1986) and Witkins and Goodenough (1981) reveal implications of cognitive style in career development. It was anticipated that the present study would make a unique contribution by using these variables with the research design. Individualizing the teaching/learning format to match a student's learning style maximizes the predictability of successful learning.

Based on the review of literature, it has been found that learning style assessment instruments such as the field dependence/field independence test of Witkin and Goodenough (1981) can be used as a predictor of students'

ability to learn. With the analysis of the results of the study, more sophisticated educator decisions can be made concerning appropriate methods to facilitate learning.

Research Questions

The major questions of this study were the following:

1. Will field dependent students who are taught using the PSI method score higher on the pharmacology exam than field dependent students taught by the traditional method? Studies by Tassinari, Morrelli, and Berlucchi (1983), Thompson and Pitt (1983), and Witkin and Goodenough (1981) reveal increased performance in field dependent students exposed to slowly placed, deductive, highly structured, and teacher-encouraged situations.

2. Will field independent students who have been taught by the PSI method score higher on the pharmacology exam than the field independent students who have received the traditional method?

Null Hypotheses

Four null hypotheses were developed for this study. They are as follows:

1. There will be no significant difference in the mean score on the topic exam for field dependent subjects receiving the PSI teaching method and field dependent subjects receiving traditional teaching method.

2. There will be no significant difference in the mean scores on the topic exam for field independent subjects receiving PSI teaching method and field independent subjects receiving traditional teaching method.

3. There will be no significant difference in the mean scores on the topic exam for field dependent subjects receiving the PSI teaching method and field independent subjects receiving the PSI method.

4. There will be no significant difference in the mean scores on the topic exam for the field dependent subjects receiving the traditional teaching method and the field independent subjects receiving the traditional teaching method.

Definition of Terms

To facilitate understanding of the research, terms are defined that either have special meaning to this study or are operationalized for the study:

Cognitive Style

Cognitive style has an important potential in individualizing instructional activities. By using the cognitive style approach to learning, educators, academic advisors, and other specialists have the opportunity to assist the student in the learning process. This term indicates a person's preference for a particular mode of information processing (Bonhomme, 1980). Operationally,

the Group Embedded Figures Test (GEFT) was used in this study and for its purposes. When the individual's score was above 9 to 18 it was classified as field independent and a score of 0 to 8 was classified as field dependent.

Various definitions of cognitive style have been reworded since the phrase was first coined by Allport (1937), who described cognitive style as a person's typical or habitual mode of problem-solving, thinking, perceiving, and remembering. Gregorc (1979:235) defines learning styles as ". . . distinctive behaviors which serve as indicators of how a person learns from and adapts to his environment." Similarly, Dunn (1978:407) describes learning style as ". . . the way individuals concentrate on, absorb, and retain new or different information or skills." Likewise, Witkin and Goodenough (1981:57) apply the cognitive style concept to emphasize its

> . . . pervasive dimension of individual functioning, showing itself in the perceptual, intellectual, personality, and social domains, and connected in its formation with the development of the organism as a whole.

Field Dependence

The person with a more field dependent way of perceiving tends to experience the surroundings in a relatively global fashion, passively conforming to the prevailing context. Witkin et al. (1962) conceived of differences of perception after studying observations first made by the Gestalt school of psychologists. In a field

dependent mode of learning, perception is strongly dominated by the overall organization of the surrounding field, and parts of the field are experienced as melted together or contained together. Field dependence may be operationally defined as the score of 0 to 8 that subjects acquired on the GEFT.

Field Independence

The person with an analytic manner of perceiving tends to have the ability to perceive the visual stimuli as separate from an embedded context. In particular, those individuals better able to distinguish the hidden figure in an embedded-figures test are classed as field independent. Operationally, subjects who scored 9 to 18 on the GEFT were defined as being field independent.

Teaching Strategies

A teaching strategy is:

> . . . formulated plan designed to bring about specific changes in students. It is the careful designing of an environment in which the student can learn what [he] is expected to learn. Teaching involves someone imparting something to someone else by some process. This definition suggests many variables in the teaching-learning process: the teacher, the subject, the learner, and the learning process. A teaching-strategy provides a pattern and sequence of teaching behaviors that are consciously and systematically designed to take into consideration all important variables (deTornyay, 1971:7).

Traditional Method of Teaching

The most traditional method of teaching in higher education is probably the lecture method with a bit of

discussion mixed with questions and answers. Because this method is the most frequently used teaching strategy, it has been used as a measure to compare other methods of teaching. Operationally, it is a four-hour planned talk on the chosen topic, for the purpose of instruction. The instruction was given in a formal classroom by the nurse educator.

Personalized System of Instruction (PSI)

The Personalized System of Instruction (PSI) was developed by Keller (1968) and implemented for the first time in a short-term course at Columbus University (Giese and Lawler, 1978). The reinforcement theory is used in PSI where students are given small segments of material to learn, evaluated immediately, and given feedback on their progress. Operationally, the nurse educator was used as proctor for offering small units of material to allow for self-pacing, mastery learning, and immediate feedback of the written/video taped material in the learning resource center.

Limitations of the Study

In order to establish the parameters of this study, the following limitations are listed:

1. The current study was limited to undergraduate nursing students at the Abilene Intercollegiate School of

Nursing located in Abilene, Texas, and the results of this study may not be generalized to other institutions.

2. No provisions were made to include motivational factors as a controlled variable.

Basic Assumptions

The review of literature informs and lends support to the following assumptions:

1. The investigation was based on the assumption that empirical data about cognitive styles can be identified from the review of literature.

2. Assumptions were made that the literature accurately reflects the stated problems in nursing education as it interfaces with cognitive styles.

3. An assumption was made that subjects have not previously been introduced to the GEFT.

Chapter 2

REVIEW OF RELATED LITERATURE

The potential usefulness of Witkin's and Goodenough (1981) conceptualization of cognitive styles gives direction for the methodological investigation of this study. An enormous amount of literature has been written regarding cognitive styles; however, there is a comparative scarcity of publications regarding the effect of cognitive styles and teaching methodology for students in nursing education. Cognitive styles is a concept that has been discussed by educators for decades. This chapter presents the conceptual framework for the study and a review of related literature.

How do differences in cognitive style arise? Do such diverse influences as genetic and endocrine factors, child-rearing, and environmental and ecological phenomena cause these differences? The intertwining of how people perceive and how they think and act is an important consideration for any theory of learning.

Witkin and Goodenough (1981) use their research to focus attention on the cognitive style of field dependence-field independence which is based on their interpretation of Gestalt psychology (Hilgard and Bower, 1975). Gestalt is a German word meaning form or pattern. A basic

assumption of this approach is that the whole is greater than the sum of the parts. The learner identifies similar patterns or categories, recognizes the relationship between the categories through insight, and comes to conclusions. The brain gives a cognitive structure to sensations and perceptions. Cognitive learning is based on the thoughts, attitudes, beliefs, and behaviors of which a person is cognitively aware, that she knows is a result of active problem-solving and goal reaching activity. Behavior is not developed by stimuli, responses, and reinforcement alone, but includes the process of knowing, learning, and thinking.

In an attempt to answer the first question in this paper, how do differences in cognitive style arise?, only the global/analytic style as suggested by Witkin and Goodenough (1981) will be examined. These researchers found that some people experience their surroundings analytically so that objects are perceived as discrete from their background. Such people are able to learn in an effective manner on embedded tasks as well as to orient themselves by internal rather than external cues. These people are called "field independent" as opposed to field dependent people whose method of perceiving is global, diffuse, and characterized by the broad field. Much research indicates that field independent people generally function in a more developed, flexible fashion than field dependent people. However, research also shows that

many field independent people are to be found in psychiatric hospitals, signifying their inability to adapt to the total picture of the world outside. There is also a difference in the subconscious selection of defense mechanisms with the field dependent person using "denial," and the field independent person using "intellectualization" more frequently.

There is a class entitled "Theoretical Learning of Nursing." During this class, a glass fish bowl is filled with the following items: oranges, lemons, potatoes, and rocks that look like potatoes. All the students look at the strange arrangement, but only the field independent students identify the rocks that look like potatoes. Another interesting intellectual functioning test is to give the student a stick and ask her to fix it across a doorway, but the stick is too short. To solve the problem, the student must use a wedge to make the stick remain in position. A deliberately "embedded" figure is to be found on the desk. It is a bottle with a stopper just the correct size to be the needed wedge. To use it for this purpose it must be taken out of the functional context of stopping up a bottle, and used in the context of serving as a wedge. People who are field independent have little trouble discovering what to do, while field dependent people size up the door and state, "It cannot be done."

When questioned later about their inability to position the stick correctly, global cognitive people tend

to use defenses as massive repression and primitive denial. These defenses involve an indiscriminant, total blotting out of memory for past experiences and of perception of stimuli. Conversely, persons with an articulated cognitive style, in their use of defense mechanisms like intellectualization and isolation, maintain the discreteness of feelings and ideas.

Principles that are derived from field dependence/ field independence theory are quite useful in teaching psychiatric nursing as well as theoretical concepts. People need to see the "whole" picture as well as the "embedded" parts of the picture.

Conceptual Framework

An enormous amount of time, effort, and money are necessary to develop instruction that is individualized to the specific needs of students. Nursing students must learn to make critical decisions early in their careers. Jenkins (1987), recognizing the complexity of nursing practice, directs attention to the nurse educator's responsibility for preparing nursing students for effective clinical decision-making. Valiga (1983) also recognized the importance of cognitive development in nursing education. Valiga's findings indicate that new baccalaureate nursing graduates were very dependent, expecting authority figures to solve problems and make decisions.

As appropriate teaching methods and approaches to facilitate sound educational decision-making are researched, examination must occur regarding what is happening in the system of collegiate education as a whole. Concern has been suggested regarding quality, or lack of it, within this system (Association of American Colleges, 1985; Association of American Medical Colleges, 1984; National Institute of Education, 1984; Southern Regional Education Board, 1985). These associations' reports echo a recurring theme: the lack of integrity, depth, and standards in undergraduate education. This is the area of collegiate-based nursing education programs which implies that it is imperative to employ a teaching methodology appropriate to the subject matter and the individual.

Just as those in nursing are concerned about higher education, the Association of American Colleges (1985:1) states that:

> . . . leaders in a complex, pluralistic society require not only technical or professional expertise, but the ability to make consequential judgments on issues involving the contextual understanding and assessment of multifaceted problems.

Noting deficiencies in the college curriculum that have a negative impact on the development of attributes deemed necessary for college graduates, some reports have pointed out ways to correct the decline in quality education. Included are recommendations for change; for minimum curricula requirements; for faculty teaching expertise; for increase in research, publication, and update in teaching

methodology; for in-depth study; for student involvement; and for evaluation (Spector, 1985).

Particularly within nursing, an examination of curriculum and teaching methods needs to be conducted to determine whether or not there is promotion of independent decision-making or dependency upon the authority figure for answers. Valiga (1983:119) asks:

> Is this [dependency] what is actually fostered and rewarded and expected throughout the nursing program--despite words to the contrary? Are students allowed to "experiment" with solutions to problems? Or are they given answers so that they never make mistakes in practice?
>
> Are students provided with enough diversity on a topic? Or are readings assigned where all authorities are in agreement?
>
> Are adequate teaching methodologies used to provide a choice of learning situations? Or are all students taught with the same methods?

A teaching/learning environment should be provided that offers students the opportunity to develop their potential resources (Spector, 1985). Traditionally, left-brain learning has been emphasized within the educational system because of the overwhelming importance of language capability in American culture. Left-brain people can systematically and analytically solve problems by looking at the parts. Right-brain people can see patterns; therefore, solving patterns by looking at the whole picture and arriving intuitively at accurate conclusions (Spector, 1985). Whole-brain people can use the attributes of both hemispheres, which is characteristic of the expert nurse.

In order to use both hemispheres, students must learn to explore alternatives to learning, and teachers must examine pedagogical methods used in teaching nursing.

Traditional approaches to learning, as practiced in many higher education institutions, seldom meet the intellectual needs of most students. Shaffer (1984) reports that memorization and misunderstanding are the prevalent learning outcomes for many college students. He lists four objectives that should guide the learning needs of university students:

1. increasing intellectual pursuits;
2. increasing comprehension;
3. using the creative process by both students and teachers; and
4. achieving a personal and discriminating approach to knowledge.

Many experts have addressed the importance of adapting instruction by using similar goals to the student's own learning style (Abraham, 1978; Grasha, 1984; Messick, 1976; Stewart, 1984; Witkin and Goodenough, 1981). An important point for meeting these goals is to recognize learning differences among students and to identity the unique ways students learn. In this way, instructional activities can be tailored specifically to the student's learning needs (Stewart, 1984).

The terms cognitive styles and learning styles overlap in regard to variables dealing with structure,

motivation, perception, thought processing, and sociological elements. There have been continuous changes in the empirical picture and accompanying changes in nomenclature and conceptualization. As Witkin and Goodenough (1981) state, recent usages of field dependence/independence and cognitive styles have created problems that have been the source of critical commentaries in the literature.

Originally, FD/FI was used primarily to describe the visual field and/or the body as referents for perception of the upright. Only later was the concept referred to as the ability to overcome an embedding context in perception Most recently, the concept, after further research studies, involves both analysis and structuring in intellectual and perceptual abilities. This broader dimension was designated an articulated versus global field approach and was also conceived as an ability. It is to this dimension the present study refers. The global/ analytic approach is developed from a specific learning style theory.

Learning styles have been the focus of extensive research, and there is substantial similarity and overlap in the models, even though they were developed by various researchers and arise from different academic disciplines. As a method of presenting the multitude of learning styles, Table 1 shows selected styles, identifies the features that cause these styles to be different or similar to one

Table 1

Cognitive Styles Identified

Model	Identifier	Source
Field dependent/ Field independent	A global versus analytic way of perceiving is suggested.	Witkin and others (1962, 1976, 1981)
Analytical-nonanalytical reasoning	Entails differentiating attributes or qualities for analytical style, and relational or thematic for nonanalytical style.	Messick and Kogan (1965)
Impulsivity-reflectiveness	Impulsivity is shown by rapid responses, reflectivity by slower responses. More errors are made by impulsiveness.	Kogan and Wallach (1964)
Risk-taking caution	Risk-taking is shown by chancing even when odds for success are slim. Caution is characterized by unwillingness to take chances unless probability of success is evident.	Kogan and Wallach (1964)

Table 1 (continued)

Cognitive Styles Identified

Model	Identifier	Source
Leveling-sharpening	Personal changes in assimilation in new material into previous knowledge, whereas the sharpener contrasts the new information from the old.	Kogan and Wallach (1964)
Broad-narrow	Individual preference for broad categories with many details versus narrow categories with few details.	Bruner and Tajfel (1961); Kogan and Wallach (1964); Pettigrew (1968)

another, and identifies the major authors of the cognitive styles. This table summarizes the styles according to the review of literature.

As shown from these models, there is a diversity as well as some interesting similarity. Field dependence/ field independence, with its emphasis on a global as opposed to analytic style of perceiving, appears similar to the non-analytic versus analytic style of differentiating data. The impulsive person is somewhat like the risk taker, while the person who deliberates with reflectiveness is akin to the person who is cautious.

Considerable research has been done on each of these and other models of cognitive styles. However, Witkin and Goodenough (1981) do not feel that learning styles are inherited. They also believe that teaching should be developed through student strengths and not weaknesses.

Related Research

Students need alternative ways to use their strengths to learn and change. Most students are forced into listening/learning modalities. Because of this, approximately one-third of the younger students become drop-outs (Ostmoe, Van Hoozer, Scheffel, and Crowell, 1984). Ostmoe et al. (1984) also state that about thirty-eight percent of the students learn best through activity which includes touch. Research studies point out

that students can recognize their learning styles and statistically increase their learning achievement by using their own specific style of learning. Ostmoe et al. (1984) and other nurse educators developed a nursing and learning strategies preference style questionnaire and administered it to ninety-two baccalaureate nursing students. Approximately one-half of these students were beginning their first nursing course and one-half were in their last nursing course. The results of this study suggested that junior nursing students prefer learning strategies that are organized, passive, and directed by the teacher. Senior students tended to prefer innovative learning strategies. The researchers found that as the students progressed in nursing, they showed less preference for traditional learning strategies (Ostmoe et al., 1984).

Another major study assessed the relationship between student learning traits and achievement with either mediated self-instruction using audio tape recordings, auto instructional aids, and filmstrips and compared results with the traditional method of learning. Subjects were 159 female junior subjects who were offered two different types of instructional methods to ascertain relationships and intermode differences (Rehn, 1985). The filmstrip program was superior to the traditional (lecture) method for specific performance instruction, and a significant relationship was found between the topic test and the high scores on the self-esteem inventory. Findings suggest that

analysis of the interactions between learning traits and type of instruction can assist teachers in assigning students to an instructional treatment (Rehn, 1985).

Jacobs and Gedeon, in their 1982 study, found significant differences in the social behaviors of field dependent and field independent students in a personalized system of instruction course. Since students did not differ in achievement, this suggests that social behavior may be one way students adapt to various instruction settings. Conversely, Ippel (1981) questioned whether generalizing performance scores of various hidden figure tests in regard to cognitive styles is justifiable. The test characteristics of embeddedness and norm figure uncertainty were systematically varied following a repeated measurement design. The generalizability of these test characteristics appeared to be limited (Ippel, 1981).

Continuing with the same line of thought, Hedberg and McNamara (1985) researched the effect of different types of feedback in computer assisted instruction. Thirty college students with different cognitive styles were studied with results indicating the field dependent subjects had faster response times and fewer response errors when given an explanation of their errors and strategies for correcting them. Field independent subjects had lower response rates and fewer errors when given only an indication that an error had been made. Other researchers discovered that presentation mode did not

affect performance, and there was no significant interaction between presentation mode and cognitive style. Moore (1985) examined the effects and interactions of multiple and linear visual presentation modes and cognitive style on performance in a visual location task. A total of 132 subjects was offered the GEFT (Witkin, Oltman, Raskin, and Karp, 1971) to identify which subjects were field dependent, field independent, or neutral. Several different presentation modes were offered to subjects with no intermode differences.

According to a study by Crosson (1984), older people are less field independent than younger people. Crosson's (1984) study used a sample of 160 women and developed comparisons between the mean GEFT scores of creative women, the mean scores of a sample of women not selected for creativity, and the mean scores of two samples of men. Creative women were shown to be more field independent than women not selected for creativity and as field independent as two samples of younger men. Crosson's (1984) study also related that artists were more field independent than writers.

Among the most field independent women, recognition of embedded figures in the GEFT was almost instantaneous. As Crosson (1984) stated, this may be attributed to art training. Relationship of Crosson's study to the present research appears when one considers society's valuing the traits of the field independent person.

Witkin and Goodenough's (1981) Group Embedded Figures Test has been successfully presented to numerous subjects for various reasons. In a 1980 study by Federico and Landis, the incorporation of computer-managed instruction into an academic program made it necessary to identify those cognitive styles, abilities, and aptitudes which were relevant to the success or failure of trainees in the Navy's basic electricity and electronics school in order to maximize attrition rate. Measures of six styles, six abilities, and twelve aptitudes were administered to 172 of the school's trainee graduates and 35 of the trainees who failed. Stepwise discriminate analyses were computed to determine what linear combination of tests optimally differentiate between the graduates and failures. Classification equations and predictive accuracies were established for each derived discriminate function as a means of evaluating its adequacy. Results indicated that failures and graduates of basic electricity and electronics school significantly differed in certain cognitive styles, abilities, and aptitudes.

> Failures as contrasted with graduates possessed: (1) field-dependent and broad conceptualizing styles; (2) poor verbal comprehension; ideational fluency, general reasoning capacity, and inductive ability; and (3) low quantitative, technical, verbal, and general aptitude (Federico and Landis, 1980:1).

Of prime concern for Federico and Landis in their 1980 study, was the capacity to identify, as accurately as possible, those students who were likely to fail the

school. Based on identification of these students, corrective action could be taken to reduce the attrition rate. Successful students (more field-independent than not) had an analytical style of information-processing, and were inclined to distinguish objects or figures from backgrounds or contexts in a differentiated manner. Graduates differed from failures in their conceptualizing style. They tended to organize or sort objects to maximize similarities or differences among them.

> The fact that graduates used more categories in an object-sorting task than failures, indicated that they usually exercise more critical judgment recognizing ambiguities among objects or events. Therefore, they may be more successful in mastering instructional materials, especially, subject matter as theoretical and technical as electricity and electronics (Federico and Landis, 1980:4).

Theoretical and technical skills are demanding and growing in the field of nursing; therefore, it is imperative that students with a capacity for skills be identified. In a distinct study presented to the Midwest Educational Research Association by Koppelman (1980), the use of ethnographic research, or participant-observer, was utilized to consider a wide range of variables in classroom interaction patterns. The objective was to determine if any differences in the behavior of field-dependent and field-independent teachers emerged. In selecting subjects for the research, five variables were used as the criteria: (1) sex, (2) grade level, (3) years of teaching experience, (4) school setting, and (5) strength of field-dependence or

field-independence. Koppelman (1980) observed teachers expounding on a variety of subjects which would allow for several educational approaches while dealing with the same students each day in a self-contained classroom.

These teachers were given the Group Embedded Figures Test and from an original group of seventeen, five subjects were selected. All five subjects were selected because of their extreme scores. A total of 120 hours of observation for a two month period was conducted. Detailed notes with direct quotes were recorded. The field notes were "completely descriptive and non-judgmental" (Koppelman, 1980:6).

Categories were grouped under ten general headings which were then treated with a chi-square statistic. Significant differences were found in the following headings: (1) Teacher is Directive, (2) Teacher is Analytical, (3) Teacher as Critic, (4) Teacher as Nurturer, and (5) Teacher as Manager. Teachers who were field dependent tended to command students much more than field independent teachers who formed questions rather than commands. Field-independent subjects gave students clues and let students figure out the problem for themselves. The problem-solving strategy was used for task and skill assignments.

Under the Teacher as Nurturer category, field-dependent teachers were more likely to be friendly throughout the day, during class time, and outside of

class. Field-independent teachers, on the other hand, used nurturing behaviors that reinforced students in their role as learners. Reinforcement was given by expressing enthusiasm for a correct response.

Inconclusive data were presented in this research; however, the study did offer more or less credible directions to pursue the investigation of the "influence of cognitive style or teaching style" (Koppelman, 1980:15).

> The personal teaching style includes a focus on the student as a person, a consistent pattern of friendly, familiar interaction with the student, a more personalized disciplinary approach that involves criticizing the individual student's behavior, and a directive approach that consists of giving commands which students are expected to obey and giving answers to help students complete their assignments (Koppelman, 1980:16).

A deeper understanding of the role of cognitive style in the development of teaching style was presented in Koppelman's (1980) study.

Of particular interest to the nursing community is a 1983 study conducted by Jonathan Cohen and Keith Sedlacek titled "Attention and Autonomic Self-Regulation" which examined how various aspects of attentional functioning are affected by autonomic self-regulation procedures. It was projected in this study that in autonomic self-regulation training, patients are taught to:

> . . . pay attention in three ways: to disembed the figure from the ground, to voluntarily deploy attention, and to sustain their attentional focus in the service of the task (Cohen and Sedlacek, 1983:244).

One hypothesis for this study was that successful autonomic self-regulation learning may be related to the cognitive dimension labeled field-dependence, field-independence by Witkin et al. (1971). Cohen and Sedlacek's (1983) study was conducted with ten adults who were using biofeedback and a variety of cognitive and somatic relaxation autonomic self-regulatory procedures to reduce blood pressure. These subjects were compared to ten adults who used relaxation techniques alone to lower blood pressure. The GEFT was only one of the tests used in the study. A one-way analysis of variance (two-tailed) for pre- and post- Group Embedded Figures Test change scores revealed a significant main effect for groups, with the biofeedback group becoming more field independent as assessed by measurement. Witkin and Goodenough (1981) suggested that field independent and field dependent cognitive styles seem best conceptualized as tendencies to function with more or less autonomy of external reference. With this independence comes a capacity to differentiate internal experiences. Cohen and Sedlacek (1983:254) state:

> Any one cognitive process, like attention, obviously operates within a larger psychological and physiological context. Many psychological and physiological variables may interact with visual perceptual disembedding processes. One may speculate that the patients in the biofeedback group may have been significantly more motivated to learn . . . and hence, show greater field independence changes.

In summary, an ERIC search and a DIALOG search from the Medline Database, using the NOVA University computer

bank, identified seventy-seven items of interest for the present study. These studies revealed various and sundry elements of cognitive styles, ranging from the Ostmoe et al. (1984) study which states that students learn best through touch activity, to Rehn's (1985) research which states that PSI is superior to the traditional method. Opposite to these findings, Ippel (1981) stated that no significant differences occurred when testing various methods of teaching. Jacobs and Gedeon (1982) noted significant differences in field dependent subjects in social behavior during a personalized system of instruction, which complimented the findings of Hedberg and McNamara (1985).

Chapter 3

PROCEDURES AND METHODOLOGY

Procedures

An investigation of the outcomes of two different types of teaching methodologies for students took place in this study. The overall research study was a quasi experimental design (Neale and Libert, 1980; Wilson, 1985). The study was mainly concerned with investigating whether one method of teaching is more effective for subjects who are field dependent than another method of teaching.

Population and Sample

The population included all individuals, age eighteen to fifty-two, who entered into the Abilene Intercollegiate School of Nursing (AISN) located in Abilene, Texas. Subjects were undergraduate nursing students enrolled full-time in a small southwest university consortium, which is fully accredited by the National League for Nursing (NLN). The study drew upon students from junior and senior classes. The sample was composed of sixty-three subjects who were asked to participate in this study. Only three male subjects participated in the study due to lack of enrollment. Naive participants only were used in the two groups as none of the participants had ever

exposed to the GEFT or to the Pharmacology Test, Also, no comparison between the ages could be conducted because of the cluster of ages on the young side. Subjects were given the following information at the time they agreed to participate:

1. Information about the study and dates of implementation.

2. Details of the testing process.

3. Verification of voluntary participation (Appendix B).

4. Benefits to the individuals.

5. Explanation of confidentiality and anonymity.

Furthermore, to protect the anonymity of these subjects, students selected one code number from a printed list. Only code numbers were placed on all data collection forms. No names were used.

Data Collection Instruments

The first instrument used in the study was the Group Embedded Figures Test (GEFT) developed by Witkin and associates (1976). This copyrighted test may be purchased through Consulting Psychologists Press, 577 College Avenue, Palo Alto, California, 94306 (Appendix C). The GEFT was designed to measure cognitive learning styles in either a field dependent or a field independent mode. Validity and reliability have been established for the GEFT by multiple researchers (Bonhomme, 1980; Claxton and Ralston, 1978;

Frank, 1986). Permission to use the test was obtained from the publishing company (Appendix D).

A second instrument, which is representative of the type of exams at AISN, was used to test knowledge of pharmacology (Appendix E). The test was developed by using questions following the objective guidelines. Questions were written to range from simple to complex with an average score of 75% anticipated. The questions test the ability of the students to show knowledge of basic material such as medical abbreviations, signs and symbols, proper administration, and technique of delivery. Also, the questions test the student's knowledge of desired effect, action of drug, drug categories, possible side-effects, and health-teaching possibilities. Most of the questions were developed to correspond with the method of testing that is used for State Boards, which is multiple choice testing. This test was submitted to a group of experts for the purpose of verifying content validity. Three nurses, two educators, and one pharmacist reviewed the pharmacology test, made comments, and suggested revisions were made.

Data Collection Procedure

The subjects were given the GEFT, stratified on the results, and then randomly assigned to one of two teaching methods (traditional or PSI) for the same topical information. Subjects scoring 9 to 18 were classified as the field-independent group, while subjects scoring 0 to 8

composed the field-dependent group. The pharmacology pretest was used as a comparison with the posttest that followed the treatment.

The pretest was offered to all participants in a classroom setting. The pharmacology test required two hours. To assure anonymity, the tests were identified by randomly chosen numbers which were retained by the subjects for use on the posttest. The only persons knowing the numbers were the individual subjects and the recorder who was an unbiased professional faculty assistant. Each test was marked with the subject's number. The next step in collecting the data was to select the subjects for the two separate two-hours monomodal presentation of the lecture "Pharmacology in Nursing." This lecture was presented verbally without supplemental audiovisual aids. Subjects were selected by using a table of random numbers. This group was identified as group L (lecture group).

Group P (PSI group) was given the same content using a multimodal presentation. In addition to the lecture presentation, overhead transparencies, handouts, slides, and video-tape presentation were used. The same nurse educator presented the pharmacology content to both groups. If subjects did not complete the sessions and take the pretest and posttest, they were eliminated from the study. Eight subjects were eliminated. Scores on the tests were analyzed and interpreted mechanically.

The GEFT is a booklet containing three sections: the first section contains seven very simple items, and the second and third sections contain nine more difficult items. A stop watch was used to determine the twelve-minute time limit formula. Before administering the test, the examiner practiced tracing the appropriate simple form in each complex figure until they were easily found. A practice trial was shown to subjects before the timed test was delivered.

After the practice trial, instructions were given as follows:

In each figure, there is a simple form present in the complex design. It is always in the upright position, so, don't turn the design around. There may be several of the simple forms in the same design, but you are to find and trace only one. Work as quickly as possible, since this is a timed event, but be sure that the form you find is exactly the same as the original simple form in shape, size, and proportions. If you forget what the Simple Form looks like, you may ask to see it again, and you may do so as often as you like. Are there any questions? (adapted from Witkin et al., 1971).

Two minutes were allowed for the first section, five minutes were allowed for the second section, and five minutes were allowed for the third section until "time" was called. All booklets were then scored by giving credit if all lines of the simple form were traced, no extra lines

were added by the subject, and all incorrect lines were erased.

Methodology

Data Analysis

An analysis of covariance was calculated to measure differences exiting between group L and group P for the total group and for the FI and FD groups. Even though subjects were randomly assigned to treatment levels, the analysis of covariance was used to increase the power of the significance test (Neale and Libert, 1980; Wilson, 1985).

When a two-way analysis of covariance was run, there were three F-ratios. These are the values which were compared against the table to determine if there was a significance. The obvious comparison of concern was the comparison between columns, i.e., X (CI) vs. X (CII). This test, however, also gave a comparison between the rows. This answered the question concerning the posttest results between field-dependent and field-independent subjects regardless of the type of instruction (Grizzle, 1988a).

Next, the problem of interaction was considered. For this explanation, the simulated values for the means were used with black numbers for the case of no interaction and asterisk numbers for the case of interaction. With no interaction (black numbers), there was a difference between the column means which would imply that for both GEFT

levels, PSI exceeds traditional. There was no difference between the row means. These row and column comparisons are called "main effect." By looking at the asterisk numbers, there were no differences between either the column or the row main effects. However, by looking at the cells, some differences existed for the field dependent and also the field independent groups. For the dependent groups, PSI exceeds traditional and for the independent groups, traditional exceeds PSI. These comparisons (X1 vs. X2, X3 vs. X4, X1 vs. X3, X2 vs. X4) are called "simple effects." In general, when interaction occurred the tests of the main effects are of no value, and the separate tests of the simple effects are needed.

In summary, when the results of the two-way analysis of covariance were received, the three F-ratio was labeled F (rows), F (columns), and F (row X column) which was the test for interaction. The F (row X column) was first checked to see if the amount of interaction was significant. It was not significant, therefore, the other two F-ratios were used to test the significance of the main effects. The interaction was significant, the row and column F-ratios were meaningless and were discarded. Then, a simple, one-way analysis of covariance test was performed in order to test the simple effects under consideration. On the basis of the above, where the interaction was insignificant, the null hypotheses were tested at the .05 level of significance (Grizzle, 1988b).

Chapter 4

PRESENTATION OF RESULTS

An investigation was conducted of the outcomes from a sample of nursing students exposed to a four hour lecture class on pharmacology versus a similar sample of subjects exposed to personalized system of instruction. Dependent variables were the Group Embedded Figures Test by Ottman et al. (1969), and the Pharmacology Test (PT) by Magee (1988).

This chapter is concerned with an analysis of the data. Demographic data regarding age, sex, and the number of participants from each consortium member school were collected to provide a description of the sample. Also included in this chapter is a description of the data presented in narrative and table form, the statistical method used, the analysis of the data, the findings of the study, and a summary of the findings.

The purpose of the study was to determine if a lecture type presentation allowed students to grasp pharmacological material in greater detail than students who were presented the material in the PSI teaching method. In order to do this, the following hypotheses were developed:

1. There will be no significant difference in the mean score on the topic exam for field dependent subjects

receiving the PSI teaching method and field dependent subjects receiving traditional teaching method.

2. There will be no significant difference in the mean scores on the topic exam for field independent subjects receiving PSI teaching method and field independent subjects receiving traditional teaching method.

3. There will be no significant difference in the mean scores on the topic exam for field dependent subjects receiving the PSI teaching method and field independent subjects receiving the PSI method.

4. There will be no significant difference in the mean scores on the topic exam for the field dependent subjects receiving the traditional teaching method and the field independent subjects receiving the traditional teaching method.

Description of the Sample

The sample consisted of sixty-three individuals who were enrolled in a nursing school education program located in a consortium school in a south-central state. Demographic data regarding age, sex, and consortium member schools were compiled. The sample consisted of sixty females and three males, with female participants comprising 95 percent of the sample and male participants comprising 5 percent of the sample. Subjects ranged in age from 18 to 52 years with a mean age of 21.3 years and a mode of 22 years (see Table 2). There were seventeen

participants or 27 percent enrolled in the "parent" school of McMurry College, twenty-five participants (40 percent) enrolled in Hardin-Simmons University, and twenty-one (33 percent) participants enrolled in Abilene Christian University. The mean scores on the Pharmacology Test were as follows: Abilene Christian University students averaged 82.5, Hardin-Simmons University students averaged 81, and McMurry College students averaged 79.7.

Table 2 was developed to show the description of the sample. Information was taken from the previous narrative.

Table 2

Demographic Data

School	Number and Percent of Participants	Mean PT Scores
Abilene Christian University	21 (33%)	82.5
Hardin-Simmons University	25 (40%)	81.0
McMurry College	17 (27%)	79.7

Findings

An analysis of covariance was calculated to measure differences between group L (lecture) and group P

(personalized system for instruction) for the total group and for the FI (field independent) and FD (field dependent) groups. Each subgroup was analyzed separately by the factorial design method of analysis of variance as a 2 X 2 configuration. Factor A, FD-FI, had two levels (FD, N = 26) and FI, N = 37) and Factor P treatment had two levels (Group L and Group P). The mean difference scores between post- and pre-measurements were subjected to computer analysis on the Prime 0130 Computer, Minitab Unbalanced Version, Analysis of Variance Program, located at Hardin-Simmons University in Abilene, Texas.

Each dependent variable in a 2 X 2 factorial design analysis of variance has three basic hypotheses as represented by one each due to Factor A, Factor B, and the Factors AB interactions. To illustrate the statements of hypotheses for the Pharmacology Test, results are as follows:

1. No differences on PT mean scores exist between FI controlled for experimental treatment on samples of nursing students exposed to PSI

2. No differences on pharmacology mean scores exist between FD subjects receiving traditional lecture method and FI subjects receiving traditional lecture method.

3. No differences among FD-FI subjects, interaction means scores exist on samples of nursing students exposed/not exposed to the traditional lecture

method and the subjects exposed to the PSI. Analogoris hypotheses could be stated for the remaining six variables by merely substituting the test names in the null statements.

Table 3 contains the results of the Analysis of Variances with attendant F-ratios and probabilities noted. A NS abbreviation in the tables signifies "no significance" for that particular F-ratio. The PT failed to attain significance on either PSI treatment or lecture treatment. Consequently, all four null hypotheses tested were not rejected (see Table 3).

Table 3

Factorial Design of PT Scores for FD Subjects Receiving PSI and FD Subjects Receiving Lecture Treatment

Source	ss	df	MS	F-ratio	Prob.
FD	.853	1	.853	.23	NS
PSI Treatment	29.727	1	29.727	11.53	NS
FD	5.323	1	5.323	2.81	NS
Lecture Treatment	11.859	1	11.859	.03	NS
Error	187.270	58	3.228		
Total	235.032	62			

As can be seen by the data in Table 4, there was a significant main effect for FI and teaching method and no significant interactions. Subjects scored higher on the examination if they had a higher score in the beginning, as would be expected. However, students' examination scores were higher in the PSI condition regardless of cognitive style (see Table 4). Also, in Table 4, the analysis of variance test results indicated that the interaction between cognitive style and instructional method and the main effect for cognitive style were not significant across the groups of field-dependent/field-independent subjects receiving the personalized system of instruction.

Table 4

Factorial Design of PT Scores for FD-FI Subjects Receiving PSI Treatment

Source	ss	df	MS	F-ratio	Prob.
FD	.009	1	.009	.00	NS
PSI Treatment	13.001	1	13.001	2.03	NS
FI	5.823	1	5.823	1.36	NS
PSI Treatment	12.889	1	12.859	3.02	NS
Error	187.620	58	5.362		
Total	219.243	62			

An analysis of extreme scores on cognitive style was also done. The highest and lowest quartiles on the GEFT were determined and than a 2 x 2 ANOVA was computed. These findings are shown in Table 5.

Table 5

ANOVA of Exam Results by Extreme Scores on Cognitive Style (CS)

Source	ss	df	F-ratio	p	R^2
CS	23.65	1	.31	.59	.64
PSI	94.72	1	1.26	.28	
LM	27.08	1	.36	.55	
Error	215.37	37			
Total	359.82	40			

There was a significant main effect for CS and for teaching method, but no significant interactions. Again, the PSI conditions assisted all students regardless of how low their scores were on the previous PT. These data are presented graphically in Figure 1.

Reliability coefficients were ascertained for the thirty-three question evaluation instrument. The Spearman-Brown test was .89 and the Kuder-Richardson coefficient was .84. The main concern was whether the items in the PT were fairly homogeneous in terms of how the individuals

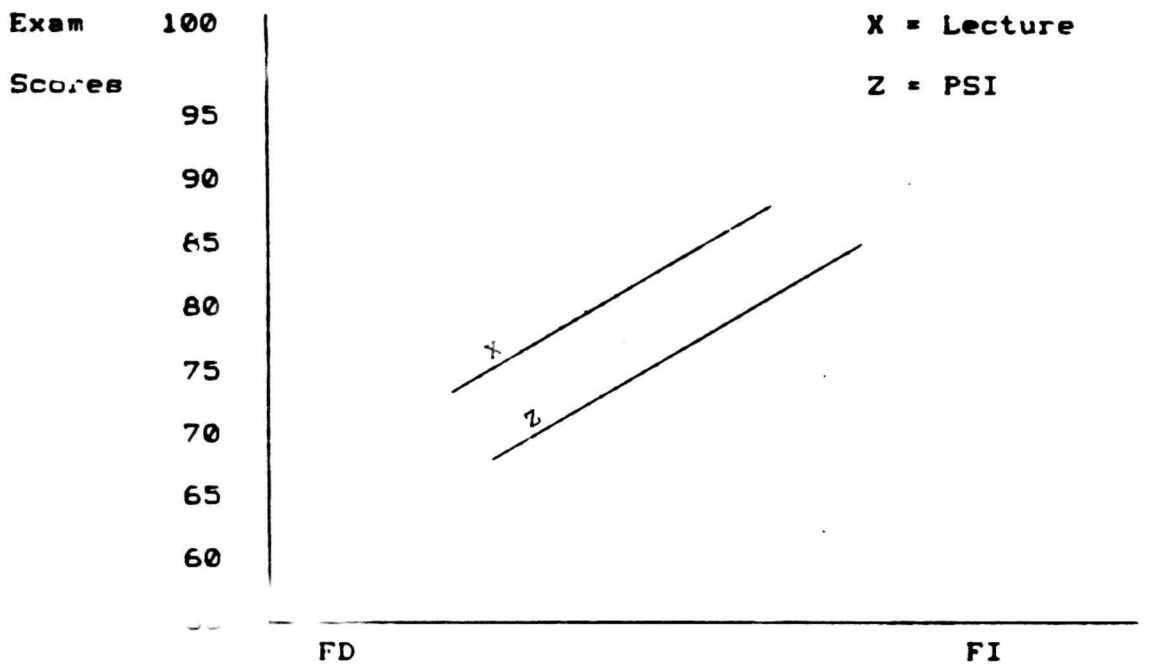

Figure 1
Mean Examination Scores on Extreme Scores in Cognitive Style (CS) by Teaching Method

responded to the items. The high reliability/coefficient score (.70 or higher) shows that the test was accurately measuring some characteristics of the subjects taking it. A high reliability means that the individual items on the test produced similar patterns of responding in different people (Grizzle, 1990).

Summary

A brief summary of the statistical analysis resulted in none of the four major hypotheses being significant at the .05 level. The main hypothesis, that field-dependent students would score higher in the PSI condition, was not supported. All students in the PSI condition scored higher on the examination regardless of cognitive style. Finally, no significant higher order interaction was found between field-dependent/field-independent styles and the teaching method offered.

Chapter 5

DISCUSSION, IMPLICATIONS, RECOMMENDATIONS AND CONCLUSION

Discussion

This study was conducted to determine the effects of personalized system of instruction and traditional method of instruction on the test-taking capacity of nursing student who were either analytic or holistic learners. Chapter 5 includes a discussion of the findings, implications for the improvement of educational practice, recommendations based on the findings of the study, and a conclusion which suggested possible means of diffusion to interested individuals. The impetus for this study came from observations in nursing school while working with students having difficulty learning the multifaceted skills related to caring adequately for patients.

The following is an interpretation of the results to the more general research questions asked of this study.

1. Will field dependent students who are taught using the PSI method score higher on the topic exam than field dependent students taught by lecture method?

Past research has indicated that field dependence/ field independence was closely related to personalized student instruction. From the analysis performed, there

was very little evidence to suggest that field dependence/ field independence was related to the component of teaching method. Although there may be commonality on other measures between high scores on topic exams, field dependency and PSI, data in this study revealed little evidence to demonstrate that fact.

2. Will field independent students taught by PSI method score higher on topic exams than the field independent students who have received the traditional method?

From this study, it would appear that personalized system of instruction is a method of teaching that aids in producing higher examination scores than with the traditional method. Past research has indicated that field dependence/field independence was closely related to cognitive styles. From the analysis performed, there was very little evidence to suggest that was true.

The theory of Witkin and Goodenough (1981), supported by other experts (Jenkins, 1987; Spector, 1985; Stewart, 1984; Valiga, 1983), concerning cognitive styles proposed that the educator offer individualized instruction by addressing the student's particular learning style. The achievement of reaching goals that students and educators set forth may be reached by various methods. Based on Wilkins and Goodenough's (1981) theory, it may be hypothesized that instructional goals may match the student's learning needs.

As educators continue to attempt calling nursing a professional field of study, research such as the present study will add to the body of knowledge, relating how to actually teach by the best method. Hogstel (1976) stated that the PSI students did not score higher than the traditional groups; however, no randomization was offered, and sample sizes were uneven. Likewise of note is an apparent paradox which exists with respect to cognitive theories. For example, Frank's (1986) study demonstrated that measures of cognitive style could prove useful in the role of academic counseling. The present study also can be used to counsel students to participate more in the PSI method by using multimodal types of presentation.

Implications for the Improvement of Educational Practice

Several pedagogical implications may be drawn from the present study, such as the type of teaching methodology used in the school of nursing. Personalized system of instruction and/or lecture method strategies promise to be amenable to instruction. The results of the study may, in conjunction with other evidence in the literature about cognitive styles (Adams, 1979; Bomberg, 1978; Canelos, 1980; Cooper, 1980), suggest the potential importance of using different learning strategies for different types of learners. These researchers state that field-dependent subjects can increase their knowledge levels and become

more analytical. Conversely, Bone (1978) reports a correlation between field-dependent subjects where elements are clumped, but not on regular or random display. In other words, Bone found insignificant changes in field-dependent subjects.

In terms of the development of analytical cognitive style, this knowledge of two selected teaching methods has given clearer direction in the planning of appropriate nursing programs at AISN. Knowledge about students' best method of learning provides useful information in relation to actual performance in the school of nursing, and provides evidence of a need to change teaching methodologies to fit learning patterns. With this in mind, it would seem appropriate to offer a choice of teaching methods. A sample of a pharmacology course that could be offered as a two- or three-hour credit is found in Appendix A. This new course could be set into motion by using the research to provide a definite need. A major goal of studies such as this one is to provide detailed information worthy of use, not only to the institution under consideration, but also to the educational process in general.

Recommendations

This study surveyed a sample of sixty-three subjects. Accurate generalizations could be based upon the statistical probability, with the exceptions and

contradictions taken into account. It appears that the study is generalized enough to forecast the future of which teaching methodology has special value in a course that has multiple objectives at the knowledge, comprehension, and application levels. This is important for material that is complex and technical because the learning process can be segmented into small conceptual units.

Students should receive feedback to small units of information. Attributes considered to be "essential" should be scrupulously identified and clarified, with instructional materials that are succinct and cogent. This study provides evidence that students can learn complex material when it is broken down into small parts.

Therefore, the recommendation based on the findings of the study is that additional research is necessary to determine further the potential significance of cognitive modes and implications upon levels of learning among nurses. Several areas for future research were generated from this study:

1. A longitudinal study could be established, using most of the same subjects, to discover whether or not long-term personalized student instruction or traditional method would affect retention of concepts.

2. Replicate this study using a larger sample of students to establish more meaningful comparisons between groups.

3. Further studies might focus on which population of students would benefit most from differing conceptual models.

Conclusion

The initial challenge of this inquiry was set forth by a review of literature where it was found that multiple investigators conceptualized various cognitive styles as most worthy of encouraging students to learn concepts. More specifically, this inquiry centered upon the possibility of increasing the level of learning by teaching traditional method and personalized student instruction. Although major changes are occurring in nursing education, curriculum and teaching methods must be examined to determine what is happening in the system of collegiate education, as a whole. Within nursing, examination of curriculum and teaching methods may determine whether or not learning is being facilitated.

As all productive research must be shared with the appropriate people, the following are suggested as possible methods of diffusion:

1. Results of the study will be shared with all peers during the regularly scheduled monthly faculty forum meeting.

2. Copies of the completed research will be placed in the faculty library and each library of the three

consortium universities, as well as the local hospital libraries.

3. A scholarly article will be produced and submitted to appropriate journals for publication.

4. A scientific speech will be developed using the data generated from this study. This speech may be presented to national, state, and local nursing and educational organizations. These implementations will allow interested individuals to become aware of results from the research.

5. The research is of specific use to AISN where there is a general concern about the problem of the students who enter from three different educational backgrounds to the consortium. Because of this uniqueness, the findings were made available to the enrichment counselor of AISN who then shared that information with students during their regularly scheduled tutorial sessions. Because the analysis revealed no one type of learning experience to excel over another for the field-dependent/field-independent students, the enrichment counselor directed each student to the compatible learning environment to promote change and improvement of educational practice.

Presently, perhaps because of the investigational spotlight shining on the problem, a part-time adjunct pharmacologist who holds a Doctor of Philosophy degree is offering short classes in the topic emphasized in this

study. In the near future, a more in-depth course may be offered.

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APPENDIX A

Development of Future Pharmacology Course

PHARMACOLOGY COURSE

THIS MODULE CONSISTS OF ONE SUBMODULE:

15.2.1 Introduction to Hormones and Therapeutic Hormones of the Pituitary Gland: Corticotropin, Somatotropin, Vasopressin, and Oxytocin

Hormones have physiologic interrelationships that control vital regulatory processes. Often these relationships are synergistic or antagonistic which allows for flexibility and control. The nurse must be aware of the delicate balance needed in drug therapy.

ENTRY KNOWLEDGE: N3650: Units I-XIV

REQUIRED READINGS:

Hahn, A., Barkin, R., & Destrich, S. Pharmacology in nursing, St. Louis: C. V. Mosby Co., 1988.

SUPPLEMENTAL READINGS:

American Society of Hospital Pharmacists. American hospital formulary service.

SPECIFIC PERFORMANCE OBJECTIVES:

15.2.1 Discuss the classification and specific prototype drugs administered for clients experiencing minor metabolic and endocrine dysfunction.

15.2.2 Explain the application of the AISN model of nursing practice in regard to drug administration for clients experiencing minor metabolic and endocrine dysfunction.

15.2.3 Compare the expected drug responses for the child, adult, and geriatric client including side effects and untoward reactions for clients experiencing minor metabolic and endocrine dysfunction.

PHARMACOLOGY COURSE - (cont'd)

SUBMODULE 15.2.1 - INTRODUCTION TO HORMONES AND THERAPEUTIC HORMONES OF THE PITUITARY GLAND: CORTICOTRIPIN, SOMATOTROPIN, VASOPRESSIN, AND OXYTOCIN.

NURSING IMPLICATIONS:

The student must understand the actions, uses, contraindications, side-effects, adverse effects, and drug interactions of the hormones of the body to responsibly administer these drugs and care for clients who receive them.

ENTRY KNOWLEDGE; N3650: Units I-XIV

REQUIRED READINGS:

Textbooks:

Hahn, A., Barkin, R., & Destrich, S. Pharmacology in nursing, St. Louis: C. V. Mosby Co., 1988. 821-828.

SPECIFIC PERFORMANCE OBJECTIVES:

Upon completion of this submodule, the student utilizing the AISN model of nursing will be able to:

15.2.1.1 Identify the importance of hormones within the human body and determine why they are administered therapeutically.

15.2.1.2 Identify the primary function, pharmacologic characteristics, therapeutic use, side effects, routes of administration, and length of action of the anterior pituitary hormone, corticotropin (ACTH).

15.2.1.3 Identify the effects, therapeutic use, action, side effects, and contraindications for the anterior pituitary hormone somatotropin (STH), the human growth hormone.

15.2.1.4 Identify vasopressin as an antidiuretic hormone secreted by the posterior pituitary, and identify its site of action within the body.

15.2.1.5 Identify conditions for which vasopressin is administered therapeutically, adverse reactions, routes of administration, and onset and duration of action.

APPENDIX B

Verification of Voluntary Participation

PARTICIPANT CONSENT FORM

Hello. My name is Jane Magee. As a requirement for completion of the doctoral degree in education at Nova University, I am conducting a research study concerning cognitive styles, and global or analytical methods of learning among nurses. The advantages of your participating in this research study are as follows:

1. You are contributing to the body of knowledge of nursing education research.
2. Thinking about different learning styles and participating in a research study may contribute to your personal growth and learning skills.

There is one booklet to consider. Also, if you are randomly selected to participate in the treatment group, there will be a two hour class to attend at Abilene Intercollegiate School of Nursing located at 1242 North 21st Street, Abilene, Texas 79601.

It will require approximately twenty minutes of your time to complete the booklet. Please do not write your name on the booklet because you are to remain anonymous. Only one person will read your answers, and after a set length of time, the booklet will be destroyed.

When completing the booklet, please respond exactly the way you think. There are no right or wrong responses; many people will answer the same way you do.

Please know that there are no physical or health tests involved in this study and no health services or compensation is provided by the university as a result of participating in this study. This study has no connection with your university education or profession, and your job or learning experiences will not be affected in any way, whether or not you choose to participate in this research study.

I will remain with you as you fill out your booklets and answer any questions if they arise. I will be the teacher conducting the pharmacology classes. You may stop and rest if you so desire, or you may stop participating if you choose.

Thank you for helping me with this study. If you want to know the results of it, you may contact me at 2610 Woodard, Abilene, Texas 79605.

_____ _____

Participant's Signature Date

_____

Researcher:
Jane Magee, R.N., M.S.N.
Assistant Professor
Abilene Intercollegiate School
of Nursing

APPENDIX C

Group Embedded Figures Test

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Information concerning this copyrighted instrument may be obtained from the following:

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577 College Avenue (P.O. Box 60070), Palo Alto, CA 94306 (415) 857-1444

Jane Magee
Assistant Professor
Abilene Intercollegiate School of Nursing
2610 Woodard St.
Abilene, TX 79605

In response to your request of June 20, 1988 (Date) permission is hereby granted you to

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APPENDIX E

Pharmacology Exam

PHARMACOLOGY EXAM

DIRECTIONS: Read each of the following items carefully. Choose the BEST option for each of the items. Place the letter of the option selected in the corresponding blank on the attached answer sheet.

1. The order reads i gtts OU BID. The nurse would place:

   a. one drop in each eye twice a day.
   b. one drop in the left eye every other day.
   c. one drop in the right eye twice a day.
   d. one drop in both eyes three times a day.

2. The order reads xylocaine spray to throat 30 minutes ac. The nurse would give this medication:

   a. after each meal.
   b. when the patient needs it.
   c. before each meal.
   d. before any treatments.

3. The order reads bedrest with BRP. This means the patient may:

   a. use the bedside commode only.
   b. ambulate to the bathroom.
   c. stand to void.
   d. only use a bedpan.

4. The order reads 500 cc RL TKO. This means to infuse the fluid:

   a. at approximately 50 cc every hour.
   b. over a twenty-four hour period.
   c. slowly, about 10 cc per hour.
   d. intermittently to keep the vein open.

5. The order reads iss ounce PO QID. The nurse gives:

   a. one-half ounce orally five times a day.
   b. one-half dram orally four times a day.
   c. One and one-half drams by mouth four times a day.
   d. one and one-half ounces by mouth twice a day.

Match the following drug agents with their appropriate drug category. Place the letter of the chosen option on the answer sheet in the blank corresponding to the number of

the drug agent. Each category may be used once, more than once, or not at all.

Drug Agents	Drug Categories
6. chlorpromazine (Thorazine)	A. central nervous system depressant
7. sulfamethoxazole (Bactrine)	B. antipsychotic
8. acetaminophen (Tylenol)	C. antihypertensive
9. phenobarbital	D. diuretic
10. rifampin	E. cardiac glycoside
11. flurosemide (lasix)	F. antihistamine
12. meperidine HCl (demerol)	G. antibiotic
	H. non-narcotic analgesic

13. Jenny is complaining of acute nausea. Which of the following generic drugs would be most useful in treating her symptoms?

    a. Dipyridamole
    b. Fulminate injections
    c. Promethazine
    d. Amytripoline

14. The drug procainamide (Pronestyl) is used in treating clients with:

    a. hypertension.
    b. Fulminate injections.
    c. psychiatric disorders.
    d. cardiac arrhythmias.

15. The most significant adverse effect of Pronestyl therapy is:

    a. bradycardia.
    b. nausea.
    c. anorexia.
    d. fever.

16. Haldol is used primarily for:

    a. control of postanesthesia seizures.
    b. management of psychotic disorders.
    c. reduction of intravestibular fluid.
    d. inducing sleep.

17. Nitroprusside (Nitride) is primarily used for:
    a. emergency treatment of shock states.
    b. reversal of narcotic effects on the CNS.
    c. maintenance of muscle tone in myasthenia gravis.
    d. treatment of hypertensive crisis.

18. If the physician wanted to use a drug that would increase the cardiac output and strengthen the heart contraction, he would probably choose:

    a. isuprel.
    b. lanoxin.
    c. atropine.
    d. nitroglycerine.

19. Mr. Jones is allergic to penicillin. Which of the following drugs has a cross-sensitivity with penicillin?

    a. Rifampin.
    b. Garamycin.
    c. Erythromycin.
    d. Cefazolin.

20. When applying nitrobid ointment, the nurse should:

    a. spread it thinly over the entire chest wall.
    b. place the measured dose on the upper thigh.
    c. use latex gloves to prevent contamination.
    d. avoid getting the ointment on her hands.

21. Kay Swartz is taking Catapress twice a day for her hypertension. When teaching her about the effects of this drug the following information should be included:

    a. take the drug as prescribed even if you feel well.
    b. the drug may turn the urine orange so wear panty liners.
    c. Include high potassium containing foods in her daily diet.
    d. take her pulse for a full minute before each dose.

22. Paula Grant is receiving Demerol 75 - 100 mg IM q. 2-3 h. PRN for pain. Which of the following side effects of Demerol is the most dangerous?

    a. Respiratory depression
    b. Pain of the infection site
    c. Sense of euphoria
    d. Urinary retention

23. Demerol and Phenergan are often given together. The primary reason this is done is because:

    a. demerol activates the nausea center in the brain and the phenergan blocks that action.

b. phenergan acts as a respiratory stimulant to prevent complications of suppression by the demerol.
c. the phenergan potentiates the action of the demerol making its effects last longer.
d. demerol is a mild analgesic and the phenergan increases its action in the central nervous system.

24. Which of the following nursing actions would be INAPPROPRIATE when monitoring a client receiving Dopamine?

a. Record hourly urine outputs.
b. Perform hourly neuro checks.
c. Check the blood pressure every 5-15 minutes.
d. Inspect the IV infusion site every 30-60 minutes.

25. Sue Ritter is admitted to the coronary unit with acute bradycardia, a rate of 36. Which of the following drugs is the drug of choice to correct this problem on a short-term basis?

a. Atropine sulfate
b. Verpamil
c. Lanoxin
d. Inderal

26. The most significant side effect of milk of magnesia use is:

a. constipation.
b. hypermagnesemia.
c. mild diarrhea.
d. abdominal cramping.

27. The effects of elavil are accomplished by the drug's ability to:

a. suppress activity in the reticuloendothelial system.
b. override depressive perceptions in limbic system.
c. inhibit the action of mon amine oxidase at the synapse.
d. increase the amount of neurotransmitter at the synapse.

28. Insulin is essential for adequate body functioning because it:

a. keeps glucose circulating in the capillary system.
b. assists transport of glucose into the cell for energy metabolism.
c. stimulates target organs to release stored glucose.
d. breaks down fats into sugar without development of toxic ketones.

29. Frankie takes her daily insulin at 7 A.M. If she takes 12 units Regular and 40 units NPH, when would you watch for hypoglycemic episodes?

a. Noon and eight PM
b. Eight AM and four PM
c. Ten AM and midnight
d. Two PM and two AM

30. Harold is taking coumarin 5 mg daily for phlebitis. Which of the following signs/symptoms would alert the nurse to a possible over-anticoagulation problems?

a. Paroxysmal tachycardia
b. Diuresis
c. Hematuria
d. Light-headedness

31. Lasix is an effective, rapid acting diuretic. It works by:

a. altering the action of aldosterone in the distal renal tubule.
b. accelerating the production of ADH in the juxtaglomerular tissue.
c. increasing the glomerular filtration rate by increasing cell permeability in Bowman's capsule.
d. inhibiting the reabsorption of sodium in the loop of Henle.

32. Ampicillin 500 mg is given to Patricia for a pulmonary infection. Which of the following signs/symptoms would indicate a severe allergic reaction to the drug?

a. Shortness of breath without wheezing.
b. Fine macular rash without pruritus.
c. A temperature of 100, orally.
d. Nausea without emesis.

I certify that I have read and am willing to sponsor this Major Applied Research Project submitted by JANE MAGEE. In my opinion it conforms to acceptable standards and is fully adequate in scope and quality as a Major Applied Research Project for the degree of Doctor of Education at Nova University.

3 May 1990
(date)

B R Herrscher
Barton R. Herrscher, Ed.D
MARP Advisor

I certify that I have read this Major Applied Research Project and in my opinion it conforms to acceptable standards for a Major Applied Project for the degree of Doctor of Education at Nova University.

8 May 1990
(date)

Anita G. Barrett
Anita G. Barrett, Ph.D.
Local Committee Member

This Major Applied Research Project was submitted to the Central Staff of the Programs for Higher Education of Nova University and is acceptable as partial fulfillment of the requirements for the degree of Doctor of Education.

May 21, 1990
(date)

Ross E. Moreton, Ed.D.
Central Staff Committee Member