DOCUMENT RESUME

ED 140 831 IR 004 936

AUTHOR [illegible]
TITLE To Test Whether Videotape Instruction Is More Effective for Learning than the Traditional Didactic Approach.
PUB DATE 5 Apr 77
NOTE 7p.; [illegible] Symposium, Nova University

EDRS PRICE MF-$0.83 HC-$3.50 Plus Postage.
DESCRIPTORS *Audiovisual Instruction; Criterion Referenced Tests; Instructional Technology; *Learning Theories; Post Testing; Pretests; Questionnaires; Student Characteristics; *Testing; *Undergraduate Study; *Video Tape Recording

ABSTRACT

This study was designed to provide Widener College with data to determine whether videotape instruction was more effective for learning than the traditional didactic approach. Thirty-one students, enrolled in the junior year of the baccalaureate program in nursing at Widener College, participated in the study. A criterion-referenced pre-test was given to the 31 students. Then the class was randomly divided into two groups. Fourteen students in Group A viewed the videotape on the Administration of the Denver Developmental Screening Test while 17 students in Group B received the same information by the didactic method. The students were given the opportunity to administer the Denver Test to a child in the clinical area. The two groups were given a posttest to measure learning gain. Both groups improved their scores on the posttest, although there was more of an increase in Group B than in Group A. Since both methods produced learning on the posttest, and the students seem to favor the videotape presentation, the videotape method with an instructor present for discussion appeared to be a viable method for this course. Recommendations are made for further study. (Author/EM)

TO DETERMINE WHETHER VIDEOTAPE INSTRUCTION IS MORE EFFECTIVE FOR LEARNING THAN THE TRADITIONAL DIDACTIC APPROACH

LEARNING THEORY AND APPLICATIONS

by

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EASTERN PENNSYLVANIA CLUSTER

A PRACTICUM PRESENTED TO NOVA UNIVERSITY
IN PARTIAL FULFILLMENT OF THE REQUIREMENTS FOR THE
DEGREE OF DOCTOR OF EDUCATION

NOVA UNIVERSITY

APRIL 5, 1977

E/I

ABSTRACT

This study was designed to provide Widener College with data to determine whether videotape instruction was more effective for learning than the traditional didactic approach. Thirty-one students, enrolled in the junior year of the baccalaureate program in nursing at Widener College, participated in the study.

A criterion-referenced pre-test (Appendix A and B) was given to the thirty-one students. All the subjects had an opportunity to read the Denver Manual for administering the Denver Developmental Screening Test. The criterion for the videotape and didactic instruction on the administration of the Denver Developmental Screening Test was given to the students prior to the pre-test. Diagnostic test items were referenced to specific desirable behavioral performance. The test was scored according to pre-defined levels, variously designated as mastery or ninety percent correct.

After the pre-test, the class was randomly divided into two groups. Fourteen students in Group A viewed the videotape on the Administration of the Denver Developmental Screening Test while [illegible] students in Group B received the same information on the Denver Test by the writer using the traditional didactic method. The students were given the opportunity to administer the Denver Test to a child in the clinical area. The two groups were given a post-test to measure learning gain. The videotape on "The Denver Developmental Screening Test" was made available to all students to view after the post-test.

None of the fourteen subjects in Group A achieved mastery level or ninety percent of the items correct on the pre-test, while four subjects in Group B answered ninety percent of the questions correct on the pre-test. The highest score on the pre-test in Group A was 92, while the highest score in Group B was 92. The lowest score in the pre-test in Group A was 57 and in Group B, 27.

On the pre-test, Group A had a range of 28 and a mean of 73.07, while in Group B, the range was 65 and the mean was 60.82 (Table 1). The difference between the ranges for Group A and B on the pre-test was 37, while the difference between the means for the two groups was 12.25. It appeared that although the groups were randomly divided, the two groups were not similar on the pre-test.

On the post-test, Group A had a range of 19 and a mean of 92.21, while in Group B, the range was 46 and the mean was 88.29 (Table 1). The difference between the ranges for Group A and B on the post-test was 27, while the difference between the mean for the two groups was 3.92. Group A, those who viewed the videotape was more homogenous than Group B.

Both groups improved their scores on the post-test. There was more of an increase in learning in Group B, those who received the didactic method of instruction than in Group A (Table 1).

Since both methods, the videotape and the didactic approach produced learning on the post-test (Table 1) and the students seem to favor the videotape presentation (Table 7), the videotape method with an instructor present for discussion appeared to be a viable teaching method for this one nursing course at the Center of Nursing at Widener College.

The participants were given a questionnaire on the effectiveness

on Administering the Denver Test at mid-term evaluation [illegible]. Student characteristics such as interest, attitude, opinion [illegible] experiences with administering the Denver Test were assessed.

All of the participants felt capable in administering the Denver Test. Ninety percent of the subjects perceived themselves to be competent in administering the Denver Test to a child; Ninety percent indicated that it was of absolute importance for the nurse to develop skill in administering the Denver Test; Seventy-six percent of the subjects in Group B voluntarily viewed the videotape when given the option, while none of the participants in Group A took this opportunity; Fifty-eight percent of the respondents indicated that they preferred the videotape as a method of learning, while forty-one percent preferred the didactic approach; and Only nine percent of the subjects indicated reasons for having difficulty in administering the Denver Test.

It was recommended that: (1) The videotape on the Administration of the Denver Developmental Screening Test be utilized by pediatric nursing students to view in their leisure time in the library; (2) The study should be repeated, using a larger sample so that an expectancy table can be developed for predicting achievement of future students; (3) A control study should be done to see if one or both met[illegible]ng increased learn[illegible] statistical method such as the T - Test should be done to show if there was a significant difference between the two groups; (5) The Dean of Nursing and the Curriculum Committee at Widener College should study the present nursing curriculum and implement the criterion-referenced format for future nursing classes and testing; (6) Further funds should be sought to purchase or produce audiovisual aids; (7) Follow-up studies of the

success of the criterion-referenced objectives in conjunction with the use of audiovisual aids at the Center of Nursing at Widener College should be periodically made.

TABLE OF CONTENTS

LIST OF TABLES

CHAPTER I

INTRODUCTION

In informal discussions with nurse-faculty and the Dean of nursing at Widener College, there seemed to be a growing concern to provide individualized learning experiences for nursing students. According to the majority of nurse-faculty, in the present baccalaureate program in nursing at Widener College, there is a lack of true individualization, even when students are encouraged to pace themselves.

The important implications are to recognize that learning is an internal process and that those methods and strategies which involve the nursing student in her learning more deeply in self-directed inquiry will produce the greatest learning experiences (Diers, 1972). Therefore, according to nurse-faculty and nursing administration at Widener College, the nursing student should be helped to: (1) self-diagnose their own needs; (2) formulate their own objectives for learning; (3) share in the responsibility for designing and carrying out their learning activities; (4) evaluate their own progress toward their objectives, and then (5) re-evaluate their needs, thereby promoting a continuous self-directed inquiry.

The problem was to determine if the videotape instruction was effective as a teaching tool as compared to the traditional didactic approach to learning.

The following is a discussion on the significance of the practicum to Widener College.

This study was being undertaken because according to most nurse-faculty, the majority of nursing classes taught at the Center of Nursing at Widener College, lack the use of audiovisual aids as a teaching method utilized for the nursing students' learning. A part of the problem was the lack of funds to purchase audiovisual materials. Also, the nursing faculty seem to feel that there is no time in their schedules to develop individualized teaching methods such as minicourses within a course, audiovisual materials as the videotape, or individualized programmed instruction.

On recent course evaluations, nursing students have commented that they wanted more audiovisual materials to be used by the nursing faculty as an adjunct to their learning experiences instead of the pedagogical approach. The students have expressed that they would like to be exposed to various teaching methods such as listening to tapes and viewing filmstrips in their leisure time instead of the formal lecture approach to the teaching of nursing.

Many of the nursing instructors at Widener College commented that the use of tapes, filmstrips, and the like can relieve them of much repetitive teaching, such as demonstrations that must be repeated over and over again for small groups. The use of appropriate audiovisual materials for this purpose, however, would provide each student with a front-row seat, while the teacher would be released for interaction with students, research, counseling, and study.

Faculty have suggested that if we had more audiovisual materials

they would have them available around the clock, for students to utilize them at night, on weekends or whenever they wish. The rapid learner could quickly complete a unit or a course, take the required examinations, and go on to the next subject area. The slow learner would be given the opportunity to go over the same material many more times to achieve the same educational objectives. In both instances, each student would proceed at her own pace.

Faculty will be requesting availability of funds to develop or purchase audiovisual materials as one method to individualize the students' learning experiences. Also, administration has expressed that they will be encouraging the development of such a learning tool as well as their utilization by nurse-faculty.

The nursing faculty seem to feel that by providing more independent study and incorporating the use of a variety of instructional media would keep the bright student stimulated, facilitate the educational process for the slow learner, and put the emphasis where it should be, on the actual learning, the end product, rather than on the mechanics (hours and classes) whereby it is achieved. The nursing faculty indicated that they would be still available for small and large group discussions, as well as for individual conferences during the student's independent study experience.

There are study carrels in the library at Widener College, but they would have to be equipped with all kinds of hardware and software such as projectors, audiocassettes, and other audiovisual equipment.

It is the feeling of the nursing faculty and administration at Widener College, that since the nursing program is different because it has a clinical component, there would be a definite need for a more

effective method to individualize student learning than the present use of audiovisual aids, in particular, television and videotape, to be used for teaching in the clinical situation.

Also significant to Widener College is the development of the registered nurse program to be implemented in the Spring, 1977. One of the major concerns expressed by administration and nursing faculty was the problem of providing individual learning experiences for the registered nurse student since she has had basic nursing courses in her curriculum. The registered nurse student would have the option to challenge the nursing course. If the registered nurse student chose not to challenge the nursing course or if she took the challenge examination and failed, then she would be required to take the course. Since the registered nurse has been exposed to the nursing material previously in her educational background and experiences, the nursing faculty suggested that it may be educationally unstimulating if the traditional method of teaching would continue to exist in the baccalaureate program of nursing at Widener College.

Little has been reported concerning the use of videotapes in education, particularly when used through the dial access. In a report by Wandt and Butts (1962) of five studies in which videotapes were substituted for live lectures, either no significant difference was found or, as in another study conducted with a control group, the live instructor achieved results superior to the inanimate videotape. In a University of Wisconsin (1970) report about a method of continuing education in nursing which utilized a direct dial videotape library, evaluation was accomplished by counting the frequency of calls according to their place of origin, time of day, and the professional status of

the caller. [illegible] ide to estimate knowledge gain . When Smith (19[illegible] ia presentations, the res[illegible] dicated that repe[illegible] methods was useful to stu[illegible] rning.

Pertinent to the effects of the videotape-access on academic performance, Hochbaum (1960) pointed out that to effect changes necessary to meet stated objectives, the changes cannot be reciprocal and cannot be made at the expense of another essential activity, i.e., change must be additive.

Today, communication, teaching, and learning have been greatly facilitated by an array of electronic media, such as the radio, telephone, and television. As a result, the great teachers may very well become those who can create the best learning environment for each student by arranging a series of learning opportunities to meet each learner's individual needs and capacities and then stimulate him to learn in his own way, at his own speed. The newer instructional media-moving visual and audiovisual media (film, television), computers (CAI), and human resources (teachers and peers) can play an important role in the process (Koch, 1975).

Television is profitable only when it improves instruction (Roth and Price, 1971). The television medium has certain characteristics and capabilities that set parameters for its use. Roth and Price believe the decision to use the television media over more conventional forms of instruction should depend upon two conditions: existing methods of instruction have not produced desired learning in the majority of students in a class, and the designated subject matter needs the singular asset of the television medium.

- Evaluation of learning outcomes is inherent in the instructional

process. The requirement is for assessment of what has been learned, as measured in reference to pre-specified criteria. Such measurement data permit absol ion of the nature of the behavior and level of per t ion-referenced test", (Glaser, 1963), is one that is deliberately constructed to yield measurements that are directly interpretable in terms of specified standards. A criterion standard, rather than relative position in a norm group, is used for describing test performance. Thus the outcomes of learning measured at any point in the instructional sequence are referenced to and evaluated in terms of competence criteria (i.e., specific performance behavior) to be developed. The interpretation or meaning of the criterion-referenced test score must be related semantically to the behavior of the individual measured, not (as in the practice in norm-referenced testing) to the test scores of other individuals. Guidelines basic to the development and interpretation of achievement or performance tests are summarized (Glaser and Nitko, 1971); (a) the generation of items from statements of educational objectives; (b) interpretation of a test score in terms of norms referenced to the scores of other examinees; and (c) interpretation of test scores so that they have meaning beyond the performance sample actually assessed and so that test scores can be generalized to the performance domain that the test subset represents.

All of these tests are ideally suited to the criterion-referenced method, the crucial point being that they were constructed or developed according to the principles apertaining. Popham and Husek (1969) and Glaser (1967) distinguish between criterion and normative-referenced tests by using the synonymous terms, "mastery", for the former, and "general achievement test", for the latter. Livingston

(1972) further delimited the term, "criterion-referenced test", but his emphasis on the scores, not the content or format of the test. Achievement is measured in levels, mastery and developmental, without concer the relative achievement of students. Gronlund (1973) ferent levels of learning (e.g., "mastery level" -- inimum essentials, and "developmental level" -- level of excellence beyond the mastery of minimum essentials).

Mauksch (1972) charged that the present socialization process in educational settings is not developing nurses capable of becoming autonomous, self-directed practitioners. Diers (1972) stated that our educational systems train out qualities of independence and abstraction in nursing students. Also, nursing students complain that their needs are not being met; that their learning experiences are not relevent to their attainment of goals. They question how their goals can be met in the thwarting climate characteristic of so many nursing educational settings (Litwack, 1971).

Significant learning takes place only when the subject matter is perceived by the learner as having relevance for personal purpose (Wolf and Quiring, 1971). They conclude that it is feasible to expect all learners to succeed in programs provided intrinsic and extrinsic learning variables are utilized to meet individual learners' needs. They identified intrinsic variables to the learning process as aptitude, perseverance, and the ability to understand instructions; the extrinsic variables as opportunity for learning and quality for instruction.

The purpose of this practicum was to determine whether videotape instruction was more effective for learning than the traditional didactic approach.

The following is a general description of the method of investigation.

(1) A criterion-referenced pre-test (Appendix A & B) was given to thirty-six baccalaureate nursing students, now in the last semester junior year in pedi[illegible]sing, to assess the level of [illegible]nd skill in [illegible] the Denver Developmental Screening Test. After the pre-test, the students were randomly divided into two groups. Group A viewed the videotape on the Denver Developmental Screening Test while Group B received the same information on the Denver Test by the writer using the traditional form of instruction, the didactic method. A post-test was given to the two groups to measure learning gain (i.e., behavioral change as demonstrated by achievement beyond the pre-instructional level).

(2) At mid-term evaluation the pediatric nursing students in the study were given a questionnaire on the effectiveness on administering the Denver Developmental Screening Test. Student characteristics such as interest, attitude, opinions and experiences with administering the Denver Test were assessed (Appendix D).

(3) The resulting data identified from the criterion-referenced pre-test and post-test (Appendix A and B) and the questionnaire on the effectiveness on administering the Denver Test (Appendix D) were shared with the nurse-faculty, nursing administration, and the Nursing Curriculum Committee at Widener College.

CHAPTER II

BACKGROUND AND SIGNIFICANCE

The significance of this study was to meet the following goals: (1) to determine whether [illegible] instruction was more effective for learning than the traditional didactic approach; (2) to use the criterion-referenced test data to provide information to base adaptive instructional decisions, especially if the students achieved below the mastery level or ninety percent; and (3) to determine if test scoring would reflect individual learning and achievement as concerned knowledge and skill, without regard for relative achievement of students in the class.

Dale (1966:108) stated that the purpose of education and the

> Goal of all learning is to develop the independent learner, the mature individual who no longer needs the protective counsel and guidance of the school or college. The aim is to decrease dependent learning and increase independent learning.

Cohen (1969:37) said, "The true end of all instruction is to help all students learn how to think." Education is also defined (Thelan, 1961) as the process of participating in inquiry under such conditions that one learns to inquire more effectively. Burton (1962:55) described the ideal learning situation as one in which "a pupil is placed in a situation where he needs to know or to acquire some skill he needs and sees that he needs."

Bruner (1966:127) said,

> The will to learn is an intrinsic motive, one that finds both its source and its reward in its own extrinsic exercise. The will to learn becomes a problem only under specialized circumstances like those of a school, where a curriculum is set, students confined, and a path fixed.

The key to individualization of instruction and learning is positive reinforcement of successful learning experiences and appropriate practice throughout the learning sequences (Hutchins, 1968). Carroll (1973:723-733) defined quality of instruction in terms of "the degree to which presentation, explanation, and ordering of elements are individualized. The learner must be shown how to use his intellectual resources effectively." Lee (1966) viewed the teacher as a manager of learning. In addition to having a basic knowledge of his subject, he must also become a specialist in designing instructional materials which allow individuals to progress at their own rate. The primary role of the teacher is to encourage and facilitate independent study.

Tyler (1950) suggested four major components of a system: (1) statement of objectives, (2) criterion we are willing to accept as evidence of achievement of objectives, (3) learning experiences selected to meet objectives, and (4) final evaluation and revision procedures.

Cohen (1969:22) defined an objective as "a concrete criterion of achievement measureable in terms of overt behavior." Mager (1962:31) amplified this definition,

> An objective is an intent communicated by a statement describing a proposed change in a learner, a statement of what the learner is to be like when he has successfully completed a learning experience.

It is a description of a pattern of behavior (performance we want the learner to be able to demonstrate.

Esbensen (1967) suggested that instructional objectives not be limited to specific teaching procedures. He argued that objectives should be stated in terms that permit the use of various teaching procedures.

[illegible] instructional units may lose [illegible] if they offer only traditional, symbolic sets of readings. True, learning rates would be more flexible, and objectives would be stated in behavioral terms. But the low-abstract learner would still be little encouraged or assisted. An instructor can provide variety in learning styles in in self-instructional units. A sequence that might feature a series of sound slides, a filmstrip, a taped lecture, or a step-by-step illustrated experiment, might be optimal for low abstract-ability students. The greater the variety, the more closely the teacher approaches optimal learning sequences for all students (Rouecho, 1972).

Unfortunately Gallup (1974:129) was quite right when he observed that

> Dull lectures can follow dull lectures like dominoes; grading on a curve can occur ad infinitum; students can be bored in a lock-step system; all manner of inefficient and perhaps harmful teaching can take place. And if such teaching is part of the status quo it goes unchallenged, except perhaps by a few alienated students. The innovator does not go unchallenged.

Although there is evidence that educators recognize the problems inherent in the traditional curriculum (Cross, 1973), making changes in curricular content is surely the most difficult of all innovations. There are no graduate schools turning out faculty members

prepared to think with sophistication about the teaching of undergraduates. There is no reward structure to recognize the extensive effort that goes into preparing current and challenging materials. Innovators and their innovations are usually imposed upon a system that is ill-prepared to accommodate

[illegible] have found creative solutions to curricular reform.

While we do not yet know about individualistic learning styles to be able to prescribe strategies that will maximize learning for a given person, it is clear that we need to give more attention to offering pluralistic alternatives. Bruner (1966:71) stated,

> The fact of individual differences argues for pluralism and for an enlightened opportunism in the materials and methods of instruction..... A curriculum, in short, must contain many tracks leading to the same general goal.

According to Tickton (1970:21), the familiar definition of instructional technology recognized by the Commission considered instructional technology to be "the media born of the communications revolution which can be used for instructional purposes alongside the teacher, textbook, and blackboard." The Commission found that the use of the new instructional tools which technology has provided has not yet been particularly successful. This was due to the fact that the new tools have simply been added to the program without utilizing the new process.

The recent Carnegie Commission on Higher Education (1972:2-3) indicated that one of the strongest benefits of instructional technology was that "it increases the opportunity for independent study and gave the student more options as to the method, time, place, and

rate for his learning." It should be pointed out that traditional methods in no way assure humanization. As cost pressures increase it is very likely [illegible] without te[illegible] [illegible] ing meth[illegible] [illegible] become [illegible] person[illegible] because of the necessity to increase class size.

Postlethwait (1969:25) reported that "grades, for example, have improved, efficiency in space and equipment utilization has risen significantly, staff effort has been directed to specific student needs, and it has been possible to cover more subject matter in far less time." Such gains are difficult to produce and require time for development and revision.

The Carnegie Commission on Higher Education (1972) has suggested that technology can contribute to improve learning, especially in small colleges, through the greater variety of course offerings and wider range of learning resources it can make available. The Commission recognized that technology can give students "access to presentations by exceptionally talented and knowledgeable teachers who live and work great distances from the students' campus", Carnegie Commission on Higher Education (1972:76), and it "gives students a more self-reliant role in their own education", Carnegie Commission on Higher Education (1972:45).

Productive instruction must be a concern of the small college for we cannot justify inefficient use of funds. Many forms of technology involve great costs and any forms of it are probably more expensive initially. There are ways to use technology to save money, particularilly if such an aim is built into the program. This was the conclusion of the Carnegie Commission on Higher Education (1972:3)

"the n tional ogy will eventually reduce
vels g methods alone, but, in
s t will only increase costs."

In the context of behavior therapy, London (1972) had contrasted operant theory with its technology. He suggested that the technology should no longer be restrained by theoretical limitations; technology may improve theory.

On instructional media, Koch (1975:30) found that, "After watching tapes of themselves, students can often diagnose their problems with remarkable skill and judgment. This technique changes the role of the instructor from one who criticizes to one who supports and validates..."

Shaffer (1976) found television instruction to be a reality as it provided a patterned sequence of learned actions which helped students and faculty for their new roles in nursing. It provided more learning in less time for it had the unique features of instant playback, repetition, control, and erasibility.

Most students rebel against rigidity, but many times these same students cannot survive situations that appear unstructured. Because students were free to proceed at their own pace, some felt that they were not receiving the same guidance they would have had if the material was required as a weekly homework assignment. Some faculty members had difficulty developing or using effective teaching methods in new situations. Like the students, they felt that the environment was unstructured as a handicap to effective learning (Marshall, 1974).

The adoption of the criterion-referenced approach to evaluation raised two measurement issues that have relatively less importance in

norm-referenced testing. These could be broadly stated as the issue of the definition of mastery, and the issue of a priori standards. Rigorous exploration of these to date has been quite minimal (Davis, 1974).

Some writers have viewed mastery in terms of a continuum of skill ranging from none to perfection. A test based on this view sought to describe the learner's position along a scale that parallels the learner's achievement at a particular point in time. Ebel (1971:282) described this type of scale as follows,

> In criterion-referenced measurement the scale is usually anchored at the extremities, a score at the top of the scale indicating complete or perfect mastery of some defined abilities. The scale units consist of subdivisions of this total scale range.

At higher level of complexity, a continuum model with a ratio-scale definition of the intervals has been proposed by Kriewall (1972: 10),

> ... suppose that student "A" has completed some phase of work with respect to learning objective, "K" (LO_k). Further imagine that we require the student to respond to all items in the population of items defined by LO_k. The proportion of items to which the student exhibits a correct response is a measure of his proficiency.

Test designations beyond the major classification, normative and criterion-referenced, are based on the particular instructional use for which they are designed to serve. Hence such categories are not representative of either criterion or normative-referenced tests, but both. To illustrate (Gronlund, 1973:24),

1. To measure prerequisite knowledge and skills needed to begin a unit of instruction (pretest).
2. To measure progress in the development of knowledge and

skills during a unit of instruction (formative test).
3. To locate learning difficulties and to clarify the nature of the difficulties during a unit of instruction (diagnostic test).
4. To measure the learning outcomes of a unit of instruction (summative test).

The major advantage of the use of criterion-referenced tests lies in the ability to identify more concretely what knowledge and what skill a student has mastered and what remains to be learned. The latter, then, in terms of desirable goals or outcomes, can be the focus of the instructional content. Properly conceived and utilized as a basis for instructional decision-making (in effect, a curricular road map), tests would then blend into the subject matter and become indistinguishable as separate entities or components of the course. That these and other benefits are inherent in criterion-referenced tests (in contrast to the norm-referenced test which yields a single global score reflecting achievement over the domain of instruction), few would argue. However, scholars of test and measurement who would take issue find some basis, in fact, with the validity and reliability of criterion-referenced tests. Proponents of the theory themselves recognize these. Novick (1974) affirmed that, since statistical measures of reliability and validity are typically expressed by means of correlation coefficients, requiring as they do variability in test scores, such statistical measures are inappropriate. Score variability need not be present in criterion-referenced mastery tests where all students may get a perfect score. No satisfactory statistics have yet been developed by which to estimate the validity and reliability of these tests. Accordingly, Gronlund (1973: 54) addressed himself to this and other precautions of this relatively new testing theory,

> Since there is little theory or research to guide the practitioner, the problem of adequately defining a domain of behavior, of obtaining a representative sample of learning outcomes, and of constructing relevant test times can be dealt with only in an approximate manner. Similarly, until a more adequate basis for determining standards becomes available, the setting of standards of performance must depend largely on the arbitrary judgment of the teacher.

The problem pertained to the Learning Theory and Applications Module since a fundamental knowledge and understanding of major theories of learning was necessary to complete the module as well as acquiring new techniques for the management of learning such as the effectiveness of the use of the videotape as compared to the traditional didactic approach. It was while investigating the feasibility of utilizing the videotape versus the didactic approach to learning at Widener College that the writer identified the problem for this practicum, which was, to determine whether videotape instruction was more effective as a teaching tool as compared to the traditional didactic approach to learning.

CHAPTER III

PROCEDURES

An extensive survey of literature was done in the following areas: (1) Various techniques for the management of learning; (2) The effectiveness of different teaching approaches; and (3) The use of criterion-referenced pre-testing.

A criterion-referenced pre-test (Appendix A and B) and a questionnaire (Appendix D) were developed to determine whether videotape instruction was more effective for learning than the traditional didactic approach that this project was designed to produce.

For a broad representative sampel, thirty-six pediatric nursing students, in their last semester of their junior year, in the baccalaureate program of nursing at Widener College, were asked to participate in the study. All subjects participated voluntarily in the study that was designed to: (1) Assess the student's level of knowledge and skill in administering the Denver Developmental Screening Test; (2) Measure the learning gain which occurred following completion of the criterion-referenced pre-test (Appendix B) on the Denver Test; and (3) Determine the effectiveness of the videotape presentation on the Denver Test for learning as compared to the traditional didactic approach.

It was felt by the writer that thirty-six subjects would be sufficient to obtain adequate data concerning the effectiveness of the videotape as compared to the didactic approach.

All nursing participants successfully completed one module on fundamentals of nursing. In addition, the subjects completed one of the following modules; medical-surgical nursing or obstetric nursing. Thus, the administration of the Denver Developmental Screening Test was not studied previously. Since no prior testing was done solely in this area, it was not possible to compare past and present achievement of the participants.

A criterion-referenced pre-test (Appendix A and B) was given to thirty-six baccalaureate nursing students, now in the last semester of their junior year in pediatric nursing. All subjects had the opportunity to read the Denver Manual for administering the Denver Developmental Screening Test. The criterion for the videotape and didactic instruction on the Denver Developmental Screening Test was given to the students prior to the diagnostic pre-test. Diagnostic test items were referenced to specific desirable behavioral performance. The test was scored according to pre-defined levels, variously designated as "mastery" and "developmental." All students who failed to achieve at the mastery level of competency or who did not answer correctly ninety per-cent or more of the items, were given the option to view the videotape, "The Denver Developmental Screening Test", which the writer developed and produced.

The criterion-referenced test information was checked for validity by the Dean of nursing and the pediatric nursing faculty. After minimal revision, the Dean of nursing and the pediatric nursing faculty indicated by their responses that the objectives (Appendix A) and pretest (Appendix B) were clear and not ambiguous. The results of the criterion-referenced test information indicated how students

performed on both methods of instruction; i.e., the traditional didactic approach and the videotape presentation.

The thirty-six subjects were randomly put into two groups. Every subject had an equal chance of doing well on the pre-test. The subjects were assigned to the groups at random by using a table of random numbers. If the odd number turned up, the subject was assigned to Group A, and if the even number turned up, the subject was assigned to Group B. It was assumed by the writer that the two groups were approximately equal in all possible variables. The investigator had used the principle of randomization to equalize the groups.

After the pre-test was given, five out of thirty-six students informed the writer that they did not receive the criterion-referenced objectives prior to the pre-test. In order to meet the criteria of the study, the five subjects were excluded from the sample. Therefore, only thirty-one subjects, fourteen in Group A, those who viewed the videotape on the administration of the Denver Developmental Screening Test, and seventeen in Group B, those who received the same information on the Denver Test by the writer using the traditional form of instruction, the didactic method, were utilized in the study.

After the two groups were given information on administering the Denver Developmental Screening Test through use of the videotape and the didactic method of instruction, the students were given the opportunity to administer the Denver Test to a child in the clinical area for two days. The two groups were given a post-test to measure learning gain (i.e., behavioral change as demonstrated by achievement beyond the pre-instructional level).

The videotape on "The Administration of the Denver Developmental

Screening Test", was made available to all students to view after taking the post-test.

At mid-term evaluation, the participants were given a questionnaire on the effectiveness on administering the Denver Developmental Screening Test (Appendix D). Student characteristics such as interest, attitude, opinions and experiences with administering the Denver Developmental Screening Test were assessed. Decisions as concerned the instructional plan would be made accordingly.

A validity check was done on the questionnaire (Appendix D). The Dean of nursing, the pediatric nursing faculty, and faculty other than in nursing reviewed the questionnaire. After revising the questionnaire, the Dean of nursing and faculty's responses indicated that the questionnaire was clear and not ambiguous.

Because of the limitation of time for the study to be completed, the writer did not do a check on the reliability of the questionnaire which could be a possible source of error. No procedure for estimating reliability of the questionnaire was done.

Diagnostic test items (Appendix B) were limited to those concerned with administration of the Denver Developmental Screening Test and these were referenced to specific behavioral criteria (Appendix A). The test was scored according to a pre-defined level, 90 Percent correct having been arbitrarily set for mastery (i.e., minimal achievement of stated objectives). In designing the test, related items were grouped together sequentially. This arrangement facilitated subdivision of content into several areas, thereby enabling interpretation of relative achievement in the various areas and gaining information concerning the degree of difficulty experienced by participants in each of these. No

attempt was made to construct test items of varying difficulty since difficulty of items in a criterion-referenced mastery test (versus a test at the developmental level) is determined by the nature of the learning tasks to be measured. At the mastery level of testing, it was expected that the participants would have achieved perfect or near perfect scores when the method(s) of instruction had been effective.

The pre-test on the Denver Developmental Screening Test (Appendix B) consisted of twelve items, open-end and closed-end questions concerned with the administration of the Denver Test. The number of questions on the pre-test were kept to a minimum, twelve in number, for the purpose of arousing interest in the participant to complete the test and for the investigator to obtain data.

It was intended that all of the stated objectives in the criteria (Appendix A) for the administration of the Denver Developmental Screening Test be included in the pre-test (Appendix B), since the participants would be directly involved with each of the criterion-referenced objectives in the administration of the Denver Test to a child.

The questionnaire on the effectiveness on administrating the Denver Developmental Screening Test (Appendix D) was developed to determine the following: (1) The feelings and experiences of the participants in administrating the Denver Test; (2) If the subjects liked pediatric nursing as a subject; (3) To determine the participant's academic achievement in previous nursing courses; (4) If the participant felt comfortable in administering the Denver Test to a child; (5) To determine the method(s) of learning the subject received; (6) To determine which method, the videotape presentation or the traditional didactic approach, was preferred by the participant and the reason for

the choice; (7) To ascertain the likes and dislikes of each method of learning, the videotape or didactic approach; (8) To ascertain those factor(s) which contributed to the participant's mastering the administration of the Denver Developmental Screening Test; and (9) To determine the participant's understanding of the importance for the nurse to develop the skill in administering the Denver Test.

On the questionnaire (Appendix D) the participant was asked to check one of the following responses, relating to the subject of pediatric nursing; whether she really enjoyed the course, did not enjoy the course, or if she had no strong feeling one way or another. A check mark was indicated for one of the following responses relating to the participant's achievement in previous nursing courses; poor, average, above average, or excellent.

To determine how the respondent felt in administering the Denver Test, the participant was asked to check one of the following responses; adequate, inadequate, or competent.

One question concerned the method of learning the participant received on administering the Denver Test. The respondent was asked to check the method(s) of learning received: the videotape, the didactic approach, or both methods of instruction, the videotape and the didactic approach.

Another question pertained to the learning method(s) liked best by the participant: the videotape, the didactic approach, neither method, or don't know. The participant was asked to check the preferred method of learning.

The respondent was asked to check which method of learning they liked best and the reason; the videotape presentation, the didactic

approach, or neither method.

If the respondent received only one method of learning, a question was asked if another method of learning would have been preferred. The respondent was asked to check either a "yes" or "no" response. If a "yes" response was indicated, the participant was asked to explain the reason for choosing the preferred method.

One question required the respondent to indicate the likes and dislikes of each method of learning received. Another question required the participant to list those factors which contributed to his difficulty, if any, in mastering the administration of the Denver Developmental Screening Test.

Another question related to the importance of the nurse's need to develop skill in administering the Denver Developmental Screening Test. The participant was asked to check one of the following responses: minimal, moderate, or absolute.

The data consisting of the pre- and post-instructional test scores were tabulated and presented graphically to bring into comparison the relative achievement of each group, on each test. The pre- to post-instructional learning gain for each participant was computed and rank ordered by percent of items answered correctly.

The writer has identified the following limitations in the study: (1) Since there were only thirty-one out of thirty-six subjects who received the objectives for the administration of the Denver Developmental Screening Test prior to the pre-test, the sample size was small; (2) The sample consisted only of baccalaureate nursing students at Widener College; (3) It appeared that although the subjects in Group A and B were randomly assigned, the groups were not as similar as

was expected; (4) The writer did nor include a correlation study of the pre- and post-tests to show that the instruments were really reliable parallel forms; (5) A control study was not done to see which method of learning, the videotape presentation or the didactic approach, increased learning gain on the post-test; (6) There is little research evidence to support the attainment of ninety percent mastery level on the post-test; and (7) There was no reliability check on the questionnaire.

For purposes of this investigation, the writer assumed the following: (1) All the subjects would have been given the criterion-referenced objectives prior to the pre-test; (2) The majority of participants would have obtained the mastery level of ninety per-cent of the items correct on the post-test; and (3) All the questionnaires returned in the study would be completed in an honest manner.

CHAPTER IV

RESULTS

In this study on determining whether videotape instruction was more effective for learning than the traditional didactic approach, thirty-six students, in the last semester of their junior year, studying pediatric nursing, in the baccalaureate program of nursing at Widener College, were given a criterion-referenced pre-test (Appendix A and B) and a questionnaire on the effectiveness on administering the Denver Developmental Screening Test (Appendix D).

The thirty-six subjects were randomly divided into two groups. Every subject had an equal chance of doing well on the pre-test. The subjects were assigned to the groups at random by using a table of random numbers. If the odd number turned up, the subject was assigned to Group A, and if the even number turned up, the subject was assigned to Group B. It was assumed by the writer that the two groups were approximately equal in all possible variables. The investigator had used the principle of randomization to equalize the groups.

After the pre-test was given, five out of thirty-six students informed the writer that they did not receive the criterion-referenced objectives prior to the pre-test. In order to meet the criteria of the study, five out of thirty-six subjects were excluded from the sample. Therefore, only thirty-one subjects, fourteen in Group A, those who viewed the videotape on the administration of the Denver Developmental

Screening Test, and seventeen in Group B, those who received the same information on the Denver Test by the writer using the traditional form of instruction, the didactic method, were utilized in the study.

The highest grade for fourteen students in Group A, those who viewed the videotape was 85 on the pre-test and 100 on the post-test. The lowest grade on the pre-test was 57 and 81 on the post-test. The range was 28 on the pre-test and 19 on the post-test. The five highest ranking students had grades of 85, 85, 84, 82, 79 on the pre-test and 100, 100, 100, 98, 97 on the post-test. The lowest ranking students had grades of 37, 61, 61, 63, 69 on the pre-test and 81, 82, 83, 86, 90 on the post-test. None of the fourteen students received grades of 90 or higher on the pre-test while on the post-test, there were ten students who achieved a grade of 90 or higher. The number of students receiving grades of 70 or lower on the pre-test was five while all of the students achieved above 70 on the post-test (Table 1).

The mean for Group A on the pre-test was 73.07, more than 16.93 percentage points below mastery level or 90 percent correct. On the post-test, the mean was 92.21 or 2.21 percentage points higher than mastery level or 90 percent correct (Table 1).

The highest grade for seventeen students in Group B, those who received the didactic instruction was 92 on the pre-test and 100 on the post-test. The lowest grade on the pre-test was 27 and 54 on the post-test. The range was 65 on the pre-test and 46 on the post-test. The five highest ranking students had grades of 92, 92, 92, 90, 88 on the pre-test and 100, 100, 98, 96, 96 on the post-test. The five lowest ranking students had grades of 27, 33, 37, 38, 45 on the pre-test and 54, 75, 83, 84, 86 on the post-test. The number of students receiving

grades of 90 or higher on the pre-test was four, while on the post-test, there were seven. The number of students receiving grades of 70 or lower on the pre-test were eleven, while on the post-test, there was one (Table 1).

The mean for Group B on the pre-test was 60.82, more than 29.18 percentage points below mastery level or 90 percent correct. The mean for the post-test was 88.29, more than 1.7 percentage points below mastery level or 90 percent correct (Table 1).

Table 1

Percent Scores and Percent Learning Gain on Pre- and Post-Test Administered to Thirty-One Nursing Students

Group A (N=14)			Group B (N=17)		
Percent Scores			Percent Scores		
Pre-Test	Post-Test	%Learning Gain	Pre-Test	Post-Test	%Learning Gain
85	94	9	92	96	4
85	92	7	92	88	4
84	100	16	92	100	8
82	100	18	90	96	6
79	83	4	88	100	12
77	100	23	77	54	-23
76	90	14	67	86	19
73	98	25	55	96	41
71	86	15	55	88	33
69	94	25	55	88	33
63	81	18	46	92	46
61	94	33	45	75	30
61	97	36	45	89	44
57	82	25	38	84	46
			37	88	51
			33	98	65
			27	83	56
$\bar{X}$ 73.07	92.21		60.82	88.29	
R 28	19		65	46	

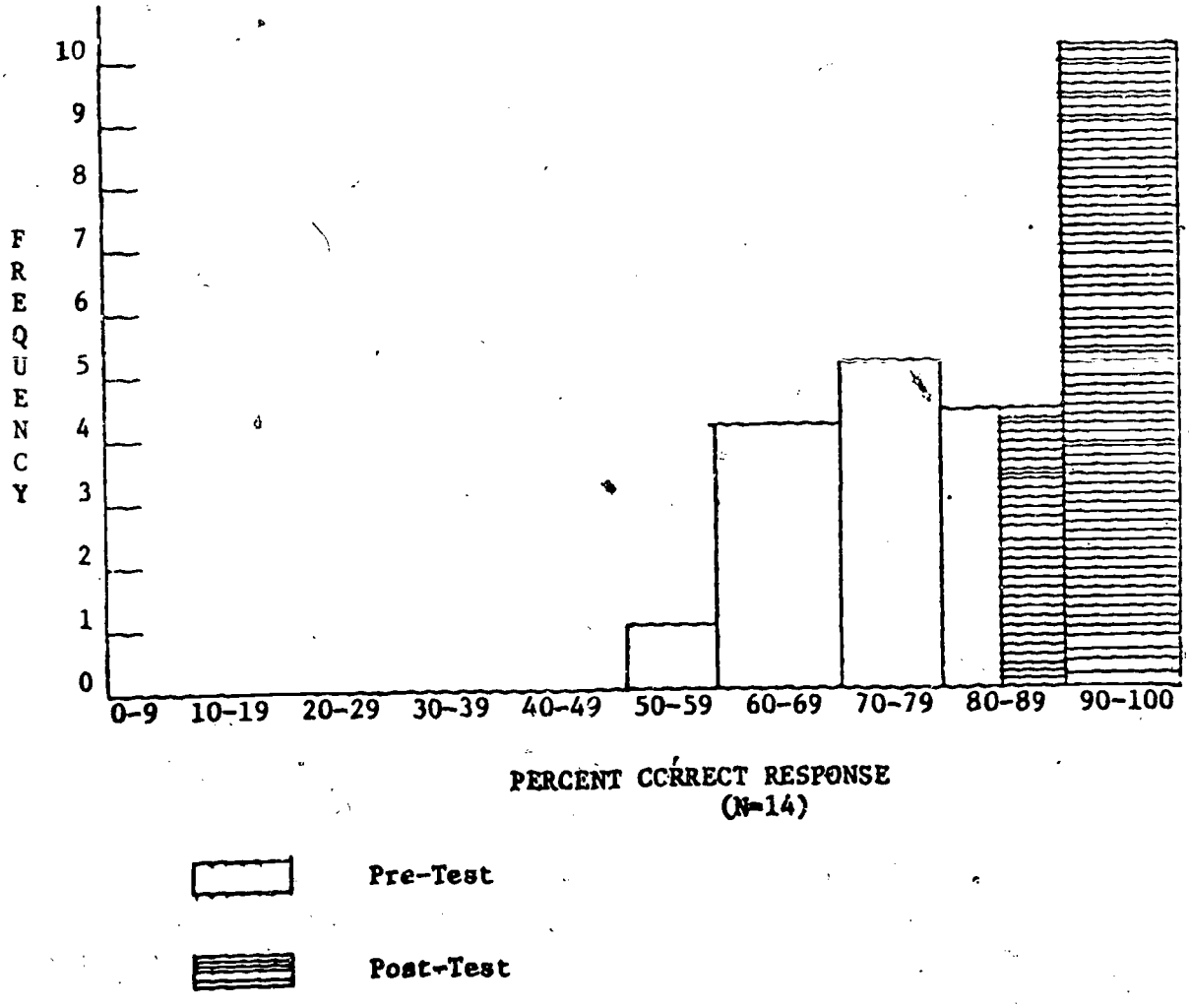
For the distribution of student scores on the pre-test by percentage of items answered in Group A, five or 35.7 percent received

scores between 70 to 79, four or 28.5 percent received grades between 60-69 and 80-89, and one or 7.1 percent received a grade between 50-59 (Table 2).

For the distribution of student scores on the post-test by percentage of items answered correctly in Group A, ten or 71.4 percent received scores between 90 to 100 while four or 28.5 percent had scores between 80-89 (Table 2).

Table 2

Distribution of Student Scores on Pre-Post Test by Percentage Of Items Answered Correctly in Group A (N=14)

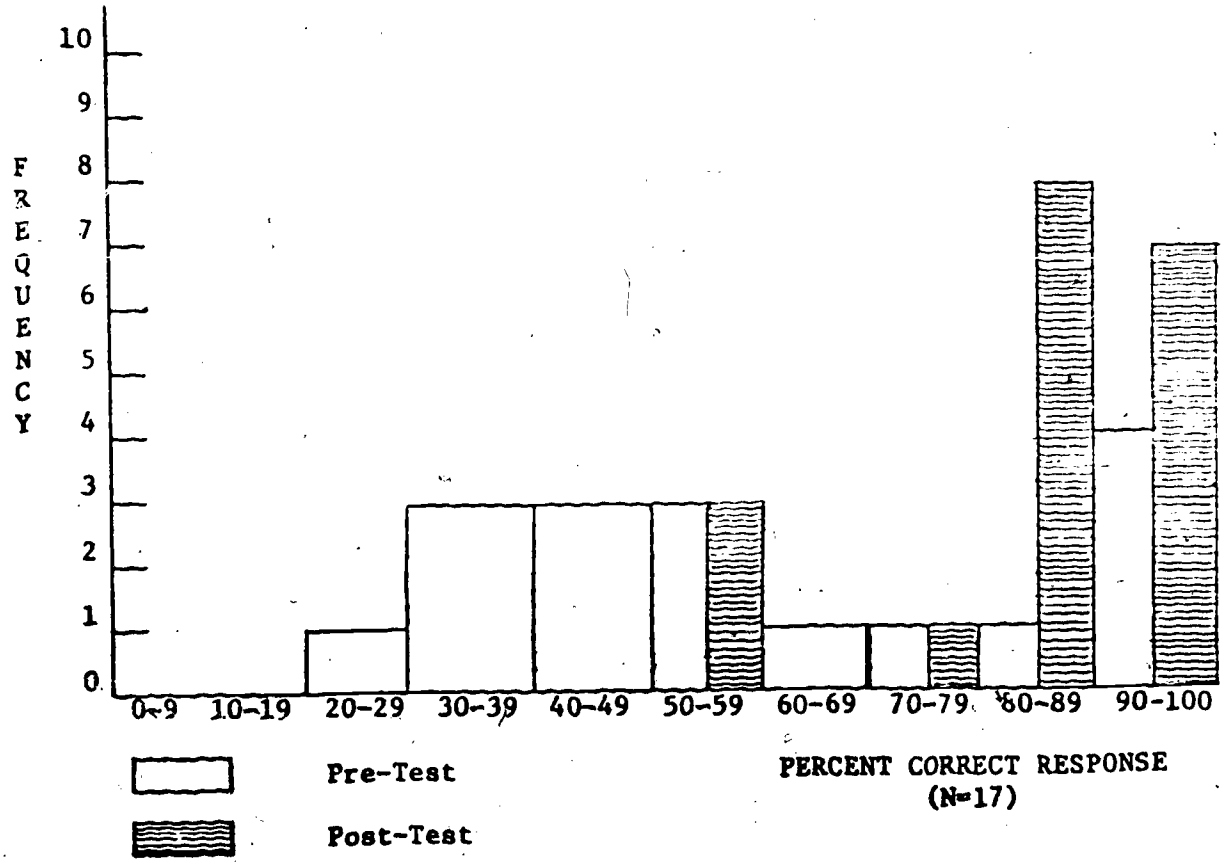


For the distribution of student scores on the pre-test by percentage of items answered correctly in Group B, four or 23.5 percent received scores between 90 to 100, three or 17.6 percent received scores between 30-39, 40-49, and 50-59, and one or 5.8 percent received scores between 20-29, 60-69, 70-79, and 80-89 (Table 3).

For the distribution of student scores on the post-test by percentage of items answered correctly in Group B, eight or 47 percent received scores between 80-89, seven or 41.1 percent received scores between 90-100, three or 17.6 percent received scores between 50-59 and one or 5.8 percent had scores between 70-79 (Table 3).

Table 3

Distribution of Student Scores on Pre-Post Test by Percentage of Items Answered Correctly in Group B (N=17)



The mean difference for Group A on the pre-post test was 19.14, while the mean difference for Group B on the pre-post test was 27.47 (Table 4).

Table 4

Mean Difference Between Group A and Group B

Group	N	$\bar{X}_1$	$\bar{X}_2$	$(\bar{X}_2-\bar{X}_1)$
A	14	73.07	92.21	19.14
B	17	60.82	88.29	27.47

A questionnaire on the effectiveness of administering the Denver Developmental Screening Test was given to thirty-one juniors studying pediatric nursing in the baccalaureate program of nursing at Widener College (Appendix D). All of the questionnaires were returned.

As indicated in Table 5, twenty-five or 80 percent of the students indicated that they really enjoyed pediatric nursing while six or 19 percent checked that they had no feeling one way or another (Table 5).

Twenty-two or 70 percent of the respondents indicated their achievement in previous nursing course to be average, while eight or 25 percent checked above average, and one student or 3 percent indicated excellent. None of the participants stated thay they were poor in their achievement in previous nursing courses (Table 5).

All of the thirty-one participants checked that they felt capable in administering the Denver Test (Table 5).

In administering the Denver Test, twenty-eight of 90 percent of the students perceived themselves to be competent while three or 9

percent felt that they were adequate (Table 5).

Twenty-eight or 90 percent of the respondents indicated that they felt it was of absolute importance for the nurse to develop skill in administering the Denver Test while three or 9 percent of the students indicated moderate importance (Table 5).

Table 5

Student Responses Regarding the Subject of Pediatric Nursing as a Subject, Past Achievement in Previous Nursing Courses, Ability and Perception of Competence in Administering The Denver Test, Importance for the Nurse to Develop Skill in Administering The Denver Test

CATEGORY	RESPONSE	PERCENT OF RESPONSES 10 20 30 40 50 60 70 80 90 100
Pediatric Nursing as a Subject	Really enjoy Do not enjoy No strong feeling one way or another	xxxxxxxxxxxxxxxxxxxx xxx19
Past Achievement in Previous Nursing Courses	Poor Average Above Average Excellent	xxxxxxxxxxxxxxxxxx xxxxxx25 x3
Ability to Administer the Denver Test	Capable Incapable	xxxxxxxxxxxxxxxxxxxxxxxxxxxx
Perception of Competence in Administering the Denver Test	Adequate Inadequate Competent	x9 xxxxxxxxxxxxxxxxxxxxxxxx
Importance for Nurse in Developing Skill in Administering the Denver Test	Minimal Moderate Absolute	x9 xxxxxxxxxxxxxxxxxxxxxxxx

When the students were given the option to view the videotape on the Denver Developmental Screening Test after taking the post-test,

thirteen out of seventeen students or 76 percent in Group B, voluntarily viewed the videotape, while four out of seventeen or 23.5 percent in Group B chose not to view the videotape (Table 6).

None of the fourteen students in Group A voluntarily viewed the videotape when given the option after taking the post-test (Table 6).

Table 6

Method(s) of Learning Received on the Administration of the Denver Developmental Screening Test

Group	N	Videotape		Didactic		Both Videotape and Didactic	
		N	%	N	%	N	%
A	14	14	100	0	-	0	-
B	17	0	-	4	23	13	76

When the respondent was asked to check which learning method they preferred, eighteen or 58 percent indicated the videotape, while thirteen or 41 percent check the didactic approach (Table 7).

Table 7

Learning Method Preferred
(N=31)

Response	N	%
Videotape	18	58
Didactic	13	41
Neither Method	0	-
Didn't Know	0	-

Eighteen out of thirty-one students or 58 percent indicated that they preferred the videotape as a method of learning for administration of the Denver Developmental Screening Test (Table 7). The reasons listed on the questionnaire (Appendix D) for liking the videotape were: "(1) Didn't take as long as the didactic approach, as indicated by twelve respondents or 66 percent; (2) Didn't have to sit in the classroom but could see it out of class time, as indicated by fifteen respondents or 83 percent; (3) Could see the tape when you were free, according to eleven respondents or 61 percent; (4) Followed objectives given in class, as fourteen or 77 percent of the students replied; (5) Tape enabled me to check on my own learning of the Denver Test when I was ready to do so. You ought to have more classes on tape as indicated by three respondents or 6 percent; (6) Could see it as many times as you wanted to, as three or 6 percent of the respondents indicated; (7) The charts in the videotape were clear and easy to interpret, according to six or 33 percent of the respondents; (8) Had everything we needed to know about the administration of the Denver Test, responded fourteen students or 77 percent; (9) I felt the responsibility for learning the material had been transferred through the videotape from the instructor to me, as nine or 50 percent of the students replied; (10) The videotape was more productive for me than the didactic approach. I didn't have to waste time in class on things that I already understood or spend time in class when I was too far behind for the class to do me any good, as eight respondents or 44 percent indicated; (11) Helped me to review the material I needed to know in a short time instead of reading a lot of the dreary details that I can learn from a book, as thirteen or 72 percent of the respondents indicated (Table 8)."

The following two responses were given by the respondents as to the reasons why they did not prefer the videotape approach to learning the administration of the Denver Developmental Screening Test: "(1) Talked too fast in the beginning of the videotape, as indicated by six or 33 percent of the respondents; and (2) Ten or 55 percent of the respondents stated that there was no discussion following the videotape which would have been helpful (Table 8)."

Table 8

Advantages and Disadvantages of the Videotape
as a Learning Method
(N=18)

Advantages	N	%
Didn't take as long as the didactic approach	12	66
Could see videotape out of class time	15	83
Could see tape when you were free	11	61
Followed objectives	14	77
Can view videotape when you wanted to	3	16
Can view videotape as many times as you wanted to	3	16
Charts were clear and easy to interpret	6	33
Had everything we needed to know about the administration of the Denver Test	14	77
Felt material was transferred to me through the videotape from the instructor	9	50
More productive than didactic approach	8	44
Reviewed the material in a short time instead of reading it from a book	13	72

Disadvantages	N	%
Talked too fast in the beginning of the videotape	6	33
No discussion followed the videotape which would have been helpful	10	55

Thirteen or 41.9 percent of the thirty-one respondents indicated that they preferred the didactic approach to learning the administration of the Denver Developmental Screening Test (Table 7). Thirteen out of seventeen students or 76.4 percent who received the didactic approach indicated the following reasons for preferring this method of learning: "(1) Twelve or 70.5 percent indicated that they had the opportunity to ask questions; (2) Seven or 41.1 percent responded that they liked the instructor's method of presentation and the informal approach to learning; (3) Instructor was willing to clarify questions when approached as nine or 52.9 percent of the respondents indicated; (4) The instructor followed the objectives given prior to the pre-test so that we knew what was expected of us to learn, as twelve or 70.5 students indicated; (5) Liked the instructor's personal interaction with students as eleven or 64.7 percent of the respondents indicated; (6) Ten or 58.8 percent of the students replied that they liked the manner in which the instructor stimulated us to think and to ask questions; (7) Twelve or 70.5 percent of the students indicated that the presentation of material was clear and that the instructor was well-prepared; and (8) Four or 23.5 percent of the respondents indicated that the instructor motivated student's interest in the material (Table 9)."

None of the thirteen or 76.4 percent of the participants indicated reasons for not liking the didactic approach to learning the administration of the Denver Developmental Screening Test (Table 9).

Table 9

Advantages of the Didactic Approach as a Method of Learning (N=13)

Advantages	N	%
Had an opportunity to ask questions	12	70.5
Liked instructor's method of presentation and the informal approach to learning	7	41.1
Instructor was willing to clarify questions	9	52.9
Instructor followed class objectives that were given prior to the pretest	12	70.5
Liked the instructor's personal interaction with students	11	64.7
Liked the manner in which the instructor stimulated us to think and to ask questions	10	58.8
Presentation of the material was clear and the instructor was well-prepared	12	70.5
Instructor motivated student's interest in the material	4	23.5

Only three out of thirty-one or 9.6 percent of the students indicated factors which contributed to their difficulty in mastering the administration of the Denver Developmental Screening Test. The following factors were (1) The calculation of the child's age; (2) Obtaining the blocks for the Denver Kit; and (3) Remembering the administration of the tasks without the Denver Manual (Table 10).

Table 10

Factors Which Contributed to the Administration of the Denver Developmental Screening Test (N=31)

Factors	N	%
The calculation of the child's age	1	3.2
Obtaining the Denver blocks for the Denver Kit	1	3.2
Remembering the administration of the tasks without the Denver Manual	1	3.2

CHAPTER V

DISCUSSION, IMPLICATIONS, AND RECOMMENDATIONS

In order to determine which method of learning was more effective, the videotape or the traditional didactic approach, a questionnaire (Appendix D) and a criterion-referenced pre-test and post-test (Appendix A and B) were given to fourteen subjects in Group A, who viewed the videotape and seventeen subjects in Group B, those who received the didactic instruction.

The level of mastery for the post-test was set at ninety percent in terms of correct responses. There exists little research or theory on which to base or support any standard of mastery for instructional content. Thus the level set, ninety percent mastery, represented a judgment based on experience in teaching the material (e.g., knowledge of the performance of students, generally). Though some authorities advocate one-hundred percent mastery where safe performance is crucial, Popham (1969) suggested a more realistic standard of ninety percent mastery. Two essential reasons were cited in support of lowering the standard for mastery level achievement: it provides greater opportunity for student success (i.e., it serves as a positive reinforcement) and it has a positive effect on motivation. The standard set in this study represented the performance level for the overall or general instructional objective (i.e., the administration of the Denver Developmental Screening Test). Gronlund (1973) noted that at the mastery level of achievement,

it is usually possible to set a standard of performance for a general instructional objective rather than for each specific learning outcome. Attainment beyond the minimum essentials (i.e., mastery level) is variously designated "developmental level", the measurement of which required definitive statements that indicated the relative degree to which the student was progressing beyond the basic standard. In the latter measure, developmental level, objectives provided direction toward ultimate goals which can never be fully achieved.

None of the fourteen subjects in Group A achieved the mastery level or ninety percent of the items correct on the pre-test, while four or 23.5 percent of the subjects in Group B answered 90 percent of the questions correct on the pre-test. The highest score on the pre-test in Group A was 85, while the highest score in Group B was 92. The lowest score on the pre-test in Group A was 57 and in Group B, 27.

On the pre-test, Group A had a range of 28 and a mean of 73.07, while in Group B, the range was 65 and the mean was 60.82. The difference between the ranges for Group A and B on the pre-test was 37, while the difference between the means for the two groups was 12.25 (Table 1). It appears that although the groups were randomly assigned, the two groups were not similar on the pre-test.

On the post-test, Group A had a range of 19 and a mean of 92.21, while in Group B, the range was 46 and the mean was 88.29. The difference between the ranges for Group A and B on the post-test was 27, while the difference between the mean for the two groups was 3.92. Group A, those who viewed the videotape on the Administration of the Denver Developmental Screening Test, was more homogenous than Group B (Table 1).

Both groups improved their scores on the post-test. There was more of an increase in learning in Group B, those who received the didactic method of instruction than in Group A (Table 1). This may have been due to one or more of the following reasons: (1) Group B had lower scores on the pre-test, thus allowing for more improvement on the post-test than the subjects in Group A. This may have been due to a statistical phenomenon known as regression toward the mean; (2) The didactic method of learning may have been a more effective method than the videotape presentation, since according to the research done by Wandt and Butts (1962) there was more of an increase in student learning with a live instructor than through the use of an inanimate videotape. Also, according to the results of the questionnaire utilized in this study, it was found that in those students who received both methods of instruction, the videotape and the didactic method, the reason gave as for preferring the didactic method, the availability of the instructor to clarify any questions the students had (Table 9); (3) Thirteen subjects in Group B received two methods of learning, the videotape and the didactic approach which may have influenced their scores on the post-test, as opposed to the fourteen subjects in Group A who received only one method of learning, the videotape (Table 6); and (4) The reason for a lower mean on the pre-test in Group B may have been because the students were less motivated initially, but became more involved as the semester progressed.

Since both methods, the videotape and the didactic approach produced learning on the post-test (Table 1) and the students seem to favor the videotape presentation (Table 7), the videotape method with an instructor present for discussion appears to be a viable teaching method for this one nursing course at the Center of Nursing at Widener

College.

The questionnaire on the effectiveness on administering the Denver Developmental Screening Test (Appendix D) was selected as the most effective means of obtaining the two types of information sought: (1) that concerning the student's academic performance in previous nursing courses; and (2) whether they liked pediatric nursing as a subject. Gronlund (1973) found that

> Both types of information are typically inaccessible by other means--the first because it deals with past behavior no longer observable, and the second because it is concerned with behavior not readily observable to an outside observer.

This methodology of assessing specific student characteristics is especially useful where the individual has no reason to distort the results. Since participation was voluntary in each case, and course grades, as such, were not affected, it can be logically assumed that there existed no reason for responses to be faked. Psychologically, it was a non-threatening technique. The emphasis on self-understanding, learning readiness and instructional planning was self-evident. In the interest of eliciting more complete and honest responses, subjects were assured that results would be used solely for planning subsequent learning experiences. The guarantee of anonymity was offered. Students were given the option of withholding their identity. Because none elected to remain anonymous, the assumption, that there existed good rapport with the subjects, seemed justified.

Statements in the written questionnaire were generalized and unrelated to each other, substantively. With one exception, the items were forced-choice, the respondent indicating which of the alternatives,

graduated on a continuum, best described his perceptions or opinions regarding the subject, pediatric nursing. In like manner, students were asked to approximate their level of theoretical achievement in previous nursing courses and to indicate the degree of competency which they possessed in performing the Denver Test. Few alternatives were used so as to reduce ambiguity. Numerical scale values were not assigned as averaging of responses would be meaningless. Results were however comparable from one respondent to another.

A questionnaire on the effectiveness on administering the Denver Developmental Screening Test was given to thirty-one participants (Appendix D). The majority of the participants or eighty percent, indicated that they really enjoyed pediatric nursing while nineteen percent indicated that they had no strong feeling one way or another (Table 5). Most of the nursing students at Widener College do enjoy their pediatric nursing experiences as indicated on the course evaluation.

The findings related to the subject's academic achievement in previous nursing courses revealed that the majority or seventy percent indicated their achievement to be average, while twenty-five percent indicated above average, and three percent indicated excellent (Table 5). This would seem to be true if one looked at their previous academic achievement as indicated on their transcripts.

It was interesting to note that all of the participants felt capable in administering the Denver Developmental Screening Test (Table 5). Perhaps this was due to either the method of learning received and/or because they were given the opportunity to administer the Denver Test under the supervision of an instructor.

Ninety percent of the participants perceived themselves to be

competent in administering the Denver Developmental Screening Test, while nine percent felt adequate (Table 5). The reasons for these responses may have been due to several factors: (1) The subjects were given the criterion-referenced pre- and post-tests (Appendix A and B). Seventy percent of the students indicated that "we knew what was expected of us to learn since the instructor followed the objectives given prior to the pre-test" (Table 9); and (2) The learning method received may have contributed to the subject's competency in administering the Denver Test. Fifty-eight percent of the students seem to favor the videotape (Table 7). Seventy-seven percent of the students indicated that the videotape "had everything we needed to know about the administration of the Denver Test" (Table 8). Fifty percent felt "the responsibility for learning the material had been transferred through the videotape from the instructor to me" (Table 8). Seventy percent of the students indicated that they had the opportunity to ask questions which may have clarified any concerns they may have had in administering the Denver Test (Table 9).

According to the response that pertained to the importance for the nurse to develop skill in administering the Denver Test to a child, ninety percent indicated that it was of absolute importance, while nine felt that it was of moderate importance (Table 5). This may have been because the student saw this as part of the nurse's role in administering the Denver Test in various clinical settings. Also, the participant may have detected developmental delays or failures in a child upon administration of the Denver Test and was able to identify where the child was in relation to his growth and development and therefore felt that it was important for the nurse to develop this skill. The responses

may have been influenced by the learner's attitude and experience with administering the Denver Test to a child. Marshall (1974) cited three preconditions or main determinants of learning, variously designated as attentional sets, motivation and developmental status. Together these internal states constitute readiness for learning. In essence, the author affirmed that

> .... every act of learning requires an apprehending phase, which is critically dependent upon attention. One way to insure that attending will occur is to arrange for the stimulus situation to contain elements of novelty, change, intensity of stimulation and so on.

Beyond such manipulation of external stimuli, attending would seem to be positively facilitated by the high degree of importance for the nurse to be able to administer the Denver Test. Conceivably, the perceived critical import of this skill would counterbalance the negative effects of student attitudes, which tend to function to reduce learning.

When the student was given the option to view the videotape on the Denver Developmental Screening Test after the post-test, 76.4 percent in Group B voluntarily viewed the videotape, while none of the participants in Group A took this option (Table 6). The students in Group B who received the didactic method of instruction were perhaps curious to see if the content was different in the videotape. Since the subjects in Group A had previously seen the videotape they probably did not feel it was necessary to view it again.

One of the main findings of this study indicated that fifty-eight percent of the respondents indicated that they preferred the videotape as a method of learning as opposed to the forty-one percent who preferred the didactic approach (Table 7). The reasons given by the

participants who preferred the videotape were: "(1) It didn't take as long as the didactic approach; (2) It wasn't necessary to sit in the classroom but could see it out of class time; (3) Could view the videotape whenever you were free; (4) The videotape followed the objectives that were distributed in class; (5) The videotape enabled me to check on my learning when I was ready to do so; (6) Could see it as many times as I wanted to; (7) The charts in the videotape were clear and easy to interpret; (8) It had everything we needed to know about the administration of the Denver Test; (9) I felt the responsibility for learning the material had been transferred through the videotape from the instructor to me; (10) The videotape was more productive for me than the didactic approach; and (11) It helped me to review the material I needed to know in a short time (Table 10)." Tickton (1970) found that nurses rated videotapes and slide-tape programs relatively high in a study on audiovisuals in nursing education.

In response to the evaluation question on reasons for not preferring the videotape, 55 percent of the ten students who replied felt that the instructor should have been present for discussion following the videotape (Table 8). Since one of the goals in this study was to support individualized instruction, have flexible scheduling needs, and provide a repetition of videotape presentations, the videotape method of instruction would be appropriate. Dale (1966:108) stated that the purpose of education and the

> Goal of all learning is to develop the independent learner, the mature individual who no longer needs the protective counsel and guidance of the school or college. The aim is to decrease dependent learning and to increase independent learning.

It appeared that factual, concise material in the videotape was not best suited for the ten students who indicated that they would have preferred to have an instructor present after viewing the videotape. It did not seem necessary that an instructor be present after the videotape since none of the students in previous pediatric nursing courses at Widener College indicated that it was necessary to have an instructor present on past course evaluations. Since the students seem to favor the videotape as a method of learning (Table 7), the videotape method with an instructor present for discussion will be the method utilized for this one particular pediatric nursing course at Widener College.

Another reason for not preferring the videotape given by six or 33 percent of the students was that the instructor talked too fast in the beginning of the videotape (Table 8). When the pediatric nursing faculty previewed the videotape on the administration of the Denver Developmental Screening Test, they did not seem to feel that the speaker talked too fast. Also, in informal discussions with students, it seems that they did not have enough time in the beginning of the videotape to take notes and felt that they had missed some of the information. The instructor reiterated to the students that the content that they felt they missed was in the criterion-referenced objectives and the Denver Manual. It is interesting to note that according to Koch (1975), the recording can be a pretty poor communication tool in videotapes.

Forty-one percent of the respondents indicated that they preferred the didactic approach to learning the administration of the Denver Developmental Screening Test (Table 7). Seventy-six percent of the subjects indicated the following reasons for preferring the didactic approach: "(1) Had an opportunity to ask questions; (2)

Liked the instructor's method of presentation and the informal approach to learning; (3) The instructor was willing to clarify questions; (4) The instructor followed the objectives given prior to the pretest ... that we knew what was expected of us to learn; (5) Liked the instructor's personal interaction with students; (6) Liked the manner in which the instructor stimulated us to think and to ask questions; (7) The presentation of the material was clear and the instructor was well-prepared; and (8) The instructor motivated student's interest in the material (Table 7)."

While we do not yet know about individualistic learning styles to be able to prescribe strategies that will maximize learning for a given person, it is clear that we need to give more attention to offering pluralistic alternatives (Bruner, 1977).

Only 9.6 percent of the respondents indicated reasons why they had difficulty in mastering the administration of the Denver Test to a child. The factors were (1) The calculation of the child's age; (2) Obtaining blocks for the Denver Kit; and (3) Administering the tasks without using the Denver Manual (Table 12). The calculation of the child's age was explained in both methods of learning. It seemed that some of the students had difficulty in subtracting the child's birthdate from the date of the test. There should not have been any difficulty in obtaining the blocks for the Denver Kit. Blocks were made available to the students. Although the Denver Manual was on Reserve in the library, instructors did have Manuals available to the students for use in the clinical area. The students were reminded to review the Denver Manual before administering the Denver Test to a child.

The data was collected and analyzed and the findings were used

to make recommendations in determining whether videotape presentation was more effective for learning than the traditional didactic approach at Widener College. The following recommendations are proposed:

(1) The videotape on the Administration of the Denver Developmental Screening Test should be made available for pediatric nursing students at Widener College to view in the library, in their leisure time, as many times as they would like. An instructor should be available to answer any questions the students may have after viewing the videotape.

(2) The majority of the participants in the study increased their learning growth from the pre-post test by having had the criterion-referenced objectives available to them. Criterion-referenced objectives should be implemented for all the classes in pediatric nursing and for test construction.

(3) The study should be repeated, using a larger sample, so that an expectancy table can be developed for predicting achievement of future students.

(4) A control study should be done to see if it was the didactic method or the videotape presentation, or both methods that increased learning.

(5) A statistical method such as the T - Test should be done to show if there is a significant difference between the two groups. It appeared that the difference between the means was significant and that the two groups were not the same in this study.

(6) The Dean of nursing and the Curriculum Committee at Widener College should study the present nursing curriculum and implement the criterion-referenced format for future nursing classes and testing.

(7) Further funds should be sought to purchase or produce audiovisual aids at the Center of Nursing at Widener College.

(8) Students and nursing-faculty should be encouraged to participate in developing audiovisual aids using the criterion-referenced format for future nursing classes.

(9) Follow-up studies of the success of the criterion-referenced objectives in conjunction with the use of audiovisual aids at the Center of Nursing at Widener College should be periodically made. These studies would be helpful to other baccalaureate programs of nursing for the selection of appropriate audiovisual aids and curriculum change.

As many have pointed out, of course, there are problems and obstacles in the use of technology in nursing education. Although neither all the tools or procedures are entirely new to us as educators, their implementation requires adjustments, training of faculty, development of materials, and investment of equipment. If either the process or the tools are used carelessly the results can be harmful for student learning. In spite of these problems, however, instructional technology is more than just a fad. There is real substance in the prospects it offers, and of all the segments of our educational systems, none stands to profit more than the private college. Instructional technology alone is not likely to save a college; it might not be an overstatement, however, to suggest that few, if any, private colleges will long continue which ignore or reject it completely. Exact results are difficult to obtain because absolute connections between cause and effect in learning are difficult to establish. We all know that most studies of the newer media show no significant difference in the amount of learning. There are some notable exceptions, however. Students who

are given the criterion-referenced tests described in this study, are more likely to pass the test than are their counterparts who have not.

If we in small colleges, then, wish to offer superior instruction, it is doubtful that we will be able to do so in the future unless we utilize in some ways both the process and the tools of instructional technology.

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APPENDIX A

Center of Nursing of Widener College

Nursing 346 - The Nurse and The Family II

Objectives For The Videotape
"Denver Developmental Screening Test"

The purpose of this videotape is to acquaint you with the assessment of the developmental status of children during the first 6 years of life through use of the Denver Developmental Screening Test (D.D.S.T.).

Following the viewing of the videotape, you should be able to exhibit the following behaviors in relation to the Denver Developmental Screening Test.

1. Detect developmental delays in infancy and the preschool years after administering the D.D.S.T. to infants, toddlers, and the preschool age children.

2. List the test materials in using the D.D.S.T.

3. Emphasize to a parent that the test is a developmental screening device and not an I.Q. test.

4. Plot the child's chronological age on the D.D.S.T. Score Sheet, correcting for prematurity when relevent.

5. Administer those items through which the child's chronologic age line passes. (personal-social, fine motor-adaptive, language, gross motor).

6. Establish and record in each sector the area in which the child passes all the items and the point at which he fails all the items.

7. Record correctly the proper letter which designates if the item was passed, failed, refused. Record if the examiner was unable to observe, and if there was no opportunity for the child to perform the item, or if the tester accepts the mother's word that the child can do the item requested.

8. Record the proper letter for the following:

   F. Failure

   P. Placed in the middle of the block of the child passes the item or if any item is reported by the parent that the child can do it.

   NO. No opportunity for the child to perform the item.

   R. Child refused

   UO. Unable to observe

   "r" Tester accepts mother's word that the child can do the item requested.

9. Observe and record how the child adjusted to the examination.

10. Ask the parent if the child's performance was typical of his performance at other times.

11. Accurately interpret the D.D.S.T. results in the following manner:

   (a) A delay is any item failed which falls completely to the left of the age line.

   (b) Abnormal - 2 or more sectors with 2 or more delays.
   Abnormal - 1 sector with 2 or more delays plus 1 or more sectors with 1 delay and in that same sector, no passes through the age line.

   (c) Questionable - 1 sector with 2 or more delays.
   Questionable - 1 or more sectors with 1 delay and in that same sector, no passes through the age line.

   (d) Untestable - When refusals occur in numbers large enough to cause the test results to be questionable or abnormal IF they were scored as failures.

   (e) Normal - Any condition not otherwise listed.

12. Know that the following factors may cause developmental delays:

   (a) Unwillingness of the child to use his ability due to temporary factors, such as, fatigue, illness, hospitalization, separation from parents, or fear.

   (b) Inability to perform the item due to general

retardation, pathologic factors such as deafness or neurological impairment.

(c) Familial Pattern of slow development in one or more areas.

13. Understand that the child with unexplained developmental delays should be retested and evaluated one month later.

14. Recognize that local norms and cultural childrearing practices may influence the child's behavior. Refer to the test manual for specific directions on presentation of each test item.

APPENDIX B

Center of Nursing of Widener College

Nursing 346 - The Nurse and The Family II

Diagnostic Pretest on the Denver Developmental Screening Test

Indicate a "T" for True and a "F" for False for items one through four.

1. _____ The D.D.S.T. is a developmental screening device to detect the child's I.Q.

2. _____ The tester should administer only those items through which the child's chronological age line passes.

3. _____ The tester should ask the parent if the child's performance was typical of his performance at other times.

4. _____ Local norms and cultural childrearing practices do not influence the child's behavior.

5. On the D.D.S.T. score sheet, plot the child's chronological age. The given birthdate was October 21, 1976. The child was not premature. Today's date is January 11, 1977. Please show calculation on the answer sheet.

6. On the D.D.S.T. score sheet and the answer sheet record the proper letter for a six month old infant for the following:

   A. Smiles responsively - passes.
   B. Initially shy with strangers - fails.
   C. Feeds self cracker - no opportunity for infant to do this.
   D. Resists toy pull - child refused.
   E. Hands together - unable to observe.
   F. Vocalizes, not crying - Tester accepts mother's word that the child can do the item requested.

7. List the four sectors through which the vertical lines on the score sheet passes.

   A. _____
   B. _____
   C. _____
   D. _____

8. List the materials used in the D.D.S.T.

A. _____ F. _____
B. _____ G. _____
C. _____ H. _____
D. _____ I. _____
E. _____

9. List three factors that may cause developmental delays.

A. _____
B. _____
C. _____

10. When should the child be retested and evaluated with unexplained delays?

11. Interpret the following D.D.S.T. results. The following terms may be used more than once. Delay, Abnormal, Questionable, Untestable, Normal.

A. _____ Any item failed which falls completely to the left of the age line.
B. _____ Two or more sectors with two or more delays.
C. _____ One sector with two or more delays plus one or more sectors with one delay and in that same sector, no passes through the age line.
D. _____ When refusals occur in numbers large enough to cause the test results to be questionable or abnormal if they were scored as failures.
E. _____ One sector with two or more delays.
F. _____ One or more sectors with one delay and in that same sector, no passes through the age line.
G. _____ Any condition not otherwise listed on the score sheet.

12. Write an example of how the child adjusted to the examination.

APPENDIX C

Center of Nursing of Widener College

Nursing 346 - The Nurse and The Family II

Answer Sheet for D.D.S.T. Pretest

Name _____ Group _____

Date _____ Grade _____

1. _____

2. _____

3. _____

4. _____

5.

6. A. _____ D. _____
B. _____ E. _____
C. _____ F. _____

7. A. _____
B. _____
C. _____
D. _____

8. A. _____ F. _____
B. _____ G. _____
C. _____ H. _____
D. _____ I. _____
E. _____

9. A. _____
   B. _____
   C. _____

10. _____

11. A. _____
    B. _____
    C. _____
    D. _____
    E. _____
    F. _____
    G. _____

12.

APPENDIX D

Center of Nursing of Widener College

Nursing 346 - The Nurse and The Family II

Questionnaire on the Effectiveness on Administering the Denver Developmental Screening Test

Please complete the following questions relative to your feelings and experiences with Administering the Denver Developmental Screening Test

1. Pediatric nursing is a subject which I
_____Really enjoy _____Do not enjoy _____No strong feeling one way or the other.

2. In all nursing courses or content to which I have thus far been exposed, my achievement was
_____Poor _____Average _____Above Average _____Excellent.

3. As concerns my ability to administer the Denver Developmental Screening Test, I feel
_____ Capable _____ Incapable.

4. In administering the Denver Developmental Screening Test, I felt
_____ Adequate _____ Inadequate _____ Competent.

5. Check the method(s) of learning you received on administering the Denver Developmental Screening Test.
_____ Viewed the videotape.
_____ Received the didactic instruction
_____ Viewed the videotape and received the didactic instruction.

6. Check which learning method(s) you liked
_____ The videotape.
_____ The didactic approach.
_____ Neither method.
_____ Don't know.

7. If you received both methods of learning, check which method you preferred and why.
_____ The videotape. Explain_____
_____ The didactic approach. Explain_____
_____ Neither. Explain_____

8. If you received only one method of learning would you have preferred another method? If yes, please explain why.
_____Yes _____No. If yes, please explain_____

9. Indicate what you liked or disliked about the method(s) you received.
(A) The videotape approach:
Liked:_____
Disliked:_____

(B) The didactic approach:
Liked:_____
Disliked:_____

10. List those factors which contributed to your difficulty, if any, in mastering the administration of the Denver Developmental Screening Test.
A._____
B._____
C._____
D._____

11. What importance do you attach to the nurse's need to develop skill in administering the Denver Developmental Screening Test?
_____Minimal _____Moderate _____Absolute.