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ABSTRACT

The relationship between student personality traits and achievement with either mediated self-instruction or didactic large group instruction was investigated. Subjects were 159 female third-year nursing students at Loyola University of Chicago. Subjects received instruction on tracheostomy care and intravenous (I.V.) therapy through either a lecture or an autoinstructional filmstrip/cassette program. Personality traits were assessed using: (1) the Dogmatism Scale, measuring the openness of the individual's belief system; (2) the Internal-External Scale, measuring locus of control orientation; and (3) the Self-Esteem Inventory, covering peers, family, schools, and personality interests. The filmstrip program was superior to the lecture method for I.V. therapy instruction, and a significant relationship was found between performance on the I.V. therapy test and high scores on the Self-Esteem Inventory. A very weak relationship was found between the instructional method employed and student performance on the tracheostomy care lesson. Findings suggest that analysis of the interactions between personality traits and type of instruction can assist teachers in assigning students to an instructional treatment. (LMM)

Relationship Between Dogmatism, Self-Esteem, Locus of Control, and Predisposition Toward Two Instructional Methods Among Female Nursing Students

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Introduction

The study of personality traits, instructional methodologies and the interaction between the two is not a new area of study. Studies of these interactions, by their nature, pose such general questions as: (1) Do complex learner aptitudes interact (either positively or negatively) with methods of instruction to predispose certain learners to success or failure in a given instructional setting? (2) Should it not be the task of educators to research and analyze these interactions and inform teachers of the possible implications of the use of certain instructional methods in the course of teaching?, and (3) If interactions between learner aptitudes and instructional methods exist, should not research be undertaken to identify instruments which will assist the teacher in identifying learners who may experience difficulty in learning through a certain instructional method? This study attempted to investigate just such questions.

Improving a student's performance in the learning situation msy be accomplished by presenting the instruction in a manner which the student most easily comprehends and accepts.[1] The introduction of audio-visual materials and independent instruction into the educational process affords increased diversity in the types and methods of

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[1] C. M. Charles, Individualizing Instruction (St. Louis: C. V. Mosby, 1980), pp. 64-72.

Instructional presentations educators make available to their students. Identifying reliable instrucments to assist the educator in choosing an apprpriate instructional approach for each student is a task confronted by this type of research. The task of this study was to discover the relaticnship between students' scores on three psychological instruments and their performance on tests of cognitive content presented through two differing instructional approaches.

Achievement in any learning situation is dependent on a number of variables, such as how well the teacher teaches, how pleasant the learning environment is, and how well the student slept the night before. In addition to the external variable which may be present, each person comes to the learning situation with a unique set of personality traits which may affect, either positively or negatively, his or her chance for success.[2] These traits may include such variables as intelligence, anxiety, motivation and self-esteem. Further confounding the learning situation is the possibility of interactions among these variable, as well as interactions between the variables and the instructional method being used. The recognition that personality traits may affect a student's performance in an instructional setting is an

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[2]James A. Wakefield, Using Personality To Individualize Instruction (San Diego: California EdITS, Publishers, 1979), p. 17.

important step toward improving the educational process. Attempts to increase the efficiency and effectiveness of instruction have focused on many variable which are often present in any learning environment. This study investigated three personality traits which a learner will bring to the instructional setting.

In order to maximize the potential of each learner, individual differences must be considered when designing instructional approaches.[3] Educators should direct learners in the same intellectual and development directions, and at the same time they must consider the different methods which may help the learner achieve their learning goals. To deal with the individual, varying methods must be made available to the learner to meet his or her goals. Thus, the task assigned to educators is two-fold: (1) develop diverse activities to help the individual learner achieve his or her educational goals, and (2) devise methods of student assessment to assist students in determining which of these diverse educational opportunities will, for them, yield the best results. The identification of potentially successful instructional methods begins with an assessment of the learner. The

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[3]R. M. Gagne, "Instructional Variables and Learning Outcomes," The Evaluation of Instruction: Issues and Problems, eds. M. C. Wittrock and D. Wiley (New York: Holth and Winston, 1970), pp. 105-125; R. S. Dunn and K. J. Dunn, "Learning Styles/Teaching Styles: Should They. . . Can They. . . Be Matched?," Educational Leadership, 36, No. 4 (1979), pp 238-244.

educator should have the ability and opportunity to administer personality trait assessment instruments which have been shown to be related to achievment in the methods of instruction to be utilized. This study attempted to assess the relationship between student scores on three personality trait instruments and the level of student achievement in two differing instructional settings.

The following questions were the basis for this study:

1. Is there a significant difference between the pass/fail performance on tests of content taught through mediated self-instruction and tests of content taught through didactic, large group lecture instruction?

2. Are there significant distinguishing interaction characteristics for those passing or failing a test of content and scores on the Dogmatism Scale, the Internal-External Scale and the Self-Esteem Inventory?

The following are the limitations imposed upon this study:

1. This study was limited to nursing students in a baccalaureate degree program at a private, urban institution.

2. Students were drawn from the third year nursing class only (first year of actual nursing instruction).

3. Only female nursing students were included in the analysis.

Personality Traits and Individual Differences

The concept of individual differences has been explored by researchers for many years. All people do not look alike, talk alike or hold the same beliefs. The knowledge that people differ through a wide variety of traits is the point from which this research has embarked. All types of information about the characteristics of learners has been collected in schools. Such traits as nationality, sex, grade point average and socioeconomic background are routinely ascertained.[4] In addition, various psychological attributes of the learner are often evaluated to determine the intellectual, social and emotional status of the student. These measures are often used to place students in homogeneous groups within the school for instructional purposes. Student grouping of this sort are attempt to mold the student to the instruction, rather than mold the instruction to the student. Cronbach and Snow point out:

> Aptitude measures and educational methods should form a mutually supportive system. Educational programs need to be designed for the student who does not fit the conventional instruction, and classification

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[4] J. W. Brown, K. D. Norberg and F. Harcleroad, A-V Instruction: Technology, Media and Methods (New York: McGraw-Hill, 1977), pp. 17-29.

> procedures need to be designed to choose the right participants for each such program. The old mandate was, "The institution is given; try to pick the persons who fit it." The needed mandate is, "Try to design enough treatments so that everyone will be able to succeed in one of them, and route the person into the treatment that fits."[5]

Media specialists have often been called upon to produce multiple instructional treatments for various instructional settings. Media specialists have for years espcused the importance of assessing the intended audience for which they are designing materials. Any discussion of the role of the developer of instructional programs will include, as a critical component of the instructional development process, the assessment of the intended audience.[6] The purpose of this assessment is to ascertain that the instructional treatment being designed will meet the educational requirements of the group of people for which it is intended. After this assessment is completed, materials are produced, strategies determined, environments are selected and evaluation instruments prepared.[7] The results are often presented as a series of scores distributed along a normal curve. Yet, if this instruction was designed to "fit" this audience, researchers must question why some students do

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[5]Lee Cronbach and Richard Snow, Aptitudes and Instructional Method (New York: Irvington, 1977).

[6]Brown, Lewis and Harcleroad, op. cit., p. 19.

[7]C. E. Cavert, An Approach to the Design of Mediated Instruction (Washington, D. C.: Association for Educational Communications and Technology, 1974).

quite well and others do poorly. Perhaps the reason is that each learner brings a particular set of attributes and characteristics to the learning setting which, to a degree may predispose each learner to success or failure in that setting.

Glaser identifies individual differences as a relevent component of the educational process and calls for the assessment of these differences and the utilization of these differences in planning instructional strategies.[8] Cronbach and Snow identify personality traits as important factors when considering the adaptation of the educational process to the individual.[9]

The investigation of interaction between treatments and trait variables has been called Trait-Treatment Interaction (TTI) or Aptitude-Treatment Interaction (ATI) research.[10] In ATI studies the task is to predict appropriate learning methods for subjects possessing certain levels of a given trait, thus allowing them to obtain their highest level of achievement. When various differing instructional programs are available within a course of study, interaction paterns may be used to predict which program will bring about the best results for each student.

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[8]Robert Glaser, "Individuals and Learning: The New Aptitudes," Educational Researcher, 1 (1972), 5-13.

[9]Cronbach and Snow, op. cit., pp. 2-6.

[10]Ibid.

Instructional Methods

The verbal instruction most commonly observed in the lecture hall at many schools is an excellent example of what Ausbel[11] and Wittrock[12] have called "expository teaching." In this type of instructional setting, the learner is required to listem, and perhaps take notes, while the instructor poses questions and then answers them. Lecture is a passive mode of learning which allows little chance for asking questions or responding with answers. While the passivity of lecture is a drawback when attempting to involve students in their own learning and adapt instruction to each individual learner, it can still provide useful learning experiences. When properly organized, expository teaching can present facts, concepts and principles which students can learn and use as a basis for further learning and study.[13]

The process of learning is unique to each individual. The educational system makes various experiences available to each student. The schools provide materials, facilities, resources and instructors. The learner also brings certain traits to the learning experience. Gagne stresses the importnace of viewing the educational process

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[11] D. p. Ausbel, The Psychology of Meaningful Verbal Learning: An Introduction to School Learning (New York: Grune and Stratton, 1963), p. 191

[12] M. C. Wittrock, "Verbal Stimuli in Concept Formation: Learning By Discovery," Journal of Educational Psychology, 64 (1963), pp. 183-190.

[13] Ausbel, loc. cit.

as a systematic presentation of instruction to diverse and constantly adapting individuals. The focus of education must be the student.[14] According to Edling,[15] independent instruction is the methodology which seems to be the most flexible and adaptable to the differences between learners. In his discussion of individualization of instruction, Edling identified independent instruction as the method which provides the most freedom to the learner.[16] Independent instruction gives the student the opportunity to make decisions concerning the location and time of the instructional experience, the materials to be used and the rate at which they will be assimilated.[17] One or more of these decisions may be the single most important component in adapting the instruction to the student. Often, more than one of these components is able to be manipulated by the student in independent instruction. The way students manipulate their learning environment is as much a function of their personality as is the way they learn.[18]

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[14]Robert M. Gagne, "Instructional Variables and Learning Outcomes, "The Evaluation of Instruction: Issues and Problems, eds. M.C. Wittrock and D. Wiley (New York: Holt, Rinehart and Winston, 1970), pp. 105-125.

[15]J.V. Edling, Individualized Instruction: A Manual for Administrators (Corvallis, Oregon: Continuing Education Publication, Oregon State University, 1970).

[16]Ibid.

[17]Brown, Lewis Harcleroad, op. cit., pp. 22-29.

[18]Ibid.

The teaming of audiovisual instruction with independent study is a methodology which has gained increasing popularity in higher education in the last ten years. The creation of learning centers, facilities where students learn independently through the use of audiovisual materials, is widespread. Sullivan[19] lists 1,778 individual learning centers in colleges and universities in the United States and Canada. Learning centers are defined as facilities where materials, both print and non-print, are stored and utilized.[20] In addition, these learning centers often become the area in a school where independent instruction is implemented.[21] Anderson[22] described this center as a place where students interact with materials while working in an independent instructional mode. It is in these centers that the technology of education meets independent instruction to form mediated self-instruction. Learning centers allow students to function independently. Students may schedule their time, arrange their work space and freely access

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[19]L. L. Sullivan, Guide to Learning Centers in Higher Education (Portsmouth, N. H.: Entelek Press, 1979).

[20]J. W. Brown, K. D. Norberg and S. K. Srygley, Administering Educational Media: Instructional Technology and Library Services (New York: McGraw-Hill, 1972), pp. 36-48.

[21]Brown, Norberg and Harcleroad, op. cit., pp. 34-37.

[22]Robert Anderson, "Sustaining Individualized Instruction Through Flexible Administration," The Computer in American Education, eds. D. Bushnell and D. Allen (New York: McGraw-Hill, 1967).

technological resources and multiple modes of communication.[23] Thus, if education is to adapt to the needs of the learner, it would seem that mediated self-instruction in special learning centers designed specifically for that methodological approach would be the most appropriate place to study instruction and learner aptitudes.

Personality Variables

Dogmatism

Dogmatism is defined by Rokeach[24] as a component of a person's personality which defines the degree to which a person can evaluate, accept, and act on on relevent information independent of extraneous outside factors. A person's level of dogmatism can be classified somewhere along a continuum which ranges from "open" to "closed." An open belief system is one which allows the individual to accept new, novel and often conflicting information and integrate this information into his or her belief system. People with open belief systems are often characterized as broad-minded, liberal, tolerant, receptive and unprejudiced. New information may be integrated rapidly, even if this means that old beliefs must be modified or discarded. A closed system of beliefs

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[23] Brown, Lewis and Harcleroad, loc. cit.

[24] M. Rokeach, The Open and Closed Mind (New York: Basic Books, 1960).

is one that defends itself against conflicting information. The person with a closed belief system is often hesitant to accept input which negates or disproves currently held beliefs. Closed belief individuals (high dogmatics) are often characterized as narrow-minded, intolerant, rigid and prejudices.[25]

High dogmatics, then, may be supposed to resist and perhaps reject unfamiliar and possibly threatening new situations. Students who test as highly dogmatic may carry with them a predisposition to failure (or at least diminished performance) when confronted with the mediated self-instruction methodology of education.

Self-esteem

In the study done by Coopersmith[26] self-esteem is defined as a person's evaluation of himself. Self-esteem is the manifestation of the approval or disapproval one feels about his or her own skills, intellectual abilities, aptitudes and morals. It is a "personal judgement of worthiness that is expressed in the attitudes the individual holds toward himself."[27] Coopersmith found a

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[25]Ibid.

[26]Stanley Coopersmith, The Antecedents of Self Esteem San Francisco: W. H Freeman, 1967).

[27]Ibid., p. 5.

high correlation between self-esteem and creativity. He considered self-esteem a critical factor in determining the degree to which a person can act confidently and successfully on an independent basis.[28] Self-esteem also relates to the ability of a person to organize chaos into order.[29] Coopersmith also found that self-esteem correlated with achievement and sociometric choice.[30]

Locus of Control

Locus of control can be defined as a measure of the degree to which a person believe she or he controls reinforcement (reward) for his or her own actions. Rotter,[31] in his social learning theory, attempts to explain behavior through "expectancy" and reinforcement "value." The behavior of an individual can be predicted if it can be determined to what extent that behavior will lead to reinforcement and what the value of the reinforcement is. Individuals place different values on the

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[28]Ibid. [29]Ibid.

[30]Stanley Coopersmith, "A Method of Determining Types of Self Esteem," Journal of Abnormal and Social Psychology, 59 (1959), 90.

[31]J. B. Rotter, Social Learning and Clinical Psychology (New York: Prentice-Hall, 1954).

importance of external reinforcement in governing their actions. The ability to assess the importance of reinforecement to the individual is critical in anticipating behavior. Hersch and Scheibe[32] found that individuals evaluated as being "internals" (belief in control of their own reinforcement), describe themselves as being assertive, independent, powerful, effective and industrious. Internal control has been shown to be positively correlated with motivation.[33] Externals (viewing reinforcement as coming from outside their control) are described as more aggressive and hostile,[34] suspicious and mistrustful,[35] and more dogmatic and authoritarian.[36] External control has been shown to correlate positively with debilitating anxiety while internal control correlates with facilitating anxiety.[37]

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[32]P. D. Hersch and K. E. Scheibe, "On the Reliability and Validity of Internal-External Control as a Personality Dimension," Journal of Consulting Psychology, 31 (1967), 609-614.

[33]J. B. Rotter and R. Mulry, "Internal versus External Control of Reinforcement and Decision Time," Journal of Personlaity and Social Psychology, 4 (1965), 598-604

[34]C. B. Williams and H. L. Vantress, "Relation Between Internal-External Control and Aggression," Journal of Psychology, 71 (1969), 59-61.

[35]A. G. Miller and H. L. Minton, "Machiavelianism, Internal-External Control and the Violation of Experimental Instruction," Psychological Record, 19, (1969), 369-380.

[36]J. B. Rotter, M. Seeman and S. Liverant, "Internal versus External Control of Reinforcement: A Major Variable in Behavior Therapy," Decisions, Values and Groups, ed. N. F. Washburn (London: Pergamon, 1962), 473-516.

[37]E. C. Butterfield, "Locus of Control, Test Anxiety, Reaction to Frustration," Journal of Personality, 32 (1964), 298-311.

DESIGN OF THE STUDY

Background

This study meets the traditional definition of an experimental design as defined by Kerlinger.[1] By measuring differences in performance, the study attempted to determine the effect personality traits (dogmatism, locus of control, and self-esteem) have in two varying instructional settings.

This study was designed as a modified Posttest Only Control Group design, as defined by Campbell and Stanley.[2] Rather than compare one experimental group to a control group which has received no treatment, the study compared two groups which have received the same instruction through two different methodologies. The form of the design is illustrated below:

R	X1	01
R	X2	02

with X1 being the lecture method and X2 being the mediated self-instruction treatment. The subjects were randomly assigned to each group to meet the assumption of statistical equivalence of the groups

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[1] Kerlinger, Foundations of Behavioral Research, pp. 327-346.

[2] Donald Campbell and Julian Stanley, Experimental and Quasi-experimental Designs for Research (Chicago: Rand McNally College Publishing Company, 1963), p. 25.

prior to the introduction of the treatment variable.

Four instruments were used to collect data: Rotter's Dogmatism Scale (DS), Rokeach's Internal-External Scale (IE), Coopersmith's Self Esteem Inventory (SEI) and multiple choice posttest for content on Tracheostomy Care (Trach) and Intravenous Therapy (I.V.)

Sample

Subjects for this study were drawn from female students in the third year class of the School of Nursing at Loyola University of Chicago (N = 159). The majority of the students in the sample were under 22 years of age (90.6 percent), had a grade point average between 2.50 and 3.40 (73 percent) and had no other post-secondary degrees (88.1 percent) As the nursing curriculum at Loyola is an upper-division major, third-year (junior) students are actually taking their first nursing classes in the first semester of their third year. Because mediated self-instruction was one of the treatments to be investigated, the effects of the treatment on the performance may be more obvious on students relatively unfamiliar with this novel instructional setting.

Group Design

Two treatment groups were designed through cluster sampling.[3] This technique was required because of the instructional groupings imposed upon students by the demands of the nursing curriculum. The

[3] Kerlinger, op. cit., p. 130.

School of Nursing arranges students into "master groups" which are in turn grouped togehter into clinical agency teams. There are no more than ten students in each master group, and a clinical team is composed of either three or four master groups. There were five clinical teams in the junior class, and teams were assigned randomly to one of the two experimental groups. Also, it should be noted that individual students were assigned to clinical teams on a random basis.

Data Gathering Instruments

There were two areas in which data concerning the subjects were needed: (1) their performance on two tests, and (2) their scores on three personality scales. Two posttests were used to assess students' understanding of the lessons on Tracheostomy and Intravenous Therapy. These instruments had been used in the School of Nursing for two years previous to this research and had been constructed from the objectives of the lessons in question. These instruments had been evaluated for content by a team of eight nursing instructors and had proved to be valid through two years of use. The objective test to assess the students' understanding of the content presented dealing with Tracheostomy care consisted of 27 multiple choice questions. The objective test of the content dealing with Intravenous Therapy consisted of 21 multiple choice items. These tests are criterion referenced: students are normally required to complete these tests as many times as necessary until they pass. A passing grade of 70 percent was established by the school curriculum committee. Thus, students must correctly answer 19 questions to pass the Tracheosomy test and 15 questions

to pass the Intravenous Therapy test. Only the students' first efforts on each test were included in the data analysis. In the analysis, student scores were recorded to one (1) for a passing grade and zero (0) for a failing grade. This was done to provide a dichotomous variable for the discriminant analysis of the data. Reliability calculations (Kuder-Richardson) were conducted on both exams. These calculations showed a reliability coefficient of .720 for the Tracheostomy exam and a .673 for the Intravenous Therapy exam.

The personality traits to be studied were assessed through the use of the Dogmatism Scale, the Internal-External Scale and the Self esteem Inventory. These instruments were used in their modified form for adults, as described by Frerichs.[4] The combination of the three scales created an instrument 127 items in length (not counting the five demographic data items which preceded the three personality scales).

The Dogmatism Scale (DS) is a 40-item scale consisting of a series of statements formulated to measure the openness of the individual's belief system. The format of the instruments is an "agree-disagree" forced choice design. All 40 statements are phrased in a dogmatic manner. If the student agrees with all 40 statements, he/she will have achieved the highest possible score and thus will be assessed as highly dogmatic. Rokeach reports a mean test-retest

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[4]Marian Frerichs, "Relationship Between Age, Dogmatism, Internval vs. External Control, Self Esteem and Grade Point Average Among Community College Nursing Students," (Doctoral dissertation, Northern Illinois University, 1971).

reliability coefficient of .74.[5] Alter and White reported split-half test-retest reliability over five months of .75 and over six months of .73.[6] Other studies using the Dogmatism Scale revealed essentially the same findings.[7]

The Internal-External Scale (IE) is a 29-item forced choice scale with two statements within each item. Subjects are asked to choose one of the two statements from each item which most accurately states what they believe to be true. One statement is an "internal" locus of control response; the other is an "external" locus of control response. In scoring the instrument, the "external" answers are totalled. Rotter (1966) reports a test-retest reliability coefficient of .78 after a one-month period.[8]

The Self Esteem Inventory (SEI) is a 58-item scale in which subjects are asked to decide whether the statements are "like I usually feel" or "not like me." Eight items included among the 58 comprise a lie scale and are not included in the scoring. The instrument examines the subjects' self-esteem in four areas: peers, family, schools, and personality interests. Scores on the SEI may

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[5] Rokeach, The Open and Closed Mind, pp. 89-90.

[6] Richard Alter and R. J. White, "Some Norms for the Dogmatism Scale," Psychological Reports, 19 (1966), pp. 967-969.

[7] J. B. Hough and R. Ober, "The Effects of Training in Interaction Analysis on the Verbal Teaching Behavior of Preservice Teachers," Interaction Analysis: Theory, Research and Application, ed. E. Amidon and J. Hough (Reading, MA: Addison Wesley, 1967).

[8] J. B. Rotter, "Generalized Expectancies of Internal versus External Control," pp. 10-13.

range from zero (0) to 50. The higher the numerical score, the higher the level of self-esteem indicated by the respondent. The Self Esteem Inventory has produced a test-retest reliability coefficient of .88 after five weeks and .70 reliability after three years.[9]

Treatment

The three personality profile instruments were administered to the students by their master instructor. Students were allotted as much time as they needed to complete the three instruments.

The treatment consisted of the viewing of two instructional lessons by each of the two treatment groups. One group ("A"), as a whole, viewed a lecture on care of the patient receiving Intravenous Therapy and they were then assigned to view at some time in the next nine weeks a filmstrip/cassette program on care of the patient with a Tracheostomy. The second group ("B") viewed a lecture on care of the patient with Tracheostomy and were assigned the task of viewing a filmstrip/cassette program on care of the patient receiving Intravenous Therapy. The two lectures were constructed around the objectives and scripted statements contained within the filmstrip/cassette programs. The lecturer (who gave both the I.V. and the Trach lectures) was given an outline for the presentations but was allowed some latitude in pace and presentation order. In this way content was kept as uniform as possible between the two treatments. A diagram of the treatments follow:

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[9]Coopersmith, The Antecedents of Self Esteem, p. 18.

		Treatment	
		Lecture	Mediated Self-Instruction
CONTENT	Intravenous	Group A	Group B
	Tracheostomy	Group B	Group A

After viewing their respective lectures, the students were administered an objective test to measure their comprehension of the material which had just been presented to them. Students were also required to complete an objective test on the information presented to them in the required mediated self-instructional material. All viewing of media was completed in the School of Nursing's Learning Resources Center. Students were allowed to schedule their own time for viewing the mediated program and completing the objective test on that content.

Procedure

All students in the study were asked to complete a personal profile inventory which included the Dogmatism Scale (DS), the Internal-External Scale (IE) and the Self esteem Inventory (SEI). This 133-item instrument was administered to the students by their master instructor 2-3 weeks before the treatment was administered. Students were told that the purpose of the instrument was to assess the attitudes and values of junior-year nursing students. Students were assured that the results of the Inventory would be confidential and would in no way

affect their grade in the course.

Treatment group "A" (N = 67) attended a 50-minute lecture setting forth the principles of caring for the patient receiving Intravenous Therapy. Immediately following the lecture a 21-item paper and pencil multiple choice exam was administered, testing the comprehension of that material by the students in that group. Group "B" (N = 92) attended a 50-minute lecture setting forth the principles of caring for the patient with a Tracheostomy. Following that lecture, a 27-item paper and pencil multiple choice exam testing that content was administered. Both lectures were given by the same School of Nursing instructor to reduce variance due to lecturer's style or personal charisma.

Groups A and B were assigned independent tasks, to be completed by the end of the semester (approximately 9 weeks after the lectures) in the School of Nursing Learning Resources Center. Group A, which had attended the lecture on I.V. Therapy, was assigned the task of viewing a mediated self-instructional filmstrip/cassette program on caring for the patient with a Tracheostomy. Group B, which had attended the lecture on Tracheostomy care, was assigned the task of viewing a mediated self-instructional filmstrip/cassette program on I.V. Therapy. Both groups were required to complete a paper and pencil multiple choice exam on the content transmitted through their respective filmstrip/cassette programs. After viewing the filmstrip/cassette program of Tracheostomy, Group A students were administered the same test as had been administered the Group B students after the lecture on that subject. Conversely, Group B

students, after viewing the filmstrip/cassette program on I.V. Therapy, were administered the same test as had been completed by Group A after the intravenous therapy lecture. Viewing of the filmstrip/cassette programs was completed by the students on an independent basis throughout the course of the semester. Students would drop in to the LRC at any time and view the designated program on their own time and at their own pace.

Statistical Treatment

After the data had been collected, it was processed using the Statistical Package for the Social Sciences (SPSS).[10] A discriminant analysis was completed to assess any significant differences between the treatments (lecture and mediated self-instruction) and the existence of interactions between any of the variables under study (lecture, mediated self-instruction, dogmatism, locus of control and self-esteem).

The Statistical Null Hypotheses tested were:

1. There are no significant differences between the performance of the two treatment groups on a test of content detailing care of the patient with Intravenous Therapy.

2. There are no significant interactions between the performance of the two treatment groups on test of content detailing care of the patient with Intravenous Therapy and their scores on the DS, IE, and SEI.

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[10] N. H. Nie, D. H. Bent and C. H. Hull, Statistical Package for the Social Sciences (New York: McGraw-Hill, 1970).

3. There are no significant differences between the performance of the two treatment groups on test of content detailing care of the patient with a Tracheostomy.

4. There are no significant interactions between students' performance on tests of content detailing care of the patient with Tracheostomy and their scores on the SEI, DS, and IE.

ANALYSIS OF DATA

This chapter examines the data which were collected from the investigation of the research questions. The questions analyzed were:

1. Is there a significant difference between students' performance on tests of content taught through didactic, large group instruction and tests of content taught through mediated self-instruction?

2. Are there significant interactions between students' scores on the Dogmatism Scale, the Internal-External Scale, and the Self Esteem Inventory and students' performance on tests of content taught through mediated self-instruction or through large group lecture instruction?

Analysis of Hypotheses

The first and second hypotheses related to the treatment variables since they were used to present content detailing care of the patient receiving Intravenous Therapy. The statistical treatment used dictates that the first and second hypotheses be discussed simultaneously. The first hypothesis tested was: "There are no significant differences between the performance of the two treatment groups on a test of content detailing care of the patient with

Intravenous Therapy." The second hypothesis tested was: "There are no significant interactions between the performance of the two treatment groups on tests of content detailing care of the patient with Intravenous Therapy and their scores on the DS (Dogmatism Scale), the IE (Internal-External Scale), and the SEI (Self Esteem Inventory). A discriminant analysis was used to test these hypotheses. A series of analyses were accomplished, using the dependent variable as a dichotomous variable (pass/fail). These preliminary analyses narrowed the choice of independent variables to be included in the final analysis to the main effects only: Group, DS, IE and SEI. Past experiences in using the I.V. tests showed that approximately 25 percent of the subjects completing this test would fail it the first time administered. Therefore, the PRIORS option in the SPSS program was utilized to enter such parameters into the analysis. The discriminant analysis of the I.V. data yielded is shown in Table 1. Wilk's Lambda and F ratios were calculated separately on each of the four independent variables to assess their strength as discriminators and the statistical significance of that strength (d.f. = 1 and 157) is shown in Table 2. The significant F ratios of Group and SEI indicate that those two variables separately may assist in classifying subjects to one of the categories of the dependent variable (pass or fail).

Further analysis of the data yielded is shown in Table 3. The Standardized Canonical Coefficients of Group (.6431) and SEI (-.6222) point to those two variables as being significant factors in classifying subjects to one of the categories of the dependent variable.

Table 1

Group Means and Standard Deviations
Intravenous Therapy Variable

		Group	DS	IE	SEI
Failed	($\bar{X}$)	0.571	16.024	12.214	34.405
	(SD)	0.501	4.598	3.695	9.308
Passed	($\bar{X}$)	0.367	14.658	11.692	37.906
	(SD)	0.484	5.323	3.861	7.104
Grand Mean		0.421	15.019	11.830	36.981
	(SD)	0.495	5.163	3.804	7.870

Table 2

Tests of Significance: I.V. by
Group, DS, IE and SEI

Variable	Wilks' Lambda	F	Significance
Group	0.9668	5.382	0.0216
DS	0.9863	2.179	0.1419
IE	0.9963	0.580	0.4473
SEI	0.9613	6.324	0.0129

Table 3

Discriminant Analysis of Intravenous Therapy Variable

Variable	Standardized Canonical Coefficients	Pooled Within-Groups Correlations
Group	0.6341	-0.7448
DS	0.2231	0.6872
IE	-0.0126	0.4372
SEI	-0.6222	0.2256

The Standardized Canonical Coefficient and Pooled Within-Groups Correlation of the variable Group reveal the significance of differing instructional methods in this study. Table 4 shows the direction of the independent variables' relationship to the dependent variable. In this analysis it is determined that the students who received the instruction through lecture method were more likely to fail the test of I.V. content. Therefore, Hypothesis 1 was rejected.

An analysis of the combined variables on function 1 (I.V. scores) is shown in Table 5. The analysis in Table 5 shows a significant discriminating power in the four independent variables used in the analysis. Although these variables are relatively weak discriminators (Wilks' Lambda being an inverse measure of the percentage of variance explained by the independent variables used in the

Table 4

Group Centroids
Intravenous Therapy
Variable

Group	Function 1
Failed	0.4469
Passed	-0.1604

Table 5

Canonical Discriminant Function:
Intravenous Therapy Variable

Function	Wilks' Lambda	Chi-square	df	Significance
1	0.9323	10.863	4	0.0281

analysis), their ability to classify subjects into correct groups is statistically significant. This is confirmed by the classification results shown in Table 6. Table 6 indicates that no cases were predicted to fall in the "failed" (0) category. The fact that 42 of the 159 subjects did fail yielded the noted classification percentage.

The two groups in this analysis met the necessary assumption of homogeneity on a test of Equality of Group Covariance Matrices.

Analysis of the first and second hypotheses through the use

Table 6

Classification Results
Intravenous Therapy
Variable

Actual p	Number of Cases	Predicted Group Membership 0	1
0	42	0	42
1	117	0	117

Percentage of "grouped" cases correctly classified: 75.47%

of discriminant analysis revealed a significant ability of the variables Group and SEI to classify subjects into a category of the dependent variable. In this analysis it may be predicted that a subject assigned to Group One (lecture) is more likely to fail the test on caring for the patient receiving Intravenous Therapy. Subjects with high scores on the SEI are more likely to pass this test. Thus, the null hypothesis in Hypothesis 2 was rejected.

Although the scores of the dependent variable in this analysis make it appear to be a continuous measure, these tests were designed for mastery learning and the students' ability to pass the test at the 70 percent level was the only measure recorded. Actual tests scores were not considered in this evaluation. To analyze this data as if it were continuous, a multiple regression analysis was accomplished. No statistically significant findings were obtained.

The third and fourth hypotheses related to the treatment variables as they were used to present content detailing care of the patient with a Tracheostomy. The statistical treatment used dictates that the third and fourth hypotheses be discussed simultaneously. The third hypothesis tested was: "There are no significant differences between the performance of the two treatment groups on a test of content detailing care of the patient with a Tracheostomy." The fourth hypothesis tested was: "There are no significant interactions between the performance of the two groups on tests of content detailing care of the patient with a Tracheostomy and their scores on the DS, IE, and SEI." A discriminant analysis tested these hypotheses. A series of analyses was completed, using the dependent variable as a dichotomous variable (pass/fail). These preliminary analyses narrowed the choice of independent variables to be included in the final analysis to the main effects (Group, DS, IE, and SEI) and the first order interactions with Group, (GDS, GIE, and GSEI). Past experience in using the Tracheostomy test showed that it was probable that approximately 25 percent of the subjects completing this test would fail it the first time it was administered. Therefore, the PRIORS option in the SPSS program was utilized to enter such parameters into the analysis.

The discriminant analysis of the Trach data yielded is shown in Table 7. It should be noted that the standard deviations, especially in GDS, GIE, and GSEI are very large, in some cases surpassing the group means. These unexpected standard deviations may have resulted

Table 7

Group Means and Standard Deviations
Tracheostomy Variable

		Group	DS	IE	SIE	GDS	GIE	GSEI
Failed	($\bar{X}$)	0.316	14.316	11.263	34.632	4.053	4.579	8.843
	(SD)	0.478	4.295	3.429	11.786	6.249	7.042	15.082
Passed	($\bar{X}$)	0.435	15.114	11.907	37.300	6.750	5.136	16.100
	(SD)	0.498	5.275	3.857	7.180	8.335	6.356	18.927
Grand Means		0.421	15.019	11.830	36.981	6.427	5.069	15.233
	(SD)	0.495	5.163	3.804	7.870	8.145	6.447	18.613

in part from the fact that the two treatment groups did not prove to be homogeneous. On a test of Homogeneity of Group Covariance Matrices a significant difference was revealed between the two groups. Thus, the two groups did not meet the assumption of statistical equivalence postulated in the sampling procedure. The implications of this finding will be discussed later in this chapter.

Wilks' Lambda and F ratios were calculated separately on each of the four independent variables and the three first order interactions with Group to assess their strength individually as discriminators and the statistical significance of that strength (df = 1 and 157).

Table 8

Tests of Significance: Trach and Independent Variables

Variable	Wilks' Lambda	F	Significance
Group	0.9938	0.9805	0.3236
DS	0.9975	0.3987	0.5287
IE	0.9970	0.4779	0.4904
SEI	0.9879	1.9350	0.1662
GDS	0.9884	1.8450	0.1763
GIE	0.9992		0.7251
GSEI	0.9839	2.569[illegible]	0.1110

An F value of 3.91 is required for statistical significance; none of the above approached that level. Therefore, none of these

seven variables individually discriminated to the dependent variable.

Further analysis of the data yielded the following:

Table 9

Discriminant Analysis of Tracheostomy Variable

Variable	Standardized Canonical Coefficient	Pooled Within-Groups Correlations
Group	-0.6276	0.2391
DS	-0.1453	0.1525
IE	0.7347	0.1669
SEI	0.1388	0.3358
GDS	1.7573	0.3279
GIE	-1.9714	0.0851
GSEI	2.1537	0.3870

The Standardized Canonical Coefficients and Pooled Within-Groups Correlations of the variables Group, SEI, GDS and GSEI point to these four variables as being factors in the classification of subjects to the two groups of the dependent variable. Although the Standardized Canonical Coefficient of Group was high (-0.6276), the Pooled Within-Groups Correlation (0.2391) was too low to engender any confidence in its ability to discriminate subjects to the dependent variable. Therefore, Hypothesis 3 was retained.

Table 10 illustrates the direction of the relationship between the categories of the dependent variable and the discriminating independent variables.

Table 10

Group Centroids Tracheostomy Variable

Group	Function 1
Failed	-0.8917
Passed	0.1210

The three independent variables which have shown significant strength of discrimination and correlation (SEI, GDS and GSEI) all discriminate to the "passed" category of the dependent variable.

An analysis of the group means of the interaction variables show the differences among the two groups in their performance on the dependent variable measure is shown in Table 11. Table 11 shows a considerable difference between the two treatment groups in their performance on the SEI. There is also a noticeable difference between the scores of the "failed" group and the scores of the "passed" group within each treatment group. Students with high scores on the SEI who received this instruction through mediated self-instruction were more likely to pass the achievement test, while students with high scores on the SEI who received this instruction through a lecture were more likely to fail the achievement test. Conversely, students

Table 11

Tracheostomy Variable
Group Means: Group/SEI

	Mediated Self-Instruction	Lecture	GSEI
Failed	8.842	25.790	34.632
	(n = 6)	(n - 13)	(n = 19)
Passed	16.100	21.200	37.300
	(n - 61)	(n - 79)	(n - 140)
Grand Means	15.450	21.849	36.981
	(n - 67)	(n = 92)	(n = 159)

with low scores on the SEI would be expected to fail in the mediated self-instruction method and pass in the lecture method of instruction. Table 12 shows the difference in the performance of the two treatment groups in their performance on the DS. Students with high DS scores who received their instruction through mediated self-instruction were more likely to pass the achievement test while those students with high DS scores assigned to the lecture group were more likely to fail the Tracheostomy test. Conversely, low DS students in mediated self-instruction were more likely to fail, while low DS scores would seem to predict success in the lecture method of instruction.

Table 13 presents an analysis of the combined variables on Function 1 (Tracheostomy scores):

Table 12

Tracheostomy Variable
Group Means: Group/DS

	Mediated Self-Instruction	Lecture	GDS
Failed	4.053	10.263	14.316
	(n = 6)	(n = 13)	(n = 19)
Passed	6.750	8.364	15.114
	(n = 61)	(n = 79)	(n = 140)
Grand Means	6.508	8.632	15.019
	(n = 67)	(n = 92)	(n = 159)

Table 13

Canonical Discriminant Function
Tracheostomy Variable

Function	Wilks' Lambda	Chi-square	df	Significance
1	0.9015	15.919	7	0.0259

Table 13 shows significant discriminating power in the four independent variables and the three first order interactions with Group. The Standardized Canonical Coefficients, along with their associated Pooled Within-Groups Correlations, point to four variables (Group, SEI, GDS and GSEI) as contributing the greatest amount to the discriminating

ability of the total. Although these varialbes are weak discriminators (Wilks' Lambda = 0.9015), their ability to classify subjects into correct groups is statistically significant. This is confirmed by the classification results:

Table 14

Classification Results
Tracheostomy Variable

Actual Group	Number of Cases	Predicted Group Membership 0	1
0	19	3	16
1	140	3	137
Percent of grouped cases correctly classified: 88.05%			

Table 14 indicates that six cases were predicted to fall in the "failed" (0) category. In this study 19 students actually failed, yielding a classification success percentage of 88.05%.

The result of this analysis is that Hypothesis 4 is rejected. Analysis of the data revealed a significant ability of the four independent variables and the three first order interactions with Group to classify subjects into categories of the dependent variable. Particularly important discriminators in this analysis were the main effect variable SEI and the interaction variables GDS and GSEI.

Subjects with high scores on the SEI were more likely to pass the Tracheostomy test. Those subjects with higher scores on the DS and SEI who were assigned to treatment group one (mediated self-instruction) would also be expected to perform quite well on the Tracheostomy test. Conversely, those students with lower scores on the DS and SEI who were assigned to the lecture treatment would be expected to perform less well on the Tracheostomy test.

Although the scores of the dependent variable in this analysis make it appear to be a continuous measure, these tests are designed for mastery learning and the students ability to pass the test at the 70% level is all that is recorded. Actual test scores are not considered in this evaluation. To analyze the data as if it were continuous, a multiple regression analysis was accomplished. No statistically significant findings were obtained.

Discussion of Findings

The following hypotheses were stated and tested:

1. There are no significant differences between the pass/fail performance of the two treatment groups on a test of content detailing care of the patient with Intravenous Therapy.

2. There are no significant distinguishing interaction characteristics for those passing or failing a test of content detailing care of the patient with Intravenous Therapy and their scores on the Dogmatism Scale (DS), the Internal-External Scale (IE) and the Self-Esteem Inventory (SEI).

3. There are no significant differences between the pass/fail performance of the two treatment groups on a test of content detailing care of the patient with a Tracheostomy.

4. There are no significant distinguishing interaction characteristics for those passing or failing a test of content detailing care of the patient with a Tracheostomy and their scores on the DS, IE and SEI.

All four hypotheses were tested through a discriminant analysis. In the first hypothesis, it was discovered that within the discriminant analysis the method of instruction was a significant factor in classifying subjects to categories of the dependent variable. The students who learned through the mediated self-instruction

method were more likely to pass the I.V. test than those in the lecture group. This was an unexpected finding, as many previous studies had found no significant differences in the comparison of these two types of instruction. Thus, Hypothesis 1 was rejected.

In the second hypothesis, a significant relationship was found between students' performance and their scores on the Self Esteem Inventory. High scores on the SEI would seem to predispose the student to higher achievement on the test of content detailing care of the patient receiving Intravenous Therapy. However, no significant distinguishing interaction characteristics were discovered, so Hypothesis 2 was retained.

In the third hypothesis, a very weak relationship was found between instructional method and student performance within the discriminant analysis. The low correlation of this relationship caused Hypothesis 3 to be retained.

In the fourth hypothesis, it was found that the main effect variable, SEI, and the interaction variables GDS and GSEI, were effective discriminators to the Trach variable. Thus, Hypothesis 4 was rejected.

Conclusion

The two parallel studies described above identified conflicting information as to the effectiveness of the the

two treatments. The analysis of data used to test Hypothesis 1 found that students assigned to the mediated self-instruction group performed significantly better on a test of I.V. content than did students assigned to the lecture method. The analysis of data used to test Hypothesis 3 identified an advantage for the students assigned to the mediated self-instruction group. However, this advantage was not significantly significant. This was an unexpected result, as the treatment groups were identical and the instructional presentations were as identical as possible. The only difference between the two studies was the topic of the presentation. The differing results may be attributed to the variance of the dependent variable (Tracheostomy), or may be a result of the lack of homogeneity of the two sample groups. The conclusion one may draw from this analysis is that there may be instances when mediated self-instruction is a more effective method of instruction than lecture.

The analysis of Hypothesis 2 and Hypothesis 4 revealed a main effect between instructional method and personality traits. In both analyses the SEI trait was a significant discriminator of students to the "pass" category of the dependent variable for those students who had received their instruction through the media. In both instances students with higher SEI scores were more likely to pass the measures of the

dependent variable. The analysis of Hypothesis 2 revealed no interaction characteristics among the personality trait measures. In Hypothesis 4, the variables GDS (Group X Dogmatism Scale) and GSEI (Group X Self Esteem Inventory) revealed an ability to classify students receiving instruction through mediated self-instruction to the proper category of the dependent variable Trach. Students assigned to Group "A" (mediated self-instruction) with higher scores on the DS and SEI were more likely to pass the test of Tracheostomy content than those in the same group with low DS and SEI scores. It is not unexpected that the interaction variable GSEI should be found significant, as it is derived from two main effect variables found to be significant in the discriminant function.

Less expected was the significance of GDS (Group X Dogmatism) in the discriminant function. Analyzed separately, the DS variable had a negative weight and a low correlation. However, when combined with Group in the interaction variable GDS, the two became a significant discriminator in the analysis. Thus, it may be supposed that the interaction of two or more independent variables can contribute to the classification of subjects into a category of the dependent variable.

The single major conclusion of this study is that an analysis of the interactions between personality traits and type of instruction can assist the teacher in assigning

the student to an instructional treatment resulting in the greater likelihood that the learning will be successful for that student.