A Comparative Study of the Psychomotor Skill of Baccalaureate Students Instructed by Autotutorial or Lecture Method

By

Oma Sharon Rawson

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APPROVED:

[redacted]

Evelyn Schindler M. A., Associate Professor,
Clinical Investigation Adviser

[redacted]

Gerald Miller Ph. D., Professor First Reader

[redacted]

E. Lynne Loehning M. N., Instructor Second Reader

[redacted]

John M. Brookhart Ph. D., Chairman, Graduate Council

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CHAPTER I

INTRODUCTION

Nursing education faces the challenge of helping more students to acquire greater capabilities. Some complicating problems that are present in the process of educating nurses are 1.) increased enrollment with lack of clinical facilities to accommodate the larger numbers of students, 2.) varied educational and experience backgrounds of those enrolled, 3.) short supply of qualified instructors, 4.) high cost of nursing education with increasing tuition, 5.) rapid increases in scientific knowledge which necessitates a flexible and easily modified curriculum in formal academic education, as well as continuing education for nurses who are proficient practitioners capable of delivering quality nursing care to clients.

These factors must be considered when planning a program for nursing students. It is not enough that only a few students master the content of nursing and become proficient practitioners. The majority of students should be helped to reach high levels of achievement. Each student has his own unique way of learning, and for instruction to be effective it must meet the needs of individuals. This is becoming increasingly hard to accomplish with the traditional instructional

approach, because of the increasing enrollment and varied backgrounds of students.

The traditional approach allocates definite time periods for a specific amount of instruction to be given to a group of students. Whatever the amount of time allotted, it may be too long for some individual students and not long enough for others. What educational approach will be most effective in helping the majority of students to reach the goal of high attainment levels, in the least amount of time, that is essential for proficient practitioners? Autotutorial instruction with the use of multi-media is one of the strategies being used to meet the demands of individualizing instruction in nursing education. The question arises as to the effects autotutorial instruction have upon nursing education and the degree to which it can be responsive to students' learning needs.

Statement of the Problem

This study will be addressed to the problem, does autotutorial instruction, as compared with conventional lecture instruction, differentially effect measures of achievement or of psychomotor skill performance?

There are not enough definitive data available to help nursing educators make decisions regarding methods of instruction. There is a need to identify the method of instruction that will individualize

instruction for the majority of students and enable them to attain high levels of cognitive and psychomotor skill achievement.

Definition of Terms

Mastery learning: the attainment of a predetermined criterion level of knowledge, problem solving ability, and/or skill necessary to meet the stated behavioral objectives of the instruction (Block, 1971; Bloom, 1968; Carroll, 1963).

Autotutorial instruction: a method of instruction in which the student can proceed by independent study to fulfill specific behavioral objectives while using teacher designated instructional materials. These include various types of multimedia, programmed instruction, specific tangible items, and workbook materials (Postlethwait, Novak, & Murray, 1966). The terms individualized, multimedia, programmed, and autotutorial instruction will be used interchangeably in this report. Autotutorial instruction for this study was given in four sequential audioslide units of nursing content. The students viewed these units on an individual basis in a learning carrel.

Lecture instruction: the presentation of information by exposition and visual aids to a group of students (Good, 1959). Lecture instruction for this study was the presentation of four sequential units of nursing content. The visual aids used in the lecture instruction were a chalk board and one 16 mm film on the subject of shock.

Purposes of the Study

The first purpose of this study was to collect empirical data of the performance of two groups of students taught by autotutorial and lecture methods of instruction. The second purpose of this study was to answer the following questions:

1. Is there a significant difference in the level of achievement between autotutorial instruction and lecture instruction as demonstrated by observation of students' psychomotor skill performance?
2. Will there be significant difference in expenditure of time by two groups of students taught by autotutorial or lecture methods of instruction?
3. To what extent can the time spent in lecture or autotutorial instruction be correlated with achievement?
4. Will there be significant correlation between achievement levels by students on cognitive and psychomotor skill performance?

Review of Literature

Mastery Learning

The present educational system produces mastery for a few, mediocrity for the majority, and failure for some. Could it be that those who achieve mastery have learned to cope with the present

educational process, while all others lack the ability to cope and thus, have unmet learning needs? (Wolf & Quiring, 1971; Bloom, 1968).

Researchers have endeavored to discover some method whereby mastery achievement can be realized by a majority of students. Carroll (1963) developed a model for learning which implies that if given enough time and instruction geared to the student's learning abilities, the student can achieve as high a level of learning as that achieved by "A" students. His model proposes that if each student is given the time he needs to learn the subject material to a certain level of competency, and he spends the time required in active learning, that level will be reached. Conversely, if the student is not allowed sufficient time, the amount of learning he would attain could be expressed by the ratio of the time actually spent in learning to the time needed. Carroll (1963) identified the variables of 1.) aptitude, 2.) ability to understand, 3.) quality of instruction, 4.) opportunity for learning, and 5.) perserverance that can affect the time required for students to reach mastery.

In the application of a modified version of Carroll's model Airasian (1967) showed that 80% of the students achieved high levels as compared with 30% of students taught the previous year without the model. In the study, course material was divided into small units. After completion of each unit a short, ungraded test was given to provide feedback for teacher and student on the adequacy of the

teaching-learning process. The tests, or formative evaluations, provided the student with information on what areas had been mastered and unmastered. They provided the teacher with information as to student progress so that prescriptive/corrective alternate approaches could be given students who had not reached mastery. Commonly missed items were thought to indicate weaknesses in instruction and were corrected before proceeding to new content areas. Mastery of the course content was measured by students' attainment on a summative evaluation test, or final examination.

In a theoretical article Wolf and Quiring (1971) postulate the application of Carroll's model to nursing education. The variables of his model as applied to nursing are 1.) the consideration of students' rate of learning when planning each experience, 2.) the consideration of students' aptitude for verbal or visual skills when planning methods of instruction, 3.) consideration of course sequence that bests facilitates students' learning, 4.) development of tests that assess students' progress and give supplementary or corrective assistance to those who have not reached mastery, 5.) consideration of students' willingness and factors which may influence the willingness, when planning course content. In order to utilize this application of Carroll's model as outlined by Wolf and Quiring (1971) the learning needs of each individual student would have to be identified before planning content, method of instruction, and learning experiences.

Webb (1972), Block (1970), Airasian (1969), and Bloom (1968) found that the majority of students reached the stated level of competency because of improved instruction with formative evaluation feedback and prescriptive/corrective procedures for individuals. If more time is allotted to the beginning units it has been found that less time and correctives are required in subsequent units.

Extensive mastery learning research has been carried out. Mastery learning has been implemented in subject areas ranging from arithmetic to physics, languages, philosophy, and physical education at all levels of education. Block (1971) states that the results of 40 major studies carried out under actual school conditions have revealed that three-fourths of the students taught by mastery learning have achieved the same level as the top one-fourth under conventional group-based instructional conditions. Airasian (1971) has demonstrated that mastery can be accomplished in large group classes.

Instructional Method

How to transform new and promising ideas into practice has always been a problem. Can mastery learning be incorporated into various methods of instruction? Programmed, or autotutorial instruction was devised with the idea that learning would be individualized and students could achieve mastery of the subject content. Block (1971) states that programmed instruction is effective in helping

some students, but not all to reach high levels of achievement.

According to Zeckhauser (1972), Lucas (1971), and Dressel (1966) the multimedia approach to individualized instruction increased the interest in the content and provided the student with the opportunity to learn at his own rate. Postlethwait, Novak, and Murray (1966) developed autotutorial instructional methods at Purdue University. They found, after extensive experience, that this method of instruction allowed for improved learning and more intensive coverage of course content.

Some benefits for students to be derived from the autotutorial method reported by Mackie (1973) and Koch (1975) included: 1.) higher degree of student satisfaction with course outcome, 2.) student may study and make use of audiovisual aids as he wishes, 3.) rapid learner will finish sooner and the slower learner is allowed to repeat the material as necessary, 4.) all students are stimulated by active responding.

Teacher benefits that can be derived from the autotorial instruction include the following: 1.) relieves the teacher of repetitive teaching, 2.) the teacher has more time to interact with students, 3.) provides for increased program uniformity, 4.) increases the probability that students would learn what is being taught, and 5.) increases the number of students that can be taught by one instructor (Koch, 1975; Coye, 1969; Griffin et al, 1965).

Comparative Studies of Instructional Methodologies

The teacher must choose the method of instruction that best lends itself to mastery learning by students. Many comparative studies have been made in public school education to determine which method of instruction is the most effective. Dubin and Taveggia (1968) reanalyzed the data of 91 comparative studies of college teaching methods conducted between 1924 and 1965. Fourteen of the 91 studies compared supervised independent study with the lecture method. Forty-eight per cent favored supervised independent study and 52% favored lecture instruction. The conclusion reached from these data is that neither method is to be preferred when evaluated by final examination. Results of comparative studies done by McCue (1973), DeBoer (1972), and Atherton (1971) found no statistical significant difference between the individualized approach versus the lecture approach.

Comparison studies carried out in nursing have revealed that (Becker & Mihelcic, 1966) students learned by slide with audiotape recording and were able to transfer from the laboratory to the hospital setting. No mention was made as to how it compared with other methods of instruction. Weslley and Hornback (1964) found no significant difference between television and "face-to-face" demonstration instruction for four motor skills or for any one of the individual motor skills. Bitzer (1966) on a very small sample did find a

significant difference in favor of programmed instruction with high speed digital computer media over the conventional method of teaching.

Craytor and Lysaught (1964) compared programmed instruction with the lecture method of teaching. Data reported in the tables do not demonstrate a significant difference in achievement between the experimental and control groups. There was an increase in knowledge of the subject matter demonstrated by all subjects.

Thompson (1972) in a comparison of traditional and autotutorial methods of learning found no significant difference in achievement between groups. Student attitudes were also studied. The initial response was unfavorable toward autotutorial instruction, but after a period of adjustment students were found to prefer the autotutorial method over the traditional lecture approach.

Stein, Steele, Fuller, and Langhoff (1972) found no appreciable difference in achievement between students of the two groups in a study of multimedia independent instruction with traditional classroom instruction in either cognitive performance or in clinical performance. A study done by Quiring (1972) showed that there was no significant difference on the cognitive aspects of learning between autotutorial method and lecture-demonstration method of instruction, but a high statistical significance was found in favor of the autotutorial instruction and psychomotor performance of a skill.

Many studies have been done in education on the effects of different teaching methodologies on performance. However, if research based decisions are to be made in favor of one method of instruction over another, that research is yet to be done. Studies have not shown a clear cut preference for any one method. Is it possible that in the comparative studies the final examinations used as measuring instruments were too weak to detect any difference? Were there confounding variables not controlled for in the studies, such as textbooks available to all students from which questions were taken for the final examination? Dubin and Traveggia (1968) found this point to be true.

Fewer studies have been made of teaching clinical behaviors to students of nursing. Contradictory evidence has been found among the studies done in the field of nursing. Most of the comparative studies tested for cognitive aspects of learning, few have been done testing psychomotor performance. Could tests for psychomotor performance as well as cognitive performance be instrumental in detecting a significant difference in instructional methodologies?

CHAPTER II

METHODOLOGY

An empirical study, using a pretest-posttest design, was conducted for the purpose of determining which method of instruction, autotutorial or lecture, was most effective in enabling students to gain mastery of four sequential units of nursing content. The study tested students' psychomotor skill performance after instruction by either autotutorial or lecture method.

A simulated patient situation for the immediate care of the hypovolemic shock patient was designed for this study (Appendix C). A behavioral checklist designating the specific behavioral skills necessary to care for the simulated patient in this situation was also designed (Appendix D). A panel of three nursing instructors evaluated the situation and checklist. There was no disagreement on the part of the three panel members as to their assessment of the content and appearance of the situation and items on the checklist. Three observers were selected from the nursing faculty and trained to record students' performance using the checklist.

A pilot study consisting of the three observers recording the pretest and posttest psychomotor skill performance of three junior nursing students in the simulated situation was conducted to test the tool and observer reliability. With the use of the checklist the

observers were able to record whether or not the students demonstrated the stated behavioral skills. The interrater reliability ratio was .93.

Permission to conduct the study was obtained from the Dean of Walla Walla College School of Nursing. This school of nursing was chosen because the autotutorial method of instruction is currently being initiated to a limited extent. Walla Walla College School of Nursing, a Seventh-day Adventist operated school, has an approximate enrollment of 400 students in the baccalaurate degree program. The school has a divided campus. Lower division courses of liberal arts and basic science are taught on the main campus at College Place, Washington. Upper division nursing courses are taught in Portland, Oregon. This study was conducted on the Portland campus where clinical facilities are located and nursing content is taught.

Sample

The population from which the sample was drawn consisted of 62 second quarter junior students of nursing in a baccalaurate program. A table of random numbers was used to select 22 students as subjects for the study. The 22 Ss selected were in turn randomly assigned to two groups with 11 Ss in each group. Two students withdrew from the program leaving 20 Ss in the study with ten in each group. The Ss were enrolled in one class with a total enrollment of

40 students. Although there were only 20 second quarter students included as Ss in the study, all 40 members of the class were divided into the two groups, received instruction by either lecture or autotutorial method, and were tested the same as the sample. The 20 members of the class not included as Ss in the study served as a control group. An explanation of the group assignments, methods of instruction, testing procedures, and an estimation of time required was given to all 40 students and their instructors. There was no disclosure made as to which students were included as Ss in the study. Due to circumstances within the school it was not possible to maintain a blind procedure during the testing. However, identity of group membership was not provided.

A pretest was given using the behavioral checklist as an instrument to obtain data on the psychomotor skill performance of the Ss in both groups. Both of the groups received the same objectives, reading assignment (Appendix E), study guide outlines (Appendix F), and viewed a 16 mm film on the subject of shock. A record of time expenditure required for the Ss to complete the pretest, units of instruction, and posttest was kept for both groups.

Group I studied four autotutorial sequential units on the subject of shock by audioslide presentation (Script, Appendix G). These units were designed by the researcher and an associate researcher, Abrams. Titles of the units are as follows:

Unit I Shock: Definitions, Classifications, and Etiological Factors.

Unit II The Pathophysiology of Shock.

Unit III Shock: Prophylactic and Therapeutic Intervention.

Unit IV Complications of Shock.

An orientation period was given the Ss of Group I in the use of the audioslide materials. The Ss were told that if they had any questions regarding the material in the units to seek answers from the researchers.

The four audioslide units were placed on reserve in the library. The librarian was given a list of the Ss in Group I with the instructions that only these students should be allowed to use the units. When each of the Ss wished to use the units, he/she would check them out of the library and take them to the learning carrel for viewing. The S would return the units to the library after each viewing session. Two weeks were allocated for the completion of the autotutorial instruction. Subjects could chose when during this two week period they wished to view the units.

Following completion of the instruction, each S's psychomotor skill performance was recorded according to a prearranged schedule. The testing for all of the Ss in the study was done the next day following the two week time allottment for completion of the instruction. Psychomotor skill testing for the control group was done two days

after completion of the instruction. The three observers used the behavioral checklist to record the Ss' ability to provide care for the hypovolemic shock victim in the simulated situation.

Group II attended regularly scheduled class periods and a record of attendance was taken at the beginning of each period. This group was taught the same content contained in the four sequential autotutorial units by lecture. The instructors closely followed the script from the autotutorial units when lecturing to this group. A chalk board was used to illustrate the material being presented. No time was allocated for discussion of the material. Questions raised by the Ss during these class periods were answered by referring to the content contained in the script. The day following completion of the instruction, the Ss' psychomotor skill performance was recorded by the three observers using the behavioral checklist.

Procedure for Data Collection

A pretest and posttest of the Ss' psychomotor skill performance in a simulated situation was recorded by the three trained observers using the behavioral checklist. The same situation and testing procedures were used for the pretest and posttest. Each S of both groups was tested individually according to a prearranged schedule.

Upon entering the testing area, the S was given a narrative of the simulated patient situation. Instructions were then given

regarding 1.) the 25 minute maximum time allotment for the test, 2.) the equipment available for the S's use during the test, and 3.) the method of relating significant information necessary for the S to make critical judgments regarding the shock victim's need for nursing intervention.

The S then proceeded to perform the necessary skills for the simulated situation. Any verbal communication, i.e., statement of pain, or specific measurement values, i.e., vital signs, associated with the skill were related to the S by the researcher, who recorded them on the blackboard as they were performed.

The observers recorded the skills on the behavioral checklist as they were demonstrated by the Ss. Each of the observers recorded the S's psychomotor skill performance as follows:

1. a score of 2 was given if each of the three top priority skills were performed in proper sequence,
2. a score of 1 was given for each of the skills performed,
3. no score was given if the skill was omitted.

The test score for each S consisted of the sum of the three observers' recordings. A percentage of the maximum performance was determined for each S.

A simultaneous study, conducted by a fellow researcher, Abrams, tested the cognitive skill achievement on immediate and delayed recall of knowledge by essay examination. Both studies used

the same sample, group assignment, and instruction.

The sequencing of events that occurred with both studies is as follows:

1. psychomotor pretest from the present study,
2. cognitive pretest from Abrams' study,
3. instruction by either autotutorial method for Group I or lecture method for Group II,
4. psychomotor posttest from the present study,
5. immediate cognitive posttest from Abrams' study,
6. delayed cognitive posttest, four weeks after completion of instruction, from Abrams' study.

Data from both studies were used to determine the correlation between psychomotor and cognitive achievement of Ss.

CHAPTER III

RESULTS AND DATA ANALYSIS

A pretest and posttest of the Ss' psychomotor skill performance in a simulated situation was recorded by the three trained observers using the behavioral checklist. The test scores for each S consisted of the sum of the three observers recordings. The percentage of maximum performance was then determined. It is presented in Figures 1 and 2. Raw data in table form is shown in Appendix H.

Figure 1. Psychomotor pretest scores for Group I (Autotutorial) and Group II (Lecture) using percentage of maximum performance.

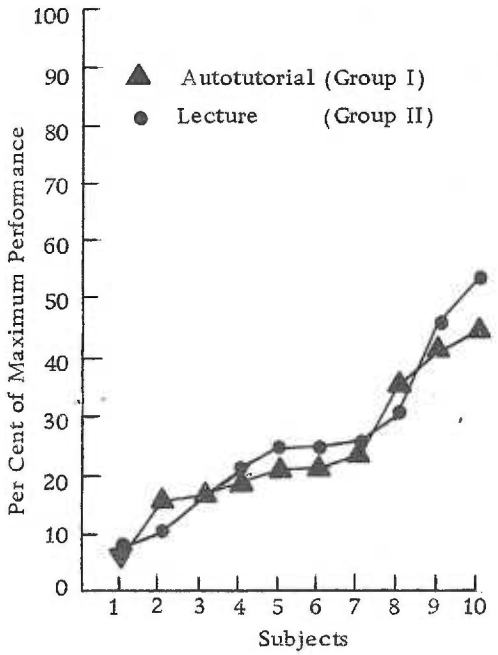
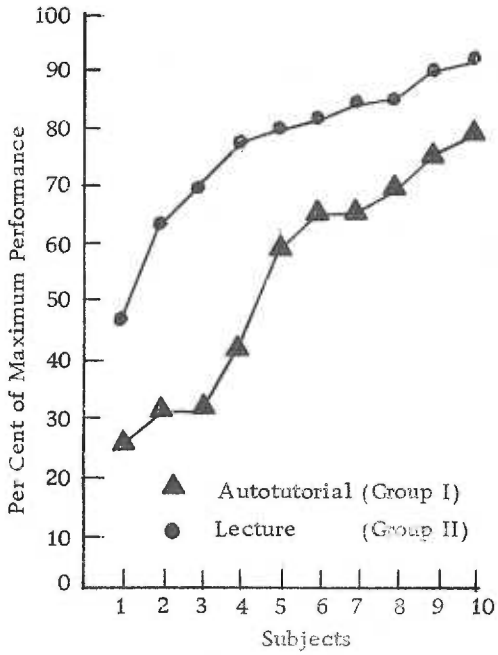


Figure 2. Psychomotor posttest scores for Group I (Autotutorial) and Group II (Lecture) using percentage of maximum performance.



A t-test using the .05 level of significance was done to answer the stated research questions: (see Table 1)

Table 1

Results of t-Test and Statistical Level of Significance for Levels of Achievement between Groups and Time Expenditure between Groups

	Groups		Degrees of Freedom	T Ratio	.05 Level of Significance
Achievement Levels	Sample Group I	Sample Group II	18	2.190	2.101
	Control Group I	Control Group II	20	2.512	2.086
Instructional Time	Sample Group I	Sample Group II	18	2.847	2.101
	Control Group I	Control Group II	8	2.346	2.306

1. Is there a significant difference in the level of achievement between autotutorial instruction and lecture instruction as demonstrated by observation of students' psychomotor skill performance?

   The mean achievement scores were:

   Group I (Autotutorial) 17.3

   Group II (Lecture) 28.7.

   The t-test value of 2.19 was significant ($p < .05$).

This indicated that the psychomotor skill performance of Group II, the lecture group, was significantly higher than that of Group I, the autotutorial group.

The results from the control group further substantiated the fact that Group II's performance was significantly higher than Group I. The control group consisted of members of the class that were not included in the study but received the same treatment as the study Ss.

The mean achievement scores for the control were:

Control Autotutorial 24.77

Control Lecture 34.54.

The t-test value of 2.512 was significant ($p < .05$).

2. Will there be significant difference in expenditure of time by two groups of students taught by autotutorial or lecture method of instruction?

The mean instructional times were:

Group I (Autotutorial) 246 minutes

Group II (Lecture) 320 minutes.

The t-test value of 2.85 was significant ($p < .05$).

Group I expended significantly less instructional time than Group II. This was also found to be true for the control group.

The mean instructional times for the control were:

Control Autotutorial 277 minutes

Control Lecture 320 minutes.

The t-test value of 2.346 was significant ($p < .05$).

Correlation tests were computed to answer the following research questions: (Correlation matrix, Appendix I)

1. To what extent can the time spent in lecture or autotutorial instruction be correlated with achievement?

An r correlation value of 0.697 was found for Group I, the autotutorial group. This value was significant at the .05 level for 9 degrees of freedom.

An r correlation value of 0.00031 was found for Group II. This value was not significant.

2. Will there be significant correlation between achievement levels by students on cognitive and psychomotor skill performance?

Correlation tests were computed using the data from the cognitive pretest, posttest, gain, and delayed test scores of Abrams' study and the psychomotor pretest, posttest, and gain scores of the present study.

The computed correlation value of 0.573 between cognitive and psychomotor posttest scores was found to be significant at the .05 level for 17 degrees of freedom. Significance at the .05 level was also found between cognitive gain scores and psychomotor gain scores. The computed correlation value for r was 0.481 with 17 degrees of freedom.

Table 2

Summary Table of Analysis of Variance for Psychomotor Gain Scores of Second Quarter, First and Third Quarter Junior Students of Nursing Instructed by Either Autotutorial or Lecture Method

	Source	D.F.	S.S.	M.S.	F	Significant Levels .05	.01
Length of time in program	A	1	518.400	518.400	4.797	4.11	
Instructional methods	B	1	1200.932	1200.932	11.114		7.39
	AB	1	67.415	67.415	0.623	N.S.	
	Error	36	3889.982	108.055			

A two way analysis of variance test was computed on the gain scores of second quarter, first and third quarter students to determine if there was any interaction between the length of time the Ss were in the nursing program and the method of instruction used in presenting the nursing content.

No significant interaction was found. The F test value was 0.623. Therefore, the variables of length of time Ss were in the program and methods of instruction will be analyzed separately.

Significance of psychomotor skill achievement was found at the .05 level for the length of time Ss were in the nursing program. The computed F test value was 4.797.

The mean achievement scores were:

First Quarter Students	35.28
Second Quarter Students	23.00
Third Quarter Students	27.38.

Means of achievement between instructional methods were found to be significant at the .01 level. The F test value was 11.114.

Discussion

Study findings indicated that lecture method influenced psychomotor skill performance to a greater degree than was found for the autotutorial method. This would seem a particularly interesting finding, since related studies (Stein, Steele, Fuller & Langhoff, 1972) indicated no significance between instructional methods, or as in Quiring's (1972) study the autotutorial instruction was significant for psychomotor skill achievement. Several reasons might be suggested that affected the Ss' ability to perform: attitudes of the Ss toward instructional methods and the amount of time spent in actual instruction.

The attitude of the Ss to the introduction of a new teaching method such as autotutorial instruction seemed to influence the Ss' ability to perform. While this study did not deal with Ss' attitudes toward instruction, some of the reactions will be related in this report. Four of the Ss in Group I expressed frustration because of the

rapid rate of presentation by the audiotape. One other S in Group I found the autotutorial learning frustrating, and stated she wanted more teacher direction. Most all of the Ss expressed a dislike for instruction by multimedia. Two Ss from Group II stated they were "so happy to be in this group where we can discuss the material presented." The autotutorial instruction used by Group I was the first encounter the Ss had had with independent study of this magnitude. They seemed to be apprehensive about having to assume so much self-direction and were seeking for more teacher direction. These reactions were included to convey the possible reason for the lower levels of achievement in the autotutorial group. They were not included in this study to make generalizations regarding the attitudes of students toward autotutorial instruction. Thompson (1972) found that students' attitudes were not favorable toward autotutorial instruction when it was first introduced into the curriculum. However, after a period of adjustment, it was found that students preferred autotutorial instruction over lecture method. In the present study, it can be suggested that S dissatisfaction with the autotutorial method could have been decreased if there had been a longer, more comprehensive orientation period to this method of instruction.

It was not found in this study that the multimedia approach to learning increased student interest as reported by Zeckhauser (1972), Lucas (1971), and Dressel (1966). The Ss were still expressing

negative feelings about the use of multimedia instruction two quarters after the completion of the study.

The study indicated that there was significant difference in the length of time spent in instruction between groups. Group I spent less time in instruction with a lower level of measurable psychomotor skill achievement than Group II. There was a significant correlation between instruction time expenditure and level of psychomotor skill achievement for Group I. This would support Carroll's (1963) conclusion that mastery is related to length of instructional time.

A possible influence that affected individual S's performance was the simulated situation. Some of the Ss stated that the situation was "unreal". Several Ss asked if they were expected to talk to the "patient". The Ss had had limited exposure to simulated situations. In most instances the patient in these situations had been a classmate, not a patient manikin. The manikin was used instead of a live patient to help control for extraneous variables that might have occurred in nurse-patient relationships. Simulated situations have been used in nursing education to help students learn problem-solving techniques for cause-and-effect relationships. Students are allowed to make decisions in the simulated situation that would be actually dangerous in the clinical areas (Bitzer, 1960; McIntyre, McDonald, Bailey & Claus, 1972).

For some Ss the presence of the three observers and a specific amount of time allotted for completing the test were anxiety producing. This is not an unreasonable situation and it has been used in research (Dunn, 1970). Interference with S's ability to perform would depend upon the degree of anxiety produced and the S's ability to cope with this stress. However, the performing of skills in a limited amount of time with observers present is not an unusual situation in nursing. In the clinical areas nurses are frequently required to perform skills in life-threatening situations with numerous observers in attendance.

Performance of both groups may have been altered by the time interval between instruction and testing. It was not possible for the three trained observers to be present immediately following instruction. Testing was scheduled for the earliest time that the three trained observers could be in attendance. Each S was tested individually, thus lengthening the time interval between instruction and testing for some.

There was found to be statistical significance for the length of time Ss were in the program. The greatest degree of achievement was seen for the first quarter Ss, while the least achievement was seen for the second quarter Ss. The reason for this is not known. It could be suggested that first quarter Ss had more skills to learn than those Ss of the other two quarters. One possible reason why third quarter Ss' achievement was greater than that of second quarter Ss

may be linked to some motivational factors that made the learning of these skills more relevant to them.

A significant positive correlation was found between achievement levels on cognitive and psychomotor skill performance. This finding holds importance for nursing education because proficient practitioners of nursing are required to perform skills competently and to decide which skills should be provided for each given circumstance. Dunn (1970) indicated no significant correlation between cognitive achievement and psychomotor performance of specific tasks by practicing nurses. However, this study agreed with Quiring (1971), who found when studying nursing students that high critical thinking was positively correlated with the learning of psychomotor skills.

CHAPTER IV

SUMMARY AND CONCLUSIONS

The purpose of the study was to collect empirical data regarding the psychomotor skill performance of two groups of students taught by autotutorial and lecture methods of instruction. The data were collected on 20 second quarter, junior students in one baccalaureate nursing program. A psychomotor skill pretest and posttest were given to each S of the two groups. Treatment for Group I was autotutorial instruction by audioslide presentation and treatment for Group II was lecture instruction. A record was kept of instructional and testing time expenditure.

The results of this study revealed that there was a significant difference between groups. Group II (the lecture group) has a higher psychomotor skill performance than Group I (the autotutorial group). There was also found to be a significant difference between groups in the instructional expenditure of time. Group I spent less time in instruction than Group II.

A significant correlation was found between cognitive and psychomotor skill achievement of Ss. Data on cognitive skill achievement from a fellow researcher's study, Abrams, was used in this correlation.

Conclusions

On the basis of this study it can be concluded that:

1. students learned better by lecture instruction, but that learning did occur from both autotutorial and lecture instruction,
2. students are able to transfer theory knowledge to performance in a simulated situation,
3. the amount of time expended in instruction does affect the level of achievement,
4. there is a correlation between cognitive achievement and psychomotor skill performance.

Although no generalizations or conclusive statements can be made on the evidence of this study, serious consideration should be given to individual student learning preferences and abilities when deciding on instructional methodology.

Clinical evaluation, it is generally agreed, is the weakest aspect of the evaluation of nursing education (Hayter, 1973; McIntyre, McDonald, Bailey, & Claus, 1972; Dunn, 1970). The information gained from this study contributed significantly to the evaluation of the curriculum. It has shown areas where the teaching of patient assessment and mastery of skills need improvement. Some students cared for minor abrasions before identifying the major life-threatening source of injury. Total assessment with proper priority setting was

identified as an area of weakness. Another area of weakness was seen in the improper aseptic technique used during the catheterization procedure.

The following questions have been raised by this study:

1. Would the same results be obtained if the study were replicated using a larger sample?
2. To what extent does attitude toward instructional methodology affect students ability to perform?
3. Will biases be eliminated if students are given a period of time to adapt to new instructional methodology before conducting a comparative study?
4. Could the behavioral checklist designed for this study be used to record students' psychomotor skill performance when caring for other simulated hypovolemic shock situations, i.e., burns, post-operative hemorrhage, dehydration?
5. Could an instrument be designed to identify levels of proficiency instead of just the recording of the skills performed?

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APPENDICES

APPENDIX A

Letter Requesting Permission for Study

October 10, 1975

Miss Wynelle Huff, Dean
Walla Walla College School of Nursing
6014 S. E. Yamhill Street
Portland, OR 97215

Dear Miss Huff:

In partial fulfillment of requirements for a Master of Nursing Degree at the University of Oregon School of Nursing, I am undertaking a research study. This study involves the psychomotor skill achievement by junior students of nursing when instructed by lecture and autotutorial teaching methods.

In order to accomplish this study I need the cooperation of you and your staff since I plan to use Walla Walla College School of Nursing for my pilot and final study. Some of the staff will be asked to help evaluate students' psychomotor skill performance. Students will be randomly selected and assigned to the two treatment groups. The names of students or instructors will not be included in the study.

Upon completion of the study copies of the report will be placed in the libraries at the University of Oregon Health Sciences Center and Walla Walla College School of Nursing.

Thank you for your help with the implementation of this study.

Sincerely,

Sharon Rawson

Mrs. Rawson is a regularly enrolled graduate student at the University of Oregon School of Nursing. Any assistance you can offer Mrs. Rawson will be greatly appreciated.

Research Adviser

APPENDIX B

Letter Granting Request of Permission for Study

October 22, 1975

Sharon Rawson
4744 N. Lombard Street
Portland, OR 97203

Dear Mrs. Rawson:

I will be happy to cooperate and assist in any possible way with your study on students' psychomotor skill achievement. You will, of course, need to work cooperatively with the Level III (junior) staff in arranging to carry out your study.

I will be most interested in your study and its results.

Sincerely yours,

Wynelle J. Huff
Dean

WJH:lc

APPENDIX C

Simulated Patient Situation

SIMULATED PATIENT SITUATION

PRETEST-PSYCHOMOTOR SKILL

Mrs. Cathy Allen, age 32 years, was returning from her annual physical examination at Dr. Paul Smead's office. She was assigned a bill of excellent health. Weight 112 pounds, height 5 feet 3 inches, temperature 98.2, pulse 70, respirations 16, blood pressure 110/70. A pap test was done. Habits of daily living include only occasional use of caffeinated beverages, no alcohol or tobacco use.

Three blocks from her home a car raced through a red traffic light hitting Mrs. Allen's car broad-side. She arrived by ambulance at the emergency room of Efficiency Hospital. An I.V. of 5% glucose in Lactated Ringers was started by the ambulance drivers.

There is a physician on call, but not in residence at the hospital. You are the E. R. nurse responsible for Mrs. Allen's care. DEMONSTRATE your nursing actions.

SIMULATED PATIENT SITUATION

POSTTEST-PSYCHOMOTOR SKILL

Mrs. Cathy Allen, age 32 years, was returning from her annual physical examination at Dr. Paul Smead's office. She was assigned a bill of excellent health. Weight 112 pounds, height 5 feet 3 inches, temperature 98.2, pulse 70, respirations 16, blood pressure 110/70. A pap test was done. Habits of daily living include only occasional use of caffeinated beverages, no alcohol or tobacco use.

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There is a physician on call, but not in residence at the hospital. You are the E. R. nurse responsible for Mrs. Allen's care. DEMONSTRATE your nursing actions.

APPENDIX D

Behavioral Skills Checklist

BEHAVIORAL CHECKLIST

PSYCHOMOTOR SKILL - PRETEST

The Student Nurse's Performance Rating for Nursing the Patient in Hypovolemic Shock

Instructions: Make a one mark (1) in the column provided if the task is done.
Make a two mark (2) in the column provided if starred items are done in proper sequence.
If the behavior is omitted, write a zero (0).**

Behavior Observed	Ratings by Observers			Scores
	1	2	3	
*1. Check airway - looks in patient's nose and mouth. Turns head to side.				
*2. Assess for trauma, observes all areas.				
*3. Controls bleeding by applying pressure dressing.				
4. Moves patient gently.				
5. Elevates extremity.				
6. Checks vital signs P, R, B.P.				
7. Position for shock - head and body level, legs elevated.				
8. Speeds up I.V. fluid rate.				
9. Does not add extra blanket.				
10. Calls doctor, reporting observations.				
11. Checks vital signs.				
12. Gives pain Med I.V.				
13. Foley catheter.				
14. Urometer.				
15. Checks vital signs.				
16. Charts using flow sheet				

Student_____ Rater_____

**Three columns provides for the three observations made on each student.

BEHAVIORAL CHECKLIST

PSYCHOMOTOR SKILL - POSTTEST

The Student Nurse's Performance Rating for Nursing the Patient in Hypovolemic Shock

Instructions: Make a one mark (1) in the column provided if the task is done.
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4. Moves patient gently.				
5. Elevates extremity.				
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13. Foley catheter.				
14. Urometer.				
15. Checks vital signs.				
16. Charts using flow sheet				

Student_____ Rater_____

**Three columns provides for the three observations made on each student.

APPENDIX E

Behavioral Objectives for the Four Sequential Units of Instruction

BEHAVIORAL OBJECTIVES

UNIT I

Shock: Definition, Classification, and Etiological Factors.

Upon completion of this instructional unit the student will be able to:

1. Define shock.
2. Explain the mechanisms that may initiate shock.
3. Define hypovolemic shock.
4. Identify etiological factors predisposing to hypovolemic shock.
5. Assess the condition of the patient susceptible to hypovolemic shock.
6. Monitor the condition of the patient susceptible to hypovolemic shock.
7. Report pertinent observations concerning the patient.

Reading Assignment:

Beland, I.L., & Passos, J.Y. Clinical Nursing Pathophysiological and Psychosocial Approaches (3rd ed.). New York: Macmillan, 1975, pp. 799-817.

BEHAVIORAL OBJECTIVES

UNIT II

Pathophysiology of shock.

Upon completion of this instructional unit the student will be able to:

1. Identify the compensatory mechanisms that occur with generalized hypoperfusion.
2. Describe the effects of hypoperfusion resulting in anaerobic metabolism on the patient in hypovolemic shock.
3. Monitor data and interpret the condition of the patient with early or progressing signs and symptoms of hypovolemic shock.
4. Report pertinent observations regarding early or progressing signs and symptoms of hypovolemic shock.

BEHAVIORAL OBJECTIVES

UNIT III

Shock: Prophylactic and Therapeutic Intervention.

Upon completion of this instructional unit the student will be able to:

1. Describe appropriate intervention in a prophylactic and therapeutic approach to hypovolemic shock.

2. Initiate appropriate intervention in a prophylactic and therapeutic approach to hypovolemic shock.

BEHAVIORAL OBJECTIVES

UNIT IV

Complications of Shock

Upon completion of this instructional unit the student will be able to:

1. List the complications associated with hypovolemic shock.
2. Explain the prevention and treatment of complications by medical and nursing management.
3. Given a patient with complications of hypovolemic shock, the student will implement appropriate nursing interventions.

APPENDIX F

Study Guide Outlines for the Four Sequential Units of Instruction

STUDY GUIDE OUTLINE

UNIT I

Shock: Definition, Classifications, and Etiological Factors

1. Definition of shock.
    - 1.1 Capillary perfusion is inadequate to sustain life.
    - 1.2 Cells lack oxygen and nutrients.
    - 1.3 Metabolic wastes are not removed.
2. Classifications of shock.
    - 2.1 Based on area of primary failure.
        - 2.11 Pump failure--Cardiogenic shock.
        - 2.12 Fluid loss--Hypovolemic shock.
        - 2.13 Lack of peripheral resistance--Vasogenic and Neurogenic shock.
3. Definition of Hypovolemic shock.
    - 3.1 A hemodynamic and metabolic disorder resulting from loss of body fluid volume leading to inadequate cellular perfusion.
4. Causes of Hypovolemic shock.
    - 4.1 Loss of whole blood--hemorrhage.
    - 4.2 Loss of plasma fluid.
    - 4.3 Severe dehydration.
5. Assessment of the condition of the patient susceptible to Hypovolemic shock.
    - 5.1 Review of patient's record.
    - 5.2 Direct observation of the patient's condition.
    - 5.3 From the example delineate factors that predispose to shock.
6. Monitor the condition of the patient susceptible to Hypovolemic shock.
7. Report pertinent observations concerning the patient's condition.

STUDY GUIDE OUTLINE

UNIT II

Pathophysiology of Shock

1. Shock.
    1.1 Stage I.
2. Shock.
    2.1 Stage II.
        2.11 Adaptation.
        2.12 Compensation.
3. Compensatory Mechanisms occur in
    3.1 Sympathoadrenal and endocrine system.
    3.2 Circulatory system.
    3.3 Respiratory system.
    3.4 Urinary system.
4. Effects of hypoperfusion resulting in anaerobic metabolism on the patient in hypovolemic shock.
    4.1 Effects on the cell.
    4.2 Effects on electrolyte balance.
    4.3 Effects on the pH.
    4.4 Effects on the gastrointestinal tract.
    4.5 Effects on the reticuloendothial system.
    4.6 Effects on the lung.
    4.7 Effects on the kidney.
    4.8 Effects on the liver.
    4.9 Effects on the heart and circulation.
    4.10 Effects on the brain.
5. Monitor data and interpret the condition of the patient with early or progressing signs and symptoms of hypovolemic shock.
    5.1 Assess perfusion of brain tissue.
    5.2 Check circulatory status.
    5.3 Assess respiratory status.
    5.4 Check general appearance.
    5.5 Evaluate patient's complaints.

6. Early signs and symptoms of shock.
7. Progressing signs and symptoms of shock.
8. Report pertinent observations regarding early or progressing signs and symptoms of hypovolemic shock.

STUDY GUIDE OUTLINE

UNIT III

Shock: Prophylactic and Therapeutic Intervention

1. Assemble necessary equipment, supplies, and medications that may be needed to treat the patient in hypovolemic shock.
2. Control of hemorrhage.
3. Replace lost volume.
4. Support the patient's compensatory mechanisms.
5. Continuous monitoring and observations of the patient.
6. Carry out treatments as prescribed by the physician.
7. Drugs
    - 7.1 Coagulating agents.
    - 7.2 Vasopressors.
    - 7.3 Buffers.
    - 7.4 Corticosteroids.

STUDY GUIDE OUTLINE

UNIT IV

Complications of Shock

1. Complications of shock.
    - 1.1 Renal failure.
    - 1.2 Shock lung.
    - 1.3 Bacteriemia and infection.
    - 1.4 Disseminated intravascular clotting (DIC).
    - 1.5 Heart failure.
    - 1.6 Brain damage.
    - 1.7 Tissue necrosis.
    - 1.8 Death.
2. Explain the prevention and treatment of each complication.

APPENDIX G

Script Narrative of One of the Four

Sequential Units of Instruction

THE AUTOTUTORIAL INSTRUCTIONAL UNITS

The instructional units you are about to see are on the subject of shock. Upon completion of these units you will be able to fulfill the objectives of each unit.

Please take as much time as you need. You may stop the projector any time you are having trouble keeping up with the program. You may repeat any or all of the units as often as you desire. If you have further questions regarding the material in these units please see your instructors. It will be helpful for you to follow the study guide outlines as you view the units.

AUTOTUTORIAL UNIT I

SHOCK: DEFINITION, CLASSIFICATIONS, AND ETIOLOGICAL FACTORS

NARRATIVE	SLIDES
Shock: Definition, classifications, and etiological factors.	1. A picture of the word shock.
Shock! A state in which capillary perfusion is inadequate to sustain life.	2. A picture of a patient in shock.
Cells are starving for lack of oxygen and other nutrients.	3. A cartoon picture of cell crying for air and food.
Metabolic products are not being removed from the tissues,	4. A cartoon picture of cell surrounded by waste products.
because capillary flow is too slow or does not exist at all.	5. Picture of blood vessels containing large number of blood cells filling the lumen.
Classifications of shock maybe based on the area of primary failure.	6. Word slide. Shock: Classifications
The flow in any system is directly proportional to the driving pressure, the pump, and	7. Cartoon of firemen with a normal "heart" pump.
to the volume of fluid in the system,	8. Cartoon of firemen with adequate flow of fluid coming from a full hose.

and indirectly proportional to the resistance throughout the system. Failure in any of these areas produces shock.	9. Cartoon picture of firemen with a normal size hose.
Pump Failure-Cardiogenic Shock. Cellular pathophysiology and the signs and symptoms of pump failure are similar to those seen in hypovolemic shock. Treatment of Cardiogenic shock is the same as treatment for a patient suffering from a myocardial infarction.	10. Cartoon picture of firemen repairing a nonfunctioning heart pump.
Fluid Loss-Hypovolemic Shock will be discussed in detail in these instructional units.	11. Cartoon picture of firemen holding a hose with fluid running out a hole in the side and only a drop coming out the nozzle.
Lack of Peripheral Resistance--Vasogenic and Neurogenic Collapse. Cellular pathophysiology is the same as for hypovolemic shock, but the compensatory mechanisms do not function efficiently. Signs and symptoms may include warm skin without pallor. Treatment consists of the administration of vaso-pressor drugs, judicious replacement of fluids, and treatment of the underlying cause.	12. Cartoon picture of firemen holding a hose with a big patched balloon in it and only a drop of fluid coming out the nozzle.

Hypovolemic shock is a hemodynamic and metabolic disorder resulting from loss of fluid volume.	13. Word slide. Hypovolemic Shock
Fluid volume loss leads to inadequate cellular perfusion with oxygen and nutritional deficit of	14. Schematic diagram of capillary circulation depicting hypoperfusion.
cells that make up tissues and generalized lactic metabolic acidosis.	15. Cartoon picture of cell surrounded by acid.
To fulfill his or her responsibilities to the patient who is at risk of going into shock, the nurse must understand current concepts of the causes, nature, effects, prevention, and treatment of shock.	16. Word slide. SHOCK causes prevention nature treatment effects
Etiological factors which predispose to hypovolemic shock may be categorized as	17. Word slide. Causes of Hypovolemic Shock.
1. Loss of whole blood.	18. Word slide. Causes of Hypovolemic Shock I. Loss of Whole Blood
Hemorrhage can be caused by traumatic injury,	19. Picture of patient with hemorrhage from injury.
surgical procedures, and by eroded blood vessels in specific organs.	20. Picture of surgical procedure being done.
Hemorrhage may also occur with only minor injury when accompanied by	21. Picture of blood clotting components depicting

blood dyscrasias, clotting factor deficiencies, and lack of vitamin C.	chain reactions in blood clotting.
Bleeding may occur externally and is directly observable, or may occur internally and can only be ascertained by the careful evaluation of the patient's condition.	22. Word slide. I. Loss of Whole Blood External Hemorrhage Internal Hemorrhage
2. Loss of Plasma Fluid.	23. Word slide. Causes of Hypovolemic Shock. II. Loss of Plasma Fluid.
Plasma may be lost when tissues are burned or have sustained severe trauma.	24. Picture of a patient with burn.
Other causes of plasma loss may include conditions with abnormal capillary dynamics; examples of which are third space fluid loss, Nephrotic Syndrome, starvation,	25. Picture of a child with anasarca.
and severe venous obstruction.	26. Picture of adult patient with severe edema.
3. Severe Dehydration of all fluid compartments.	27. Word slide. Causes of Hypovolemic Shock. III. Severe Dehydration.
Hypovolemic shock may occur when fluid loss exceeds fluid intake as in the following clinical situations:	28. Picture of dehydrated child with intravenous infusion running.

Acidosis with Diabetes Mellitus

Decreased secretion of Anti-diuretic hormone as in Diabetes Insipidus

Vomiting and Diarrhea

Excessive sweating

Inadequate intake of fluid and electrolytes

Destruction of Adrenal Cortices with failure of the kidney to reabsorb sodium, chloride, and water.

In summary the causes of hypovolemic shock are:

1. Loss of whole blood.
2. Loss of plasma fluid.
3. Severe dehydration.

29. Word slide.

Causes of Hypovolemic Shock

I. Loss of whole blood.
II. Loss of plasma fluid.
III. Severe dehydration.

ASSESSMENT OF PREDISPOSING FACTORS

One method of assessing for predisposing factors that make the patient susceptible to shock is a chart review.

30. Picture of two nurses looking at a patient's chart.

The chart should be reviewed for the following:

1. patient profile
2. chief complaint
3. history including past history, history of present illness, and family history.
4. review of systems

31. Word slide.

Includes an outline of the items to be reviewed on the chart.

5. report of physical examination
6. laboratory and x-ray reports
7. baseline values of vital signs

Patient Situation.

An example of a chart review would be the case of Mr. Paul Tanner, age 42 years, who was admitted to the hospital because of jaundice. An exploratory laparotomy was done to determine the cause of the jaundice. His past history revealed that he had had an ulcer with surgical gastrectomy ten years previous. He was an accountant for a company with questionable financial status. He drank socially and consumed one pack of cigarettes daily. Family history is non-significant.

Laboratory values included the following:

Bilirubin was 2.0 mg/100 cc.
PTT was 50 seconds.
Hemoglobin 14.8 grams.
Vital signs are Blood pressure 132/80, pulse 70, and respiration 16.

32. Word slide. Includes laboratory data.

Predisposing factors that may lead to shock from this example of Mr. Tanner are as follows:

33. Picture of jaundiced patient with hemorrhage.

1. jaundice
2. stress factors, such as previous ulcer with gastrectomy, unknown origin of jaundice with the possibility of cancer, and occupational uncertainty.
3. elevated bilirubin and PTT.
4. vital signs normal values from which to assess change.

---

5. drinking of alcoholic beverages in the presence of jaundice adds further stress to the liver, resulting in depletion of clotting factors.

34. Picture of blood clotting components depicting chain reactions in blood clotting.

Another method of assessing for predisposing factors that make the patient susceptible to shock is to evaluate the patient's condition by direct observation.

35. Picture of patient with abdomenal dressing saturated with blood.

Frequent periodic evaluation of the patient's condition should be made by observing the color and degree of moisture of the skin, checking of vital signs for quality as well as quantity, and by measuring the intake and output.

36. Word slide.
Monitor every fifteen minutes.

Any significant change noted from the patient's normal data base should be reported and recorded. Guidelines

37. Word slide.
Significant Changes.

for significant changes include the following:	
Increase in pulse rate 10 to 15 beats above normal for the patient.	38. Word slide. Significant Changes. Pulse rate increased 10 to 15 beats above normal.
Increase in respiratory rate 6 to 10 breaths above normal for the patient.	39. Word slide. Significant Changes. Respiratory rate increased 6 to 10 breaths above normal.
Narrowing pulse pressure. A change in diastolic blood pressure in relation to the systolic pressure.	40. Word slide. Significant Changes. Narrowing pulse pressure.
Decrease in systolic blood pressure	41. Word slide. Significant Changes. Systolic blood pressure.
below 80 mm of mercury in a young person, a drop of 15 mm of mercury for a normal person, and a drop of 30 mm of mercury in a hypertensive person.	42. Word slide. Significant changes in systolic blood pressure outlined the same as in the narrative.
Decrease in urinary output below 25-30 cc per hour.	43. Word slide. Significant Changes. Urine output below 30 cc per hour.

Increase drainage above the expected amount,	44. Picture of bloody drainage on chux under patient.
as might be seen on dressings, and in suction, etc.	45. Picture of patient with nasogastric tube and a large amount of levine drainage.
Monitoring. When monitoring Mr. Tanner's condition, we find the following changes in his situation.	
The nurse reported the following to the attending physician: Pulse 96, Respirations 24, Blood pressure 115/96. Urine output 18 cc in the last hour. The abdomenal dressing of four fluffs and one ABD were all saturated with blood. The levine drainage was 200 cc of dark red fluid. His skin was pale.	46. Picture of nurse talking on the telephone.
Every emergency situation is a predisposing factor to shock. These patients' condition should be monitored closely. The following ABC's of emergency care are to be followed: A--is for Airway. The first priority of care is to establish and maintain a patent airway.	47. Picture of patient in emergency room with multiple persons in attendance. The picture is labeled: A--is for Airway B--is for Bleeding C--is for Circulatory Status.

B--is for Bleeding.

The second priority of care is to identify any hemorrhage and to control the bleeding. An assessment of the total body will be necessary to identify all areas of hemorrhage.

C--is for Circulatory Status.

Cardio-pulmonary resuscitation or positioning of the patient to maintain adequate circulation to vital organs is the third priority of care.

This concludes Unit I Shock: Definition, Classifications, and Etiological Factors.

APPENDIX H

Raw Data of Time Expenditure Recordings and Psychomotor Skill Test Scores for Both Groups

Raw Data of Time Expenditure Recordings and

Psychromotor Skill Test Scores for Both Groups

Sample Autotutorial Group

Subject Number	PRETEST Time	PRETEST Score	PRETEST Per Cent	Instructional Time	POSTTEST Time	POSTTEST Score	POSTTEST Per Cent	TEST DIFFERENCE Time	TEST DIFFERENCE Score	TEST DIFFERENCE Per Cent	Total Time	Quarter in Program
1	27"	20	35%	138"	5"	18	32%	-22"	-2	-3%	170"	2nd
2	19"	12	21%	200"	10"	15	26%	- 9"	3	5%	229"	2nd
3	5"	13	23%	152"	20"	18	32%	15"	5	9%	177"	2nd
4	20"	22	39%	185"	17"	39	68%	- 3"	17	30%	222"	2nd
5	25"	25	44%	330"	20"	44	77%	- 5"	19	33%	375"	2nd
6	10"	3	5%	230"	25"	24	42%	15"	21	37%	265"	2nd
7	12"	10	18%	396"	15"	33	58%	3"	23	40%	423"	2nd
8	10"	9	16%	310"	25"	37	65%	15"	28	49%	345"	2nd
9	10"	9	16%	260"	15"	37	65%	5"	28	49%	285"	2nd
10	22"	12	21%	260"	25"	42	74%	3"	30	53%	307"	2nd
Totals	160"	135	-	2461"	177"	307	-	56+ 34-	173	-	2798"	-
Means	16"	13.5	24%	246"	17.7"	30.7	54%	9"	17.3	30%	280"	-

Sample Lecture Group

Subject Number	PRETEST Time	PRETEST Score	PRETEST Per Cent	Instructional Time	POSTTEST Time	POSTTEST Score	POSTTEST Per Cent	TEST DIFFERENCE Time	TEST DIFFERENCE Score	TEST DIFFERENCE Per Cent	Total Time	Quarter in Program
1	25"	31	54%	320"	15"	27	47%	-10"	-4	-7%	360"	2nd
2	25"	27	47%	320"	20"	52	91%	- 5"	25	44%	365"	2nd
3	25"	18	32%	320"	18"	45	79%	- 7"	27	47%	363"	2nd
4	10"	4	7%	320"	18"	36	63%	8"	32	56%	348"	2nd
5	25"	14	25%	320"	20"	46	81%	0	32	56%	370"	2nd
6	15"	6	10%	320"	20"	39	68%	5"	33	58%	355"	2nd
7	20"	14	25%	320"	20"	48	84%	0	34	60%	360"	2nd
8	15"	9	16%	320"	15"	44	77%	0	35	61%	350"	2nd
9	17"	12	21%	320"	20"	48	84%	3"	36	63%	357"	2nd
10	25"	14	25%	320"	20"	51	89%	- 5"	37	65%	365"	2nd
Totals	202"	149	-	3200"	191"	436	-	16+ 27-	287	-	3593"	
Means	20.2"	14.9	26%	320"	19.1"	43.6	77%	4.3"	28.7	50%	360"	

Raw Data of Time Expenditure Recordings and

Psychomotor Skill Test Scores for Both Groups

Control Autotutorial Group

Subject Number	PRETEST Time	PRETEST Score	PRETEST Per Cent	Instructional Time	POSTTEST Time	POSTTEST Score	POSTTEST Per Cent	TEST DIFFERENCE Time	TEST DIFFERENCE Score	TEST DIFFERENCE Per Cent	Total Time	Quarter in Program
1	20"	21	37%	180"	15"	39	68%	- 5"	18	32%	215"	3rd
2	15"	24	42%	300"	20"	42	74%	5"	18	32%	335"	3rd
3	25"	19	33%	230"	20"	39	68%	- 5"	20	35%	275"	3rd
4	20"	31	54%	235"	20"	51	89%	0	20	35%	275"	3rd
5	25"	12	21%	290"	15"	33	58%	-10"	21	37%	330"	1st
6	25"	9	16%	340"	25"	33	58%	0	24	42%	390"	3rd
7	17"	12	21%	255"	25"	39	68%	8"	27	47%	297"	3rd
8	13"	6	11%	350"	20"	42	74%	7"	36	63%	383"	3rd
9	7"	3	5%	320"	25"	42	74%	18"	39	68%	352"	1st
Totals	167"	137	-	2500"	185"	360	-	38+ 20-	223	-	2852"	-
Means	18.55"	15.2	26%	277.77"	20.55"	40	70%	6.4"	24.77	43%	316.88	-

Control Lecture Group

Subject Number	PRETEST Time	PRETEST Score	PRETEST Per Cent	Instructional Time	POSTTEST Time	POSTTEST Score	POSTTEST Per Cent	TEST DIFFERENCE Time	TEST DIFFERENCE Score	TEST DIFFERENCE Per Cent	Total Time	Quarter in Program
1	25"	30	53%	320"	20"	45	79%	- 5"	15	26%	365"	3rd
2	25"	16	28%	320"	25"	39	68%	0	23	40%	370"	3rd
3	25"	18	32%	320"	20"	45	79%	- 5"	27	47%	365"	1st
4	20"	24	42%	320"	15"	54	95%	- 5"	30	53%	355"	3rd
5	10"	9	16%	320"	25"	44	77%	15"	35	61%	355"	1st
6	3"	9	16%	320"	25"	48	84%	22"	39	68%	348"	3rd
7	13"	11	19%	320"	15"	51	89%	2"	40	70%	348"	1st
8	15"	10	18%	320"	25"	51	89%	10"	41	72%	360"	3rd
9	10"	6	11%	320"	15"	48	84%	5"	42	74%	345"	1st
10	15"	8	14%	320"	20"	51	89%	5"	43	75%	355"	1st
11	10"	9	16%	320"	20"	54	95%	10"	45	79%	350"	3rd
Totals	171"	150	-	3520"	225"	530	-	69+ 15-	380	-	3916"	-
Means	15.54"	13.63	25%	320"	20.45	48.18	84%	7.63	34.54	61%	356"	-

APPENDIX I

Correlation Matrix

CORRELATION OF TEST SCORES AND TIME RECORDINGS BETWEEN ABRAMS' AND THIS STUDY

	Cognitive Pretest Score	Cognitive Pretest Time	Instruction Time	Cognitive Posttest Score	Cognitive Posttest Time	Cognitive Gain Score	Cognitive Delayed Score	Cognitive Delayed Time	Cognitive Score Difference	Cognitive Total Time	Psychomotor Pretest Time	Psychomotor Pretest Score	Psychomotor Posttest Time	Psychomotor Posttest Score	Psychomotor Time Difference	Psychomotor Gain Score	Psychomotor Total Time
Cognitive					-*												
Pretest Score	1.00	.170	.090	.246	-.489	-.309	.412	.140	.114	-.026	.273	.166	-.092	.347	-.290	.178	.112
Cognitive					*				*			*			-*		
Pretest Time	.170	1.00	-.004	-.340	.620	-.427	.060	.437	.459	.281	.442	.583	-.194	.069	-.490	-.361	.035
Instruction										*				*			*
Time	.090	-.004	1.00	.389	.081	.332	.259	.118	-.204	.930	.352	.046	-.184	.503	-.405	.398	.992
Cognitive					-*	*	*		-*					*		*	
Posttest Score	.246	-.340	.389	1.00	-.586	.846	.583	-.017	-.606	.191	.073	-.136	-.136	.573	-.130	.590	.375
Cognitive	-*	*		-*				*								-*	
Posttest Time	-.489	.619	.081	-.586	1.00	-.306	-.277	.466	.418	.406	.107	.244	-.096	-.367	-.142	-.490	.084
Cognitive				*					-*							*	
Gain Score	-.309	-.427	.332	.846	-.306	1.00	.346	.060	-.657	.202	-.079	-.225	-.083	.372	.032	.481	.306
Cognitive				*													
Delayed Score	.412	.060	.259	.583	-.277	.346	1.00	.136	.293	.199	.253	.157	-.381	.353	-.408	.189	.256
Cognitive					*												
Delayed Time	-.140	.437	.178	-.017	.466	.060	.136	1.00	.153	.383	.074	-.055	-.304	-.005	-.209	.035	.104
Cognitive Score		*		-*		-*										-*	
Difference	.114	.458	-.204	-.606	.418	-.657	.293	.153	1.00	-.031	.163	.314	-.213	-.329	-.247	-.509	-.190
Cognitive			*												-*		
Total Time	-.029	.281	.930	.191	.406	.202	.199	.383	-.031	1.00	.391	.140	-.246	.380	-.468	.225	.920
Psychomotor												*		*	-*		*
Pretest Time	.273	.442	.352	.073	.107	-.079	.253	.074	.163	.391	1.00	.713	.043	.657	-.883	.049	.455
Psychomotor		*									*				-*	-*	
Pretest Score	.166	.583	.046	-.136	.244	-.245	.157	-.055	.314	.140	.713	1.00	-.247	.205	-.760	-.544	.110
Psychomotor																	
Posttest Time	-.092	-.194	-.184	-.136	-.096	-.083	-.381	-.304	-.213	-.246	.043	-.247	1.00	.066	.430	.237	-.114
Pyschomotor			*	*							*				-*	*	*
Posttest Score	.347	.069	.503	.573	-.367	.372	.353	-.005	-.330	.380	.657	.205	.066	1.00	-.562	.709	.563
Psychomotor		-*								-*	-*	-*		-*			-*
Time Difference	.290	-.490	-.405	-.130	-.142	.032	-.408	-.209	-.247	-.468	-.883	-.760	.430	-.562	1.00	.065	-.465
Psychomotor				*	-*	*			*			-*		*			
Gain Score	.178	-.361	.398	.590	-.490	.481	.189	.035	.509	.225	.049	-.544	.235	.709	.065	1.00	.403
Psychomotor			*								*			*	-*		
Total Time	.112	.035	.992	.375	.084	.306	.256	.104	-.190	.026	.455	.110	-.114	.563	-.465	.403	1.00

* Positive Correlation .05 level of significance. -* Negative Correlation .05 level of significance.

AN ABSTRACT OF THE CLINICAL INVESTIGATION OF

OMA SHARON RAWSON

For the MASTER OF NURSING

Date of Receiving this degree June 10, 1977

Title: A COMPARATIVE STUDY OF THE PSYCHOMOTOR SKILL OF BACCALAUREATE STUDENTS INSTRUCTED BY AUTOTUTORIAL OR LECTURE METHOD

APPROVED:_____

(Clinical Investigation Adviser)

The purpose of the study was to collect empirical data regarding the psychomotor skill performance of two groups of students taught by autotutorial and lecture methods of instruction. The data were collected on 20 second quarter, junior students in one baccalaureate nursing program. A psychomotor skill pretest and posttest were given to each subject of the two groups. Treatment for Group I was autotutorial instruction by audioslide presentation and treatment for Group II was lecture instruction. A record was kept of instructional and testing time expenditure.

The results of this study revealed that there was a significant difference between groups. Group II (the lecture group) had a higher psychomotor skill performance than Group I (the autotutorial group). There was also found to be significant difference between groups in the instructional expenditure of time. Group I spent less time in instruction than Group II.

A significant correlation was found between cognitive and psychomotor skill achievement of subjects. Data on cognitive skill achievement from a fellow researcher's study, Abrams, was used in this correlation.

Conclusions

On the basis of this study it can be concluded that:

1. students learned better by lecture instruction, but that learning did occur from both autotutorial and lecture instruction,
2. students are able to transfer theory knowledge to performance in a simulated situation,
3. the amount of time expended in instruction does effect the level of achievement,
4. there is a correlation between cognitive achievement and psychomotor skill performance.