

CRITICAL THINKING ABILITY IN  
SOPHOMORE BACCALAUREATE NURSING STUDENTS

by

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A Clinical Investigation

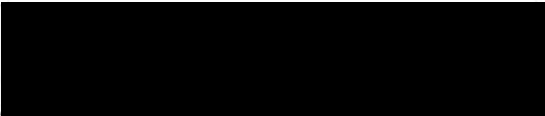
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"Do not ask for an easy life.  
Pray to be a strong person."

Quaker proverb

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## Chapter I

During the past few years there has been an ever increasing emphasis on the necessity for a collegiate based education as the preparation for professional nursing. When the focus for professional nursing education was transferred to the collegiate setting it stimulated new investigations into the process of learning and the design of effective curricula.

Most traditional hospital centered schools of nursing depended on a logistic mode of instruction. There was a systematic accumulation of knowledge based on body systems in which the etiology, pathology, treatment and nursing care of diseases was emphasized, rather than placing the focus on patient needs. The systems approach to nursing education in use today has much in common with this method, since the selection of a solution or action depends upon the total accumulation of data at hand (Finch, 1969).

The dialectical curricular method was subsequently designed in an effort to teach the synthesis of comprehensive solutions while meeting patient needs. This approach was designed by nurse educators in an attempt to retain concern for patient needs while maintaining continuity in the curriculum (Stevens, 1971). Curricula in this mode employed a continuum (birth-death, health-illness) as a conceptual framework.

Other schools instituted the operational curricular mode which emphasized student learning needs rather than the needs of the patient or client as the focus of the curriculum. The student became directly involved in the identification of learning needs, setting learning goals, and selecting meaningful experiences to meet those needs. Evaluation of the ability of the students to accomplish these goals within the curriculum framework was an important component of this method. The freedom of the student to pursue learning rather than "give" care emphasized this concept of nursing education as an interactive, dynamic process (Berggren & Zagornik, 1968).

The problematic curricular method is a more recent approach to nursing education, and reinforces the need for recognition of the interaction between nurse and client in the solution of selected problems. Problem resolution requires a sound knowledge base, and implies the ability to use discrimination, synthesize information, make decisions, and implement those decisions appropriately in patient care (Abdellah, 1961; Lewis, 1976).

The ability to think critically is an essential component of the problematic mode of instruction. A curriculum framework designed to promote problem solving emphasizes the same basic elements found in individuals identified as having a high level of creativity; that is, the ability to define problems, collect data, postulate solutions, and

evaluate results for potential revisions. The recognition of assumptions and inferences, the ability to deduce, interpret, and especially the ability to evaluate results is essential in order to identify problems and define possible solutions. This method places the responsibility for identifying problems, goals, and learning needs on the student rather than on the instructional system. In contrast to the operational mode, however, the focus remains on the problems of the client, and how the student and client together can arrive at the optimum solution for their given situation.

#### Statement of the Problem

In the process of selecting potential students many schools use a multiple regression formula in an effort to prevent academic attrition. The correlation of high grade point averages, various nursing and achievement tests, and success on state board examinations is widely documented (Deardorff et al., 1976; Taylor et al., 1965). It would be even more valuable to predict the student who is able to maintain acceptable academic standing and who also has the potential for becoming a creative and professional practitioner of nursing. The question to be asked is: Can a ✓ critical thinking appraisal have predictive value in determining which student will achieve success in a nursing program which has problem solving as an integral part of the curriculum?



A longitudinal study is being conducted at the University of Oregon Health Sciences School of Nursing to determine whether it is possible to increase critical thinking ability significantly by the addition of special materials during the period of nursing education (Berger, 1976, 1978). The first problem is to determine whether there is a high correlation between critical thinking ability and grade point averages in nursing and science for sophomore students, and secondly, will this same correlation be maintained throughout their nursing education? Or in contrast, will all students who are exposed to a problem solving curriculum show a significant increase in their problem solving ability?

In order to determine this, several problems must be approached. What are the critical thinking score norms for nursing students at various levels in their education? Is there a correlation between science and nursing theory grade point averages and scores on a critical thinking appraisal?

This study was an effort to answer these questions, and to establish part of a data base to determine whether the systematic introduction of research methodology into early nursing education will significantly increase critical thinking ability over the period of nursing education.

#### Purposes of the Study

1. To establish a baseline of critical thinking ability scores which will allow comparison with the scores of this same group of students during their senior year.
2. To accumulate data which will allow norms to be

established of the critical thinking scores of nursing students.

3. To correlate scores of a critical thinking appraisal with the nursing and science grade point averages in an entire class of sophomore nursing students in an effort to determine whether there is a significant relationship.

### Review of the Literature

The introduction of creative thinking and problem solving into a curriculum poses some challenging questions for the nurse educator. What is thinking, and can it be measured qualitatively? Can problem solving behaviors be taught? Who are the students with the greatest potential for creative thinking?

Educational literature reveals that a diversity of investigations have been conducted in an effort to identify the elements and quality of thinking. Some recent investigations into the relationships between critical thinking and problem solving or concerning the effect of instructional attitudes on learning and problem solving have highly important implications for the field of nursing education.

### The Process of Thinking

Thinking is a special human characteristic which is differentiated from other mental processes. It includes the organization of new information and the reorganization of material previously learned into forms leading to new responses which can be generalized to new situations. Thinking enables the individual to use delayed reactions to cope

with an anticipated outcome. In addition, thinking forms the link from the past and the future to the present (Sills, 1968).

Other mental processes include learning. The acquisition of new knowledge is frequently accomplished to meet standards of performance, set by the learner or the teacher. Perception is the relationship between stimulus and response, and denotes awareness of objects or other data through the medium of the senses. Memory is the storage and retrieval of information, and is the power by which we reproduce past impressions. Thinking serves as a mediational period between learning and responding and utilizes the products of memory to synthesize our response to internal needs or to help cope with the external environment (Sills, 1968).

The two major components of the process of thinking are reasoning and imagination. Reasoning refers to controlled symbolic processes relating to goals and the use of information in a systematic manner to arrive at a decision. Imagination is the reoccurrence or reorganization of symbolic past experience without accuracy or regard for form and direction (Sills, 1968).

Problem solving or logic is the product of reason, while creative thinking involves both reasoning and imagination. Creative thinking resembles logic in that it produces tangible, orderly results, but like imagination it combines past impressions in new or unexpected ways.

There have been three major stages in the investigation of the thinking process during the past one hundred and twenty five years. The descriptive phase focused on identifying the characteristics of thinking and was based on Greek philosophy. The responsibility of psychology was the investigation of conscious mental processes such as the effects of environment on attention and defining the differences between imagination and logic. The elements of mental activity were perceived to be sensation, image, and feeling. Thinking was considered to be primarily the translation of images into ideas. As Sills (1968) points out, it was during this period that William James wrote about "streams of thought," and Francis Galton attempted to determine differences in speed of thought that occur with age. Alfred Binet, Oswald Kulpe and others heralded the end of this period with investigations demonstrating that the processes involved in mental arithmetic allowed no time for imagery (Sills, 1968). It was at this stage that the concept of sets and determining tendencies became accepted as functioning properties of cognition (Sills, 1968).

Objective definition of variables and the necessity to replicate experiments opened the era of the laboratory survey. Intelligence, learning, and perception were studied intensely during this period, perhaps because they were easier to measure! Many concepts used to describe thought processes have developed from the intelligence testing and experiments

in learning theory that were developed during this period.

The observations and experiments done by Piaget and other child psychologists during the later stage of this period illustrated the developmental stages of thought. The egocentric and prelogical stages of early childhood progress to the logical and systematic thought formulations of the adult (Flavell, 1963). The subsequent emphasis on concept formation and problem solving led to hypothesis testing and the initiation of systematic investigations based on theory.

Even more recently, investigations have explored the factor analysis of learning. Mediation theory (including the role of language and implicit speech), information theory, the components of creativity (Furst, 1960), and investigation into the role of cognitive dissonance in learning (Mussen, 1969) have developed in an effort to explore the elements of learning and the relationship of thinking and creativity to the formulation of solutions.

### The Quality of Thinking

While perception, learning and memory can be tested quantitatively, it is much more difficult to ascertain the quality of thinking. Tests involving judgments, attitudes, and attitudinal changes require large populations for validation.

Goor (1967) reported that highly creative subjects performed better in problem solving than subjects with low

creativity, but that this is tempered by previous experience. For example, Harvey and Kelley (1974) found that the feeling of having exerted effort and succeeded on a difficult task was conducive to a strong sense of judgment competence and encouraged risk taking. Hartnett and Barber (1974) substantiated this in their observation that students who were exposed to a failure orientation by their instructor, made high risk decisions involving poor judgment, and expressed a high degree of fear of failure in their decision making. Students in a control group who were exposed to a success oriented instructor, however, perceived themselves as being greater risk takers than their peers, while in fact they consistently used a higher level of judgmental competence. In other words, expert endorsement of your success serves as a strong reinforcement and encourages a positive attitude toward future competence. An interesting corollary to this is that in one large study students who withdrew from college scored consistently lower on a critical thinking appraisal than students who completed the course. This correlation between critical thinking ability and a sense of judgmental competence could have important implications in nursing education (Stratton & Brow, 1972). It also affects all levels of problem solving by making comparisons more accurate, and by limiting use of poor solutions and unprofitable material.

#### Critical Thinking and Problem Solving Ability

A concise list of abilities which comprise critical

thinking is set forth by the Cooperative Study of Evaluation in General Education in the Watson Glaser test manual (p. 10).

These abilities are:

1. The ability to define a problem.
2. The ability to select pertinent information for the solution of a problem.
3. The ability to recognize stated and unstated assumptions. ✓
4. The ability to formulate and select relevant and promising hypotheses.
5. The ability to draw conclusions validly and to judge the validity of inferences.

Is it possible to increase critical thinking ability by training in the production of solutions? Mussen and Langer (1969) felt that the development of critical attitudes progresses through fairly well defined stages: naive credulity, uncertainty, global rejection, specific rejection ("you can't expect me to do two things at once"), and to the stage of constructive interpretation ("if I have the information and there is a solution I can find it").

Students who receive implicit instruction in problem solving and who are able to verbalize problems and the problem solving approach, achieved much higher levels of performance than students who were not able to state the principles of problem solving involved (Stinesson, 1974). ✓

While this would seem to indicate that learning or the educational process can increase both quantity and quality of problem solving, other factors are also involved.

Certain individuals have been shown to have consistently poorer potential for creative thinking than others. Luck and Green (1970) confirm that authoritarian, dogmatic individuals score lower on critical thinking analysis primarily because they do not recognize assumptions as such! Mind sets and rigidity are detrimental to the synthesis of new beliefs into novel solutions or unique settings. Shultz and DiVesta (1972) found that highly dogmatic individuals examine and reject solutions which are inappropriate to their existing beliefs, and depend on authority for resolution of problems. The interesting analysis of 2,700 college freshmen which Harvey and Kelley (1974) performed showed males (especially those from rural areas) and students educated in Catholic parochial schools to be more dogmatic. A longitudinal study by Inkenberry and Lehman (1959) showed that over a period of time students became less stereotypic and more emergent in their values. Their critical thinking scores also improved. The same study indicated that females enrolled in non-technical programs were significantly less stereotypic than those in vocationally oriented curricula.

The testing done by Friend and Zubek (1958) is interesting in that it indicates that certain aspects of critical thinking peak at different ages. Testing was completed on 484 individuals in 64 occupations, and ranging in age from 12 to 80. According to this survey the ability to evaluate arguments and interpret data peaks in the mid-20s and declines shortly



thereafter at a moderate rate, reaches a plateau between the ages of 40 and 55 and then continues to decline slowly with age. On the other hand, the ability to draw inferences, detect assumptions, and make deductions does not peak until some 10 years later in the mid-30s, adopts a plateau configuration until the mid-60s, and then declines fairly rapidly.

### Teaching and Problem Solving

Search of the literature reveals little or no correlation between any particular format of instruction and an increase in critical thinking ability. Independent study, traditional lectures, discussion groups and experimental non-graded paced instruction have all been investigated, and results have shown no particular advantage to any one system (Besvinik et al., 1966; Garvey, 1966).

In contrast, two clearly positive correlations have been found between the process of instruction and critical thinking. One is an affirmation that inquiry based systems dealing with broad concepts are especially effective in increasing critical thinking when the specific questions and discussions are based on a high level of cognition. The second and related factor is the degree of teacher-learner interaction (Murphey, 1971; Herman, 1970; Cook, 1967). These findings support the position that teachers can use either direct or indirect approaches, but that the quantity of interactions correlates significantly with positively affected outcomes. The student who is encouraged to try, to

question, and to interact frequently with the teacher gains in creative thinking ability. Hunt and Germaine (1969) examined the relationship between a teacher's critical thinking ability, classroom verbal behavior, and perception of teaching. A direct relationship was evident between the teacher's own critical thinking ability and the number of verbal interactions involving evaluative thinking that occurred between student and teacher. Statements based on recall are not related to a high level of critical thinking. The high scoring teachers also made a greater number of supportive comments to students, and consistently reinforced the students' sense of competence. An interesting question raised by this study is: "If training students in critical thinking can be taught (and research indicates that it can), then teachers need to be trained as models of such thinking. The question then remaining is: Who will teach the teacher's teacher?"

#### Implications for Nursing Education

In an investigation designed to identify activity centered rather than textbook centered teachers, Taylor (1972) determined that activity centered teachers were found to be more self-sufficient, more affected by feelings and had an increased ability to recognize inferences and assumptions as well as scoring high in overall critical thinking ability. It would certainly be an advantage to identify those teachers who could impart their critical thinking ability to students

in the primary focus for problem solving--the clinical area.

Snypes (1965) analyzed a number of baccalaureate programs in nursing to determine whether the concept "critical thinking" was reflected in the philosophy of the school, educational objectives, course objectives, learning experiences and evaluation techniques used. A majority of the respondents from the five schools surveyed considered the concept "critical thinking" as being analogous to "problem solving." While there were inconsistencies in the replies concerning which aspects of critical thinking should be developed for nursing courses, most respondents agreed that general education courses did not assist in developing critical thinking abilities anyway! Other results indicated that while specific outcome behaviors were specified for nursing courses, only a few vague behaviors related to problem solving and critical thinking as such. Essay and multiple choice items were considered the most effective test items for evaluating critical thinking abilities.

Finally we consider the problem of which students will benefit most by a nursing program which emphasizes problem solving and critical thinking. Numerous factors have been analyzed in the attempt to predict academic success in schools of nursing. Results of studies by Taylor et al. (1968) and Dubs (1975) show that nonacademic predictors as well as academic predictors are needed. These and other studies indicate that clinical and academic performance are

not closely related. There is little or no relationship demonstrated in the results of National League for Nursing (NLN) or other nursing achievement tests and the ability of the student to give care to actual patients as measured by ratings of clinical performance. The high school grade point average correlated positively with success in college physics and microbiology, the NLN and pre-nursing guidance test results correlate with performance on state board test pools and so on. However, it seems highly significant that these achievement tests showed their greatest correlations with each other (.50-.65) and show little significant correlation with clinical nursing course performance ratings.

Until fairly recently problem solving has not been a major emphasis in the teaching of nursing, yet teaching the performance of nursing is a clinical problem with multiple aspects involving evaluation and decision making ability. If we are to emphasize accountability, the expanded role and especially the professionalism of nursing, it becomes increasingly more important to select those students with the potential to increase their problem solving ability. Stinesson (1974) has indicated that students who are able to verbalize a concept after implicit instruction are able to perform much better on application than the nonverbal student. This would appear to refute the student who states, "Well, I can't talk about it, but I can do it." Numerous sources support this correlation between verbal ability ✓

(including reading) and a high level of critical thinking ability (Smith, 1971; Duckworth, 1968; Arlo, 1969).

Do student characteristics change during their exposure to a nursing education? Several studies indicate that students develop attitudes in response to the model set by instructors. In an investigation by Stone and Green (1975) students agreed overwhelmingly that they assumed professional roles in response to the example set by their instructors, and that faculty should examine and adjust their roles as professional nurse role models to agree with the demands of the curriculum.

In the examination of an integrated curriculum Richards (1977) found that students responded to the new curriculum with an increased level of leadership ability and empathy but a lower level of creative thinking ability than in the "before" group. It was theorized that this might be due to a highly consistent approach to the learning process. Since nursing students appear to have a less intellectual attitude than the average college student, that is, less interest in learning for learning's sake (Meleis & Farrell, 1974), this might indicate an even greater need for a curriculum rich in problem solving opportunities.

The relationship of thought processes to the development of a specific nursing curriculum has only been of recent concern. Abdellah developed a list of 21 problems which could develop critical thinking ability while exposing

students to a patient's total needs rather than a specific illness in 1961. Burkett (1964), however, felt that the problematic approach to learning should be reserved for the older student since this approach is more feasible when problems are more easily recognized. Since that time there have been several nursing texts based on problem solving (Beland, 1970; Levine, 1973; Wooley et al., 1974) and a number of experimental curricula tried which were based on the problematic mode (Abdellah et al., 1973). Evaluation of these curricula has been inconclusive due partly to the difficulty in developing criteria for evaluation of a decision making process which incorporates so many variables.

Tschudin (1964) has written that the professional practitioner of nursing should possess a scientific attitude which will facilitate investigation. Nursing actions will be selected which are innovative and have a high probability of successful outcome. More recently Gizi and Hadley (1970) have emphasized that success in professional nursing depends to a large extent on the ability to consider alternatives and quickly implement constructive conclusions. These statements all imply the use of nursing evaluations and decisions based on critical thinking and problem solving. If this is so, then the baccalaureate graduate needs to be able to acquire an increasing level of problem solving ability over the period of nursing education.

### Summary

Systematic investigation into the critical thinking ability of nursing students is a fairly recent development in nursing education (Berger, 1976; Richards, 1977). Although many educators have talked about the value of critical thinking and the application of problem solving skills to professional nursing, few curricula have included specific strategies to teach or develop these abilities.

## Chapter II

### METHODOLOGY

#### Design of the Study

This study was correlational in design and investigated the relationships between nursing and science grade point averages and the results of a critical thinking appraisal. An entire sophomore nursing class of the University of Oregon Health Sciences Center was tested in order to avoid bias.

#### Subjects and Setting

The population tested in this study consisted of 137 nursing students who were midway through their sophomore year at the University of Oregon Health Sciences Center. This group represented the entire class with the exception of a few students who were registered nurses with a diploma or associate degree. These students were excluded due to the fact that they had received widely varying amounts of education and nursing experience before enrolling in the baccalaureate program.

#### Characteristics of the Sample

One hundred and twenty-eight females and nine male students were in the final sample. The majority of students were Oregon residents with a few who came to the school from other states. They were fairly evenly divided between students from towns over 350,000 and students from rural areas.



All students had completed a minimum of one year of college (45 credits) including chemistry, biology, nutrition, human growth and development, general psychology, sociology, anthropology, college algebra, and writing. Admission to the school of nursing requires that the student has maintained at least a 2.5 grade point average.

At the time the critical thinking appraisal was administered the students were midway through their first year in the school of nursing. Since this was 18 months into the four-year program, the peak period for academic and motivational attrition had passed.

#### Data Collection Instrument

Of the several tests available to measure creativity and critical thinking ability, two of the more frequently used are the Torrance Test of Creative Thinking and the Watson Glaser Critical Thinking Appraisal. The Watson Glaser test was selected for this study because it has been normalized for the age and education level being examined, although no norms for nursing students are reported in the manual. This test has been developed in two forms for before and after testing, and contains five subtests to measure different aspects of the creative thinking process.

Rust (1962) and Helmstadter (1965) state that this instrument is an excellent criterion measure for those who profess to teach thinking ability and problem solving. Helmstadter adds that "this critical thinking appraisal is an

instrument well worth attempting to use in a wide variety of educational assessment, selection, and research situations" (p. 214).

While this is a widely accepted and used test, other sources point out some of the weaker aspects of this instrument. Crites (1972) indicates that although percentiles for total scores are given for each grade to which it has been administered, there is no differentiation made for male or female. Since there is a significant difference in male and female problem solving scores he feels that this could be significant, depending on the number of each involved. He also comments that the two forms of the test (Ym and Zm) are supposed to be equivalent, but differ as much as six raw score points at the same percentile, especially in the middle of the distribution. It was also noted that scores appear to change with age, and this is verified by the work of Friend (1958). Ennis (1952) felt that this test gives too high a score to the chronic doubter, and that the third section which tests for deduction contains too many items that "do not follow." These criticisms notwithstanding, the Watson Glaser test was selected since unlike the Torrance Test of Creative Thinking it did not have to be scored by hand, and used a scale based on normalized data which applied to this age and education group.

#### Reliability and Validity

The administration manual points out that the predictive

validity of this test depends on the specific criteria used to define outcome, and must be established empirically in the situation in which the test will be used.

Normalization tables are available for grades 9-12, liberal arts college freshmen, and seniors. Reliability data derived from the scores of the various normative groups are reported in the test manual along with the means, ranges of scores, standard deviations and standard errors of measurement. Only two age groups correspond with the age groups included in this study. The odd-even split half reliability coefficient corrected by the Spearman Brown formula was .85 for both college freshmen and seniors. A correlation of this test with the Otis Quick Scoring Mental Ability test shows a positive score of .60 for the liberal arts freshmen using the Ym test, and a correlation of .66 for the seniors which gives the impression that years of education do have some effect. On the other hand, it may be due to the increase in age as indicated by Friend.

Although content validity is important as the measurement of success or achievement, this study is primarily concerned with the measurement of the psychological concepts of critical thinking and problem solving for which it is difficult to define specific criteria. In considering construct validity there is a relatively low correlation between the subtests (as reported in the manual), but there is a correlation of .56 to .79 between the various subtests and the total test.

This would appear to substantiate the premise that different aspects of thinking are being tested, and can be included in the total score as a synthesis of the creative thinking process.

#### Description of the Test

The Ym form of the Watson Glaser Critical Thinking Appraisal is a 100 item paper and pencil test which uses a test booklet and a separate answer sheet which can be scored by computer or with a manual stencil. Clear, concise instructions for taking the test are provided in the instructor's manual and were read to each group in order to provide consistency in the manner of administering the test. The five subtests, number of items, and suggested time needed to complete each segment are as follows:

1. Inference. (Twenty items in 13 minutes.) Samples ability to discriminate among degrees of truth or falsity of inferences drawn from given data.

2. Recognition of Assumptions. (Sixteen items in six minutes.) Samples ability to recognize unstated assumptions or presuppositions which are taken for granted in given statements.

3. Deduction. (Twenty-five items in 11 minutes.) Samples ability to reason deductively from given statements or premises; to recognize the relation of implication between propositions; to determine whether what may seem to be an

implication or inference from given premises is indeed such.

4. Interpretation. (Twenty-four items in 12 minutes.) Samples ability to weigh evidence and distinguish between (a) generalizations from given data that are not warranted beyond a reasonable doubt, and (b) genralization which while not absolutely certain, do seem to be warranted beyond a reasonable doubt.

5. Evaluation of Arguments. (Fifteen items in eight minutes.) Samples ability to distinguish between arguments which are strong and relevant and those which are weak and irrelevant to a question at issue.

#### Data Collection Process

Since this was a test of power rather than speed, students were informed that if they did not complete all items within the allotted time span they would be allowed to complete the unfinished portions at the end of the test. Most students were able to finish the test within the 50 minute time period. Students were allowed to sign for a test administration time which fit their class schedule. In addition to the standard test instructions, students were informed that they were part of a longitudinal research project in which the results of the individual test would be confidential.

#### Analysis of the Data

Mathematical means were computed for the dependent and

each of the independent variables. A simple correlational matrix was designed using the forces from the critical thinking appraisal as the dependent, and grade point averages from science, nursing theory, and total grade point average as the independent variables. The range, standard deviation and means for the critical thinking appraisal were compared with liberal arts students at the same age and educational level.

Since the computation of percentiles would serve no purpose in this simple correlation, raw scores of the critical thinking appraisal were used for the dependent variable in this study.

## Chapter III

### RESULTS AND DISCUSSION

The population tested in this study consisted of 137 nursing students who were half way through their sophomore year at the study institution. The raw scores from the Watson Glaser Critical Thinking Appraisal for this group ranged from 50 to 96, with a mode of 73, median of 76.5, and a mean of 77.15. A summary of scores compared with the table for liberal arts students given in the Ym manual is as follows:

	N	Mean	Range	S.D.
Liberal Arts Freshmen	5297	70.2	19-95	9.8
Liberal Arts Seniors	200	74.4	37-97	9.6
Nursing Sophomores	137	77.15	50-96	

Grade point averages for science and nursing in the sample ranged from 2.0 to 4.0 with the mean of the total grade point average at 2.97. The mean for science grade point averages was 2.28, and for nursing 3.46.

In order to determine whether there was a relationship between critical thinking as measured by this test and grade point averages, a simple correlational matrix was designed. Since these students had received grades in nursing subjects for only one term, it was decided to include the total grade point average as an additional variable.

Correlation coefficients tell us two things. There is an indication of the magnitude of the relationship, and also

the direction of the relationship. For example, the longer and farther an individual runs, the slower the average speed becomes. This is an inverse relationship. On the other hand, when two variables are positively related, as one increases the other increases also. In this study if high grade point averages showed a high positive relationship with critical thinking appraisal scores then high grade point averages might serve as a predictor for those students with the potential to be good problem solvers.

Before computations were begun scatterplots were constructed in order to gain a picture of the relationship between the dependent variable and each of the independent variables. A basic condition necessary for the computation of Pearsons  $r$  is that there be a linear relationship between the variables. In a deviation from linearity the computed correlation coefficient is an underestimation of the true relationship (Downie, 1974). All scatterplots indicated a low positive relationship.

The low level of positive correlation suggested by the scatterplots was confirmed when the correlational matrix demonstrated the following results:



Table 1

A correlation of scores on the Watson Glaser Critical Thinking Appraisal with nursing, science, and total grade point averages of sophomore nursing students.

	WBCTA	Nursing	Total	Science	p
WGCTA	1.0	.139	.235	.219	ns
Nursing	.139	1.0	.752	.357	ns
Total	.235	.752	1.0	.815	ns
Science	.219	.357	.815	1.0	ns

Since there must be an  $r$  of 0.3 or better to indicate a significant positive relationship, it would appear that no significant relationship exists between the Watson Glaser Thinking Appraisal results and the independent variables. The only significant positive relationship appears to be that the students who do well in science (as indicated by grade point averages) are apparently more likely to do well in nursing subjects.

Since Crites (1972) indicated that there has been a significant difference demonstrated in the problem solving abilities of males and females, the mean grade point averages and the mean results of the results of the critical thinking appraisal

were compared between males and females in this class. Males scored 75.85 on the critical thinking appraisal compared to 77.2 for females. Their mean score for science was slightly higher (2.6 to 2.2) while the mean of their nursing grades was slightly lower (3.1 to 3.5 for females).

Recent literature on nursing education contains frequent references to the importance of decision making and problem solving to the professional practitioner. To date, little data has been reported on the problem solving ability of students entering or graduating from nursing programs. Curriculum evaluations that have included an investigation of creative thinking have not been comprehensive enough to show a significant correlation between any specific course or methodology and student problem solving ability.

As mentioned in the review of the literature, Richards (1977) compared baccalaureate students graduating from a subject centered curriculum with those from an integrated curriculum. Results were correlated from tests on intelligence, empathy, clinical performance, state board test results and National League for Nursing examinations. In this study the Watson Glaser Critical Thinking Appraisal was used as the measure of critical thinking ability. Students from the new curriculum showed significantly higher results in the evaluation of leadership potential and also higher grade point averages. Conversely, this was accompanied by lower grades on state board examinations and a decrease in their critical

thinking ability scores. Richards felt that this might be the result of too much consistency of approach in the new integrated curriculum. It is possible that the improved grade point averages resulted from the Hawthorne effect which accompanies an intense research investigation. Could the improved leadership skills be a reflection of the increased self-esteem that students involved in such a study might feel?

A study by Jones (1975) using the Edwards Personal Preference Scale showed that the academic prerequisites for admission to a school of nursing are such that all students should have been able to achieve success. The high achievers were shown to have an unusually strong need for achievement, deference, heterosexuality, and nurturance. The low achievers and drop-outs had a low self-esteem. This was confirmed by the work of Bailey and Claus (1969) and also the work of Meleis and Farrell (1974) who found low self-esteem to be a common factor in their analysis of baccalaureate, diploma, and associate degree nursing students.

Nursing has been in the throes of an identity crisis for 20 years or more. As an extension of the essentially nurturing nature of women, it offered a quasi-professional status to women while relieving them of accountability by allowing the medical profession to be the decision makers. In a study of self-concept and occupational role expectation, Davis (1969) stated that only slightly more nurses agreed that nursing

includes freedom and opportunities for creativity than disagreed. Social workers in the same study felt that these statements were not good descriptors for the nursing role. Perhaps a more pragmatic indication of the effect of this general mind set of the public is reflected in the current wage scale for nurses in the Portland area. At this time (1980) grocery clerks with one year of experience are making \$18,000 while many professional nurses are paid \$14,000 to \$15,000 after the same period.

In order to use problem solving effectively one must have the power to implement nursing diagnoses and decisions. Some authors feel that one of the problems with professional nursing is that nurses lack the power to make decisions (Sheahan, 1972). Having the courage to implement one's decisions implies a fairly high level of self-esteem.

Since the critical thinking scores and grade point averages of nursing students compare favorably with liberal arts students, it is not a lack of problem solving potential but other factors which cause this low self-esteem. Do students enter nursing with this mind set, or do they develop it as part of their socialization to nursing education?

In an evaluation of nursing course objectives, LaBelle and Egan (1975) designed questionnaires based on competencies representative of the curriculum being tested. Problem solving was an integral part of the course objectives, and the eight steps necessary to problem solution were included in the

design of the questionnaire. When this tool was used with new graduates and their employers, 10% of the replies indicated that the new graduate was experiencing great difficulty in using problem solving in the administration of nursing care. Interpretation of the source of the investigators to determine whether the graduate was having difficulty implementing decisions (new graduates lack power), or whether the graduate was unable to demonstrate the process involved in problem solving to their supervisors.

Frederickson and Mayer (1977) conducted a study to determine if a significant difference in problem solving occurred between baccalaureate and associate degree nursing students. Once again the results were inconclusive because while there was no significant difference in problem solving ability, the baccalaureate students scored higher on the critical thinking survey! This might imply that students applying to a baccalaureate school bring a higher level of critical thinking with them, and should have the potential to learn to apply problem solving skills if an effective way can be found to introduce these behaviors into the curriculum. ✓

## Chapter IV

### SUMMARY, CONCLUSIONS, AND RECOMMENDATIONS

The main emphasis in nursing education today is on accountability. Educators are accountable for the preparation of instructional opportunities which will prepare students for a high level of performance (McCullen, 1975). Students will then be encouraged to become accountable for their own actions in setting standards and providing a high level of care. If the terminal goal of nursing education is to prepare students to become effective practitioners of nursing, and if all nursing is indeed a problem solving process (Roy, 1975), then we need predictors that will identify latent problem solving ability in students.

The purposes of this study were to determine if a relationship exists between grade point averages and critical thinking ability, to establish a baseline for comparison with the results of a similar test to be taken by this group in the senior year, and the accumulation of data which will allow the establishment of norms in critical thinking for nursing students.

Results of this study show a low correlation between grade point averages and the scores on a critical thinking appraisal. As yet there are no data to show us whether this test might be an excellent predictor of clinical problem solving ability. Studies, including those by Taylor (1968),

indicate that clinical and academic performances are not closely related and that grades do not necessarily reflect the ability of the graduate to assume the role of professional practitioner.

The present study did contribute to the data pool concerning the critical thinking level of new students in a baccalaureate nursing program. It will also serve as a baseline for comparison when these students are retested at the end of their senior year. It is only through the systematic collection of such information that educators will be able to determine whether specific instructional modalities are effective in increasing problem solving ability.

#### Conclusion

No significant relationship between grade point averages and critical thinking averages was demonstrated in this study. The chief contribution made by this investigation was the addition of data to the pool of information concerning nursing education and problem solving.

#### Recommendations for Further Study

1. Reexamination of this group immediately prior to graduation to ascertain if an increase of critical thinking scores occurred during the period of nursing education.
2. Correlation of clinical performance ratings of this and other groups of nursing students with scores on the critical thinking appraisal.
3. A longitudinal study which would test the problem solving ability of graduates at the end of one year of experience, and the correlation of these results with critical thinking scores during the educational period.

4. A study of the systematic introduction of problem solving behavioral objectives into a nursing curriculum. Pre and Post testing of critical thinking would be administered, and the results correlated with clinical performance ratings as well as grade point averages.



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AN ABSTRACT OF THE THESIS OF

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For the MASTER OF NURSING

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Title: CRITICAL THINKING ABILITY IN SOPHOMORE  
BACCALAUREATE NURSING STUDENTS

Approved: \_\_\_\_\_

Ma

When the focus for nursing education was moved to the collegiate setting nurse educators were challenged by the need to design curricula for nursing that could maximize the learning process while maintaining a focus on meeting the needs of the client population.

The problem oriented approach to nursing education provides a singular opportunity for the resolution of concerns which involve both the student and the client. In order to determine which students have the potential to be good problem solvers, it was necessary to determine whether there is a correlation between another variable already present (such as grade point averages), and the ability to think creatively.

As a first step in this process it is necessary to establish norms for the population in question. Subsequently it is necessary to do pre and post test on individuals to determine the effect of a curriculum with problem solving as an integral

part. This study was an attempt to meet these needs.

The sample consisted of the entire sophomore class at the University of Oregon Health Sciences Center. These 137 students were halfway through their sophomore year. The Watson Glaser Critical Thinking Appraisal was administered and the results correlated with grade point averages in nursing and science.

Results indicated no significant relationship between grade point average and scores on the Watson Glaser critical thinking ability test. There was also no statistically significant difference existing between men and women.

From the results of this study it would appear that grade point averages are not a reliable indicator of critical thinking and problem solving ability. However, the review of the literature suggests that further research into the relationship of clinical ratings and problem solving ability is needed. If a positive relationship can be established then the critical thinking appraisal might serve as predictor for those students with a high potential for problem solving as professional practitioners of nursing.