

AN ABSTRACT OF THE CLINICAL INVESTIGATION OF

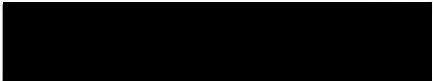
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for the Master of Nursing

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Title: A CRITICAL THINKING APPRAISAL OF SELECTED AUSTRALIAN  
NURSING STUDENTS

Approved:

  
(Professor in Charge of Clinical Investigation)

Nursing education in Australia is in a period of transition. Service-centered, hospital-controlled schools of nursing are joining the mainstream of general education in colleges and universities. Schools proposing new programs have been charged with assessing the effectiveness of program innovations so that informed, systematic evaluations will be available. As a first step in this process, it is necessary to evaluate existing programs. In nursing programs throughout the world, the current emphasis is increasingly on problem solving and critical thinking.

The purposes of this study were to: 1) determine the effect of a traditional subject-matter centered, 3-year, hospital-based curriculum in nursing at the Sydney Adventist Hospital on the critical thinking ability of nursing students by comparing beginning and senior students

in their critical thinking ability and 2) establish baseline data on critical thinking abilities of students for future comparison with the new college-based program after it has been instituted.

The sample consisted of 76 nursing students enrolled in the Sydney Adventist Hospital School of Nursing. Of these, 39 students were within 2 weeks of the beginning of the nursing curriculum and were referred to as Group I. The remaining 37 students were within 6 months of graduating and were referred to as Group II. Both groups represent the entirety of their classes. A questionnaire designed to supply demographic and socioeconomic information about the subjects was administered along with the Watson-Glaser Critical Thinking Appraisal. This questionnaire revealed that both groups were very similar.

The findings of the study showed that while the group mean of Group II (65.4) was just slightly higher than of Group I (64.6), there was no statistically significant difference between the two means.

No statistically significant difference existed between those who completed high school and those who did not complete high school. A statistically significant difference did occur between the men and women in Group II, but not between the men and women in Group I. However, the men in both groups did have a higher group mean than the women.

From the results of this study, it may be concluded that the traditional logistic or subject-matter centered, 3-year, hospital-based curriculum of this School of Nursing does not increase the critical-thinking abilities (as measured by The Watson-Glaser Critical Thinking Appraisal) of those students exposed to it. However, other factors which affect critical thinking ability of students were not measured.

A CRITICAL THINKING APPRAISAL  
OF  
SELECTED AUSTRALIAN NURSING STUDENTS

by

Mima Burgher, R.N., B.S.

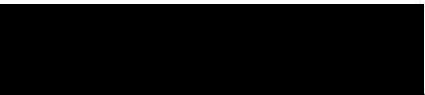
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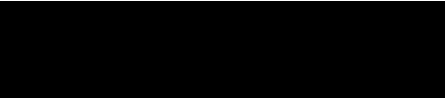
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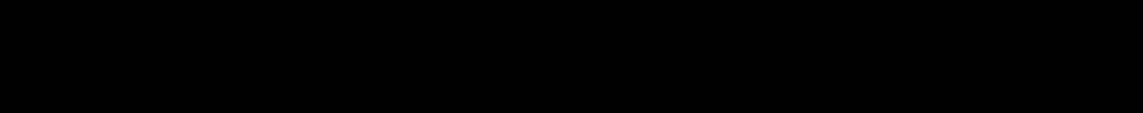
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m.b.

"A true friend is somebody who can make us do what we can."

Ralph Waldo Emerson

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## CHAPTER I

### INTRODUCTION

There are concerted efforts internationally to improve the standards of nursing education to meet the demands of present-day health care situations. For example, the purpose of a WHO Symposium on Higher Education in Nursing held in The Hague, Netherlands, 1972, was to "explore ways in which the resources of universities and higher education might be used to develop the nursing leadership essential to modern health services delivery" (International Nursing Review, 1973, p. 184).

Historically, nursing education has taken various forms in different countries. In Australia, it has primarily remained hospital-based. However, in 1976, the Royal Australian Nursing Federation, the College of Nursing, Australia, the National Florence Nightingale Committee of Australia, and the New South Wales College of Nursing published a joint policy statement committing the transfer of control of education of professional nurses from the hospital to the mainstream of general education at the college and university level. Descriptions of these new nursing education programs suggest that they will be similar to baccalaureate degree nursing programs in the United States (Policy Statement, 1976; Slater, 1977). Schools proposing new programs have been charged with assessing the effectiveness of program innovations established so that informed, systematic evaluations will be available.

Although many abilities are important in the practice of nursing, one that is currently receiving considerable attention world wide, and specifically in baccalaureate programs in the United States, is the ability to think critically (INR, 1973; Slater, 1977). Nursing leaders in Australia agree that critical thinking is an important ability of the educated nurse. For example, Cuskelly, Assistant Nurse Advisor, New South Wales Nursing Registration Board, writing on nurse education states that "the ability to think critically, to question contentious issues, and to conduct an intelligent and constructive conversation with like minds is the hallmark of an educated person" (1976, p. 28).

The proposal to move the control of Australian nursing programs from hospitals to the arena of higher education will necessitate that some curricular changes occur. In light of the aforementioned trend, an expected curriculum emphasis is the ability to think critically. Before the changes occur, it would be useful to obtain some perspective on the critical thinking ability of students educated in the present hospital-based programs, such as the program the investigator will be assisting through the transition.

#### REVIEW OF LITERATURE

In the literature of curriculum and instruction, a curricular continuum is assumed to exist. It is assumed further that the location of a curricular type on this continuum influences how and, to some extent, what the students will learn. The review of literature will provide a foundation for understanding curricular methodology by a brief description of the curricular continuum. The two extremes of the continuum are the

student-centered curriculum and the subject-matter centered curriculum.

The current emphasis on problem solving and the broader construct of critical thinking as necessary skills to the practice of nursing is directly related to the increasing complexity of the problems of modern health care and the nurse taking more responsibility for making independent judgments. Because critical thinking ability is central to the competent practice of nursing, schools of nursing in the United States have revised curricula to facilitate the teaching and learning of this skill. The implications of these revisions have meant that curricula have been designed with an increasing emphasis on how students learn, i.e., they are student-centered, as opposed to emphasizing what students learn, subject-matter centered. This emphasis is congruent with the premise suggested by theorists such as Dewey. Stevens' summary article (1970) presents one framework explaining the impact of this emphasis on curricular methodology in schools of nursing.

#### Subject-Centered or Logistic Method

The subject-centered, or logistic method, of curricular development predominated in nursing for many years and is still in existence today. The newer modifications are seen in the computerized and systems approaches (O'Malley, 1969; Finch, 1969; Given, 1969; Hardy, 1973; Hazzard, 1971). In the logistic method, knowledge is accumulated by the process of addition. No overview of the whole is given initially, but as the student learns fact after fact, a general framework is built into which each fact or part fits (Burkitt, 1964). It is assumed that the whole is equal to the sum of the parts. In this method, nursing knowledge is usually taught by body systems. Each disease is taught from the etiology through pathology to

nursing care. The disease is emphasized rather than the patient.

The chief weakness of the logistic method is considered to be the segregation of units which is believed to reduce the student's integration of knowledge, a skill basic to problem solving. In the newer forms, however, there is a focal shift from the disease towards the patient, and decision theory is incorporated (Stevens, 1971). The logistic method lends itself very well to the traditional form of evaluation, that is, by examination of the student's knowledge by recall of facts.

The curriculum under investigation is of this traditional logistic mode with no previous attempts having been made to alter it. Nursing knowledge is taught according to functional areas and body systems. The many divisions thus created are taught quite independently of each other although, in some areas, patients' total needs are considered. The expectation is that the students will synthesize their knowledge in the clinical setting where the majority of their time is spent as part of the nursing service work force.

#### Dialectical Method

Around 1955, several different curricular methods, already in use in general public education (Saylor & Alexander, 1974), were begun in schools of nursing in an attempt to break away from the logistic method. One of these, the dialectical method, remains in close proximity on the continuum to the subject-matter centered curriculum. In this method, the thought pattern is one of synthesizing. Two theories contradicting each other are resolved by producing a third theory or comprehensive principle incorporating the essence of both theories. The conflicting theories are referred to as thesis and antithesis and the comprehensive solution,

the synthesis. The student learns by the process of assimilation. That is, knowledge from any particular point leads toward a knowledge of the whole. In nursing, this whole is man. The parts are seen as they function within the whole or within man, thus giving rise to the concept of total patient care. Because of the nature of the thought pattern and its relationship to the comprehensive whole, problem solving could very well be taught in this methodology.

Change usually occurs gradually. In education, there is not a sudden move from one curricular methodology to another. Rather, there is a transitional period during which components of both methods are incorporated. One of the early proponents of a move towards the dialectical method was Stonsby (1953) who organized her curriculum on the concept of man from birth through the different stages of development to maturity. She retained the logistic method in that the skills and basic principles of simple therapeutic treatments and psychiatric nursing were kept independent from her dialectic curriculum. However, she focused on both health and illness throughout the developmental stages.

Quinlan (1955) described a combined logistic/dialectical approach. The concept of total patient care, intrinsic to the dialectic method, was used in the clinical experience of a logistic orthopedic course. She saw the acquisition of knowledge prior to the clinical experience as freeing the student to more effectively participate in total patient care.

Subsequently, conceptual frameworks using more complete dialectical curricular stages and the health-illness continuum have been developed and used extensively. However, the concept of total patient care is difficult for all but the experienced student to comprehend. The

focus is on the patient as a whole and as an individual rather than on the disease, as in the logistic method. Concepts of both health and nursing care have expanded as the dialectical method developed allowing for the incorporation of new knowledge, while maintaining a unity in the curriculum (Stevens, 1971).

Evaluation of this method requires that one assess the student's ability to recognize and respond to the total needs of the patient. It requires evidence of the student's ability to synthesize nursing knowledge.

#### Student-Centered or Operational Method

A complete swing to the student-centered end of the continuum was instituted by means of the operational method. The student is the center of the curriculum and, as such, is the decision-maker regarding his/her selection of learning experiences (Stevens, 1971). Thinking occurs by discrimination. That is, the student chooses between alternatives (Burketts, 1964), such as deciding to learn one procedure before another procedure, to care for one patient rather than another patient.

MacCambridge and Moucha (1954) developed a program in which the students took an active part in planning their education. After observing in the clinical area during their first week in the school of nursing, they made decisions regarding what they were to learn. This continued throughout their whole first year in nursing. No preplanned curriculum existed.

The problems, as seen by the authors of this approach, were related to increased faculty time required, the difficulty for some teachers to allow the students to make the choices, the skepticism of the students about deciding their own learning experiences, the teachers being required

to deal with broader subject areas than previously, and the conflict between students and faculty as to what was important to learn. The advantages were related to the students being more interested and secure, and with learning occurring at a faster rate. The faculty experienced a greater sense of accomplishment.

The operational approach, being on the opposite end of the continuum from the logistic approach, seems to be quite free from most restraints. The student is permitted great freedom to pursue learning and, as such, is seen as being activity centered. Thus, added emphasis is given to the concept of nursing as a dynamic interactive process (Berggren & Zagornik, 1968). The real focus is on the activities of the nurse (Stevens, 1971). However, the implementation of such a program appears to this researcher to be very demanding of the faculty and unnecessarily cumbersome to implement.

Because thinking occurs by discrimination in the operational method, evaluation requires analytical decisions based on acquired knowledge. Burkett (1964) suggested that evaluation requiring students to choose the correct response by the process of eliminating alternatives would be appropriate.

#### Problematic Method

The problematic method is situated between the dialectical and operational methods on the continuum, tending towards the student-centered end but with the focus being on selected problem situations rather than the student, as in the operational method. The problematic method has gradually developed over the years to become the most prominent method in use at the present time. It is believed by some educators that this

is the most meaningful and appropriate method by which to study nursing. It requires a sound knowledge base and the ability to think critically so as to arrive at appropriate solutions for patient care (Abdellah, 1961; Lewis, 1976).

Dewey (1933), the chief exponent of the problematic method, states that "the origin of thinking is some perplexity, confusion, or doubt" (p. 15). The next step is the consideration of a solution from a person's past experience and fund of relevant knowledge. If there is no past analagous experience or if the store of knowledge is inadequate, the confusion remains, the problem is not solved. An unsatisfactory solution may be reached if the "person is not sufficiently critical about the ideas that occur to him" (Dewey, 1933, p. 16). Unsatisfactory solutions result from insufficient time spent in reflective thinking due to "impatience, mental sloth or torpor" (Dewey, 1933, p. 16). During reflective thinking, intellectual searching is engaged in with the suspension of judgment. Dewey notes the progression of thinking from perplexity, through conjectural anticipation, careful survey and exploration, elaboration of a tentative hypothesis to acceptance of an hypothesis for testing (Dewey, 1916). This is what has come to be known as the problem solving method.

The problematic method moves by a process of resolution. The total environment surrounding the problem is reorganized as resolution of the problem takes place. The person solving the problem is part of the environment. He affects, and is affected by, the resolution (Stevens, 1971).

Strieter (1955) was one of the first to publish her attempts at

using a problematic curriculum for nursing. She delineated learning experiences in the clinical section of a graduate program into four broad areas. Soon after that, Abdellah developed her list of 21 nursing problems which have become well known. She viewed problem solving as a means of meeting patients' needs (1961). She states that the organization within the hospital did not allow nurses to meet total patient needs as is required in the dialectical approach. Therefore, her belief was that a curriculum based on her list of 21 nursing problems and accompanied by planned experience providing adequate exposure to patient problems would develop understanding and critical thinking ability (Abdellah, 1961). It follows that such a curriculum would prepare nurses to give realistic patient care within the existing hospital system.

The activity of the nurse in the problematic method is problem solving. Thus to identify problems, he/she, of necessity, becomes a diagnostician. Hornung advocated the adoption of the term "nursing diagnosis" in 1956. The concept of nursing diagnosis has continued to be developed since that time, although little consensus exists on how the nursing diagnosis (problem) should be stated (Lewis, 1976). Munding and Jauron, however, have presented a style that adapts well to the nursing process (Lewis, 1976). Several textbooks are now available that have been designed incorporating the problematic model (Beland, 1970; Levine, 1973; Lewis, 1976; Matheney, 1968). They give assistance to both the instructor and the student in understanding and developing further the problematic method.

Evaluation of the problematic method requires evaluation of problem solving and critical thinking skills. de Tornay has done some work in

developing simulated clinical experiences designed to teach and assess clinical judgment and problem solving (1968, 1976). While efforts have been made to evaluate nursing curricula, very little has been done in the actual evaluation of problem solving and critical thinking skills.

### Summary

The four major curricular methodologies (logistic, dialectical, operational and problem solving) have been discussed as they relate to nursing education. Appropriate evaluation of the curriculum is seen as that which is consistent with the particular curricular methodology.

### Nursing Program Evaluations

Numerous articles appearing in literature attest to the fact that nursing is attempting to deal with the problem solving approach to curricular development. Despite this, very few evaluations of programs actually include any kind of testing of problem solving ability. The following studies are cited to show the efforts which have gone into curriculum evaluation. However, the assumed curricular methodology is not always clear.

Stone and Green (1975), investigated the impact of an innovative, integrated baccalaureate degree curriculum on students. Inferences indicate that this curriculum had a problem solving focus. They compared state board and NLN examinations, academic ability, demographic data, and tests of personality characteristics of a class of nursing students with other classes of nursing students of their university and another university. They also compared descriptive and prescriptive curricular perceptions by the use of a 72-item Curricular Evaluation Q-Sort. This

Q-Sort was developed specifically for the purpose of evaluating the innovative curriculum from the student's perceptions.

It would seem that what is important here and what is missing is an estimation of the critical thinking ability of the students. The state board and NLN examination scores indicate most often the factual knowledge gained which is appropriate for the evaluation of the logistic method. However, questions can be stated in such a way as to require the nurse to make analytical decisions, which is appropriate for the operational method, and to synthesize his/her knowledge, which is appropriate for the dialectical method. The personality test and perceptions of the curriculum are student centered in that they are designed to show changes taking place within the student, thus corresponding with at least some of the objectives of the curriculum. However, the effect of the curriculum on the critical thinking ability of the students cannot be determined without measurement.

LaBelle and Egan (1975), developed two questionnaires composed of competencies representative of the curriculum and administered to both new graduates and their employers. Course objectives included the problem solving approach to patient care. The questionnaire included 8 steps in the problem solving process related to patient care. Ten percent of the employers' ratings indicated "great difficulty" in the use of problem solving in nursing care. However, a clear interpretation of the type of difficulty could not be made because of the inadequacy of the rating scale. The researchers were unable to determine if the difficulty resulted from the employers being unable to understand these behaviors, or if the students had difficulty in implementing problem solving in practice, or if

graduates had difficulty in interpreting their use of problem solving to their supervisors. It appears to this researcher that eight steps in the problem solving process may be too involved for supervisors to be able to evaluate easily.

A more recent study conducted by Frederickson and Mayer (1977) was aimed directly at discovering if a difference exists in problem solving and critical thinking abilities between baccalaureate and associate degree students. They found that there was no significant difference in the process of problem solving between the two groups, but the baccalaureate students scored significantly higher on a standardized critical thinking test (Instrument not stated).

A critical thinking appraisal was first identified in a curriculum evaluation by Richards (1977). In her study, she compared baccalaureate students, using one group graduating from the older subject-centered curriculum and two groups graduating from a new integrated curriculum. She correlated results from state board and NLN examinations, personality and intelligence tests, empathic ability, nurse performance scales and critical thinking ability as measured by the Watson-Glaser Critical Thinking Appraisal. While the second group of students graduating from the new integrated curriculum obtained higher grade point averages, higher scores on the NLN examination and indicated greater leadership potential, they scored lower on the state boards and actually showed a decrease in critical thinking ability after exposure to the curriculum. Richards found this decrease in critical thinking ability distressing, particularly as it was coupled with significantly greater leadership potential in clinical practice. She suggested that the decrease in critical thinking

ability might result from "too much consistency of approach in the integrated program" (1977, p. 90).

The Richards' study certainly reveals a discrepancy between the intent to teach problem solving and critical thinking and the accomplishment of that purpose. However, Richards has at least demonstrated the use of an instrument to measure critical thinking as a more generalizable skill reflecting problem solving.

### Summary

Examination of the literature reveals that efforts to evaluate nursing curricula have existed for some time; however, only recently, through the work of Richards (1977) has the critical thinking ability of the students been precisely measured and reported.

## Critical Thinking

### Definition

Critical thinking is viewed as a composite of attitudes, knowledge and skills by Watson and Glaser.

This composite includes: (1) attitudes of inquiry that involve an ability to recognize the existence of problems and an acceptance of the general need for evidence in support of what is asserted to be true; (2) knowledge of the nature of valid inferences, abstractions and generalizations in which the weight or accuracy of different kinds of evidence are logically determined; and (3) skills in employing and applying the above attitudes and knowledge (p. 10).

All thinking, including problem solving, creative thinking and critical thinking, depends on different combinations of cognition or discovery factors, production or solution factors, and evaluations or relative suitability factors. Certain cognition factors, such as "general

reasoning, ability to abstract and generalize, sensitivity to problems, conceptual foresight" (Watson & Glaser, 1964, p. 11), and several evaluation factors such as "logical evaluation, experimental evaluation and judgment" (Watson & Glaser, 1964, p. 11) seem to be particularly associated with critical thinking.

Several definitions and lists of critical thinking abilities are available. One list which appears particularly concise and clear is set forth by the Cooperative Study of Evaluation in General Education. 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" (Watson & Glaser, 1964, p. 10).

An instrument, The Watson-Glaser Critical Thinking Appraisal, has been developed to measure critical thinking ability. It has been standardized and normed in the United States. It has, however, been used in a study of 1,937 students graduating from the different high school systems in South Australia (Broadhurst, 1970). These students were all taking chemistry and represented 81 percent of the total student enrollment in chemistry in South Australia. Using the Test on Understanding Science, Form W and The Watson-Glaser Critical Thinking Appraisal, Broadhurst found a correlation of .47 which was significant at the .01 level between the critical thinking ability and understanding of science. Broadhurst reported this correlation as very high. He also found that there was no significant difference in the learning outcomes from graduating chemistry

students attending the various types of schools in South Australia. The study revealed that, statistically significant at the .01 level, the girls were more able to think critically than the boys. The explanation given for this difference was the fact that more girls than boys left school before completion of high school. This left the more able girls in the schools and, of these, the more able would be enrolled in the sciences.

The group mean for critical thinking in these 1,937 South Australian students who were taking chemistry was 68, whereas the group mean for the United States grade 12 students was 65. This United States figure included students who were not taking chemistry so the group means are not exactly comparable. It seems to suggest, however, that students taking chemistry have increased ability to think critically which is consistent with the aims of science education.

Critical thinking is increasingly recognized as an essential skill in the professional practice of nursing (Millers & Huntsman, Australia, 1977). The nurse is constantly confronted with situations which require her to think constructively and arrive at appropriate conclusions quickly (Gezi & Hadley, 1970). Based upon this, it follows that the success of a graduating student is partly determined by his/her ability to think critically. It then seems logical to assume that the nursing program should provide the means by which this skill can be developed and/or improved. While considerable learning underlies the cultivation of critical thinking (Furst, 1950), effective organization of related material will facilitate learning (Conley, 1973). Therefore, the specific organization of a curriculum would seem to affect critical thinking ability.

### Factors Affecting Critical Thinking

In addition to the curriculum affecting critical thinking, research in other areas, mainly biology, indicates that critical thinking is affected by the method of instruction (Bean, 1969; Castelli, 1970; Furst, 1950; Murphy, 1971), by the teacher (Cook, 1967; Duckworth, 1968; Taylor, 1972), by teacher-pupil interaction (Harris, 1975; Poel, 1970), and age (Friend & Zubek, 1958). However, one researcher found no significant difference in critical thinking between two selected methods of instruction in biology (Smith, 1971). Friend and Zubek (1958), found that critical thinking ability reached a peak in the mid-twenties, remained constant until the mid-thirties, and then steadily declined.

### Summary

Critical thinking has been defined and discussed. An appropriate instrument has been developed in the United States to measure critical thinking. This instrument has been used in Australia and no culture bias was evident. Several factors other than the curriculum influence the development of critical thinking.

### Statement of the Problem

Although all curricular forms still prevail in schools of nursing in the United States, considerable emphasis is placed on the student-centered problem solving approach. While much effort has been expended in evaluating nursing curricula, appropriate measures evaluating critical thinking have rarely been included or proved significant in the evaluations. It seems essential, therefore, before schools of nursing in Australia change their nursing curricula completely, to assess the critical

thinking ability of students in the currently existing curricula.

### Purpose of the Study

The purposes of this study were to:

1. Determine the effect of a traditional subject-matter centered 3-year hospital-based curriculum in nursing at the Sydney Adventist Hospital on the critical thinking ability of the nursing students by comparing beginning and senior students in critical thinking ability.

2. Establish baseline data on critical thinking abilities of students for future comparison with the new college-based program after it has been instituted.

## CHAPTER II

### METHODOLOGY

#### Subjects and Setting

Nursing students at the Sydney Adventist Hospital School of Nursing, New South Wales, Australia, comprised the subjects. The beginning class, hereafter referred to as Group I, consisted of 39 students, and the senior class, hereafter referred to as Group II, consisted of 37 students. The majority of the students came from most of the states of Australia and from the country of New Zealand. A small percentage of other nationalities were represented in each class. Students were about 18 years of age at the beginning of the course. Men students constituted between 20 to 26 percent of each class.

The majority of students accepted into the nursing program had completed high school although this was not a national or state requirement at that time. The minimal entry requirement was satisfactory completion of an examination in English, mathematics or a science. The coursework covered by this examination is most similar to educational achievement by grade 10 in the United States. There was also a special nurses' entrance examination which could be taken by selected students who did not meet the entry requirement.

In the selection of students, preference was given to high school graduates. Other criteria consisted of scholastic ability indicated by

high school grades, vocational interests judged by scores on vocational guidance tests, and personal qualifications judged from individual references. Differences existed between the states in the vocational guidance tests as well as the high school grading system, so neither one was standardized.

A class of approximately 40 - 50 nursing students began the course every 6 months. They spent an initial 2 months in the School of Nursing in preparation for their hospital experience. After this period, they were scheduled for designated months as hospital staff on specific units and designated months in the School of Nursing. A total of 8 months out of the 3-year period was spent in the School of Nursing. The program was designed to follow an organized, sequential pattern of related didactics and clinical practice. However, in practice, this educational plan was altered to meet the staffing needs of the hospital which superseded the educational needs of the students. And further, it was the plan for the nursing students to be assigned duties and responsibilities on the units commensurate with their level of education. The staffing needs often conflicted with this plan also and students, at times, were called upon to bear responsibilities for which they had not been adequately prepared. They were supervised by one registered nurse who was in charge of each 16-bed unit. They were paid a weekly wage throughout the 3 years, whether on the units or in the School of Nursing.

The "block" system was followed, meaning that the students received instruction and wrote examinations in each subject separately. This format was most comparable with the subject-matter centered or logistic curriculum of the United States. The students were taught by about an

equal representation of nurse educators and medical doctors.

During the 3-year program, the students had no exposure to liberal arts courses nor to the mainstream of the general education system. They gained most of their nursing education and experience in one hospital. They affiliated with selected hospitals for specialized experience.

#### Data Collection Instruments

The Watson-Glaser Critical Thinking Appraisal (CTA) was chosen as the instrument to measure critical thinking. Helmstadter (1965) indicates that this "instrument could provide an excellent criterion measure for those who claim their instruction results in the 'ability to think' rather than simply the acquisition of subject matter" (p. 1214). He says further that "this critical thinking appraisal seems to be an instrument well worth attempting to use in a wide variety of educational assessment, selection and research situations" (p. 1214).

The Watson-Glaser Critical Thinking Appraisal (CTA) is a 100-item multiple choice, paper and pencil test. It consists of 5 subtests which measure 1) inference - 20 items, 2) recognition of assumptions - 16 items, 3) deduction - 25 items, 4) interpretation - 24 items, and 5) evaluation of arguments - 15 items. The items include problems, statements, arguments and interpretation of data similar to those one encounters in daily life in a democratic society.

The format of the CTA differs for each of the 5 subtests. For subtest 1, the student is asked to respond to the degree of truth or falsity of inferences following a statement of fact. The degrees are true, probably true, insufficient data, probably false, and false. For

subtest 2, the student is asked to respond to proposed assumptions following a given statement by deciding if the assumption was made or if the assumption was not made. In subtest 3, the student is asked to decide after reading two statements (premises), whether the stated conclusions follow or whether they do not follow. Subtest 4 requires the student to read a short paragraph and decide whether the conclusions follow or whether they do not follow. In subtest 5, the student is asked to evaluate arguments following questions as to whether they are strong or weak.

Responses to each of the 100 exercises are recorded on answer sheets. Scoring keys are designed for counting the number of correctly marked spaces, thus giving a total raw score. The higher the score, the greater the CTA. If desired, subscores can be recorded for each subtest. However, subtests contain relatively few items and lack sufficient reliability to be valuable as a statistic (Watson & Glaser, 1964).

The CTA was standardized and normed on grades 9, 10, 11, and 12, grades 9 - 12, liberal arts freshmen and college seniors. Norm tables are provided for each of these. Reliability coefficients are also available on each category. The odd-even split-half reliability coefficients corrected by the Spearman Brown formula was .85 for both liberal arts freshmen and college seniors, .86 for grades 9 - 12 and .87 for grade 12 alone. Of content, construct and predictive validity, this study is most concerned with construct validity. A substantial relationship between the various subtests and the total test is seen by a correlation of .56 - .79.

The CTA is a test of power rather than speed. Consequently, there is no rigid time limit for administering the instrument. The

suggested usual time for completing the total instrument is 50 minutes.

A researcher-made questionnaire (Appendix A) was administered along with the CTA to supply demographic and socioeconomic information about the subjects.

### Design of Study

The study was an investigation of the effect of the nursing curriculum on the critical thinking ability of nursing students. Two independent groups of nursing students, a beginning group (Group I), and a senior group (Group II), comprised the samples. The study was cross-sectional and therefore a researcher-made questionnaire was administered along with the Watson-Glaser Critical Thinking Appraisal, Form YM, to supply demographic and socioeconomic information to determine the similarity or dissimilarity of the two independent samples.

### Procedure

The Watson-Glaser Critical Thinking Appraisal, Form YM, Manual which provides standardized instructions for administration, a supply of the Form YM test, answer sheets, and the questionnaire were sent to the person in charge of the School of Nursing at the Sydney Adventist Hospital. He arranged for the administration of the CTA and questionnaire to Group I within the first 2 weeks of their nursing program and to Group II within 6 months prior to completion of their nursing program. The students were informed that they were participating in a research project and that their individual scores, as well as the total group score, were available to them. The completed tests and questionnaires

were mailed back to the researcher for hand-scoring and analysis.

### Analysis of Data

An arithmetical mean for each group was calculated using the total raw scores from each individual answer sheet. The two group means were then subjected to a t-test for independent samples to determine if there was a statistically significant difference. The same procedure was carried out for those who completed high school and for those who did not, and for the men and the women in each group.

Information from the questionnaire was summarized to show characteristics, demographic and socioeconomic, for the two groups and to indicate similarities or differences between the groups.

## CHAPTER III

### RESULTS AND DISCUSSION

The sample consisted of 76 nursing students enrolled in the Sydney Adventist Hospital School of Nursing. Of these, 39 students were within 2 weeks of beginning the nursing curriculum and are referred to as Group I. The remaining 37 students were within 6 months of graduating and are referred to as Group II. Both groups represent the entirety of their classes.

Examination of the demographic data revealed that there was a high similarity between both groups. Group I contained 26 percent men while Group II contained 21 percent men. The mean age for Group I was 19.4 years and for Group II, 21.73 years. This difference in age indicates that students began the 3-year program at about the same age. Approximately 60 percent of both groups completed high school before commencing their nursing program. The education and occupation of the parents of both groups were similar. Between 26 percent and 33 percent of each group listed their fathers as professional and 24 percent to 26 percent as being managers or owners of their own businesses. The majority of the remainder could be categorized as blue collar workers. Approximately 50 percent of each group listed their mothers as being housewives.

Most state of Australia and the country of New Zealand were represented as the previous residence of both groups. Approximately 30 percent of Group I and 38 percent of Group II were from New South Wales,

which is the state in which the Sydney Adventist Hospital is located. The next most highly represented states for Group I were Queensland (26 percent), and Victoria (21 percent), which are adjoining New South Wales on the northern and southern borders respectively. For Group II, Queensland, Western Australia and New Zealand had an equal representation of 14 percent. A few students in each group were from other countries.

The Watson-Glaser Critical Thinking Appraisal scores of Group I ranged from 37 - 89 with a group mean of 64.6 and a standard deviation of 10.9. The CTA scores of Group II ranged from 50 - 88 with a group mean of 65.4 and a standard deviation of 9.2.

A t-test to show significance of the difference between the two means for independent samples was applied. The t-test score was .35. There was no significant statistical difference between the means of the two groups.

The mean group scores for the men and the women were compared. The scores of the eight men in Group I ranged from 53 - 89. The mean score was 69.25 and the standard deviation was 13.2. The scores of the 31 women ranged from 37 - 81. They had a mean score of 63.38 and a standard deviation of 9.93. There was no statistically significant difference in the critical thinking ability between the men and the women in Group I.

The scores of the eight men in Group II ranged from 60 - 80. The mean score was 71.87 and the standard deviation was 6.78. The scores of the women in Group II ranged from 50 - 88. The mean score was 63.62 and the standard deviation was 8.97. In Group II, a t-test revealed a statistically significant difference between the mean score of the men and the

women in critical thinking ability. However, it is difficult to draw any conclusions because of the small numbers and because there was no statistically significant difference between the men and the women in Group I, even though the mean score for the men was higher than the mean score for the women. These findings may not necessarily be in opposition to those of Broadhurst who found the girls (mean - 69.6) scored significantly higher than the boys (mean - 67.8). His explanation was that the less academically able girls discontinue high school before completion. If a fair percentage of the nursing class was made up of the less academically able women, then the difference between the men and the women could be accounted for. However, the group mean (64.6) was close to the mean for the United States grades 9 - 12 (63), which may indicate a broad representation of academic ability. No conclusion can, therefore, be drawn.

The freshman year of college in the United States seems to be a significant factor in increasing critical thinking ability, as the mean for grade 12 is 65 and for college freshmen, 71. The students in this study have not been exposed to the freshman year of college.

The mean score for the students in Group I who had completed high school was 65, and 64 for those who had not completed high school. For Group II, the mean score for those who had completed high school was 67, and 62 for those who had not. The mean score for those who had not completed high school was higher than the United States grade 10 mean of 61. However, several of the students in this sample had gone 6 - 18 months beyond grade 10. These scores show no significant difference although there is a slight upward trend in favor of those who had completed high school.

The critical thinking ability mean score for Group I of the sample was compared with the mean scores for United States students grades 9 - 12, and for United States students grade 12, and for South Australian graduating high school students as listed in Table 1. Group I only is included in this Table because it compares more closely than Group II in age and education to the other groups.

The mean score for the South Australian students (68) was higher than that of Group I (64.6). However, the South Australian students were graduating high school students who were taking chemistry. In contrast, Group I did not all graduate from high school nor were they necessarily taking chemistry at this level. The fact that the students were taking chemistry may indicate greater academic ability. If so, it seems to be significant, especially when related to the speculation that the more able students do not go into nursing. As there was no significant statistical difference in Group I between the high school graduates and those who did not graduate, one can only assume that, of the students going into nursing, there was no disadvantage to critical thinking ability in not completing high school. It would have been helpful to know which students in the sample had taken chemistry at the same level as the South Australian students so that a comparison in critical thinking ability could have been made.

Some students in the student sample indicated that the test was biased toward the United States. This may have been because certain United States geographical locations and historical events were mentioned in the instrument. Also, a difference in phrasing could have made them uncomfortable. However, the possibility of the test being

Table 1

Comparison of critical thinking ability group mean scores of Group I with South Australian graduating high school students, United States students, grades 9 - 12 and United States grade 12 students alone.

Group	N	Mean Score	%-ile Rank
South Australian graduating high school students*	1,937	68	
United States students, grade 12**	included in the 20,312 below	65	
United States students, grade 9 - 12**	20,312	63	
Group I	39	64.6	58 (U.S. grades 9 - 12)**

\* Reported in Science Education, 1970, January/March, 54 (1), pp. 17 - 21.

\*\* Reported in Watson-Glaser Critical Thinking Appraisal Manual.

culturally biased toward the United States seems diminished when one compares the United States and South Australian mean scores.

Group II, with a mean score of 65.4, had a percentile ranking of 50 when compared with United States grade 12 students, 30 when compared with liberal arts college freshmen, and 20 when compared with college senior women (Watson & Glaser, 1964). Direct comparison, however, between the research groups under discussion and normed scores for college students had questionable validity. Group II had not had the equivalent of a college education either in content or length of time to compare with the college senior women. However, while the Group I mean score compares favorably with that of high school students in the United States, Group II, after 3 years of exposure to the nursing curriculum, did not approach the level of United States college freshmen.

As this study indicates that there was no significant improvement in the critical thinking ability of the students, one must assume that the type of curriculum currently being used was one factor involved. The curriculum under study was not arranged around a problem solving methodology but rather the logistic mode. It is claimed that the chief weakness of the logistic curricular method is due to the effect of the segregated units of information reducing the student's integration of knowledge which, in turn, reduces the critical thinking skills. One, then, would not expect a logistic curriculum to enhance these skills.

However, in Richards' (1977) study, the students in the older subject-centered or logistic curriculum actually scored higher than the graduates of the new integrated curriculum. The students of the logistic curriculum had a percentile ranking of 70. The first graduates of the

new integrated curriculum had a percentile ranking of 40. The percentile ranking of the second group of graduates was 60. From this observable trend upward, it could be expected that the third group might score higher again. However, in the new integrated curriculum of her study, the second group of graduates began with a mean score of 73.69 and ended with a mean score of 71.82. While a decrease in critical thinking ability is cause for concern, it may have been the result of a regression toward the mean.

In comparing Richards' study, it should be observed that the mean scores in her study are well above that of 65.4 for Group II of this study. The freshman year of college appears to be responsible for the higher critical thinking ability of the students in Richards' study as opposed to the students of this present study. Richards' study is strong evidence that new curricula will not necessarily improve critical thinking ability. The need for testing is obvious.

While it is true that the logistic curriculum of the present study did not improve the critical thinking ability scores of the students, it is also true that the highest critical thinking ability score in Richards' study was from a logistic curriculum. Therefore, the fact that the lack of change in critical thinking ability scores of the study may be due to instructional methodology rather than curricular methodology must be considered.

The effect of other factors reported to influence critical thinking on these students is not known. These factors were the method of instruction, the teachers themselves, the teacher-pupil interaction and age. Critical thinking ability reportedly steadily increases until

the mid-twenties. On this basis alone, one would expect an increase in critical thinking ability between the ages of 18 and 22 years. An increase in the mean score is seen between Group I and Group II. However, it is not known by the researcher how much increase in critical thinking ability is attributable to age and, therefore, no conclusion can be drawn.

As Group II represented 62.71 percent of the original class, it is likely that the attrition rate of Group I will also be high. Data indicating reasons for students discontinuing the program were not available. The lowest score in Group I was 37 and there was only one other score, 44, below 50, which was the lowest score in Group II. This seems to indicate that the very low scorers will discontinue. However, the discontinuation of these two low scorers would only slightly affect the group mean. It appears that the level of critical thinking ability is not related to the attrition rate. The significance of the attrition rate on the critical thinking group mean can only be determined by repeated longitudinal studies to see the critical thinking scores of those who discontinue. Such studies may or may not supply reliable predictive data for determining those who will not complete the course.

Group II was tested 6 months prior to graduation. They had completed all of the study blocks. In the final 6 months, they were working full time for the hospital with the exception of a 2-week study block for preparation for the state final examinations. No new content was presented and the assumption could be made that there would be no further changes in critical thinking ability. On the other hand, the students were synthesizing their knowledge in preparation for their final

comprehensive examinations and, by so doing, may, in fact, improve their critical thinking abilities. This could only be determined by testing the students immediately prior to graduation.

#### Limitations

The cross-sectional design of this study was recognized as the major limitation. A possible further limitation was the administration of the CTA to Group II 6 months prior to completion of the nursing program rather than 2 - 4 weeks prior to completion.

## CHAPTER IV

### SUMMARY, CONCLUSION AND RECOMMENDATIONS

#### Summary

Nursing education in Australia is in a period of transition. Service-centered, hospital-controlled schools of nursing are joining the mainstream of general education in colleges and universities. Schools proposing new programs have been charged with assessing the effectiveness of program innovations so that informed, systematic evaluations will be available. In nursing programs throughout the world, the current emphasis is increasingly on problem solving and critical thinking. Therefore, it is necessary to determine the effect of present hospital-based programs on the critical thinking ability of the students to serve as a baseline for future comparison. It is also important to understand the particular curricular methodology and to use a form of evaluation that will be appropriate to that methodology.

The purposes of this study were to: 1) determine the effect of a traditional subject-matter centered, 3-year, hospital-based curriculum in nursing at the Sydney Adventist Hospital on the critical thinking ability of the nursing students by comparing beginning and senior students in their critical thinking ability and 2) establish baseline data on critical thinking abilities of students for future comparison with the new college-based program after it has been instituted.

The sample consisted of 76 nursing students enrolled in the Sydney Adventist Hospital School of Nursing. Of these, 39 students were within 2 weeks of the beginning of the nursing curriculum and were referred to as Group I. The remaining 37 students were within 6 months of graduating and were referred to as Group II. Both groups represent the entirety of their classes. The data were collected by the person in charge of the School of Nursing. The purpose of the study was explained to the students. A questionnaire designed to supply demographic and socioeconomic information about the subjects was administered along with the Watson-Glaser Critical Thinking Appraisal, Form YM.

The findings of the study showed that while the group mean of Group II (65.4) was slightly higher than that of Group I (64.6), there was no statistically significant difference between the 2 means. No statistically significant difference existed between those who completed high school and those who did not complete high school. A statistically significant difference did occur between the men and the women in Group II, but not between the men and women in Group I. However, the men in both groups did have a higher group mean than the women,

### Conclusion

From the results of this study, it may be concluded that the traditional or subject-matter centered, 3-year, hospital-based curriculum of this School of Nursing did not increase the critical thinking abilities (as measured by the Watson-Glaser Critical Thinking Appraisal) of those students exposed to it. However, other factors such as the method of instruction, the teacher's personal qualities, the teacher-pupil

interaction, and the effect of age on the critical-thinking ability of the students were not measured. Because these factors were not measured and because of the small number involved in the sample and the transitional nature of nursing education in Australia at the present time, the results of this study should not be generalized to represent the effect of other programs in Australia.

### Recommendations

Recommendations for further study include:

1. Administration of the Watson-Glaser Critical Thinking Appraisal, Form YM, immediately prior to graduation to determine if critical-thinking ability increases during the last 6 months of the nursing program.
2. Reexamination of Group I on the critical thinking instrument at the end of their third year so that data from a longitudinal study will be available.
3. Collection of data from the students of the college-based program once it has started to compare with the independent sample study and the longitudinal study.
4. Correlation of critical thinking ability scores of nursing students with their high school chemistry grades.
5. A comparative longitudinal study with college students enrolled in other majors.
6. Correlation of state board scores, GPA, and clinical performance evaluations with critical thinking scores.

Appendix A

Demographic and Socioeconomic Characteristics

Questionnaire

Questionnaire

Name \_\_\_\_\_ Age this year \_\_\_\_\_ Sex \_\_\_\_\_

Ethnic background: if Australian, which state \_\_\_\_\_ if other specify \_\_\_\_\_

Parents' education

Highest grade of school completed - check below appropriate year

	Primary school								High school				College or university					
1	2	3	4	5	6	7	8	1	2	3	4	1	2	3	4	5	6	

Mother \_\_\_\_\_

Father \_\_\_\_\_

Highest degree obtained: Mother \_\_\_\_\_ Father \_\_\_\_\_

Parents' occupation

Mother

Father

- |  |       |       |
|--|-------|-------|
| 1. Professional                                    | _____ | _____ |
| 2. Manager or owner of business                    | _____ | _____ |
| 3. Farmer (owner or manager of at least 100 acres) | _____ | _____ |
| 4. Clerical, sales, technician                     | _____ | _____ |
| 5. Skilled craftsman, foreman                      | _____ | _____ |
| 6. Operative semi-skilled                          | _____ | _____ |
| 7. Service worker                                  | _____ | _____ |
| 8. Unskilled                                       | _____ | _____ |
| 9. Farm laborer (or owner of less than 100 acres)  | _____ | _____ |
| 10. Housewife                                      | _____ | _____ |

Student's education and previous occupation

Level of education prior to commencing the nursing course \_\_\_\_\_

Years in high school \_\_\_\_ Did you successfully complete high school \_\_\_\_

Years in college or university (state which) after completion of high school and prior to commencing nursing \_\_\_\_\_

Have you graduated from another course \_\_\_\_ Name of course \_\_\_\_\_

What was your occupation prior to commencing nursing \_\_\_\_\_

For how many years \_\_\_\_\_

Do you plan to continue education on completion of this nursing course  
circle one      yes      no

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